

## OPERATING MANUAL FLOOD SENSOR FGFS-101 v2.1 - v2.3

Fibaro Flood Sensor is a universal, Z-Wave compatible, flood and temperature sensor. Device can be battery (ca. 2 years battery life) or VDC powered (12 or 24 VDC). Flood alarm is sent to the Z-Wave network devices or additionally to any alarm system controller, through opening a NC contact.

The device has built in temperature sensor, monitoring temperature of e.g. floor. Fibaro Flood Sensor is designed to be placed on the floor or on a wall with a flood sensor probe extended by connected wire. The device has built in LED indicator and acoustic alarm. In addition, the sensor is equipped with a tilt sensor reporting tilt or movement to the main controller e.g. when someone has taken the Sensor from its original location. LED diode signals flood, operating mode or the Z-Wave network communication range. Fibaro Flood Sensor is sink-proof, which means it drifts on the water surface and keeps on sending alarm signal in case of substantial inundation of water.

### SPECIFICATIONS

Power Supply: 12 - 24 VDC

Battery Type: CR123A

Power Consumption (at VDC operation): 0.4W

Output terminals maximum current carrying capacity (ALARM NC, TAMP NC): 25mA

Maximum voltage at output terminals: 40V (AC or DC)

EU standards compliance: EMC 2004/108/EC R&TTE 199/5/WE

Radio protocol: Z - Wave

Radio frequency: 868.4 MHz EU;  
908.4 MHz US;  
921.4 MHz ANZ;  
869.2 MHz RU;

Range: up to 50m outdoors  
up to 30m indoors  
(Depending on terrain and building structure)

Operational Temperature: 0 - 40°C

Measured temperature range: -20 do 100°C

Temperature measuring accuracy: 0,5°C (within 0 - 40°C range)

Dimensions (Diameter x Height): 72 x 28 mm

\* Operational temperature in VDC powering mode: -20°C - 70°C

### TECHNICAL INFORMATION

- Compatible with any Z-Wave network controller,
- May be connected to any alarm system (potential free output terminal),
- Extremely easy installation - simply put on a surface prone to flooding,
- May be installed anywhere - flood sensor's contacts extended with a wire,
- Battery or VDC powered. When connected to an external, VDC power source, the battery serves as an emergency power source,
- Theft protection - tilt is reported to the Z-Wave network or alarm system's main controller,
- Two operating modes - flood / temperature sensor or just a temperature sensor.



**NOTE**  
Connect while observing wiring diagram shown in this manual only. Incorrect wiring may be dangerous or result in the device breakdown.

### I. GENERAL INFORMATION ABOUT FIBARO SYSTEM

Fibaro is a wireless system, based on Z-Wave technology. Fibaro provides many advantages when compared to similar systems. In general, radio systems create a direct connection between the receiver and transmitter. However, the radio signal is weakened by various obstacles located on the path (apartment walls, furniture, etc.) and in extreme cases it fails to transfer required data. The advantage of Fibaro System is that its devices, apart from being transmitters and signal receivers, also duplicate signal. When a direct connection path between the transmitter and the receiver cannot be established, the connection may be achieved through other intermediate devices.

Fibaro is a bi-directional wireless system. This means that the signal is not only sent to the receivers but also the receivers send the confirmation of its reception. This operation confirms their status, which checks whether they are active or not. Safety of the Fibaro System transmission is comparable to the safety of transmission in data bus wired systems.

Fibaro operates in the free bandwidth for data transmission. The frequency depends on radio regulations in individual countries. Each Fibaro network has its own unique network identification number (home ID), which is why it is possible to co-operate two or more independent systems in a single building without any interference.

Although Z-Wave is quite a new technology, it has already become recognized and officially a binding standard, similarly to Wi-Fi. Many manufacturers in various industries offer solutions based on Z-Wave technology, guaranteeing their compatibility. This means that the system is open and it may be extended in the future. Find more information at [www.fibaro.com](http://www.fibaro.com).

Fibaro generates a dynamic network structure. After Fibaro System is switched on, the location of its individual components is automatically updated in real-time through status confirmation signals received from devices operating in a "mesh" network.

### II. Z-WAVE NETWORK INCLUSION

Use TMP button to include the Fibaro Flood Sensor into the Z-Wave network. In addition, the device may be included into the Z-Wave network in auto inclusion mode, at connecting a DC power source (mode active only after the built in battery has been disconnected).

