SALT SENTRY

1   Inhoud

1   preface

This is the manual for the Salt sentry. The Salt sentry can measure how much salt is still present in a water softener and send this information to a home automation system (Currently supported: Domoticz, Home assistant and OpenHAB). This makes it possible, for example, to send a message to your phone when the salt is almost empty, so that you no longer have to physically check this and can no longer forget it.

2   Installation

The Salt sentry should be installed above the salt block in the water softener with a piece of double-sided tape. The "eye" of the salt sentry should be pointing downwards.

The Salt sentry must be supplied with power by means of a USB adapter and a micro USB cable. Depending on the softener type, it may be necessary to make a small recess in the water softener housing to feed the cable through.

3   Configuration

As soon as the Salt Sentry is powered on, it will start a WiFi network called "saltSentry". Connect to the network with, for example, a mobile phone. Most modern phones will direct you to the configuration page, if not, browse to http://192.168.4.1

The following page will be displayed:

Choose "configure wifi" to scan and connect to available networks. Choose configure wifi (no scan)" if you have to or want to type in the name of the wifi network manually.

After choosing "configure wifi" the following page will be displayed:

Click on your WiFi network and enter the WiFi password. If your WiFi network is not shown, you can search for networks again by pressing "scan" at the bottom of the page.

Enter the IP address and port of your home automation system. Optionally, username and password can be entered if your home automation system is secured with this.

Only one field of the following 3 fields needs to be filled:

- If you want the Salt sentry to send an MQTT message (eg for Home assistant), fill in the MQTT topic field.
- If you want to use the Salt sentry with Domoticz, enter the idx of the virtual switch (See chapter 7 for configuration of Domoticz)
- If you want to use the Salt sentry with OpenHAB, enter the itemID of the item in OpenHAB (See Chapter 8 for OpenHAB configuration)

The "full distance" & "empty distance" fields are used to determine what percentage the water softener is still filled with salt.

- Full distance in cm: The number of centimeters from the Salts sentry to the salt when it is full (for example 5cm)
- Empty distance in cm: The number of centimeters from the Salt sentry to the salt when the salt is (almost) empty (for example 30cm)

After pressing save, the Salt sentry will try to connect to the configured WiFi network. If this fails, the Salt sentry will return to access point mode and can be reconfigured.

When successfully connected to the wifi network, the Salt sentry will immediately send a message with the number of measured cm and the percentage.

Every 5 minutes the Salt sentry will report the salt level

4   Configure connected module

If you want to make a change in the configuration or check the status of the Salt sentry after it is connected to your WiFi network, you can do this by going to the IP address of the Salt sentry with a browser.

If you do not know the IP address of the salt sentry, this can be found by pressing the right button of the salt sentry. The Salt sentry then opens an access point called "Salt sentry online", by connecting to it you can retrieve the IP address that the Salt sentry has on your network. After finding this IP address, reconnect to your own WiFi network and browse to the displayed IP address, for example http://192.168.2.46/

On the page shown, the settings of the Salt sentry can be viewed and adjusted.

If an MQTT topic is set, it will show what the MQTT connection status is.

SALT SENTRY

Salt sentry configuration & status

MQTT connection status: connected

mqtt server:

192.168.2.177

mqtt port:

1883

mqtt username:

mqtt_user

mqtt password:

mqtt topic:

hallway/saltsentry

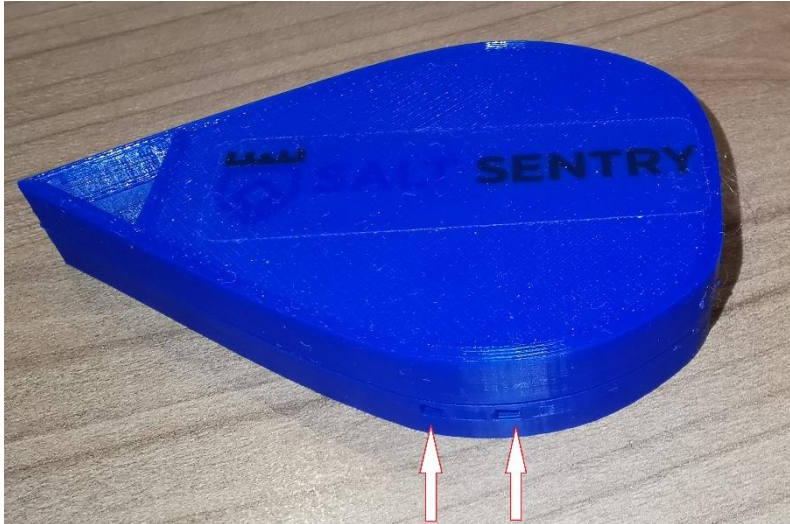Domiticz idx:

OpenHAB itemId:

full distance in cm:

35

empty distance in cm:

5

save settings

5   Buttons

The Salt sentry has 2 buttons that can be pressed with a narrow object, for example a small screwdriver or paper clip:

The left button resets the module without clearing the settings.

