



## SEC\_SWM301

### Water Meter Sensor

Firmware Version : 3.0

#### Quick Start

**S** This device is a Z-Wave Sensor. The device will fit into Water Meters from Sensus (<http://sensusesaap.com/>). To confirm inclusion and exclusion put a magnet on the flat side of the sensor for 3 seconds until the red LED is blinking. To send out a NIF or to wake up the device follow the same process.

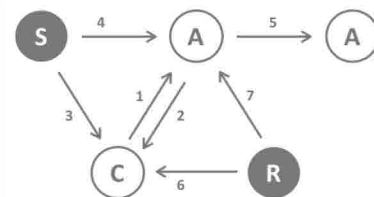
Please refer to the chapters below for detailed information about all aspects of the products usage.

#### What is Z-Wave?

This device is equipped with wireless communication complying to the Z-Wave standard. Z-Wave is the **international standard for wireless communication** in smart homes and buildings. It is using the **frequency of 868.42 MHz** to realize a very stable and secure communication. Each message is reconfirmed (**two-way communication**) and every mains powered node can act as a repeater for other nodes (**meshed network**) in case the receiver is not in direct wireless range of the transmitter.

Z-Wave differentiates between Controllers and Slaves. Slaves are either sensors (**S**) transmitting metered or measured data or actuators (**A**) capable to execute an action. Controllers are either static mains powered controllers (**C**) also referred to as gateways or mobile battery operated remote controls (**R**). This results in a number of possible communication patterns within a Z-Wave network that are partly or completely supported by a specific device.

1. Controllers control actuators
2. Actuators report change of status back to controller
3. Sensors report change of status of measured values to controller
4. Sensors directly control actuators
5. Actuators control other actuators
6. Remote controls send signals to static controllers to trigger scenes or other actions
7. Remote controls control other actuators.



There are two different role a controller can have. There is always one single primary controller that is managing the network and including/excluding devices. The controller may have other functions - like control buttons - as well. All other controllers don't manage the network itself but can control other devices. They are called secondary controllers. The image also shows that its not possible to operate a sensor just from a remote control. Sensors only communicate with static controllers.

#### Product description

SWM 301 is a battery-powered RF module using Z-Wave® technology for reporting water metering from SENSUS water meter (<http://sensusesaap.com/>). The RF module records the meter reading by backlash-free pick-up on the litre wheel of the meter register and transmits the data over the Z-Wave network either on a time or delta change. Choose the position where the unit is to be mounted, avoid locations alongside or behind large metal surfaces that could interfere with the low-power radio signals between the unit and the Controller. The unit contains a lithium battery which provide a 10 years battery life based on a 24hr reporting interval.

#### Batteries

The unit is operated by batteries. Use only batteries of correct type. Never mix old and new batteries in the same device. Used batteries contain hazardous substances and should not be disposed of with household waste!

Battery Type: 1 \* DC 3V

#### Installation Guidelines



Just snap in the sensor in to the position beside the meter digit display. The device will fit into Water Meters from Sensus (<http://sensusesaap.com/>). It may also be applicable to other manufacturers meters but this is not supported by the manufacturer.

## Behavior within the Z-Wave network

**I** On factory default the device does not belong to any Z-Wave network. The device needs to join an existing wireless network to communicate with the devices of this network. This process is called **Inclusion**. Devices can also leave a network. This process is called **Exclusion**. Both processes are initiated by the primary controller of the Z-Wave network. This controller will be turned into exclusion respective inclusion mode. Please refer to your primary controllers manual on how to turn your controller into inclusion or exclusion mode. Only if the primary controller is in inclusion or exclusion mode, this device can join or leave the network. Leaving the network - i.e. being excluded - sets the device back to factory default.

If the device already belongs to a network, follow the exclusion process before including it in your network. Otherwise inclusion of this device will fail. If the controller being included was a primary controller, it has to be reset first.

To confirm inclusion and exclusion put a magnet on the flat side of the sensor for 3 seconds until the red LED blinks.

## Operating the device

The meter readings are transmitted by wireless and can be read by any Z-Wave controller.