Including the Fibaro Flood Sensor using auto inclusion mode:

- 1) Make sure a DC power source is disconnected and the sensor is located within direct communication with the main controller's range. The battery must be removed.
- 2) Open the cover.
- 3) Set the main controller into the learning mode (see a main controller's operating manual).
- 4) Connect a DC power source to include the Fibaro Flood Sensor into the Z-Wave network in autoinclusion mode.
- 5) Fibaro Flood Sensor will be detected and included.



**NOTE**  
In case the Sensor is not detected, proceed to the manual inclusion (described below) or reset the Sensor and repeat auto inclusion procedure.

To deactivate auto inclusion mode, press TMP button once, after the Fibaro Flood Sensor has been connected to a DC power supply.

Manual Z-Wave network inclusion:

- 1) Connect a DC power supply to the Fibaro Flood Sensor or insert a battery. Make sure the sensor is located within the Z-Wave network's main controller's range (see main controllers operating manual).
- 2) Set the main controller into the learning mode.
- 3) Triple click TMP button.
- 4) Fibaro Flood Sensor will be detected and included.

### III. Z-WAVE NETWORK EXCLUSION

Complete the following steps to exclude a Fibaro Flood Sensor from the Z-Wave network:

- 1) Remove sensor's cover.
- 2) Make sure sensor is connected to a battery or a DC power supply.
- 3) Set a main controller into learning mode (see main controllers operating manual).
- 4) Triple click TMP button, located inside Flood Sensor's casing.

### IV. SENSOR'S INSTALLATION

- 1) Remove top cover.
- 2) Include into the Z-Wave network (see pt. II).
- 3) Place sensor onto a surface prone to flooding. All three electrodes underneath the device should evenly touch the surface.
- 4) If the sensor is to be DC powered, drill holes in its casing and connect wires observing the wiring diagram no.2.
- 5) Close sensor's casing.



**NOTE**  
After completing installation it's recommended to test sensor's operation by placing the entire sensor or its probes' extension wire onto water surface.



**NOTE**  
The Sensor detects resistance (under 4MΩ) between electrodes 1 and 3, 1 and 2 (according to scheme no.4), and electrodes connected to contacts (SENS1 and SENS2).



**NOTE**  
Contacts SENS1 and SENS2 are dedicated to flood detection only. Do not connect external voltage.



#### NOTE

When changing the Sensor's location, it's recommended to wake up the device and reconfigure the Z-Wave network by triple clicking the TMP button.



#### NOTE

The TMP button has two functions:  
1) Including / Excluding the device into / from the Z-Wave network.  
2) Tamper contact for II-nd Association Group. When a sensor is included into the Z-Wave network, case opening alarm may be activated (according to parameter 74 settings).

### V. POWERING MODE INFORMATION

There are two powering modes for the Fibaro Flood Sensor. By default it's powered by a factory included battery. In addition it can work with a constant current, after connecting a 12 / 24 VDC power supply to +12 and GND terminals (see diagram no.2). Powering mode configuration is carried out automatically, while a sensor is being included into the Z-Wave network. When battery powered, a Fibaro Flood Sensor communicates with a Z-Wave network main controller periodically. Detected alarms are sent immediately, but configuration parameters and associations settings only at specified wake up intervals, or at a manual wake up (TMP triple click). In DC powering mode, configuration and associations parameters are sent when necessary, and in addition a sensor serves as a Z-Wave signal repeater.

Switching to a constant current powering mode:

- 1) Exclude a sensor from the Z-Wave network.
- 2) Connect constant current power source (12 / 24 VDC) to +12 and GND terminals observing wiring diagram no.2.
- 3) Include the Fibaro Flood Sensor into the Z-Wave network.

In constant powering mode a sensor may operate without a battery. Installing a battery is recommended though, as it will serve as an emergency power source. When constant power fails, sensor will automatically shift to an emergency mode. All reports, including flood and temperature, will be sent immediately, but it will not be possible to modify the configuration or association settings until constant power returns. If a sensor served as a signal repeater for other Z-Wave devices, in emergency mode signal repeating function will be deactivated.



#### NOTE

Fibaro Flood Sensor will automatically exit emergency mode once 12/24 VDC at +12 and GND terminals is detected (according to diagram no.2) and the device wakes up after detecting an event, i.e. flood alarm, temperature report, tilt, or manual wake up using TMP button.

