PRODUCT MANUAL

LUZEN ONE

Universal Dimmer

ZN1DI- 4001

Edition 6

Version 2.2

INDEX

1. OVERVIEW

1.1. PRODUCT

The Dimmer **LUZEN ONE** operates according to the phase control or cut on principle and enables the switching/dimming of the different light points connected to the Dimmer Channel, adjusting automatically the parameterized values.

Up to 9 different functions available, among those that stand out:

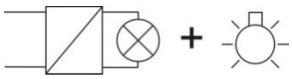
- Configuration of "**Timers**" and "**Flashing**"
- Configuration of "**Scenes**" and "**Sequences**"
- **Secondary ON/OFF** available
- **Blocking** option available

1.1.1. LOAD MIXING

The Dimmer LUZEN ONE allows the load mixing in the Dimmer Channel Output.

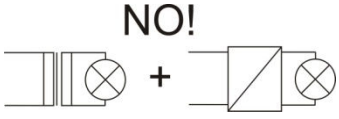
Ohmic loads, as well as inductive and capacitive ones may be connected to the Dimmer Channel with a maximum wattage of approx. 400 W/VA (phase control), having always on mind the following restrictions:

For mixed loads with conventional transformers, do not exceed a 50% share for the ohmic load (incandescent lamps, HV halogen lamps).



Conventional ohmic loads can be installed together with capacitive loads (Electronic transformer) in any proportion.

Do not connect capacitive loads and electronic transformers together with inductive loads, e.g. conventional transformers.



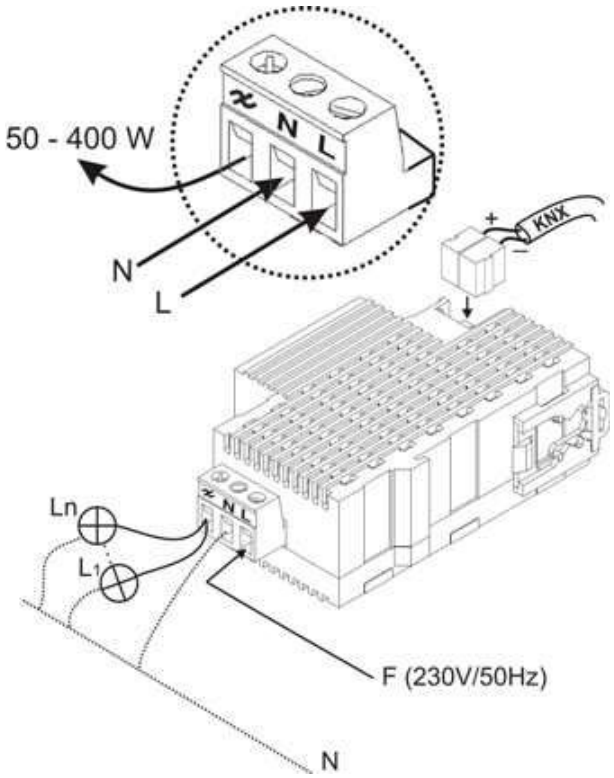
1.1.2. WIRING

The **KNX bus** connection is carried out via the bus connecting terminal included with the device. The cable to the load and the mains voltage are connected via plug-in terminals with a screw connection. The cables can be screwed onto the plug-in terminal before installing the device and then inserted at a later date.

The insertion of the terminal may not take place in the energized state of the device.

All the devices that are installed next to the dimming actuator must at least be equipped with basic insulation.

Next picture shows the scheme of device connections.



Nota: Due to some changes in socket and terminal block of the dimmer, if you use devices with a batch previous to 09AAP, downloading the document "Technical note about terminals" is recommended. This document can be accessed in our Products-Downloads area for Luzen One in our web www. Zennio.com.

Please refer to the product **data Sheet,** which is included in the original product packaging, and is also available to be downloaded from the Web **www.zennio.com**. In this document you will find detailed information on the device technical characteristics, as well as installation and security information of the Dimmer **LUZEN ONE**.

1.2. ETS PARAMETERIZATION

Access via ETS to the main parameterization screen, shows two main sections:

<<GENERAL>>

<<FUNCTIONS>>

In the **General Section**, Logical Functions can be selected and, in this case, a new section will appear in the main parameterization screen:

<<LOGICAL FUNCTIONS>>

Every section in the parameterization screen, as well as the functionality description of the device, is detailed next in this manual.

2. GENERAL

This section of the settings allows determining several global characteristics of the device.

- **TYPE OF LOAD:** It will be the integrator who determines the type of load control by the actuator. This parameter provides the following selectable options:

    - Inductive
    - Inductive-Resistive
    - Resistive
    - Capacitive-Resistive
    - Capacitive

Before explaining the different parameterization sections, it is necessary to mention an essential characteristic of the Dimming actuator, the "**Smooth ON**" or "**Smooth Step**".