The right button can be used to find out the IP address of the module (see chapter 4).

If the right button is pressed for 10 seconds, a factory reset will be performed and all settings will be erased.

6   Home assistant configuration

To use the Salt sentry with Home assistant, Home assistant must be configured to communicate with MQTT. For example, using the Mosquitto add-on.

The installation and configuration of an MQTT server is beyond this manual, there are various manuals on the internet for configuring MQTT in combination with Home assistant.

When MQTT is configured a sensor must be created:

```
# sample configuration.yaml entry
sensor:
  - platform: mqtt
    name: "Salt sentry"
    state_topic: "hallway/saltsentry"
    unit_of_measurement: "%"
```
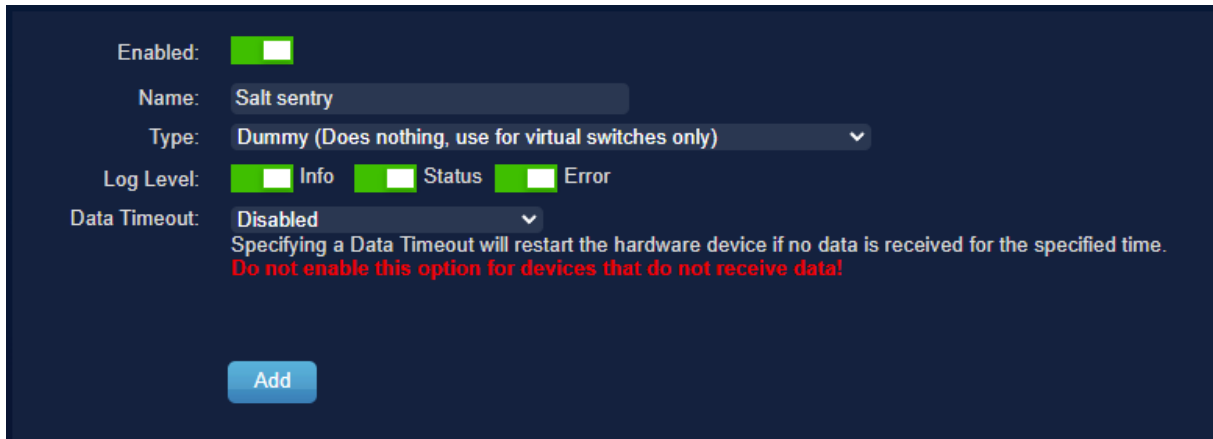
In addition to the percentage of salt present, the number of CM from the sensor to the salt is also communicated. This is communicated on the configured topic, with the postfix "_distance". To get this information also in Home assistant, the following sensor can be created:

```
  - platform: mqtt
    name: "Salt sentry distance"
    state_topic: "hallway/saltsentry"
    unit_of_measurement: "cm"
```

After this is done, the Salt sentry can be added to Home assistant and used in automations.

