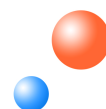




ZAS

KNX Room Controller

ZN1VI-TPZAS



Program version: 1.2

Manual edition: a

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1. INTRODUCTION

1.1. ZAS

The room controller **ZAS** (Zennio Analogue Screen) is a **touch panel** that includes thermostat, IR receiver, and analogue/binary inputs. ZAS is a great solution for demanding applications in hotel rooms, apartments, offices, and in any room where it is necessary to manage climate, shutters, lights, scenes, etc.



Figure 1.1. ZAS Room Controller

Below, the most relevant features of ZAS are shown:

- **1.8"** black-lighted display: **128 x 64 pixels**
- **Temperature sensor** with thermostat function
- **12 tactile buttons**
- **Screensaver** showing the time and temperature measured by ZAS, with the suitable letter size for its reading from several meters away
- It includes **two opto-coupled inputs**, to be configured as **digital** (switch/sensor) or **analogue** for the connection of temperature probes

1.2. INSTALLATION

ZAS is connected to the KNX installation as any other KNX device, through the KNX connector placed at the back.

For installing ZAS, first it is necessary to fix the metallic piece into the squared/rounded standard box where it is going to be installed, with the corresponding screws.

Next, the KNX bus and the inputs terminal must be connected using the corresponding connectors; both terminals are placed in the rear part of the device.

Once inputs and bus KNX are connected, the device is fitted in the metal platform thanks to the included magnets.

Finally, it is necessary to check, from both sides, that nothing unless the ZAS outline can be seen (the metal platform should be completely hidden by ZAS).

This device does not need any additional external power supply since it is powered through the KNX bus.

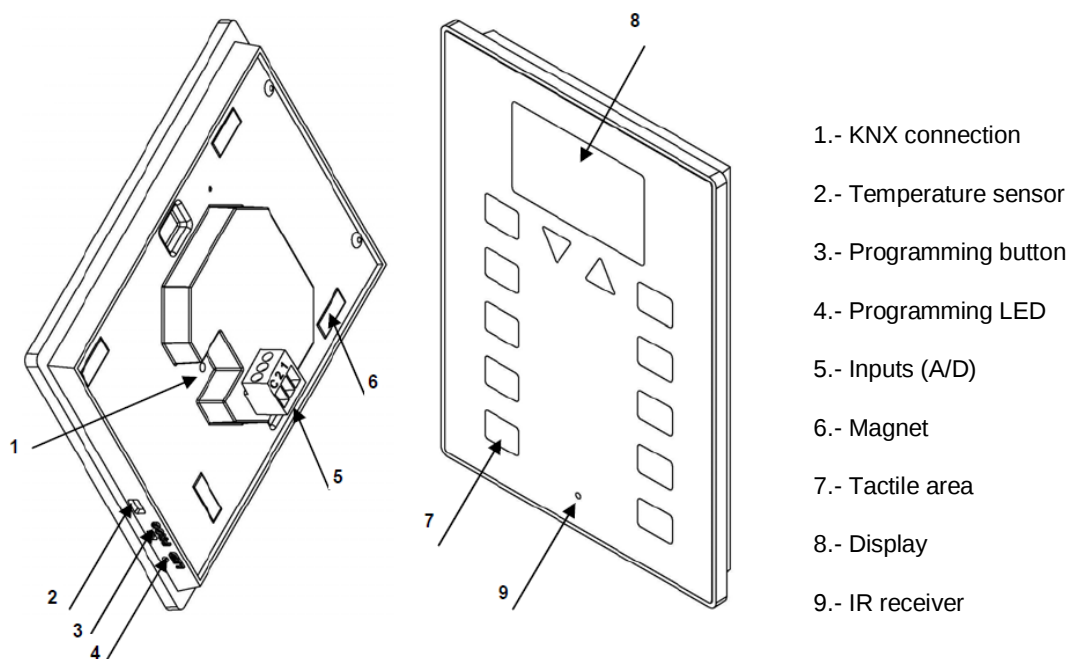


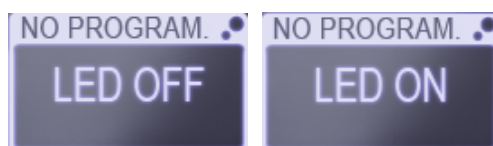
Figure 1.2. ZAS Elements scheme

The programming button (3) is used to set ZAS in the programming mode, by means of a short push (the programming LED lights red).

Note: *If this button is held while plugging the device into the KNX bus, ZAS goes into secure mode. The LED blinks red.*

Besides the Programming button, the button 7 (bottom left in the tactile area) can also be used to set the controller in the programming mode. (**Note:** *This method can be used the first time ZAS is connected to KNX bus, before downloading the corresponding application program*).

In the factory status of the controller, after connecting it to the KNX bus and before downloading its application program, the message "NO PROGRAM" will be shown at the upper side of the Display, and in the middle of it, the status of the programming LED will be shown: "LED OFF" or "LED ON", as appropriate.



Once the application program download has finished, it is necessary to **calibrate** ZAS. The touch calibration is carried out pressing the buttons 1, 2, 7 and 8, in this order (see graphic description in Figure 1.3). The display will indicate the buttons to press at any time (only if a text chain associated to this process has been previously configured in the screen "General Labels" in ETS. See section 3.2).

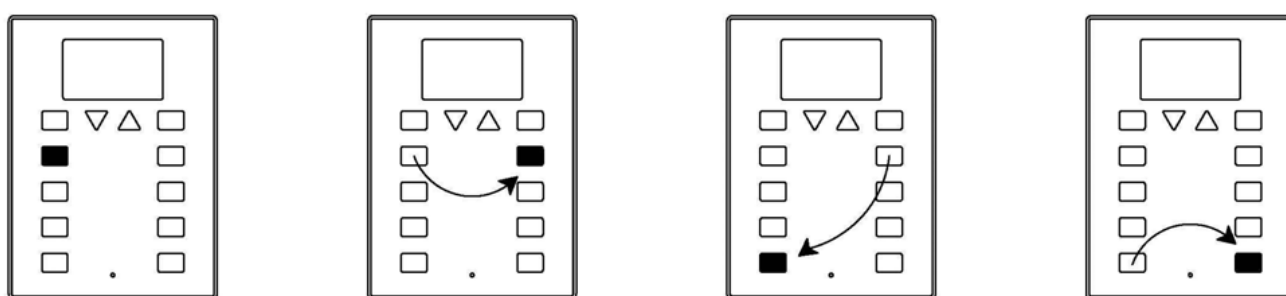


Figure 1.3. Calibration sequence

To obtain a more detailed information about the technical features of ZAS, as well as security and installation information, please read the controller **Datasheet**, included in the original package of the device and also available at: <http://www.zennio.com>.

2. CONFIGURATION

2.1. GENERAL CONFIGURATION

ZAS allows controlling a set of functionalities in a domotic installation in a simple and intuitive way.

There are several parameters that reference to the **general functioning** of the controller, such as: luminosity, touch blocking, initial setup, internal sensor, contrast, screensaver, information screen, Menu screen enabling, etc.

ZAS counts on **2 opto-coupled inputs** that may be individually configured as **switch/sensor** or **temperature probe**. Depending on the selected configuration, it is necessary to connect different external elements to the ZAS inputs: push buttons, switches or temperature probes (like the Zennio model **ZN1AC-NTC68**).

The menu of the display offers several **submenus**, which will be explained in section "3. ETS Parameterization":

-  Thermostat
-  Scenes
-  Presence simulation
-  Security
-  General configuration

Each submenu allows the access to the functionalities configured by parameter in ETS.

Within any submenu, for returning to the previous one, it is necessary to press the button Menu or the “arrow” icon that will appear in the upper left corner of the display. See Figure 2.1.

Likewise, as well as the button Menu, a “cross” icon in the upper right corner, allows going out of the menu directly. See Figure 2.1.



Figure 2.1. Menu representation example in the Display

2.2. TACTILE AREA

ZAS counts on **12 tactile buttons** for controlling all its functionalities. See figure 2.1.



Figure 2.1. Tactile Area

The first row of the touch consists of the following buttons:

- 🎯 Button **Menu**: allows the direct access to the menu, which has also several sub-menus.
- 🎯 **Arrow** buttons: allow scrolling up and down through the different options of the menu as well as increasing or decreasing the temperature (temperature control, configured by parameter).
- 🎯 Button **OK**: allows selecting the desired option or sub-menu.

Under this first row, there are **8 buttons**, arranged in 4 rows of two buttons each. They can be configured through ETS to operate either independently or as a couple, implementing joint

functions. They are direct-action buttons, i.e., they will carry out the parameterized action every time they are pressed, no matter the menu or submenu the panel is. Moreover, when these buttons are pressed, the text message previously configured in ETS for every action will appear in the display (see section 3.4). Each button counts on a **central LED** that lights during 1 second for showing that the key-press has been correctly done.

