Chapter 4

Wireless Z-Wave Sensors

The Fibaro System consists of a constantly growing range of wireless sensors. All of the sensors communicate using the Z-Wave protocol. Their main characteristic is battery power supply allowing sensors to be installed almost anywhere, within the range of Z-Wave network. The Expected maximum battery life is 2 - 3 years, and the battery state may be monitored via the Home Center 2. Z-Wave wireless sensors do not serve as mesh network signal relays. For that reason all of them should be included into system after being installed in desired places. Because of they are battery powered, wireless sensors do not communicate with the Home Center 2 on constant basis. They are referred to as "sleeping nodes", i.e. Home Center 2 communicates with them (checking their status and network presence) in certain time intervals, these are defined as the "Wake up intervals" parameter in the device's configuration. In addition to regular, interval based communication, each battery powered sensor communicates with the HC2 in case of breach, arming or a forced change of state, i.e. in the case of detecting a certain action.

4.1 Universal Binary Sensor

The Universal Binary Sensor is a wireless module designed for increasing any binary output sensor's functionality by adding possibility of wireless communication with Z-Wave network and Fibaro System. Moreover, the module enables inclusion of DS18B20 temperature sensors to the Fibaro System. A single Universal Binary Sensor supports up to two binary sensors of any type, or four DS18B20 temperature sensors. The Universal Binary Sensor is so small it can be place inside the casing of a sensor or other device that needs to be increased functionality. The Universal Binary Sensor may be used anywhere, where wireless data collection, from sensors, is needed. After the appropriate protection, the module may be used in high humidity or temperature situations. The Universal Binary Sensor was designed primarily for the use with existing wired and wireless alarm and control systems, so that they could be easily integrated with the Fibaro System. For the use with alarm system, the module is 100% transparent to parametric lines.

Figure 4.1: Universal Binary Sensor - Icons Views

Product Characteristics:

- Controlled by Fibaro System devices or any other Z-Wave controller.
- Microprocessor control.
- Compatible with standard and parametric alarm lines (may be connected to single alarm sensor with tamper button, or two alarm sensors without tampers).
- Compatible with binary sensors (may be connected to two binary outlets).
- Compatible with DS18B20 temperature sensors (supports up to four DS18B20 temperature sensors).

4.1.1 Specifications

- Power supply: 9-30V ±10% DC
- Inputs: 2 floating inputs, 1 digital input 1-wire
- Outputs: 2 floating outputs
- Max. input voltage: 36V ±5% DC
- Output carrying capacity: 150mA
- Operational temperature: from 0 °C to 40 °C
- Radio protocol: Z-WAVE
- Radio Frequency: 868 MHz for EU; 908 MHz for US; 921 MHz for AUS/NZ/BRA.
- Range: up to 50 m outdoors, up to 30 m indoors (depending on building materials)
- Number of supported DS18B20 temperature sensors: up to 4

4.1.2 Example Configuration Parameters

Configuration parameters, for each module, available in Advanced Settings tab, for each device, in Home Center 2 interface.

Parameter 1
Delayed alarm cancellation at input IN1. This option enables you to define additional time after which IN1 alarm gets cancelled after it's breach is no longer present.
Default value: 0

Parameter 2
Delayed alarm cancellation at input IN2. This option enables you to define additional time after which IN2 alarm gets cancelled after it's breach is no longer present. *Default value: 0*

Parameter 3
Input 1 type.
Default value: 1 = INPUT NC (Normal Close)
Default value: 1 = INPUT_NC (Normal Close)

Parameter 4
Input 2 type.

Default value: 1 = INPUT_NCNC (Normal Close) *Default value: 1 - INPUT NC (Normal Close)*

Parameter 5

Steering frame type for 1st association group, triggered from input IN1. Parameter enables setting alarm frame type or forces sending of steering frames (BASIC_SET).

Default value: 255 = BASIC_SET

Parameter 6

Steering frame type for 2nd association group, triggered from input IN2. Parameter enables setting alarm frame type or forces sending of steering frames (BASIC_SET).

Default value: 255 = BASIC_SET

Parameter 7

Parameter defining forced level of dimming/blinds opening in case TURN ON/OPEN commands are sent to devices of 1st association group. In case of alarms, alarm priority is defined.