So called at a softly change of the brightness intensity managed by de Dimmer Channel. One of the main advantages of this feature, is the avoiding of a sudden temperature change in the filaments of the light points during the switching On/Off , which implies a significant increase on the average lifespan of the bulbs,…..

This section of the parameterization environment allows the integrator to set the duration of this "**Smooth ON**" or "**Smooth Step**", as well as customizing some aspects relative to the maximum brightness to be emitted by the light points managed by the Dimmer Channel.

- **REGULATION STEP DURATION (Smooth):** This parameter sets the time the Dimmer takes to softly pass from 0% (Off) to a 100% brightness percentage (On) in the Dimmer Channel Output. The same can be said for the "Off to On" status change.

Note: This time can be extrapolated to the Dimmer internal calculation when the device has to pass from 50% to 100% (in this case, the time the Dimmer takes will be half of the value parameterized in this field).

- **MAX LIGHTING LEVEL:** Allows the integrator to customize the maximum brightness level to be applied to the Dimmer Channel Output.

    - **Normal:** Corresponding with the 100% brightness level.

- **Eco Mode:** Customize the maximum brightness level applied to the Dimmer Channel Output.
  - ✓ **Never Exceed x% energy level:** The valid setting range for this field is [20%.....99%].

- **LOGICAL FUNCTIONS**: it allows enabling/disabling the logical functions module in Luzen ONE. When it is enabled, a new section appears in the menu of the main parameters screen.

3. FUNCTIONS

The Dimmer **LUZEN ONE** has up to nine different functions to be enabled.

Every available function is detailed next:

3.1. STATUS OBJECT

This function allows the integrator to independently enable the 1 bit (On/Off) and/or the 1 byte (percentage) Status Objects in the Channel Output.

These objects are meant to feedback switching and value stats of the dimming actuator.

- **1 BIT (ON/OFF):** Enable a 1 bit Status Object; in charge of updating the **ON/OFF** status of the Dimmer Channel when required.
    - **SENDS "1" WHEN:** This parameter allows the integrator to set when the Channel Status output signal will be sent to the **BUS**.
        - **Totally On:** Corresponding with the 100% brightness percentage.
        - **Partially On:** Any brightness percentage within the range **[1%....99%]** will be always considered by the Dimmer as **ON** (for status updating purposes), in the same way, any other percentage will be considered as an **OFF** (except the 100% lighting level).
- **1 BYTE (PERCENTAGE):** Enable a 1 byte Status Object, in charge of the real-time updating of the Dimmer Status Channel, showing with **precision of "+-1 %",** the brightness level applied to the Dimmer Channel output when required.

***Note**:* 100% will be always considered as an **ON** for any purpose.

3.2. SIMPLE TIMER

It is possible to control the Dimmer Channel Output in a temporized way by applying delays for the **Channel ON**, as well as for the **OFF**. In addition to this, it is also possible to set the **ON duration** by parameter.

The parameters detailed next are used in the timer as follows:

- When “**1**” is sent to the object ”**Timer**”, an ON order is sent to the channel output applying the "On Delay" and the "On Duration"
- When “**0**” is sent to the object “**Timer**”, an OFF order is sent to the channel output applying the "Off Delay".

➢ **ON DELAY:** This parameter sets the elapsed time between the "**ON**" order (over the “**Timer**” object) and the "**ON**" Channel Output switching. This value must be set with precision to tenths of a second (e.g. to get “2.5” seconds, set “25”). If no delay is needed, please set “0” in this field.

➢ **OFF DELAY:** This parameter sets the elapsed time between the "**OFF**" order (over the “**Timer**” object) and the "**OFF**" Channel Output switching. Similar to the "On Delay" working.

➢ **ON DURATION:** This parameter sets the time the Channel Output remains **ON** before switching to **OFF**. Setting "0" in this field means unlimited duration.

➢ **MULTIPLY:** Consists in increasing (multiply) the timer as many times as the value “**1**”/ “**0**” is received through the object “**Timer**”.

- **No multiply:** If during a temporized **ON**, a "1" is received through the object "Timer", the Dimmer Luzen will start counting again the time set in the "On duration" field.
- **Multiply:** If during a temporized **ON**, a "1" is received through the object "Timer", the Dimmer Luzen doubles the time set in the "On duration" field. If another "1" is received, the time triples, and so on. Similar to the Temporized Off.

3.3. FLASHING

This function allows the integrator to conduct a sequence of type **ON-OFF-ON-OFF**… in the Dimmer Channel Output, as well as to set the **On/Off** duration of the flashing applied in the output.