ZAS will emit a light beep every time a button of its tactile area is pressed.

2.3. IR CONTROL

ZAS has a remote control (optional) that allows the control of the functions in the same way that short or long press of the touch buttons.

Moreover, it counts on a series of buttons that directly activates some special functions such as scenes, special thermostat modes, 1-bit object sending, etc.

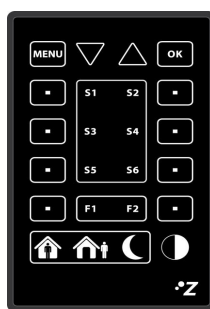


Figure 2.2. ZAS remote control

As it can be seen in the Figure 2.2, the first row of buttons of the IR remote controller matches with the first row of buttons of the own ZAS, both, in position and functionality. It has the keys **Menu**, two keys **Arrows** and the key **OK**.

Functions associated to the buttons in the most external lateral columns match up with the rows of buttons of the device.

Besides the described buttons that have their equivalent button in the touch panel, the remote control counts on the following keys which directly activate special functions:

- 🌐 **Buttons S1-S6:** they activate the configured scenes for the submenu “scenes” (scenes 1-6). Unlike ZAS, the remote control only allows executing scenes but not saving them.

 **Buttons F1 and F2:** they allow sending 1-bit object configurable from ETS for sending a “0”, a “1” or switching between “0” and “1”.

 **Buttons Comfort, Night and Standby:** they allow directly establishing the special thermostat modes Comfort, Night and Standby. It is necessary that these modes had been previously enabled in ETS (thermostat).

 **Button Switch off:** a short press switches off the ZAS display. One press on the display or pressing a key of the remote control will activate the default luminosity of the device.

When pressing a key of the remote control, besides executing the associated function, ZAS will show the corresponding text message of that function and the LED associated to the button of the tactile area will light. Once the message is shown, the display will automatically return to the submenu where it was before pressing the button or to the main screen (if enabled by parameter) if it was previously in the Menu screen, in screensaver mode or in the indicators screen (if this screen is not enabled by parameter, the display returns to the screen where it was before receiving the order from the remote control: screensaver, menu or submenu).

3. ETS PARAMETERIZATION

For starting to parameterize ZAS it is necessary, once the ETS program has been opened, importing the data base of the product (Version 1.2 of the application program).

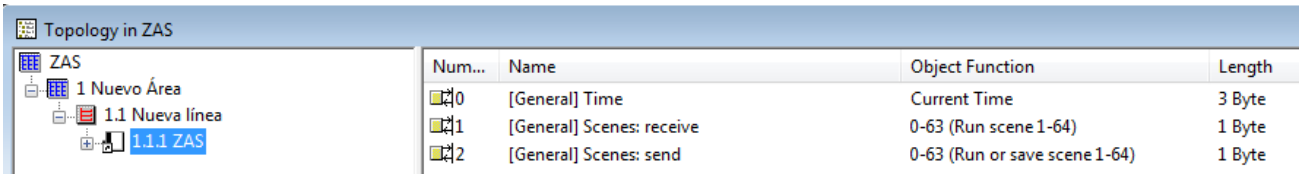
Next, the device is added to the project where desired. Click the right mouse button on the device and select "Edit parameters" for starting with the configuration.

In the following sections there is a detailed explanation about each of the different functionalities of ZAS in ETS.

3.1. DEFAULT CONFIGURATION

This section shows the default configuration from which the device parameterization starts.

The following figure shows the default communication objects: "[General] Time", to show the current time, as well as the scenes objects "[General] Scenes: receive" and "[General] Scenes: send".



The screenshot shows the 'Topology in ZAS' window. On the left, a tree view displays the project structure: 'ZAS' containing '1 Nuevo Área', which contains '1.1 Nueva línea', which in turn contains '1.1.1 ZAS'. On the right, a table lists the default communication objects.

Num...	Name	Object Function	Length
0	[General] Time	Current Time	3 Byte
1	[General] Scenes: receive	0-63 (Run scene 1-64)	1 Byte
2	[General] Scenes: send	0-63 (Run or save scene 1-64)	1 Byte

Figure 3.1. Default topology

When entering for the first time in the parameter edition of ZAS, the following screen will be shown, with the three main sections of ZAS parameterization: General, Inputs and Buttons

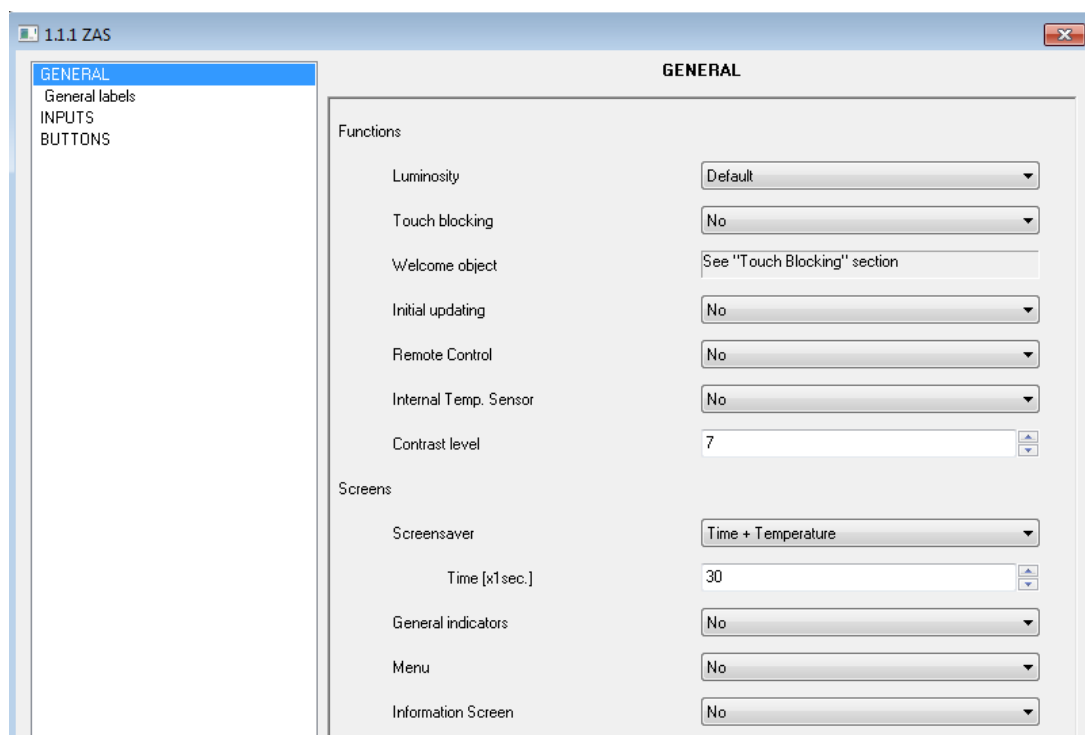


Figure 3.2. Configuration screen by default

3.2. GENERAL

The parameterization window General allows configuring the basic functionalities, menus and screens of the room controller ZAS.

The basic functions that can be configured in the section General are the following:

- 🌐 **General labels:** to insert the text chains that will identify the common options to several functions, as: OFF, ON, SCENE, SAVED SCENE, and the text chains to guide the user through the calibration process.
- 🌐 **Luminosity.** This functionality allows carrying out a customized configuration of the luminosity when it is in normal operation and in screensaver mode:
 - **Level with normal operation:** value between 5 (minimum luminosity) and 10 (maximum luminosity).
 - **Level with screensaver:** value between 3 (minimum luminosity) and 10 (maximum luminosity).

It is also possible to configure two special levels of luminosity than can be activated through 1-bit communication objects ("[General] Display lighting 1 and 2") or through scenes (via the specific object for scenes). Moreover, it can be configured the desired luminosity level for each special level (from 1 to 10).