Default setting enables turning device ON. In case of Dimmer this means turning to last memorized status.

Default value: 255.

Parameter 8

Parameter defining forced level of dimming/blinds opening in case TURN ON/OPEN commands are sent to devices of 2nd association group. In case of alarms, alarm priority is defined.

Default setting enables turning device ON. In case of Dimmer this means turning to last memorized status.

Default value: 255

Parameter 9

Alarm cancelling frame or turning the device off steering frame (Basic) - deactivated. Allows you to deactivate the feature off and cancel alarms for devices paired with the given input of Fibaro Sensor.

Default value: 0, for association groups 1 & 2 information is sent.

Parameter 10 The interval between temperature readings from all sensors connected to the device. NOTE: The temperature reading from the sensor does not result in sending a report to HC unit.

Default value: 20 sec.

Parameter 11

The interval between successive reports on the state of the temperature. Forced report is sent immediately after the next reading of the temperature sensor

regardless of the setting of parameter No. 12

Default value: 200 sec.

NOTE *Frequent reports on the state of the temperature make sense in the case when the sensor is placed at the point where it is exposed to rapid changes in ambient temperature. In other cases, we recommend you left the default value of the parameter.*

Parameter 12

Maximum allowed difference in temperature last reported and currently recorder by the sensor. If the difference in temperature meets or exceeds defined level, then report to device in third association group is sent. Parameter 10 defines intervals between temperature readouts.

Value set at 0 means sensor reports each change in temperature.

Default value: 8 [$0,5\,°\mathrm{C}$*]*

Parameter 13

Alarm frames or steering frames sent in broadcast mode i.e. to all devices within the device's reach.

Default vaule = 0 (broadcast mode OFF).

NOTE *Broadcast mode cancels "single cast" communication with associated devices for given channel.*

Parameter 14 Scene activation. Scene number corresponds to button pushed.

Default value = 0

4.1.3 Universal Binary Sensor - Inclusion / Exclusion

After entering Home Center 2 into learning mode (described in 5), triple click button "B".

4.1.4 Wiring Diagrams - Universal Binary Sensor

Please note:

- When using DS18B20 temperature sensors, it is recommended to use single wire cables, no longer than 30 m.
- Do not arrange DS18B20 temperature sensors cables parallel to house electrical system cables (230V AC). High voltage AC wires may induce magnetic field resulting in erroneous DS18B20 temperature sensors readouts.
- DS18B20 temperature sensors should be tested before being mounted in desired locations.

- Depending on number of the devices connected to it, the Universal Binary Sensor may be presented in HC2 interface as 3 to 7 different devices.
- In case of any changes in TP / TD line (1-wire) configuration, i.e. adding/removing DS18B20 temperature sensors, it is necessary to exclude and re-include the Universal Binary Sensor to Z-Wave network. Please note, HC2 will enter learning mode only after all connected sensors are detected, which may take up to 10 seconds.
- Do not connect sensors other than DS18B20 temperature sensor to TP / TD line (1-wire).
- Do not connect devices not supporting 1-wire protocol to TP / TD line. Lines not in use, must be isolated.

Symbol descriptions:

- Live wire - red
- GND (GROUND) - ground wire, blue
- IN1 - (INPUT 1) - input 1, yellow
- IN2 (INPUT 2) - input 2, green
- TP (TEMP_POWER) - power (3,3V) to DS18B20 temperature sensor, brown
- TD (TEMP_DATA) - signal to DS18B20 temperature sensor, white
- ANT- antenna, black
- B -service button (used for including/excluding device)
- OUT1 - output no.1, assigned to input IN1
- OUT2 - output no.2, assigned to input IN2