Therefore, the number of repetitions can be set (up to a maximum of 255), as well as the status the Dimmer output will remain, after last repetition.

The Flashing function starts by sending a "**1**" to the object “**Flashing**”, and stops sending a “**0**".

➢ **ON DURATION:** Set the time the output will remain **ON** when the Flashing function is active.

- **OFF DURATION:** Set the time the output will remain **OFF** when the Flashing function is active.

- **REPETITIONS:** Select the number of repetitions to carry out when the Flashing function is active. For an **unlimited number of repetitions**, please set the value "**0**" in this field.

- **STATUS AFTER LAST REPETITION:** Allows the integrator to set the Dimmer Channel Output status after the last Flashing repetition.

Note: Both functions "**Simple Timer** " and "**Flashing**" are independent from each other, and also independent from the normal "**ON/OFF**" and the Secondary "**ON/OFF Control**", as all of them are managed from four different communication objects.
Example: When an ON order is sent to the object "**Timer**", a temporized ON starts in the Dimmer Channel Output. If before this comes to the end, an OFF order is sent to the object "**ON/OFF**", the output will switch off and the temporization will finish. In fact, any other order sent to the Dimmer will finish the temporization.

3.4. SCENES

Scenes or "lifestyles" consist of a synchronized activation of some devices in our domotic installation, so that different predefined atmospheres are generated.

This function allows the integrator to control the Dimmer Channel Output through the object "**Scenes**", using 1 byte objects.

The **DPT** (Datapoint Type) **Scene Control** is a 1 byte Object with the following format:

C	R	N ≡ Scene Number
1 bit	1 bit	6 bits

- **C** **0** = Activate the Scene corresponding to the field Scene.

  1 = Learn the Scene corresponding to the field Scene.

- **R** **Reserved Field with Value "0"**

- **N** **Scene Number Range [0…..63]**

Note I: *If C=0, the DPT valid range is [0….63], whereas if C=1, the DPT valid range is [128…..191]*
Note II*: Activate Scene 1 ≡ DPT=0*
Activate Scene 2 ≡ DPT=1
….
Activate Scene 64≡ DPT=63
Learn Scene 1 ≡ DPT=128
Learn Scene 2 ≡ DPT=129
….
Learn Scene 64≡ DPT=191

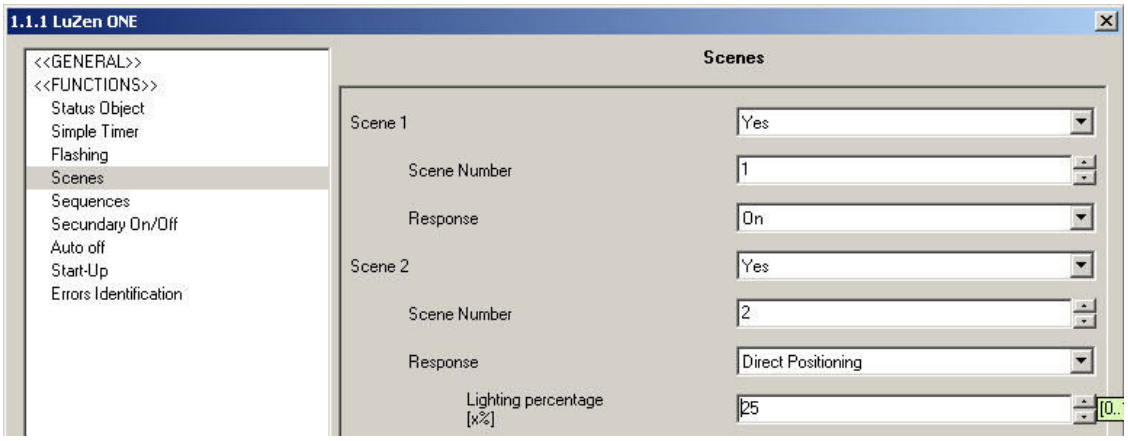
A single Communication Object will be valid to Activate Scenes and/or Learn them (depending on the C-value).

Up to five different scenes may be configured through two different parametrizable fields:

- **SCENE NUMBER:** This is a number defined by the user to identify the scene or the “lifestyle” to be created.
- **RESPONSE:** Set the order the dimmer channel output must carry out when the corresponding scene number is received through the object "Scenes". Possible responses are:
  - **Off / Smooth Off**
  - **On / Smooth On**
  - **Positioning / Smooth Positioning:** When setting one of this two options, a new parameter appears
    - ✓ **LIGHT PERCENTAGE (%):** Set the brightness percentage the Channel Output will remain, when a 1 byte Scene Control object is received through the object "Scenes".