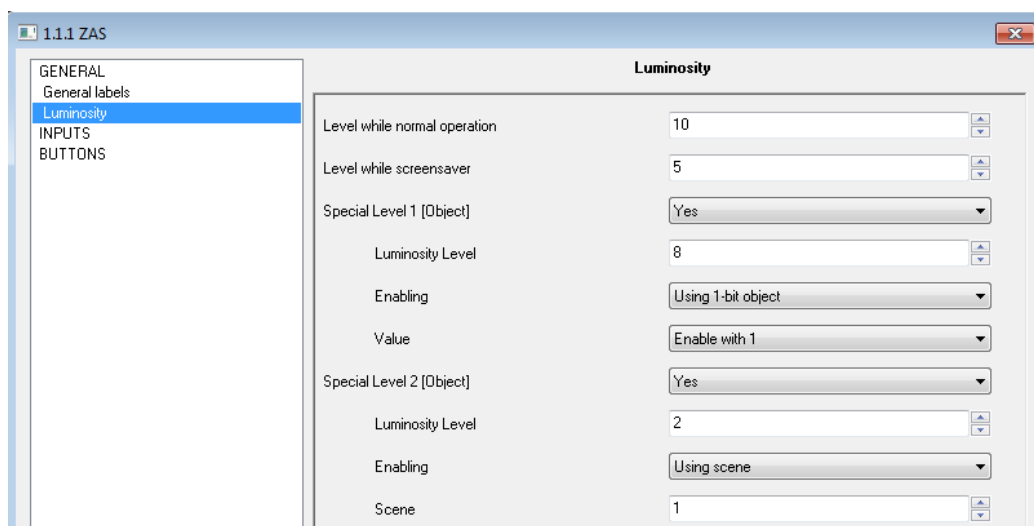


Figure 3.3. Luminosity function

 **Touch blocking.** This function allows blocking and unblocking the ZAS buttons. The following fields can be configured:

- **Blocking method:** by means of the 1-bit object "[General] Touch block", with value "0" or "1", configurable, via scenes (configurable scene number 1-64) or automatic blocking establishing the time to pass between the last key-press and the automatic blocking (time to block, in seconds).
- **Unblocking method:** by means of the 1-bit object "[General] Touch unblock", with value "0" or "1", configurable, via scenes (configurable scene number 1-64) or pressing the ZAS, which also allows a welcome object sending (1-bit object or scene).
- **Block IR as well?:** option to block the remote control at the same time with the touch panel ("Yes").

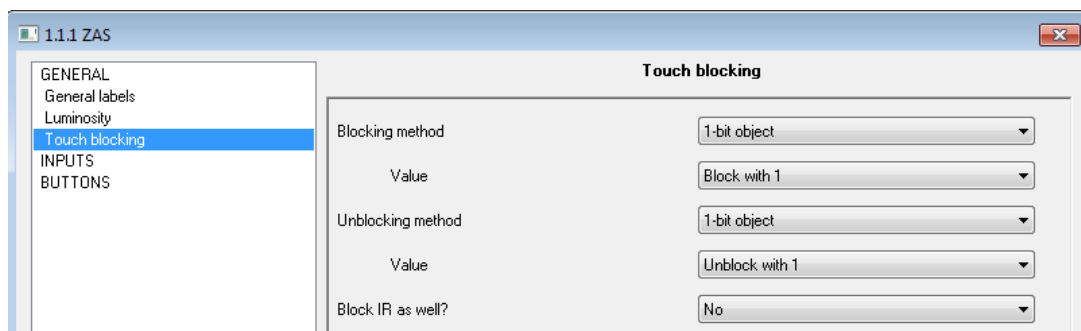


Figure 3.4. Touch blocking

Initial updating This functionality allows re-establishing the value of the general indicators (if enabled by parameter) as well as the values of the 1-bit objects associated to the buttons, after a power failure. Moreover, this functionality allows establishing a delay for sending the initial values since the power is recovered.

Note: *If this function is not enabled, the values prior to the bus power failure will be kept.*

Remote control. When enabling ("Yes") this option in the general screen, the operation of the remote control will be activated and the following features can be configured:

- **Special function 1 (F1):** configurable for sending the value "1", "0" or switching between them when the button F1 of the remote control is pressed. It will appear a new 1-bit communication object: "[IR] F1".
- **Special Function (F2):** same working as F1, but this time, when pressing the button F2 in the remote control. The 1-bit object "[IR] F2" will be enabled.
- **IR Blocking:** the remote control blocking is configured in the box "Touch blocking", already seen, since it can be only blocked with the touch panel altogether.

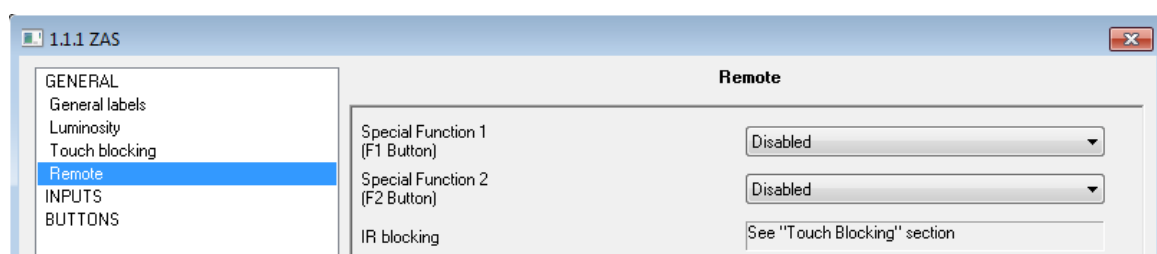


Figure 3.5. Remote control

Internal Temp. Sensor. ZAS has an internal temperature sensor with an associated 2-byte communication object ("[General] Temperature"), which appears when the the internal sensor function is enabled in the General parameterization screen. In the box "Internal Temp. Sensor" it can be configured to send this object periodically ("Temperature sending period") or after a temperature change ("Sending with a temperature change"), as well as calibrating the sensor ("Temperature sensor calibration"), in case a deviation between the measurement taken by the sensor and the room real temperature occurs.

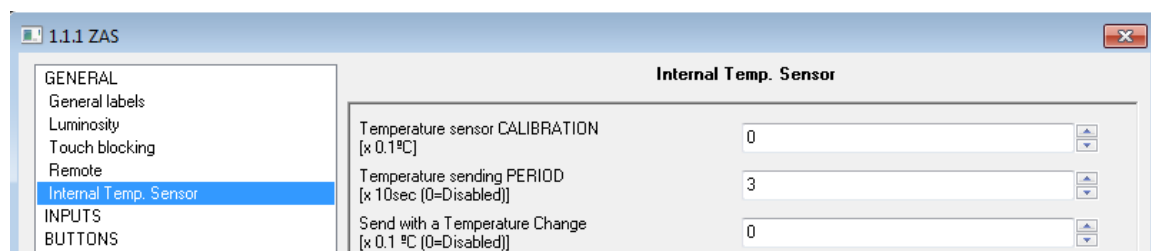


Figure 3.6. Internal Temperature Sensor

Contrast level: the initial contrast level of the display can be set (0-20). This value can be changed later, if the contrast function of the configuration menu is activated.

In the General section, it is possible to configure a set of **specific screens**, such as:

Screensaver: to configure the information shown in the display when ZAS is in the screensaver mode:

- **No**
- **Only time**
- **Only temperature**
- **Time + Temperature** (shows the current time and temperature, switching between the two values every 4 seconds).

The time (in seconds) between the last press and the screensaver appearance can be also configured.

 **General indicators:** enables a new screen with the same name, to configure up to 6 general indicators, of different types:

- **Binary (1 bit):** it shows different texts according to the received value.
- **Counter (1 byte)**
- **Percentage (1 byte)**
- **Enumeration (1 byte):** it allows the introduction of up to 6 numerical values with their corresponding labels (configurable texts by parameter).
- **Float (2 bytes):** it shows the received value specifying the units (configurable text by parameter).

The name of every indicator can be set (name to be shown in the display).