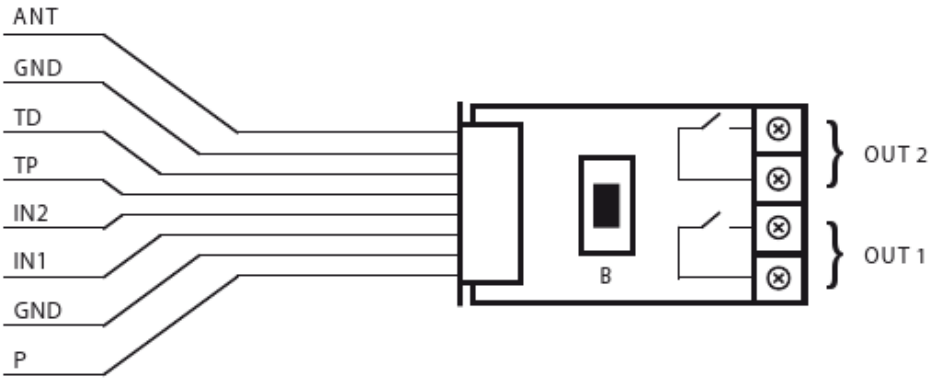

Figure 4.2: Universal Binary Sensor - connections description

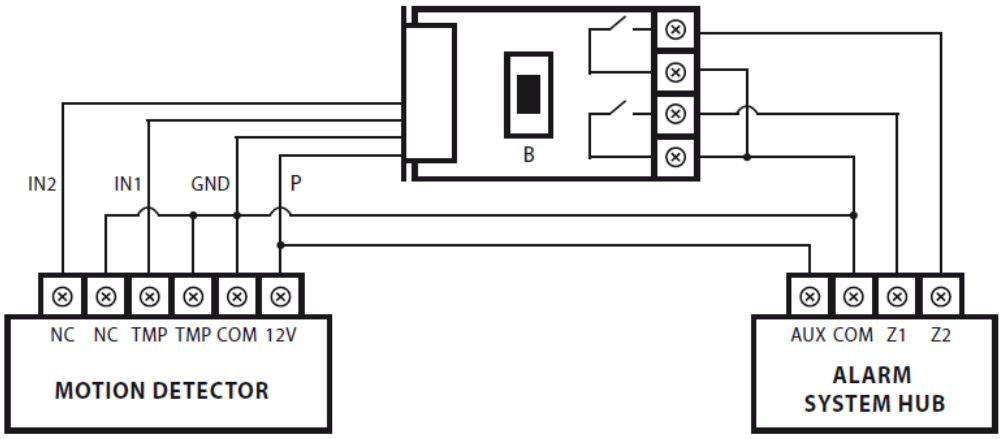

Figure 4.3: Universal Binary Sensor, standard alarm line

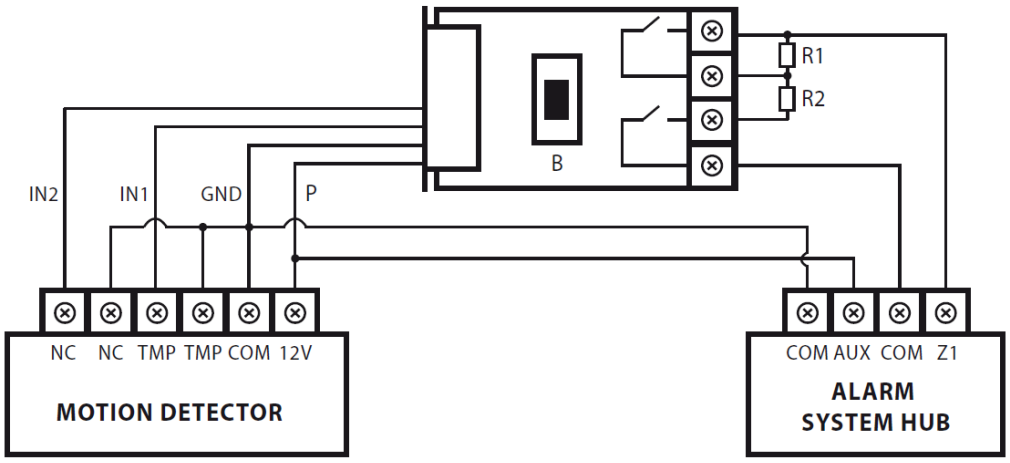

Figure 4.4: Universal Binary Sensor, parametric alarm line

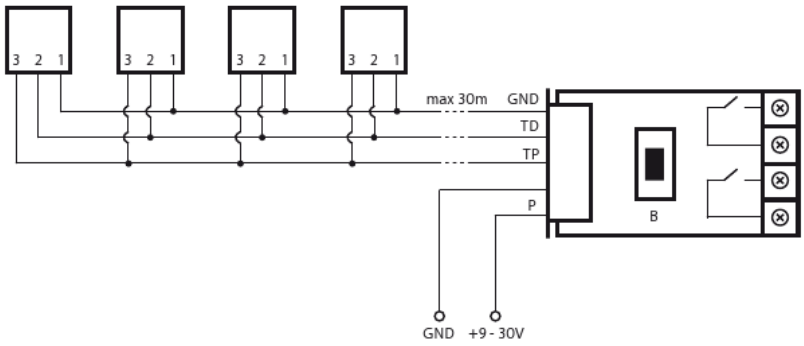

Figure 4.5: DS18B20 temperature sensors connection diagram

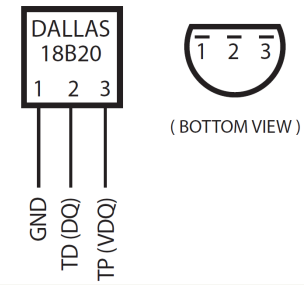

Figure 4.6: DS18B20 connections description

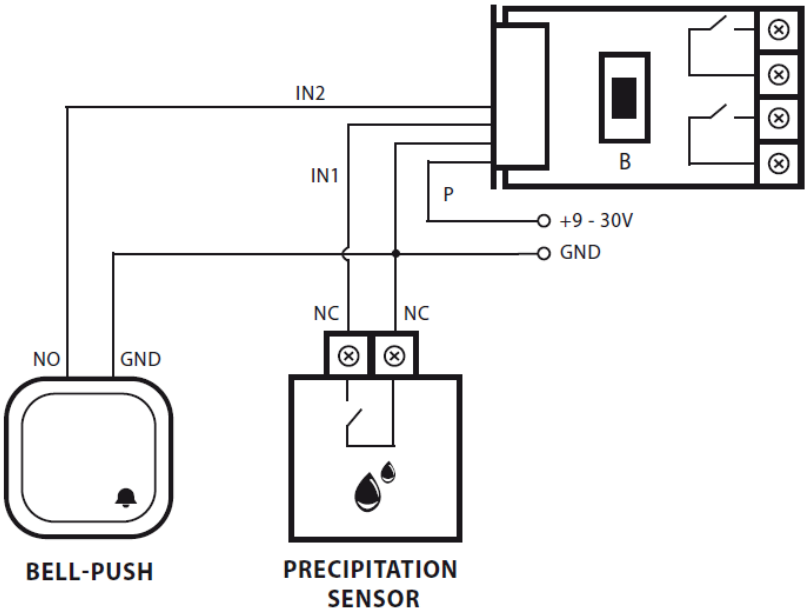

Figure 4.7: Universal Binary Sensor connection diagram

4.2 Danfoss Living Connect Electronic Thermostat

Figure 4.8: Electronic Thermostat Danfoss Living Connect

The Danfoss living connect is an electronic radiator thermostat, which communicates with the Fibaro System through the Z-Wave wireless protocol. Desired temperature is set by the simple click of a button or through Heating Panel in HC2, and then Danfoss Living Connect opens/closes the radiator's valve with an electromechanical actuator. The thermostat features an open-window function, which closes the valve if the temperature in the room is falling dramatically.

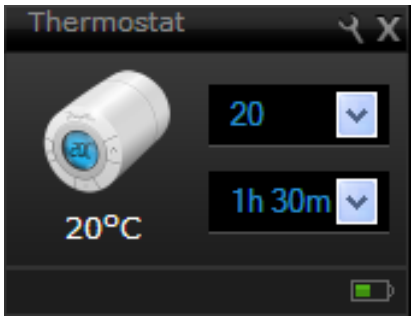

Figure 4.9: Danfoss Thermostat - Parameters Modification Window

Danfoss Thermostat configuration window (HC2 interface) shows following parameters:

- *Devices name*
- *Room* - Parameter available from the list of rooms created (see 5.3 for detailed description)
- *Device kind*
- *Device type*
- *ID* - Devices number