Example: *Two different scenes parameterized on an installation (Nº1 & Nº 2). Responses of the Dimmer will be:*
Scene 1: ON
Scene 2: Smooth Positioning 25%

The parameterization environment will remain as follows:



3.5. SEQUENCES

This function allows the integrator to control the Dimmer Channel Output through the object "**Sequences**", using for it (1 byte) **BUS** Scenes.

A **sequence** consists of a Dimmer Channel Output programming in steps, phases or actions, up to a maximum of four. Every action can be parameterized via two different fields, "Response" and "Duration".

Sequences are activated via the same DPT explained in **Section 3.4 Scenes**, by sending it to the object "**Sequences**". Up to a maximum of five different sequences can be programmed through two different parametrizable fields.

- **SEQUENCE NUMBER:** This is a number defined by the user to identify the sequence to be created.
- **NUMBER OF ACTIONS:** Set the number of stages in which the sequence will be divided [1…4]

  For every enabled stage, two new parameterizable fields appear:

- **RESPONSE:** Set the order the Dimmer Channel Output must conduct when the corresponding sequence number is received through the object "Sequences". Possible responses are:
  - **Off / Smooth Off**
  - **On / Smooth On**
  - **Positioning / Smooth Positioning:** When setting one of this two options, a new parameter appears

- ✓ **LIGHT PERCENTAGE (%):** Set the brightness percentage the Channel Output will remain, when a 1 byte Sequence Control object is received through the object "Sequences".

- ➢ **DURATION:** Set the time the corresponding action will last, up to a maximum of 255 minutes.

- ➢ **FINAL STATUS:** Set the status the Channel Output will remain when the last action of a sequence finishes.

3.6. BLOCK

This function makes possible to block the dimmer channel output, in other words, to disable the channel output.

The channel output is blocked by sending a "**1**" to the object "**Block**" and unblocked by sending a "**0**".

***Note**:* All the orders sent to the Dimmer while being blocked, will be lost.

3.7. SECONDARY ON/OFF

This feature gives the integrator the possibility to enable a "**Secondary ON/OFF**" to customize the ON/OFF brightness level of the channel output, and at the same time defining if the switching will be immediate or soft.

Note: This function is totally independent from the "Normal On/Off", as it has an specific communication object for it.
Example: *Guess that besides the "Normal On/Off"; it is necessary an specific brightness level and Dimmer response, e.g: children bedrooms, in hospitals, with patients… where the maximum brightness level may be harmful in the presence of these people.*
In this cases, the "Secondary On/Off "may be really useful, as we will always have both options (Normal On/Off & Secondary On/Off) to choose, depending on the situation.

- ➢ **LIGHTING LEVEL WHEN "OFF":** This field allows the integrator to define the brightness percentage for the secondary OFF order.

- ➢ **OFF STEP LEVEL:** Define whether the OFF will be immediate or soft (smooth)

- ➢ **LIGHTING LEVEL WHEN "ON":** This field allows the integrator to define the brightness percentage for the secondary ON order.

- **ON STEP LEVEL:** Define whether the OFF will be immediate or soft (smooth)

3.8. ON/OFF MEMORY

This new functionality allows restoring dimmer on the light percentage it had before it was turned off by an Off command (**ON / OFF Power Memory**).

Selecting the feature in the ETS parameterization will enable the Communication Object **"On/Off (Memory)"** and a new tab where you can select:

- **OFF STEP TYPE:** set the type of shut down of the dimmer when it is turned off with the “On/Off (Memory)” communication object. It can be “smooth” or “at once” (see the regulation of step duration in General parameters tab).

- **ON STEP TYPE:** set the type of regulation when the dimmer is turned on with the “On/Off (Memory)” communication object. It can be “smooth” or “at once” (see the regulation of step duration in General parameters tab).

Note I: *The **"On/Off (Memory)"** will only keep the light percentage in memory if it is **different of 0%** and the dimmer is **turned off** by communication objects **"On/ Off (at once)", “On/Off (Smooth)"** or **"On/Off (Memory)"**. If the dimmer is regulated to 0%, the previous percentage will not be stored and, thus, when sending an On command through the **“On/Off (Memory)”,** the light percentage will be the one stored before the last Off command and different of 0%.*

Note II*: If an On command is sent through the **"On / Off (Memory)"** and the channel output was already dimmered at a higher percentage than 0%, the device will respond with a total On (100%).*

3.9. AUTO OFF

The loads managed by the Dimmer Channel, may be automatically turned off by the LUZEN ONE, within two limits set by parameter.

The "**Auto Off**" function considers the time the Channel Output falls below certain threshold brightness level, and after this time, the Dimmer proceeds to send the "**Auto Off**" order.

- **THRESHOLD LEVEL:** Set the brightness percentage the device will consider when proceeding to an "Auto OFF" order.