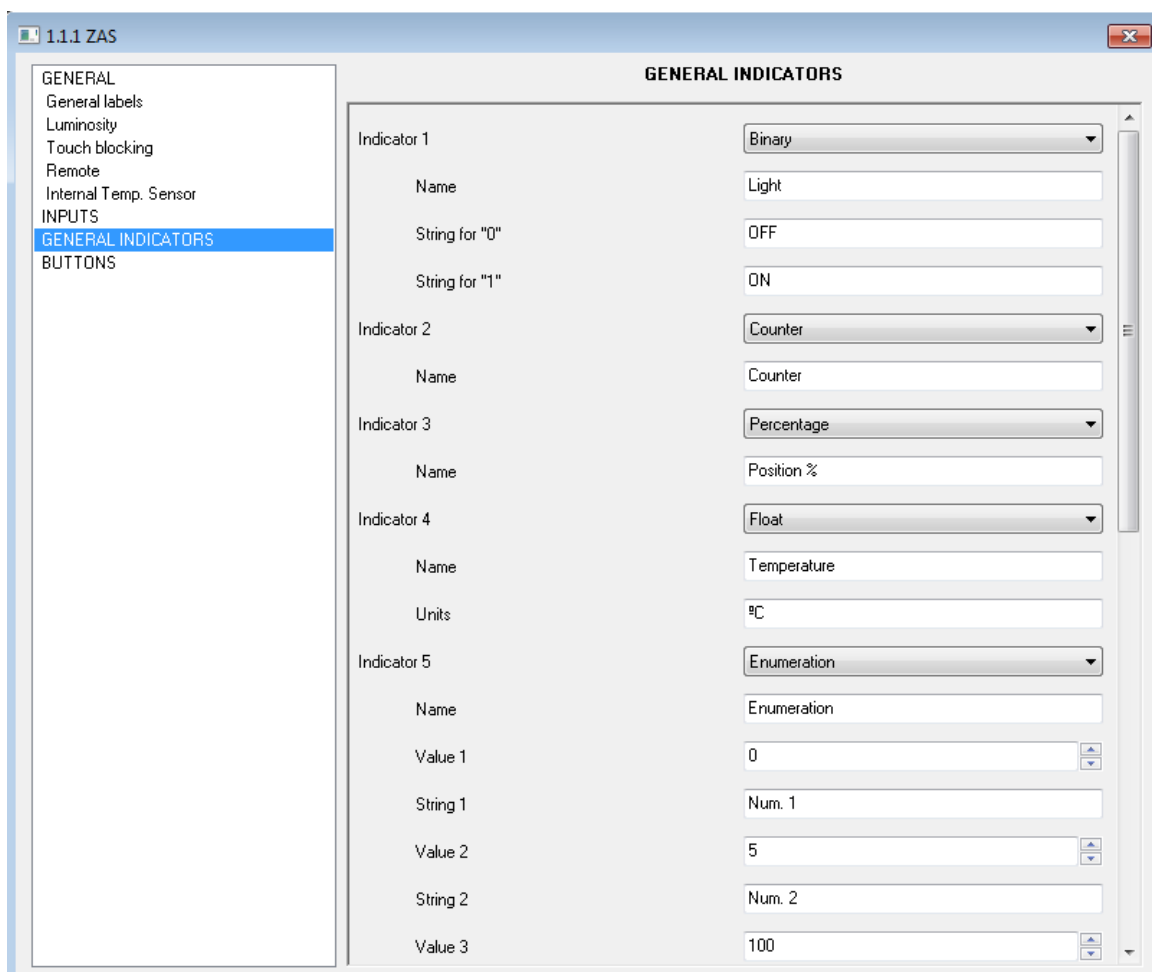


Figure 3.7. General indicators

 **Menu:** In the section Menu, the different options of ZAS can be enabled. When each of these options is enabled, it could be configured selecting the corresponding section in the lateral menu of the parameters edition. Each of them will be explained in detail in section 3.2.1. Menu options. In the field Header it is possible to write an identificative name for the Menu.

 **Information screen:** it shows an image of the touch buttons (see figure 3.8) with their corresponding labels in the display, making easy the identification of the controls associated to each button. This screen is acceded pressing the central area of the controller (among the touch buttons) and, after 10 seconds or when it is pressed again, the information screen is left behind.



Figure 3.8. Information screen

3.2.1. MENU OPTIONS

Once enabled the Menu in the general screen, its options can be enabled and configured: thermostat, scenes, presence simulation, security and configuration.

Each functionality has associated a screen that can be accessed through the main menu.

Moreover, it is possible to configure a **default password** ("Enable main menu security?"=Yes) to protect the menu options, the buttons and the menu screen itself.

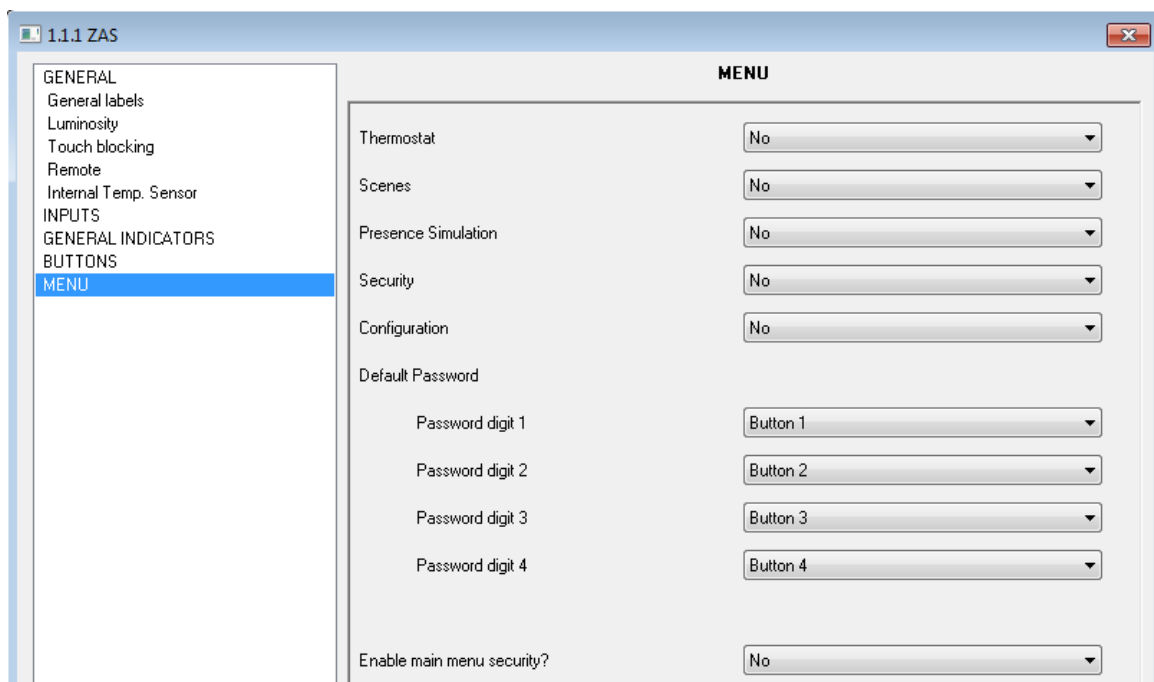


Figure 3.9. Menu configuration, by default

Next, the menu functionalities are explained in detail.

 **Thermostat** ZAS has the option to enable the thermostat for the following regulation types: **Heating**, **Cooling** or **Heating and Cooling**.

The default main thermostat screen in the one showed in Figure 3.10.

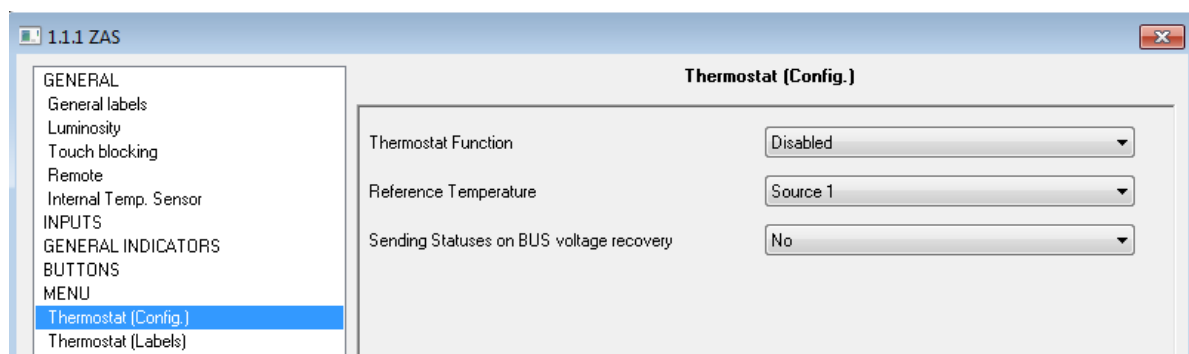


Figure 3.10. Thermostat Configuration

Once chosen the regulation type (or mode), a new access is enabled in the left menu:

➤ **Thermostat Function: Heating.** Configure the following features:

Heating	
Freezing protection	Yes
Protection temperature [x 1°C]	7
Control Method	2 Point Control
Lower Hysteresis [x 0.1°C]	10
Upper Hysteresis [x 0.1°C]	10
Additional Heating	No

- **Freezing protection:** Allows acting over the thermostat automatically if the temperature measured reaches a minimum temperature value defined in the "Protection Temperature" parameter (°C). The system is able to react instantaneously to face this situation, maintaining the temperature always above this fixed value. This protection only has effect with the thermostat switched off.

- **Control method:** choose the way the thermostat will control the temperature:

2 point control with hysteresis (it requires configuring the lower and upper hysteresis).

Proportional integral control (PI): continuous or PWM (it requires configuring the cycle time and its control parameters).

- **Additional heating:** enabling this field, the auxiliary system is asked to contribute to reach the "Set temperature" as soon as possible. The additional heating band (in tenths of degree) must be configured.

➤ **Thermostat Function: Cooling.** Configure the following features:

Cooling	
Overheating protection	Yes
Protection temperature [x 1°C]	35
Control Method	PI Control
Control Type	Continuous [1byte]
Cycle time [x 1 min]	15
Control Parameters	Cooling Ceiling [5K-240min]
Additional Cooling	Yes
Additional Cooling Band [x 0.1°C]	25

- **Overheating protection:** Allows acting over the thermostat automatically if the temperature measured reaches a maximum temperature value defined in the

"Protection Temperature" parameter (°C). The system is able to react instantaneously to face this situation, maintaining the temperature always below this fixed value. This protection only has effect with the thermostat switched off.