7 Domoticz configuration

To use the Salt sentry with Domoticz, a device must first be created. To do this, go to Setup, hardware in Domoticz and create a device like below:
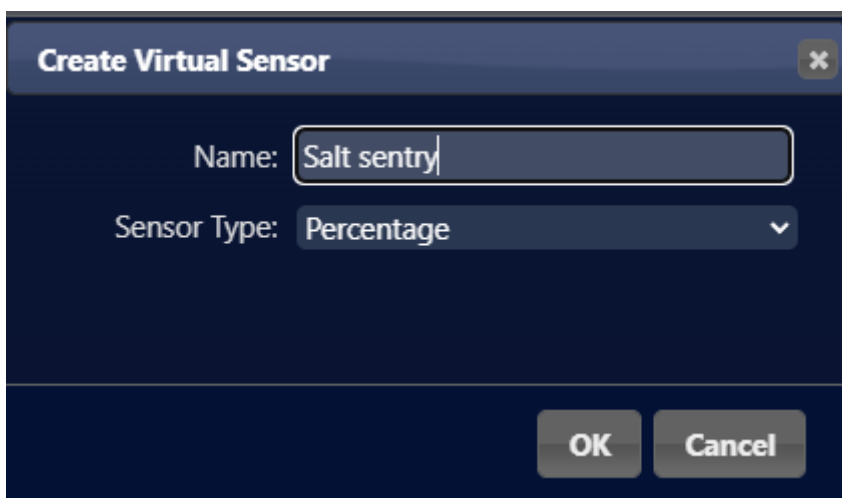
Then click on the "create visual sensors" button behind the device:
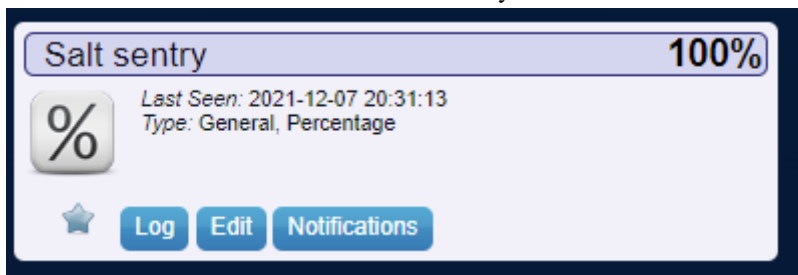
The created sensor can be found on the "Utility" tab:
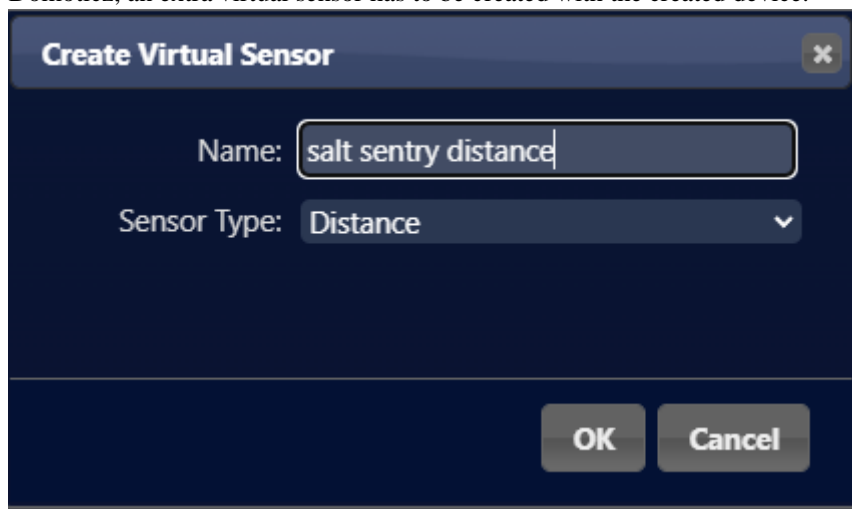
To connect the Salt sentry to the created device in Domoticz, the IDX of the device must be used. The IDX can be found in setup, devices. This IDX must be entered on the Salt Sentry's configuration page.

Every time the Salt sentry makes a measurement, it also sends the measured distance in cm. To get this value in Domoticz, an extra virtual sensor has to be created with the created device.

This virtual sensor can then also be seen under "UItility". The Salt sentry assumes that this virtual sensor has an idx that is subsequent to the previously created sensor (for example, if the first sensor has idx 23, then the distance in cm is communicated to idx 24).

9. OpenHAB configuratie

To use the Salt sentry with OpenHAB, 2 items must be created in openHAB, for example create the file saltSentry.items and put the following in it:

```
# Sample conf/items/saltSentry.items
Number saltSentry "Salt sentry [% %%]"
Number saltSentry_cm "Salt sentry cm"
```

The name immediately after "Number" is the itemID, this itemID must be used in the configuration of the Salt sentry. (see chapter 3).

The Salt sentry will always communicate the measured distance in CM on the same itemID, followed by _cm

8   Programming the module with custom firmware

The Salt sentry is based on the popular ESP8266 microprocessor (in an ESP-WROOM-02 package). It is possible to program the Salt sentry with your own software, for example with the Arduino IDE.

To do this, connect the module to a computer via USB. If the module is not recognized, it may be necessary to install USB to serial drivers for the CH380 chip.

Use the following settings in the Arduino IDE to program the module:

Setting	
Board: "Generic ESP8266 Module"	>
Builtin Led: "2"	>
Upload Speed: "115200"	>
CPU Frequency: "80 MHz"	>
Crystal Frequency: "26 MHz"	>
Flash Size: "1MB (FS:64KB OTA:~470KB)"	>
Flash Mode: "DOUT (compatible)"	>
Flash Frequency: "40MHz"	>
Reset Method: "dtr (aka nodemcu)"	>
Debug port: "Disabled"	>
Debug Level: "Geen"	>
lwIP Variant: "v2 Lower Memory"	>
VTables: "Flash"	>
Exceptions: "Legacy (new can return nullptr)"	>
Erase Flash: "Only Sketch"	>
Espressif FW: "nonos-sdk 2.2.1+100 (190703)"	>
SSL Support: "All SSL ciphers (most compatible)"	>

On the Salt sentry there is room for a pin header with which you could expand the circuit with other sensors.

The following pins are available:
- 3.3v
- GND
- GPIO02

- GPIO14
- GPIO4
- GPIO13
- GPIO16

The markings for the pins can be found on the bottom of the pcb.

The Salt sentry uses the VL53L0X sensor, which is connected to pins 2(SDA) and 14(SCL) of the ESP-WROOM-02

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