- **TIME:** Set the time after which, taking into account the parameter above "Level", the Dimmer will execute the OFF order.

Note: The Auto-Off function is not object dependant. This is an internal operation executed by the Dimmer, where only the 2 parameters defined above are considered.

3.10. START UP

This function allows integrators to preset the Dimmer behaviour (ON, OFF or Positioning) on BUS voltage return (after a Power Failure) or after programming the device with the ETS; additionally the initial status of the load after "**Open Circuit**" error detection, and its later solution, can be set by parameter.

- **INITIAL STATUS:** Choose the initial status of the Dimmer Channel. The option "**Last Saved Position**" means that the Channel Output will remain just as it was before the BUS Power Failure.
    - ✓ **LIGHTING PERCENTAGE (%):** When the "**Positioning**" option is selected in the field above, this parameter sets the specific brightness level the Dimmer Channel output will remain.
- **INITIAL STATUS ON LOAD RECOVERY:** To set the Channel Load initial status when this is redetected after "**Open Circuit**" detection The "**Last saved status**" option means that the Channel Output will remain as it was before the "**Open Circuit**" detection.
    - ✓ **BRIGHTNESS PERCENTAGE (%):** When the "**Positioning**", option is selected in the field above, this parameter specifies the exact brightness percentage the Dimmer Channel Output will remain after the "Open Circuit" circumstance has been solved.
- **UPDATE:** This parameter offers the option to update the rest of devices in the installation by sending the Dimmer initial status to the BUS.
    - ✓ **START-UP SENDING DELAY:** This field allows the integrator to set a delay (in seconds) to put off the initial status sending, until the rest of devices on the installation are completely initiated, this way the installer will make sure that the Start-Up configuration will be received by all the devices in the installation.

Note I: To get an immediate sending (no delay), set the value "0" in this field.
Note II: The Start-Up Status sending is always done through the Status Object.

3.11. ERRORS IDENTIFICATION

Protection against short circuits, open circuits, overload, over temperature and anomalous frequency is integrated within the dimmer.

When any of these protective measures respond, the brightness set for the lights connected will go down or a cut-off will be triggered.

Subsequent to the elimination of the error, the device will be back to normal after a short cool-down period.

> ***Note:*** Centralised multi-service control pulses from power stations may become perceptible by a short-time flickering at low dimming positions.

In order to identify possible errors in the dimming actuator behaviour, as well as to know the response to these situations, five protection functions are detailed next.

3.11.1. OPEN CIRCUIT PROTECTION

The response to open circuit detection will be as follows:

- A "**1**" value will be internally sent through the "**Opened Circuit**" Communication Object disabling the device.
- If the Channel Output was in an **ON** status, the status object will be turned into "**0**" and sent to the **BUS.**
- The Dimming actuator itself periodically checks whether the abnormal situation is corrected
- Once the open circuit situation is corrected, a "0" will be internally sent through the "**Opened Circuit**" Communication Object, and the Dimming actuator will be ready again to receive new orders from the **BUS**.

3.11.2. SHORT CIRCUIT PROTECTION

The response to short circuit detection will be as follows:

- A "**1**" will be internally sent through the "**Short Circuit**" Communication Object disabling the device
- If the Channel Output was in an ON status, the status object will be turned into "**0**" and sent to the **BUS.**

- The Dimming actuator itself periodically checks whether the abnormal situation is corrected

- Once the short circuit situation is corrected, a "**0**" will be sent through the "**Short Circuit**" Communication Object, and will be ready again to receive new orders from the **BUS**.

3.11.3. OVERLOAD PROTECTION

The response to overload detection will be as follows:

- A "**1**" will be internally sent through the "**Overload**" Communication Object disabling the device

- If the Channel Output was in an **ON** status, the status object will be turned into "**0**" and sent to the **BUS**.

- The Dimming actuator itself periodically checks whether the abnormal situation is corrected

- Once the overload situation is corrected, a "**0**" will be sent through the "**Overload**" Communication Object, and will be ready again to receive new orders from the **BUS**.

3.11.4. OVER TEMPERATURE PROTECTION

The Dimmer **LUZEN ONE** has an internal protection system to automatically regulate the Channel load when the internal temperature of the device is excessive.