- **Control method:** the same as for "Heating".
 - **Additional cooling:** enabling this field, the auxiliary system is asked to contribute to reach the "Set temperature" as soon as possible. The additional cooling band (in tenths of degree) must be configured.
- **Thermostat Function: Heating and Cooling.** When the two modes are selected, a new drop-down box appears "Heating/Cooling automatic switching", to configure whether the transition between modes is carried out automatically (Always enabled), manually (Always disabled) or making use of 1 bit communication object ("1" to enable and "0" to disable). Moreover, the Heating and Cooling screens are shown.
- **Enable special modes (Comfort, Night, Standby):** the modes Comfort, Night and Standby are enabled, and the climate reaction can be chosen, among:
- It remains OFF and nothing changes
 - It remains OFF but Setpoint temperature is updated
 - Setpoint temperature changes and climate turn ON
- **Startup setting:** to configure the status of the thermostat after a bus power failure (Last, ON, OFF).
- **Reference temperature:** to select the source of the reference temperature: Source 1, Source 2 or a proportion between both measures (Proportion 1: 25%-75%; Proportion 2: 50%-50%; Proportion 3: 75%-25%).
- **Sending statuses on bus voltage recovery:** A new box will appear to parameterize the delay (in seconds) after which the thermostat statuses will be sent to the KNX bus.

Note: For further information about the thermostat of Zennio products working, please refer to the document **Clima I - Zennio Thermostat** available in the documentation area in the site: <http://www.zennio.com>.

 **Scenes.** ZAS allows configuring up to 6 different scenes for running or running and saving.

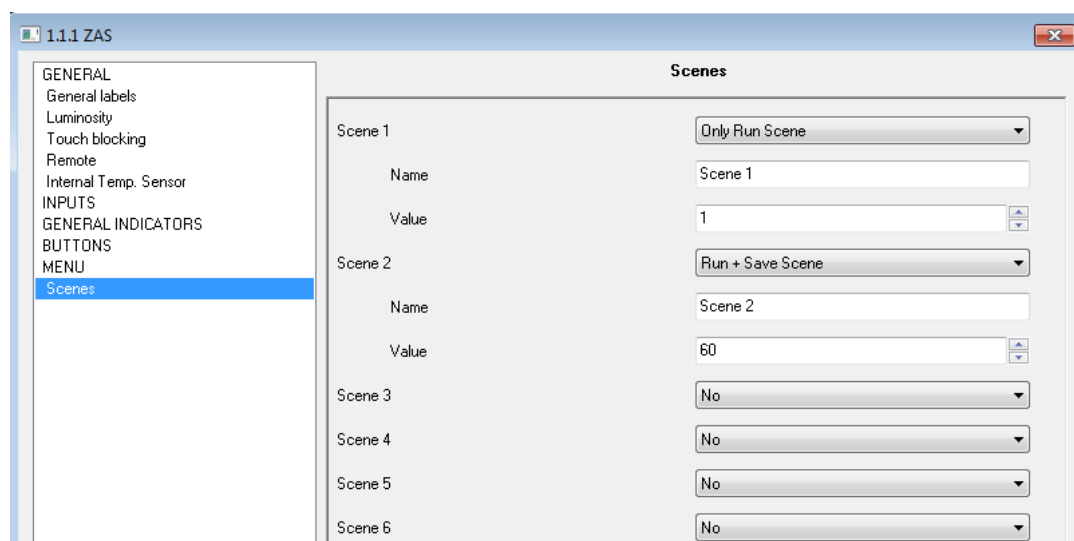


Figure 3.11. Scenes

All the scenes allow the configuration of a name and the value associated to the scene (scene number, between 1 and 64).

 **Presence simulation:** this function has two windows associated: one for its configuration and the other, for defining the labels of the functionality.

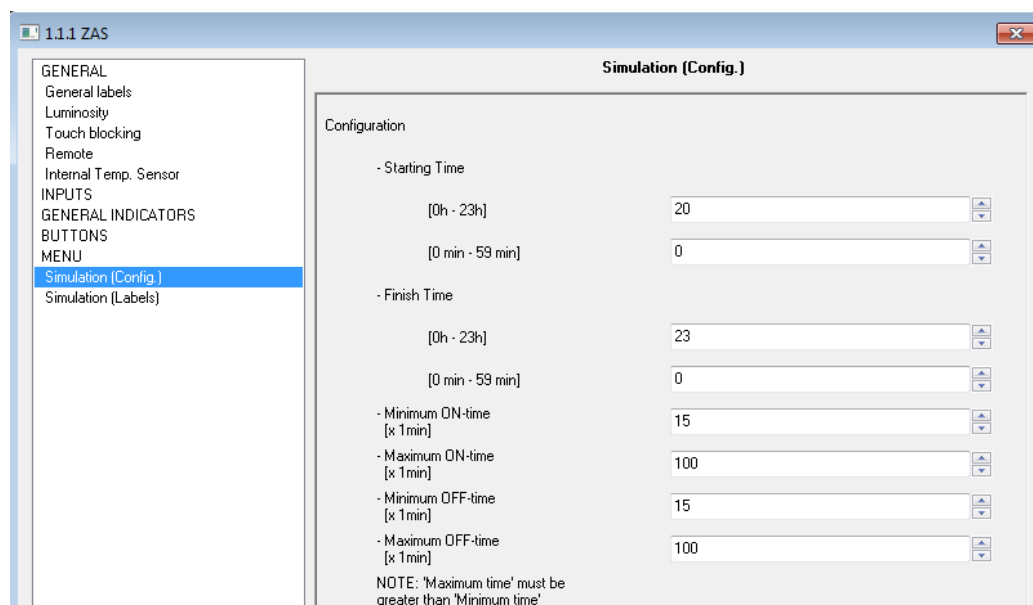


Figure 3.12. Presence simulation (configuration)

The presence simulation allows introducing the Starting time, Final time and the maximum and minimum ON and OFF times for the presence simulation.

Note: *The value established for Maximum Time (both ON and OFF) must be greater than the value established for Minimum Time, in order not to generate a wrong parameterization that may cause anomalous situations.*

 **Security:** The window Security allows establishing the labels and text messages that will be shown in the display for guiding the user in the process of code change and block/unblock of menus and buttons.

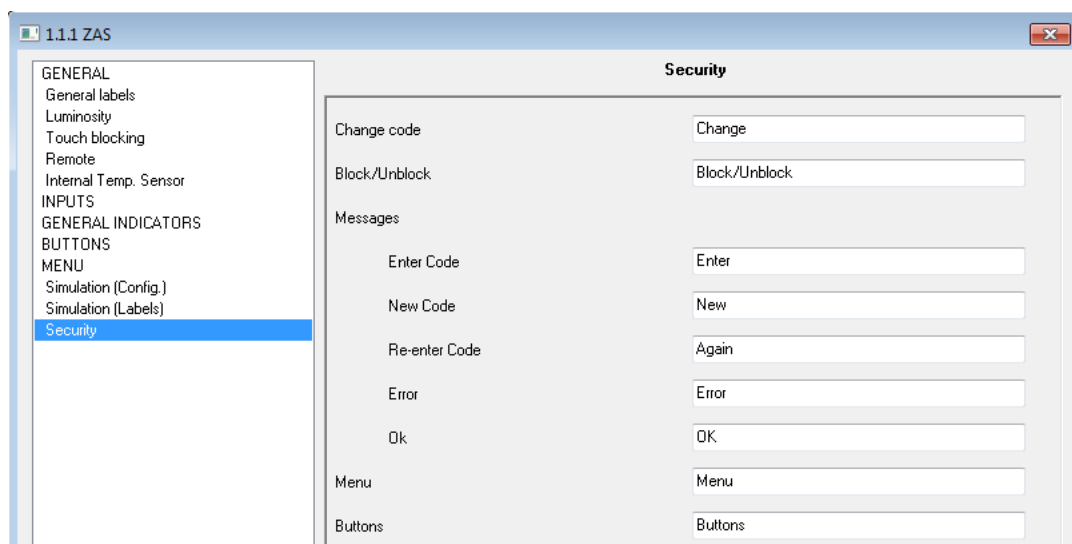


Figure 3.13. Security

 **Configuration:** in this screen, some control can be enabled and also the name with which they will appear in the display:

- **Contrast**
- **Time**
- **Programming LED**
- **Touch calibration**
- **Reset** (it will be necessary a long press, at least of 3 seconds, over the button OK to reset the ZAS).