### BATTERY TIPS



Fibaro Flood Sensor's battery life is ca. 2 years at factory default settings. The current battery level is displayed in a Home Center 2 interface. Red battery icon means a battery needs replacement. In order to avoid triggering tamper alarm while replacing the battery, II-nd association group's associations must be deleted, and Sensor's parameters' configuration set to default. Alternatively, the Sensor may be powered by VDC power source (12 / 24 VDC in accordance with a wiring diagram no.2) - in such a configuration, a battery will serve as an emergency power supply.



#### NOTE

Mounting screws shown in a diagram no.3 are not included in the package. Choose a screw type depending on the building material it is being attached to.

### DIAGRAMS' DESCRIPTION:

+12V - 12 / 24 VDC positive terminal  
-GND - negative (ground) terminal  
ALARM NC - potential-free flood sensor terminals (for wired systems)  
TAMP NC - potential-free tamper terminals (for wired systems)  
SENS1, SENS2 - flood sensor electrodes' terminals.



#### NOTE

ALARM NC and TAMP NC connectors may be used as EOL protective loop's terminals.

### VI. FIBARO FLOOD SENSOR RESET

Reset procedure deletes EPROM's memory, including all information on the Z-Wave network and the main controller.

Fibaro Flood Sensor's reset procedure:

- 1) Make sure the Sensor is powered.
- 2) Press and hold a TMP button for 15 - 20 seconds. LED indicator glows yellow to confirm entering 4th sub-menu.
- 3) Release the TMP button.
- 4) Click the TMP button, once.

The LED indicator glowing red and then turning off will confirm a successful reset. Reset completion will be confirmed by an acoustic signal, same as at the power source connection.



#### NOTE

Reset procedure doesn't remove the Sensor from the Z-Wave network's main controller's memory. Prior to reset, a sensor must be deleted from the Z-Wave network.

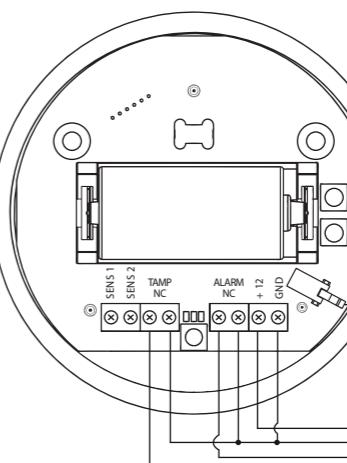


Fig. 1 - Connection with alarm system

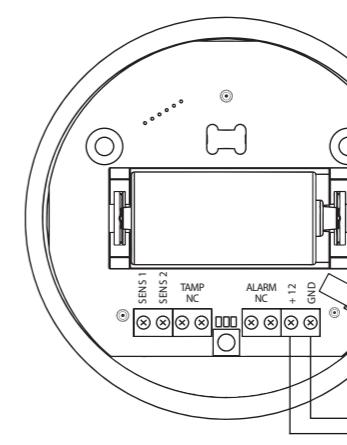


Fig. 2 - Connection to a constant power source

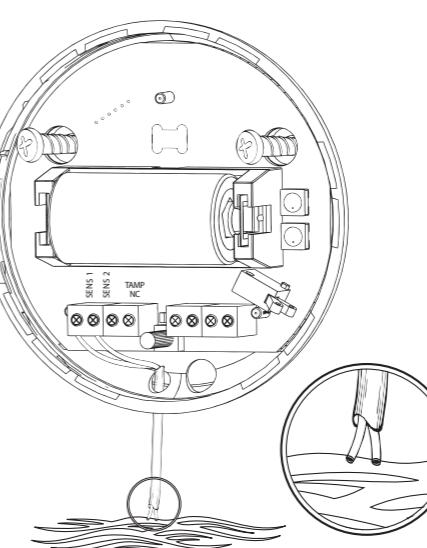


Fig. 3 - Flood sensor's contacts extended with a wire

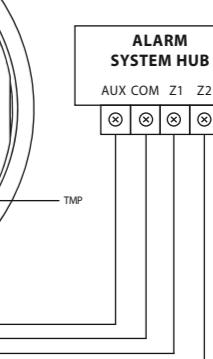


Fig. 4 - Probes marking

## VII. OPERATING THROUGH THE Z-WAVE NETWORK

Fibaro Flood Sensor has two sensors built in - flood and temperature sensors, meaning it's a multichannel device. In the Z-Wave network's main controller the Sensor will be shown as two devices.