There are two different types of response depending on the internal Temperature of the device:

- **Temperature in the range [75ºC….85ºC]**

  A "**1**" will be sent through the "**OverTemperature**" Communication Object adjusting itself to the 20% brightness

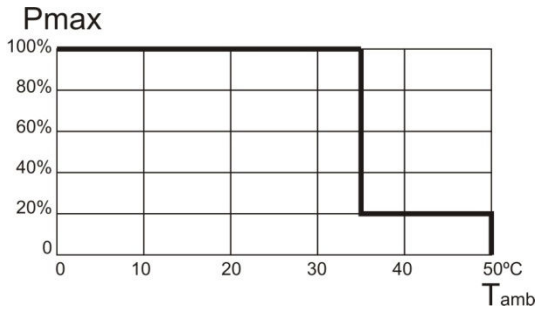
  The Dimming actuator itself periodically checks whether the abnormal situation is corrected

  After cooling down, the dimming actuator will send a "**0**" through the "**OverTemperature**" Communication Object, and will be ready again to receive new orders from the **BUS**.

- **Temperature over 85ºC :** The only difference with the case explained above is that, if temperature is over 85ºC, the Channel Output Status Object is also sent to the BUS.

Note I: *The internal Temperature of the Dimmer must be considered as:*

Internal Tª = Ambient Tª + Real Internal Tª inside the device



Note II: *When the Ambient Temperature is high, the Dimmer adjusts itself to the 20% brightness (according to the diagram), avoiding any problem arisen from an excessive over heating that could be harmful for the electronic of the device.*

3.11.5. ANOMALOUS FREQUENCY PROTECTION

This option allows the detection of **an anomalous frequency in the power supply**. The supplier company usually provides power supply at 50Hz. Nevertheless, that frequency could be affected, for example, when an **UPS system** (Uninterrupted Power Supply) is used.

The UPS is very useful in some circumstances, but it cannot keep a constant frequency of the power supply. Because of this, the dimmer needs to detect anomalous frequencies in order to protect the system.

The response to anomalous frequency will be as follows:

- The frequency is continuously monitored and compared with the range **50Hz+/-2Hz**.

- If the detected **frecuency is < 48 Hz or > 52Hz**

  - The 1bit communication object corresponding to this kind of error (**Anomalous frequency**) will be **enabled** (set to 1).

- The dimmer will go on **monitoring** the frequency in order to know if the correct frequency is re-established or not.
- In case the **right frequency** of power supply is re-established, the **Anomalous frequency** communication object will be **disabled** (set to 0).

4. LOGICAL FUNCTIONS

This section in the **Luzen ONE** is meant to perform **binary logic operations with incoming data from the bus**, to send the result through other communication objects specifically enabled in the dimmer for this operation. These functions work with two different types of data:

- **Bus**, through special **Communication Objects** enabled for these functions.
- **Internal variables**, to store the intermediate partial operation results.

The **parameters** related with **Logical Funcions** must be configured in this section:

- **Logical Function Selection:** up to five different logical functions can be enabled.
- **Total Data Entry Objects:** It is necessary to define the number of Data Entry Objects of each type necessary to be used in all functions.
    - **1 BIT (16 available objects)**: It is necessary to previously define the number of 1 bit objects to be used as data entry in the function operations.
    - **1 BYTE (8 available objects)**: It is necessary to previously define the number of 1 byte objects to be used as data entry in the function operations.
    - **2 BYTES (8 available objects)**: It is necessary to previously define the number of 2 byte objects to be used as data entry in the function operations.

Take into account I: *Also available as internal variables to store partial results in the operations:*
16 "1 bit" variables
8 "1 byte" variables
8 "2 bytes" variables.

Take into account II: *It is necessary to previously define by parameter the number of data entry objects to be used in the functions before these appear on the ETS environment.*

***Take into account III**: It is always recommended to define more data entries than needed, as a later redefinition involves the deletion of the possible Group addresses association previously made; with the consequent loss of time to re-associate them all again.*

4.1. CALL

This section is meant to select the objects to **trigger** the function execution. Up to **8 different objects** may be selected.

***Take into account:** For the function to be executed, it will be necessary that at least one of the enabled objects in this section is updated. It is NOT necessary that the objects in charge of triggering the function execution are included in it.*

4.2. OPERATIONS

This section is meant to define the operations to be performed in every enabled function. Up to 4 different operations can be enabled:

- **Operation: Enable the corresponding operation**
- **Type: 4 different operation types:**
  - **Logic**: 1 bit available logical operations are **ID, AND, OR, XOR, NOT, NAND, NOR y NXOR**. All of them work with 2 different values (except **ID** and **NOT**). These values can be chosen from the available **16 1 bit objects**, and the **16 1 bit internal variables**. In this case, the operation Result is also a 1 bit value that can be stored in any of the 16 available 1 bit internal variables.
  - **Arithmetic (1 byte/2bytes (unsigned integer)/2bytes (Floating point):** Depending on the chosen type, these operations will work with 1 byte or 2 bytes values. Users can choose among the following arithmetic operations: **ID, ADD, SUBSTRACT, MULTIPLY, DIVIDE, MAXIMUM y MINIMUM**. All of them work with two values (excepto **ID**); these can be chosen from the available objects, variables or a constant value chosen by parameter. The Result in the arithmetic opeation will be 1byte or 2 bytes, (depending on the operation). This Result can be stored in any of the 8 corresponding variables.