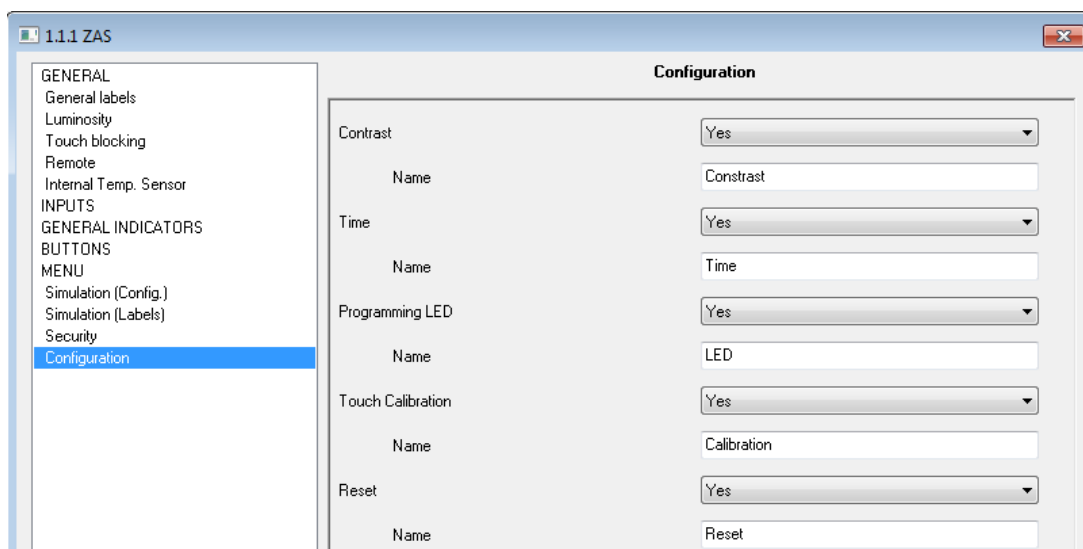


Figure 3.14. Configuration

3.3. INPUTS

ZAS has two inputs that can be configured as switching/sensor or temperature sensor.

Once the input is enabled, the access to the corresponding configuration window appears in the main menu according to the configured type of input.

3.3.1. SWITCH/SENSOR

When configuring an input as switching/sensor, it is necessary to select the action to carry out in the falling edge and the rising edge:

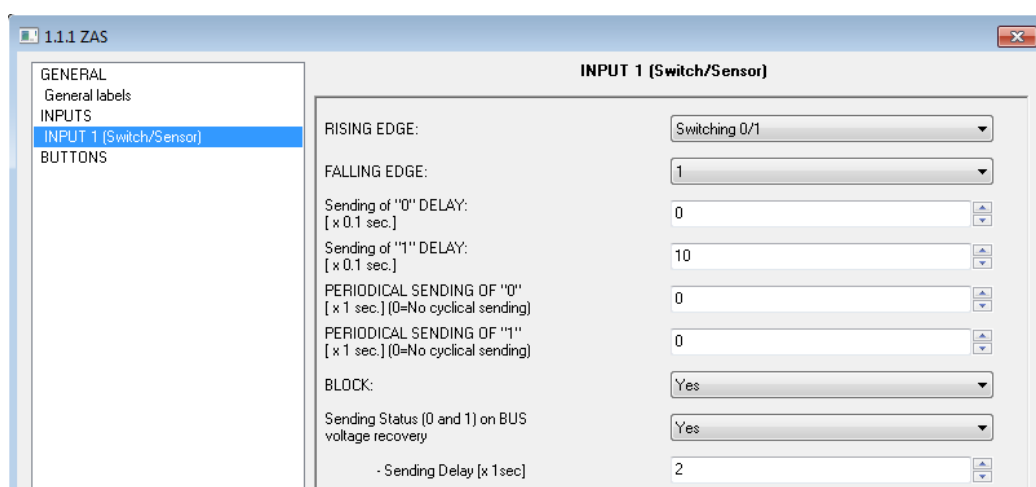


Figure 3.15. Input: Switch/Sensor

The available options are:

-  **Rising edge:** select the sending value when this edge happens:
 - **Nothing** (no action is performed).
 - **0:** the object "[Ix][Sensor] Edge" is sent to the KNX bus with value "0".
 - **1:** the object "[Ix][Sensor] Edge" is sent to the KNX bus with value "1".
 - **Switching:** sending "0" or "1" to the KNX bus, as appropriate.
-  **Falling edge:** select the sending value when this edge happens: Nothing, 0, 1 or switching.
-  **Sending of "0" Delay:** specify the time, in seconds, after which the value "0" will be sent, once received the corresponding order.
-  **Sending of "1" Delay:** specify the time, in seconds, after which the value "1" will be sent, once received the corresponding order.
-  **Periodical sending of "0":** define a cyclical sending, in seconds, of the value "0". The value 0 indicates that the periodical sending is not activated.
-  **Periodical sending of "1":** define a cyclical sending, in seconds, of the value "1". The value 0 indicates that the periodical sending is not activated.
-  **Block:** if "Yes" is chosen, a new 1-bit communication object "[Ix] Block" is enabled, to block or unblock the corresponding input (sending a "1" or a "0", respectively). Meanwhile the input is blocked, any order received from the KNX bus will be ignored (excepting the alarm, which has priority over the rest of functionalities).
-  **Sending statuses on bus voltage recovery:** this option allows configuring an automatic sending of the input status after a voltage recovery, with a sending delay (value between 2 and 255, in seconds).

3.3.2. TEMPERATURE PROBE

When configuring an input as a temperature probe, the following options can be configured:

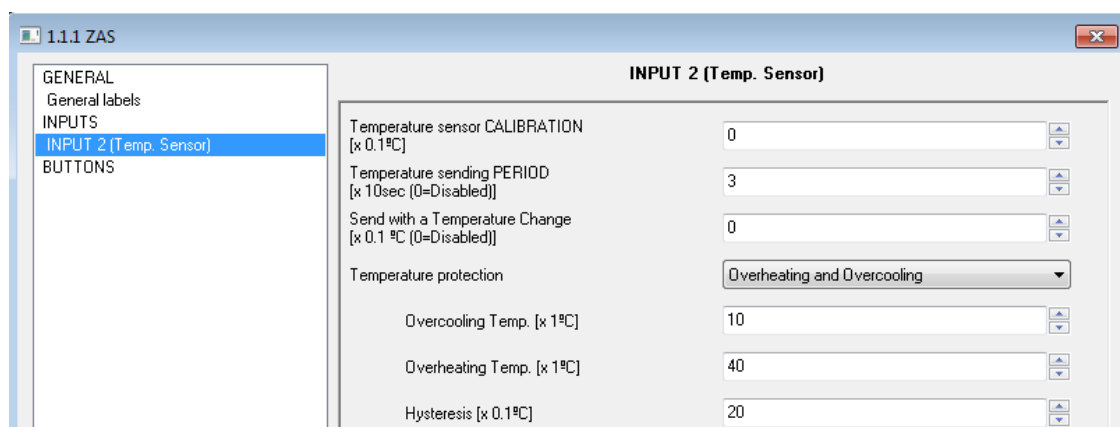


Figure 3.16. Input: Temperature probe

- 🔴 **Temperature sensor calibration:** to re-calibrate (setting the tenths of degree) the sensor to take as reference any other sensor present in the installation, thus synchronizing the measurement of the two.
- 🔴 **Temperature sending period:** to select by parameter the time (in tens of second) to send cyclically to the KNX bus the current temperature measurement. The value 0 indicates that the periodical sending is not activated.
- 🔴 **Send with a temperature change:** the current temperature will be only sent to the KNX bus when it has changed (increased or decreased) with regard to the last measure, the amount of degrees specified in this parameter (from 0 to 200 tenths of degree).
- 🔴 **Temperature protection:** to select an overheating, overcooling or both protection. Depending on the chosen protection, one or two communication objects will be enabled: "[Ix] Overheating" and "[Ix] Overcooling", which will indicate (with the value "1") if the corresponding temperature has been exceeded. It is necessary to define the overheating or the overcooling temperature (or both), in tenths of degree, as well as an hysteresis value.

3.4. BUTTONS

ZAS has 8 buttons, which can be configured individually or in couple, through the specific window "Buttons". Besides deciding whether the arrow buttons will be used or not.