Fig. 5 Flood Sensor icon in HOME CENTER 2

## VIII. ASSOCIATIONS

Through an association Fibaro Flood Sensor may control another Z-Wave network device, e.g. a Dimmer, Relay Switch, Roller Shutter, RGBW Controller, Wall Plug, or a scene (scene only through the Home Center 2 main controller).



### NOTE

Association allows for direct communication between Z-Wave network devices. Main controller does not take part in such communication. Using this mechanism, Fibaro Flood Sensor may communicate with other devices even when the main controller is damaged, e.g. in a fire.

Fibaro Flood Sensor allows for the associations of three groups.

**1-st Association Group** is assigned to the device status - sending the BASIC SET (default) or ALARM control frame to the associated devices.

**2-nd Association Group** is assigned to a TMP button and tilt sensor - ALARM GENERIC control frame will be sent to the associated devices in case a TMP button is released or a tilt sensor triggered (depending on parameter 74 settings)

**3-rd Association Group** reports the device status and allows for assigning single device only (the main controller by default - the device reports its status to the main controller).

Fibaro Flood Sensor allows for controlling 5 regular and 5 multichannel devices per an association group, out of which 1 field is reserved for the Z-Wave network main controller.

To add an association (using Home Center 2 interface) go to device settings and click the following icon:



Select the "device options" tab. Then specify to which group and what devices are to be associated. Sending relevant information to devices that have been added to association groups may take even a few hours depending on configuration parameters' settings.

## IX. LED VISUAL SIGNALS AND SETTINGS

Fibaro Flood Sensor is equipped with a LED diode, signaling sensor's operating modes and alarms. In addition the LED indicator may inform of the Z-Wave network range and the current temperature.

LED indicator signaling modes:

1) Flood alarm is signaled with alternating white and blue light.

2) In battery powering mode, with parameter no.63 set to 1, LED indicator will periodically show temperature readouts (depending on parameters 50, 51, 61 and 62 settings)

3) In constant powering mode, the current temperature readouts will be continuously signaled with a colour depending on the parameters 50, 51, 61 and 62 settings.

4) Currently chosen MENU position is signaled with an illumination colour.

Press and hold the TMP button for at least 3 seconds to enter MENU. Inside MENU, each of the positions will be signaled by another LED colour.

**WHITE** - entering MENU confirmation,  
**GREEN** - cancel alarm for associated devices,  
**PINK** - Z-Wave network's range test,  
**YELLOW** - sensor reset.

## X. CANCEL ALARM FOR ASSOCIATED DEVICES

It's possible to cancel alarm for associated devices simply by entering MENU - signaled by GREEN illumination.

## XI. Z-WAVE RANGE TEST

Fibaro Flood Sensor has a built in the Z-Wave network main controller's range tester. Follow the following instructions to test the main controller's range:

1) Press and hold a TMP button for 10 - 15 seconds, until a LED indicator colour changes to violet.

2) Release the TMP button.

3) Click the TMP button.

4) LED indicator will signal the Z-Wave network range (see description below).

5) To exit the Range Tester click the TMP button.

Z-Wave Range Tester signaling modes:

**LED Indicator pulsing green** - Fibaro Flood Sensor attempts to directly communicate with the main controller. If the direct communication attempt fails, the sensor will try routed communication, through other devices, which will be signaled with LED Indicator blinking yellow.

**LED Indicator glowing green** - Fibaro Flood Sensor directly communicating with the main controller.

**LED Indicator pulsing yellow** - Fibaro Flood Sensor tries to establish routed connection with the main controller, through intermediary devices.

**LED Indicator glowing yellow** - Fibaro Flood Sensor communicates with the main controller through other, intermediary devices. After two seconds the Sensor will retry to directly connect to the main controller, which will be signaled with the Indicator pulsing green.

**LED Indicator pulsing violet** - Fibaro Flood Sensor communicates at the range limit. If connection proves successful it will be confirmed with a yellow glow. It's not recommended to use the sensor at the range limit.

**LED Indicator glowing red** - Fibaro Flood Sensor unable to connect to the main controller directly or through another Z-Wave network nodes.

## XII. SENSOR OPERATION WARNING

By default, flood sensor's insensitivity is set to 1 second, which means flooding will be reported one second after it's been detected.