Take into account I: *Arithmetic operations (2 bytes unsigned integer) work with data range (0…65535). Constants set in the corresponding parameterizable field use format 1X (i.e. Value 4000 -> Parameter4000).*
Take into account II*: Arithmetic operations (2 bytes Floating point) work with data in the range (0……120). Constants set in the corresponding parametrizable field use format 0.1X (i.e. Value=22.5→Parameter=225)*
Take into account III*: If the Result in the 2 bytes Arithmetic operations exceed the permitted range, this will be converted to the corresponding limit in the range. Dividing by "0" doesn´t send anything to the Bus*

- **Comparison (1 byte/2bytes (unsigned integer)/2bytes (Floating point)**: These operations work with 1 byte or 2 bytes values, depending on the chosen type. Users in this case can choose among the following comparison operations: **HIGHER, HIGHER OR EQUAL, LOWER, LOWER OR EQUAL, EQUAL, UNEQUAL**. All of them work with two values to be chosen among the available objects, values or constant values chosen by parameter. The Result in the operation is a 1 bit type. This Result can be stored in any of the 16 available 1 bit variables.

- **Conversion (1 bit/1 byte/2bytes (unsigned integer)/2bytes (Floating point):** To convert the Communication Objects between formats.

➢ **Operation Result:** To define the variable to store the operation result.

4.2.1. DESCRIPTION OF CONVERSION FUNCTIONS

Specific information on the conversion function in **ACTinBOX Hybrid** is detailed next:

➢ **"CONVERSION" (1 bit → 1byte)**

1bit	1byte
0	00000000
1	00000001

➢ **"CONVERSION" (1bit → 2bytes unsigned integer)**

1bit	2bytes unsigned integer
0	00000000 00000000
1	00000000 00000001

- **"CONVERSION" (1 bit → 2 bytes floating point)**

1bit	2bytes floating point
0	0
1	0,1

- **"CONVERSION" (1 byte → 1 bit)**

1byte	1bit
0	0
1..255	1

- **"CONVERSION" (1 byte → 2 bytes unsigned integer)**

1byte	2bytes unsigned integer
$00	$00 00
$01	$00 01
...	...
$FF	$00 FF

- **"CONVERSION" (1 byte → 2 bytes floating point)**

1byte	2bytes floating point
0	0
1	0.1
255	25.5

***Take into account**: Conversion limit in this case is 25.5*

- **"CONVERSION" (2 bytes unsigned integer → 1 bit)**

2bytes unsigned integer	1bit
0	0
1..65535	1

- **"CONVERSION" (2 bytes unsigned integer →1 byte)**

2bytes unsigned integer	1byte
$00 00	$00
$00 01	$01
…	…
$00 FF	$FF
> $00 FF	$FF

- **"CONVERSION" (2 bytes unsigned integer→ 2 bytes floating point)**

2bytes unsigned integer	2 bytes floating point
0	0
1	0.1
…	…
1200	120
>1200	120

- **"CONVERSION" (2 bytes floating point → 1 bit)**

2 bytes floating point	1bit
0	0
0,1…….120	1

- **"CONVERSION" (2 bytes floating point →1 byte)**

2 bytes floating point	1byte
0	0
0,1… 25,5	1..255
> 25,5	255

- **"CONVERSION" (2 bytes floating point → 2 bytes unsigned integer)**

2 bytes floating point	2bytes unsigned integer
0	0
0.1	1
…	
120	1200
>120	1200

4.3. RESULT

This section is meant to tell the **ACTinBOX Hybrid** where to store and what to do with the **Result** obtained in the previous sections.

- **Type:** Choose among 1 bit, 1 byte or 2 bytes (Unsigned integer) / (Floating point).

- **Value:** Set the variable where the Result will be stored.

  ***Take into account**: Please notice that all the storing variables are shared with all the possible functions/operations in the ACTinBOX Hybrid, this means that a specific variable used to store the Result in an operation/function, should not be used to store a different result.*

- **Sending: Set the conditions to send the Result to the Bus.**

  - **Result is different from last sent**: The Result will be sent every time the final Result in the operations changes.

  - **Whenever the function is executed**: The Result will be sent every time the Function is executed.

  ***Take into account:** This parameter is related with section CALL; actually, the Result will be sent every time the Function is executed, but the Function will only be executed when at least one of the enabled objects in the section CALL is updated.*

  - **Periodical sending**: The result will be periodically sent depending on the time set in the **CYCLE TIME** field.