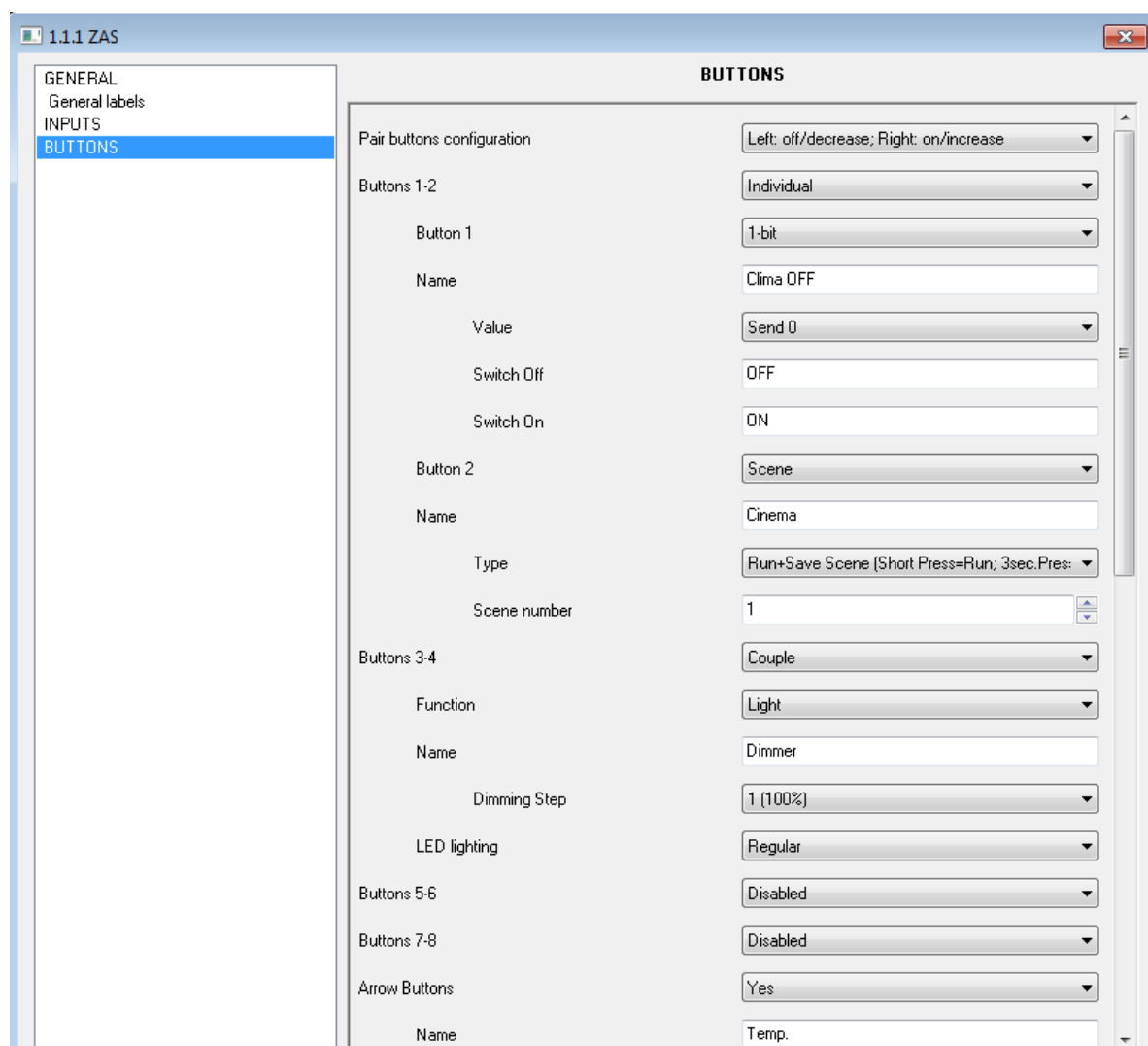


Figure 3.17. Buttons configuration

The "**Pair buttons configuration**" parameter sets whether the right button is used for On/Increment value sending and the left button is used for Off/Decrement value sending, or the opposite.

Once the type of operation (individual or couple) is selected, the functionality of each button or couple of buttons can be configured.

3.4.1. INDIVIDUAL BUTTONS

The configuration options for the individual operation of the buttons are the following:

-  **1 bit:** it allows sending the value "0", "1", or toggle between them. There is an associated 1-bit communication object called "[Bx] Binary control" The LED of the button will light when a "1" is sent and it will be off when sending a "0". If the Toggle option is selected, the parameter "LED lighting" will appear. This parameter enables the Regular lighting, during some seconds when the button is pressed, or Status-dependent lighting, where the LED of the button will light while the object status is "1" and it will remain switched off when the object status is "0".
-  **Scene:** it allows the configuration of the button for running a scene or running and saving a scene. The value of the configured scene will be sent by means of the general object "[General] Scenes: send".
-  **1 bit (Press & Release):** it allows sending to the KNX bus a binary value ("0" or "1") via the 1-bit object "[Bx] Binary control: press" while the button is pressed and the sending of the same value (or another) when it is released, via the object "[Bx] Binary control: release".
-  **1 byte constant:** it allows sending a 1 byte fixed value when the button is pressed, via the object "[Bx] 1-byte value". The range is 0 to 255.
-  **2 byte constant (unsigned integer):** it allows sending a 2 bytes fixed unsigned integer value when the button is pressed, via the object "[Bx] 2-byte (unsigned integer) value". The range is 0 to 65535.
-  **2 byte constant (floating point):** it allows sending a 2 bytes fixed floating point value when the button is pressed, via the object "[Bx] 2-byte (floating point) value". The range is 0 to 120.0.

3.4.2. COUPLE BUTTONS

The configuration options for the couple operation of the buttons are the following:

 **Switch:** enables a 1-bit communication object "[Bxy] Binary control" for each couple, which will be set to value "0" or "1", depending on the button that was pressed. This option allows introducing the name of the functionality, associated to the buttons, and a text message for the actions Switch On and Switch Off. The parameter "LED lighting" indicates if the couple has Regular lighting, with the LED on during some seconds when the button is pressed, or Status-dependent lighting, where the LED of the button will light while the object status is "1" and it will remain switched off when the object status is "0".

 **Light:** 3 communication objects are enabled: "[Bxy] Light On/Off", a 1-bit object to switch on/off a source of light; "[Bxy] Light dimming", 4-bits object for dimming the luminosity and "[Bxy] Light indicator", 1-byte object to indicate, in percentage, the luminosity status (0%=Off, 100%=On). The light dimming is carried out as follows:

- Off/Decrease button: a short press switches off the light ("[Bxy] Light On/Off"=0). A long press decreases the luminosity.
- On/Increase button: a short press switches on the light ("[Bxy] Light On/Off"=1). A long press increases the luminosity.

This option allows introducing the name of the functionality of these buttons and selecting the dimming step, in percentage (see table 3.1).

The parameter "LED lighting" indicates if the couple has Regular lighting, with the LED on during some seconds when the button is pressed, or Status-dependent lighting, where the LED of the button will light while the object status is "1" and it will remain switched off when the object status is "0". The object "[Bxy] Light On/Off" must be linked to the status object of the light actuator so that the LED is updated.

Dimming step	Necessary pulsations for a complete regulation (0-100%)
(1). 100%	1
(2). 50%	2
(3). 25%	4
(4). 12.5%	8
(5). 6.25%	16
(6). 3.1%	32
(7). 1.5%	64

Table 3.1. Dimming step

 **Shutter:** it allows controlling the movement of shutters by means of two binary objects: "[Bxy] Move shutter" ("0"=Up and "1"=Down) and "[Bxy] Stop shutter" and 1-byte object "[Bxy] Shutter position", which indicates the position of the shutter, in percentage, at any time (100%=Down, 0%=Up).

- Decrease button: a long press moves down the shutter while a short press stops the shutter, sending the value "1" through the object "[Bxy] Stop shutter".
- Increase button: a long press moves up the shutter while a short press stops the shutter, sending the value "0" through the object "[Bxy] Stop shutter".

 **Scaling:** allows sending a percentage by means of the object "[Bxy] Scaling" associated to the couple of buttons.

- Decrease button: a short press decreases the percentage value one by one while a long press decreases the value 10 by 10.
- Increase button: a short press increases the percentage value one by one while a long press increases the value 10 by 10.

 **Counter:** allows sending an integer value by means of the object "[Bxy] Counter" associated to the couple of buttons.

- Decrease button: a short press decreases the counter value one by one while a long press decreases the value 10 by 10.
- Increase button: a short press increases the counter value one by one while a long press increases the value 10 by 10.

 **Enumeration:** allows sending a numerical value (0-255) via the object "[Bxy] Enumeration" associated to the couple of buttons. Up to 6 values can be configured for the enumeration (Value 1-Value 6). It is necessary to introduce a label for each value in order to enable them in the enumeration menu. When pressing the right and left button, the different labels will be shown in the display and their value sent to the bus. First press will show the current value of the control.

The selected value can be changed using short presses or maintaining the button pressed.

 **Temperature:** allows controlling a temperature value (between 0 and 100°C). This functionality has associated a 2-byte communication object: "[Bxy] Temperature control".

- Decrease button: a short press decreases the temperature 0.5 by 0.5°C. A long press decreases the temperature value 1 by 1°C.
- Increase button: a short press increases the temperature 0.5 by 0.5°C. A long press increases the temperature value 1 by 1°C.