Tilt tamper is insensitive to little vibrations and turns. After its activation, insensitivity is turned off for 15 seconds. After that, each Sensor's movement will trigger audible alarm, consisting of 3, brief acoustic signals.

## XIII. BATTERY USE WARNING

Fibaro Flood Sensor is a battery-powered device. Using batteries other than specified may result in explosion. Dispose of properly, observing environmental protection rules.

## XIV. ADVANCED CONFIGURATION

**Wake up interval (battery mode)**

Available settings: 0 or 5 - 86399 (in seconds, 5 s. to 24 hours)

Default setting: 4 000 (each 66 minutes)

Defines a time period, in seconds, by which a Flood Sensor will perform a "Wake up" instruction - communicate with main controller, update parameters, update software. Flood Sensor will wake up each defined time interval and will always attempt to connect with the main controller, without trying if connection fails (thus preventing a battery from discharging when the Sensor is used at the range limit, in case of the main controller's breakdown, or in case the sensor is taken away from the main controllers range). This parameter is relevant in case of battery operation - higher Wake up interval means the Sensor communicates less often saving a battery.

After successful communication attempt, a sensor will go into standby mode, update parameters or will enter a software update mode.

After failed communication attempt, a sensor will go into standby mode until another time interval will have elapsed.

**1. Alarm cancellation delay**

Delays flood alarm cancellation for the device after flooding has ceased.

Available settings: 0 - 3 600 (in seconds, each 1s)

Default setting: 0 (no delay, immediate alarm cancellation)

Parameter size: 2 [bytes]

Determines time period, in seconds, by which a Flood Sensor will retain the flood state after the flooding itself, has ceased. Sensor will keep on reporting flooding to the main controller. This parameter settings do not affect acoustic and visual alarms, which turn off immediately after flooding ceases.

**2. Acoustic and visual signals On / Off in case of flooding**

The parameter allows for LED indicator and acoustic alarm deactivation in case of flooding detection.

Available settings:

0 - acoustic and visual alarms inactive

1 - acoustic alarm inactive, visual alarm active

2 - acoustic alarm active, visual alarm inactive

3 - acoustic and visual alarms active

Default setting: 3

Parameter size: 1 [byte]

Changes in this parameter settings allow for increasing a battery life. Settings changes will not affect the Sensors communication with the main controller - commands to association groups, alarms and reports will still be sent.

**5. Type of alarm frame sent to 1-st association group (FLOOD)**

Available settings:

0 - ALARM WATER command frame

255 - BASIC SET command frame

Default setting: 255

Parameter size: 1 [byte]

The parameter determines a type of command frame sent by the Sensor in case flooding has been detected or cancelled.

**7. Forced dimming level / roller blind opening level, when sending turn on / open command to 1-st association group devices**

In case of alarm frames, alarm priority is determined.

Available settings: (1-99) or 255

Default setting: 255

Parameter size: 1 [byte]

The value of 255 allows for turning a device on. In case of a Dimmer it means turning it on with the last memorized state, e.g. Dimmer set to 30% and turned off, turned on again using 255 command is turned on with last state i.e. 30%.

**9. Alarm cancelling or turning a device off (Basic) command frame deactivation.**

Allows for deactivating device turn off and alarm cancellation functions for the devices assigned to 1-st association group (1 byte).

Setting the parameter's value to 0 results in stopping BASIC SET = 0 or ALARM WATER = 0 control frames from being sent. After sending flood alarm report the device will keep on reporting flooding after the flooding itself has ceased. Such a state can be cancelled by choosing alarm cancellation from the MENU, marked with green LED colour.

Available settings:  
0 - alarm (flooding) cancellation inactive  
1 - alarm (flooding) cancellation active

Default setting: 1

Parameter size: 1 [byte]

## 10. Temperature measurement interval

Time interval, in seconds, between consecutive temperature measurements done by built in temperature sensor. New temperature value is reported to the main controller if it differs from the previously measured by hysteresis (defined in parameter 12).

Available settings: 1 - 65535 (in seconds)  
Default setting: 300 (5 minutes)  
Parameter size: 2 [bytes]

The parameter determines time interval, in seconds, at which a Flood Sensor measures and reports ambient temperature and battery level. If a temperature value will differ from previously reported by a value determined in parameter 12 (e.g. P12 = 50, i.e. temperatures differ by 0.5°C), new temperature value will be reported. If a battery level changes, the device will report a battery status change - Battery Report.