- **Restriction:** The sending of the **1 bit functions Result** can be restricted to ("**0**" or "**1**"). **1 byte and 2 bytes functions Result** sending can be also restricted depending on the following options:

  - Values equals reference one

  - Values not equal to reference one

  - Values lower than reference one

  - Values higher than reference one

    - ✓ **Reference Value**: For the **Result Type = 1 byte**, possible reference value range is **[0…..255]**. For the **Result Type = 2 bytes**, possible reference value range is **[0……65535]**.

- **Delay:** Time to pass before sending the Result to the Bus. If no delay is needed please set value "0" in this field.

5. ANNEX I: COMMUNICATION OBJECTS

SECTION	NUMBER	SIZE	IN/OUT	FLAGS	VALUES			NAME	DESCRIPTION
					RANGE	1ST TIME	RESET		
COMMMON	0	1bit	I	W	0/1	Any	Any	ON/OFF (immediate)	0= OFF (immediate) 1= ON (immediate)
	1	1 bit	I	W	0/1	Any	Any	ON/OFF (soft)	0=OFF; 1= ON (softl)
	2	4 bits	I	W	0/1	Any	Any	Light Dimming	4 bits Control
	3	1 byte	I	W	0/1	Any	Any	Light Precise Dimming (immediate)	1 byte Control (immediate)
	4	1byte	I	W	0-63 128-192	Any	Any	Light Precise Dimming (soft)	1 byte Control (soft)
STATUS OBJECT	5	1 bit	O	R-T	0/1	0	Previous	ON/OFF Status	0= OFF 1= ON
	6	1byte	O	R-T		0	Previous	Light Status	0%= OFF 1%.....100%= ON
SIMPLE TIMER	7	1 bit	I	W	0/1	Any	Any	Timer	0=Timer OFF 1=Timer ON
FLASHING	8	1 bit	I	W	0/1	Any	Any	Flashing	1=Start Flashing 0=End Flashing
SCENES	9	1byte	I	W	0-63 128-192	Any	Any	Scenes	0= Scene 1 ..... 63= Scene 64
SEQUENCES	10	1byte	I	W	0-63 128-192	Any	Any	Sequences	0= Scene 1 ..... 63= Scene 64
BLOCK	11	1 bit	I	W	0/1	0	Previous	Block	0= Unblock 1= Block
SECONDARY ON/OFF	12	1 bit	I	W	0/1	Any	Any	Secondary On/Off	1= Secondary On 0= Secondary Off
OPEN CIRCUIT ERROR	13	1 bit	O	R-T	0/1	0	0	Open Circuit	1= Open Circuit 0= Closed Circuit
SHORT CIRCUIT ERRORS	14	1 bit	O	R-T	0/1	0	0	Short Circuit	1= Shortcircuit 0= No Shortcircuit

OVERLOAD ERROR	15	1 bit	O	R-T	0/1	0	0	Overload	1= Overload 0= No Overload
OVER TEMPERATURE ERROR	16	1 bit	O	R-T	0/1	0	0	Over Temperature	1= Over Temperature 0= No Over Temperature
MEMORY ON/OFF	17	1 bit	I	W		Any	Any	Memory On/Off	0=Off ;1= On (memory)
ANOMALOUS FREQUENCY	18	1 bit	O	R-T		0	0	Anomalous Frequency	0=Normal ;1= Anom.Freq
LOGICAL FUNCTIONS	19-34	1bit	I	W	0/1	0	Previous	[FL] (1bit)Data Entry 1	Binary data entry (0/1)
								...	...
								[FL] (1bit) Data Entry 16	Binary data entry (0/1)
	35-42	1byte	I	W	0-255	0	Previous	[FL](1byte) Data Entry 1	1byte Data Entry (0-255)
								...	...
								[FL] (1byte) Data Entry 8	1byte Data Entry (0-255)
	43-50	2bytes	I	W	0-FFFF	0	Previous	[FL] (2bytes) Data Entry 1	2 bytes Data Entry
								...	...
								[FL] (2bytes) Data Entry 8	2 bytes Data Entry
	51-55	1bit	O	R-T	0/1	0	Previous	[FL] Function1 RESULT (1bit)	FUNCIÓN 1 result
								...	...
								[FL] Function5 RESULT (1bit)	FUNCIÓN 5 result
	56-60	1byte	O	R-T	0-255	0	Previous	[FL] Function1 RESULT (1byte)	FUNCIÓN 1 result
								...	...
								[FL] Function5 RESULT(1byte)	FUNCIÓN 5 result
	61-65	2bytes	O	R-T	0ºC-120ºC	25ºC	Previous	[FL] Function1 RESULT 2bytes)	FUNCIÓN 1 result
								...	...
								[FL] Function5 RESULT (2bytes)	FUNCIÓN 5 result

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