ANNEX I. COMMUNICATION OBJECTS

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
GENERAL	0	3 bytes	I/O	TRW	-	00:00	Last	[General] Time	Current time
	1	1 byte	I	W	0-63	Indifferent	Indifferent	[General] Scenes: receive	0-63 (Run Scene 1-64)
	2	1 byte	O	T	0-63	Indifferent	Indifferent	[General] Scenes: send	0-63 (Run or save scene 1-64)
	3	1 bit	I	W	0/1	Indifferent	Indifferent	[General] Display lighting 1	1=Light the display; 0=No action
	4	1 bit	I	W	0/1	Indifferent	Indifferent	[General] Display lighting 2	1=Light the display; 0=No action
	5	1 bit	I	W	0/1	Indifferent	Indifferent	[General] Touch block	1=Block; 0=Nothing 0=Block; 1=Nothing
	6	1 bit	I	W	0/1	Indifferent	Indifferent	[General] Touch unblock	0=Unblock; 1=Nothing 1=Unblock; 0=Nothing
	7	1 bit	O	T	0/1	Indifferent	Indifferent	[General] Welcome object	1-bit generic control
	8	2 bytes	O	TR	0-95°C	25°C	Indifferent	[General] Temperature	Internal sensor value
INDICADORES	9	1 bit	I	TWU	0/1	0	Last	[Ind 1] Binary indicator	1-bit generic indicator
	10	1 bit	I	TWU	0/1	0	Last	[Ind 2] Binary indicator	1-bit generic indicator
	11	1 bit	I	TWU	0/1	0	Last	[Ind 3] Binary indicator	1-bit generic indicator
	12	1 bit	I	TWU	0/1	0	Last	[Ind 4] Binary indicator	1-bit generic indicator

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
INDICADORES	13	1 bit	I	TWU	0/1	0	Last	[Ind 5] Binary indicator	1-bit generic indicator
	14	1 bit	I	TWU	0/1	0	Last	[Ind 6] Binary indicator	1-bit generic indicator
	15	1 byte	I	TWU	0-255	0	Last	[Ind 1] 1 byte indicator	1 byte generic indicator
	16	1 byte	I	TWU	0-255	0	Last	[Ind 2] 1 byte indicator	1 byte generic indicator
	17	1 byte	I	TWU	0-255	0	Last	[Ind 3] 1 byte indicator	1 byte generic indicator
	18	1 byte	I	TWU	0-255	0	Last	[Ind 4] 1 byte indicator	1 byte generic indicator
	19	1 byte	I	TWU	0-255	0	Last	[Ind 5] 1 byte indicator	1 byte generic indicator
	20	1 byte	I	TWU	0-255	0	Last	[Ind 6] 1 byte indicator	1 byte generic indicator
	21	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 1] Floating indicator	Generic float indicator
	22	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 2] Floating indicator	Generic float indicator
	23	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 3] Floating indicator	Generic float indicator
	24	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 4] Floating indicator	Generic float indicator
	25	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 5] Floating indicator	Generic float indicator
	26	2 bytes	I	TWU	0-6553.5	0	Last	[Ind 6] Floating indicator	Generic float indicator
BUTTONS	27-30	1 bit	I/O	TRW	0/1	0	Last	[Bxy] Binary control	1-bit generic control
								[Bxy] Light On/Off	0=Off; 1=On
								[Bxy] Move shutter	0=Up; 1=Down

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
BUTTONS	31-34	4 bits	O	TR	0-15	0	Last	[Bxy] Light Dimming	4-bits dimmer control
	35-38	1 byte	O	TR	0-255; 0-100%	0	Last	[Bxy] Light indicator	0%=Off; 100%=On
								[Bxy] Shutter position	0%=Top; 100%=Bottom
								[Bxy] Scaling	1 byte generic control
								[Bxy] Counter	1 byte generic control
								[Bxy] Enumeration	1 byte generic control
	39-42	2 bytes	I/O	TRW	0-100°C	25°C	Last	[Bxy] Temperature control	from 0°C to 100°C
	43-46	1 bit	O	TR	0/1	Indifferent	Indifferent	[Bxy] Stop Shutter	0 or 1 -> Stop
	47	2 bytes	I/O	TRW	0-100°C	25°C	Last	[Arrows] Temperature control	from 0°C to 100°C
	48-55	1 bit	I/O	TRW	0/1	0	Last	[Bx] Binary control	1-bit generic control
								[Bx] Binary control: press	1-bit generic control
	56-63	1 bit	O	TR	0/1	0	Last	[Bx] Binary control: release	1-bit generic control
	101-108	1 byte	O	TR	0-255	Indifferent	Last	[Bx] 1 byte value	0-255
INPUTS	109-116	2 bytes	O	TR	0-65535 0-120.0	Indifferent	Last	[Bx] 2-byte value (unsigned int)	0-65535
								[Bx] 2-byte value (float)	0-120.0
	64-65	1 bit	I	W	0/1	0	Last	[Ix] Block	1=Input disabled; 0=Input free
	66-67	1 bit	O	TR	0/1	0	0	[Ix] [Sensor] Edge	Edge -> Sending of "0" or "1"
	70-71	2 bytes	O	TR	0-95°C	25°C	Last	[Ix] Current temperature	Temperature sensor value
	72-73	1 bit	O	TR	0/1	0	Last	[Ix] Overcooling	1=Overcooling; 0=No Overcooling
PRESENCE SIMULATION	74-75	1 bit	O	TR	0/1	0	Last	[Ix] Overheating	1=Overheating; 0=No Overheating
								Presence simulation	0=Disabled; 1=Enabled

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
PRESENCE SIMULATION	69	1 bit	O	TR	0/1	0	Last	Simulation channel	0=Off; 1=On
MENU THERMOSTAT	76	1 bit	I	TW	0/1	0	Indifferent	Thermostat - ON/OFF	0=Off; 1=On
	77	1 bit	O	TR	0/1	0	Last	Thermostat - ON/OFF Status	0=Off; 1=On
	78	2 bytes	I	TW	0-95°C	25°C	Last	Setpoint Temperature	from 0°C to 95°C
	79	2 bytes	O	TR	0-95°C	25°C	Last	Setpoint status	from 0°C to 95°C
	80	1 bit	I	TW	0/1	0	Last	Cool/Heat	0=Cool; 1=Heat
	81	1 bit	O	T	0/1	Indifferent	Indifferent	Control variable (Cool)	2 point control
								Control variable (Cool)	Proportional integral (PWM)
	82	1 bit	O	T	0/1	Indifferent	Indifferent	Control variable (Heat)	2 point control
								Control variable (Heat)	Proportional integral (PWM)
	83	1 byte	O	T	0-255	Indifferent	Indifferent	Control variable (Cool)	Proportional integral (Continuous)
	84	1 byte	O	T	0-255	Indifferent	Indifferent	Control variable (Heat)	Proportional integral (Continuous)
	85	1 bit	O	T	0/1	0	0	Additional cool	Temp > (Setpoint+Band) => "1"
	86	1 bit	O	T	0/1	0	0	Additional Heat	Temp < (Setpoint+Band) => "1"
	87	1 bit	I	TW	0/1	0	Last	Comfort mode	1=Set comfort mode; 0=No action
	88	1 bit	I	TW	0/1	0	Last	Noght mode	1=Set standby mode; 0=No action
	89	1 bit	I	TW	0/1	0	Last	Standby mode	1=Set comfort mode; 0=No action
	90	2 bytes	I	W	0-95°C	26°C	Last	Comfort setpoint (cool)	Temperature for comfort mode

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1st TIME	RESET		
MENU THERMOSTAT	91	2 bytes	I	W	0-95°C	23°C	Last	Comfort setpoint (heat)	Temperature for comfort mode
	92	2 bytes	I	W	0-95°C	28°C	Last	Night setpoint (cool)	Temperature for night mode
	93	2 bytes	I	W	0-95°C	21°C	Last	Night setpoint (heat)	Temperature for night mode
	94	2 bytes	I	W	0-95°C	30°C	Last	Standby setpoint (cool)	Temperature for standby mode
	95	2 bytes	I	W	0-95°C	19°C	Last	Standby setpoint (heat)	Temperature for standby mode
	96	2 bytes	I	W	0-95°C	25°C	Last	Temperature source 1	External sensor value temp.
	97	2 bytes	I	W	0-95°C	25°C	Last	Temperature source 2	External sensor value temp.
	98	1 bit	I	W	0/1	0	Last	Heating/Cooling automatic switching	1=Enabled; 0=Disabled
REMOTE CONTROLLER	99	1 bit	O	T	0/1	0	Last	[IR] F1	1-bit generic control
	100	1 bit	O	T	0/1	0	Last	[IR] F2	1-bit generic control



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