## Wakeup Intervals - how to communicate with the device?

**W** This device is battery operated and turned into deep sleep state most of the time to save battery life time. Communication with the device is limited. In order to communicate with the device, a static controller **C** is needed in the network. This controller will maintain a mailbox for the battery operated devices and store commands that can not be received during deep sleep state. Without such a controller, communication may become impossible and/or the battery life time is significantly decreased.

This device will wakeup regularly and announce the wakeup state by sending out a so called Wakeup Notification. The controller can then empty the mailbox. Therefore, the device needs to be configured with the desired wakeup interval and the node ID of the controller. If the device was included by a static controller this controller will usually perform all necessary configurations. The wakeup interval is a tradeoff between maximal battery life time and the desired responses of the device.

To wake up the device put a magnet on the flat side of the sensor for 3 seconds until the red LED blinks.

It is possible to set the node ID to 255 to send wakeup notifications as broadcast. In this mode device takes more time to go to sleep and drains battery faster, but can notify all it's direct neighbors about a wakeup.

## Node Information Frame

**NI** The Node Information Frame is the business card of a Z-Wave device. It contains information about the device type and the technical capabilities. The inclusion and exclusion of the device is confirmed by sending out a Node Information Frame. Beside this it may be needed for certain network operations to send out a Node Information Frame.

Put a magnet on the flat side of the sensor for 3 seconds until the red LED blinks. Water meter will then send NIF after 15 seconds.

## Associations

**A** Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called *association*. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called **association groups** and they are always related to certain events (e.g. button pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive a common wireless command.

Association Groups:

1	Nodes to receive unsolicited water meter reading (max. nodes in group: 2)
2	Nodes to receive unsolicited low battery warning report (max. nodes in group: 2)
3	(max. nodes in group: 2)

## Configuration Parameters



Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

**IMPORTANT:** Controllers may only allow to configure signed values. In order to set values in the range 128 ... 255 the value sent in the application shall be the desired value minus 256. For example: to set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

#### Accumulated Register Value (Parameter Number 1, Parameter Size 4)

shows the actual counter of the sensor

Value	Description
0 — 99999999	m3/Hr (Default 0)

#### Reading Reporting Interval (Parameter Number 2, Parameter Size 2)

how often the meter reading is reported

Value	Description
1 — 10000	minutes (Default 3600)

#### Delta Configuration Reading (Parameter Number 3, Parameter Size 2)

defines the minimal change until a new meter value is reported

Value	Description
0 — 10000	m3/Hr (Default 0)

#### Serial Number Water Meter (Parameter Number 4, Parameter Size 4)

Value	Description
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#### Serial Number Z-Wave Module (Parameter Number 5, Parameter Size 4)

in Format YYMMxxx with YYY as year, MM as month and xxx as id

Value	Description
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## Command Classes

### Supported Command Classes

- Battery (version 1)
- Basic (version 1)
- Wake Up (version 2)
- Association (version 1)
- Version (version 1)
- Manufacturer Specific (version 2)
- Configuration (version 1)
- Multilevel Sensor (version 1)
- Meter (version 1)
- Alarm Sensor (version 1)

## Technical Data

IP Rating	54
Battery Type	1 * DC 3V
Explorer Frame Support	Yes
SDK	4.54.01
Device Type	Slave with routing capabilities
Generic Device Class	Meter
Specific Device Class	Simple Meter
Routing	No

FLiRS	No
Firmware Version	3.0

## Explanation of Z-Wave specific terms

- **Controller** — is a Z-Wave device with capabilities to manage the network. Controllers are typically Gateways, Remote Controls or battery operated wall controllers.
- **Slave** — is a Z-Wave device without capabilities to manage the network. Slaves can be sensors, actuators and even remote controls.
- **Primary Controller** — is the central organizer of the network. It must be a controller. There can be only one primary controller in a Z-Wave network.
- **Inclusion** — is the process of bringing new Z-Wave devices into a network.
- **Exclusion** — is the process of removing Z-Wave devices from the network.
- **Association** — is a control relationship between a controlling device and a controlled device.
- **Wakeup Notification** — is a special wireless message issued by a Z-Wave device to announces that is is able to communicate.
- **Node Information Frame** — is a special wireless message issued by a Z\_Wave device to announce its capabilities and functions.

## Disposal Guidelines

The product contains batteries. Please remove the batteries when the device is not used.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

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