The parameter is relevant when using a Flood Sensor in a battery power mode - longer time interval means less frequent communication resulting in extended battery life.

After consecutive FAILED and SUCCESSFUL communication attempts, the Sensor will go to standby mode.

## 12. Temperature measurement hysteresis

Determines a minimum temperature change value (insensitivity level), resulting in a temperature report being sent to the main controller, according to the Parameter 10 settings.

Available settings: 1 - 1 000 (each 0.01°C)

Default setting: 50 (0.5°C)

Parameter size: 2 [bytes]

## 13. Alarm BROADCAST

Value other than 0 means alarms are sent in BROADCAST mode (with a priority over other communicates), to all devices within the Fibaro Flood Sensor's range.

Available settings:

0 - broadcast inactive

1 - flood (1-st Association Group) broadcast active, tamper (2-nd Association Group) broadcast inactive

2 - flood broadcast inactive, tamper broadcast active

3 - flood broadcast active, tamper broadcast active

Default setting: 0

Parameter size: 1 [byte]

## 50. Low temperature alarm threshold

Available settings: - 10 000 to +10 000 (each 0.01°C)

Default setting: 1 500 (15.00°C)

Parameter size: 2 [bytes]

The parameter stores a temperature value, below which LED indicator blinks with a colour determined by a Parameter 61 settings. By default the LED indicator blinks blue.

## 51. High temperature alarm threshold

Available settings: - 10 000 to +10 000 (each 0.01°C)

Default setting: 3 500 (35°C)

Parameter size: 2 [bytes]

The parameter stores a temperature value, above which LED indicator blinks with a colour determined by the Parameter 62 settings. By default the LED indicator blinks red.



### NOTE

The main controller does not interpret negative numbers as decimals. That's why read value may be different than entered. Negative numbers are coded in U2 standard.

## Decimal

## Hexadecimal (U2)

## Value in main controller

| Decimal | Hexadecimal (U2) | Value in main controller |
|---------|------------------|--------------------------|
| 32767   | 0xFFFF           | 32767                    |
| 1       | 0x0001           | 1                        |
| 0       | 0x0000           | 0                        |
| -1      | 0xFFFF           | 65535                    |
| -10000  | 0xDBF0           | 55536                    |
| -32768  | 0x8000           | 32768                    |

## 61. Low temperature alarm indicator colour

Parameter stores RGB colour value.

Available settings: 0 - 16777215

Default setting: 255 (blue 0x000000FF)

Parameter size: 4 [bytes]



### NOTE

A main controller interprets colours as a sum of its component colours value. Each colour's value is a number from 0 to 255.

## Example:

Indicated colour = 65536 \* RED value + 256 \* GREEN value + BLUE value

## 62. High temperature alarm indicator colour

Parameter stores RGB colour value.

Available settings: 0 - 16777215

Default setting: 16711680 (red 0xFF0000)

Parameter size: 4 [bytes]



### NOTE

A main controller interprets colours as a sum of its component colours value. Each colour's value is a number from 0 to 255.

## Example:

Indicated colour = 65536 \* RED value + 256 \* GREEN value + BLUE value

| Colour                   | Decimal value |
|--------------------------|---------------|
| Red                      | 16711680      |
| Green                    | 65280         |
| Blue                     | 255           |
| Yellow                   | 16776960      |
| Turquoise                | 65535         |
| Orange                   | 16750848      |
| White                    | 16777215      |
| LED indicator turned off | 0             |

## 63. Managing a LED indicator under standard operation

Parameter determines LED indicator's operation. Set to 0 turns the indicator off, saving a battery life.

Available settings:

0 - LED indicator doesn't indicate the temperature

1 - LED indicator indicates the temperature (blinks every Temperature Measurement Interval (Parameter 10, constant current and battery) or Wake Up Interval (battery mode))

2 - LED indicator indicates the temperature continuously, only in constant power mode.

Default setting: 2

Parameter size: 1 [byte]

## 73. Temperature measurement compensation

Available settings: -10 000 to +10 000

Default setting: 0 (0.000°C)

Parameter size: 2 [bytes]

Parameter stores a temperature value to be added to or deducted from the current temperature measured by internal temperature sensor in order to compensate the difference between air temperature and temperature at the floor level.