

## 7.4 EXERCISE 3

### OBJECTIVE

The main purpose of this exercise is to:

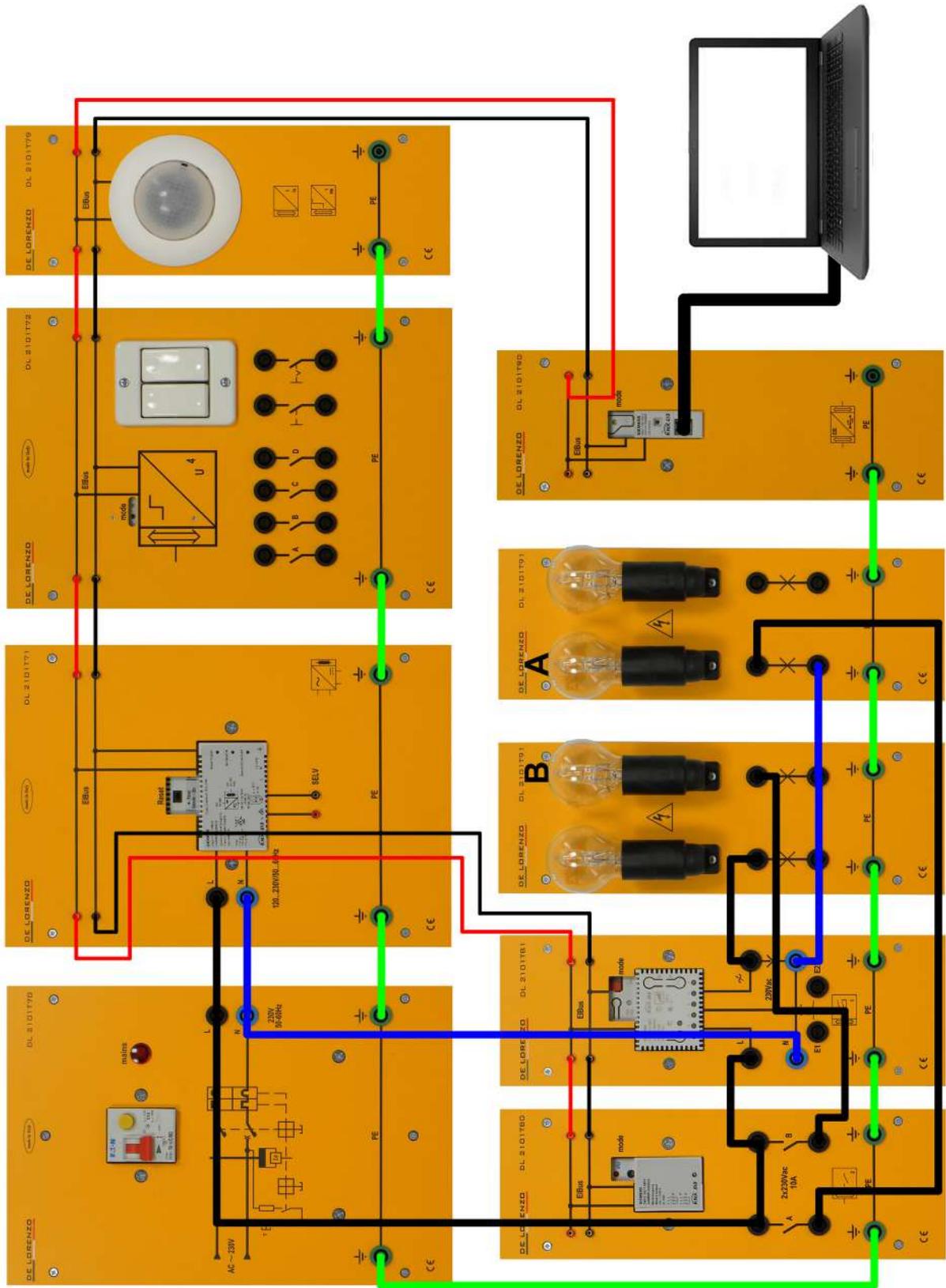
select the essential and indispensable modules for the generation and use of the Bus line,  
 establish the connection between the Bus system interface and the PC,  
 make the connection between the various modules identifying the low voltage EIBus line and the power line necessary for the utilities,  
 make a more in depth study of the modules which are indispensable in any electrical system such as the wall switch interface (to make a traditional push button an intelligent one), the brightness sensor, besides naturally the modules seen in the two previous exercises such as the universal dimmer and the binary output.  
 adequately configure both the brightness sensor and the wall switch interface in order to be able to use them respectively as a regulator for the universal dimmer and as a push-button for the binary output.

### CONFIGURATION

The De Lorenzo modules that are used in this exercise are the following:

Code	Description	Quantity
DL 2101T70	SINGLE PHASE POWER UNIT	1
DL 2101T71	POWER SUPPLY	1
DL 2101T72	PUSH-BUTTON INTERFACE	1
DL 2101T79	PRESENCE/BRIGHTNESS SENSOR	1
DL 2101T80	BINARY OUTPUT	1
DL 2101T81	UNIVERSAL DIMMER	1
DL 2101T90	USB INTERFACE	1
DL 2101T91	SOCKETS WITH LAMPS	2
DL SW-ETS	SOFTWARE	1
DL 1155EIB	SET OF CONNECTING CABLES	1
Personal Computer		Not included
DL 2101T70VT	VOLTAGE ADAPTATION MODULE necessary in case the main voltage is different from 230 Vac	

## CONNECTION DIAGRAM



## SYSTEM WIRING

First of all, identify the modules that are necessary for the realisation of this exercise according to the list on the previous page.

Connect the single phase DL 2101T70 power supply module to the EIBus power supply module DL 2101T71 through points L, N and PE; power the magneto-thermal breaker switch from the grid voltage and turn the switch to ON.

Check the lighting up, after a few seconds, of the green LED on the EIB power supply module, which indicates its correct operation. Should the red Reset LED be lit (due to some accidental manoeuvre, although not likely), simply move the switch located above the Reset label to the opposite position.

Using a tester, check the voltage on both the EIBus line points and the SELV (Safety Extra Low-Voltage) auxiliary output points; the allowable range is: DC 28...30V.

With the cables, connect the other modules (USB interface, push-button interface, brightness controller, binary output and universal dimmer) to the EIBus line as indicated in the connection diagram.

For the power line, connect the phase and neutral to the DL 2101T81 module and the output of the same module to the points of one of the two lamps of module DL 2101T91, as indicated in the connection diagram. Also, connect the phase and neutral to the two lamps of the other DL 2101T91 module, interrupting the phase through A and B relay outputs of the DL 2101T80 module, as indicated in the connection diagram.

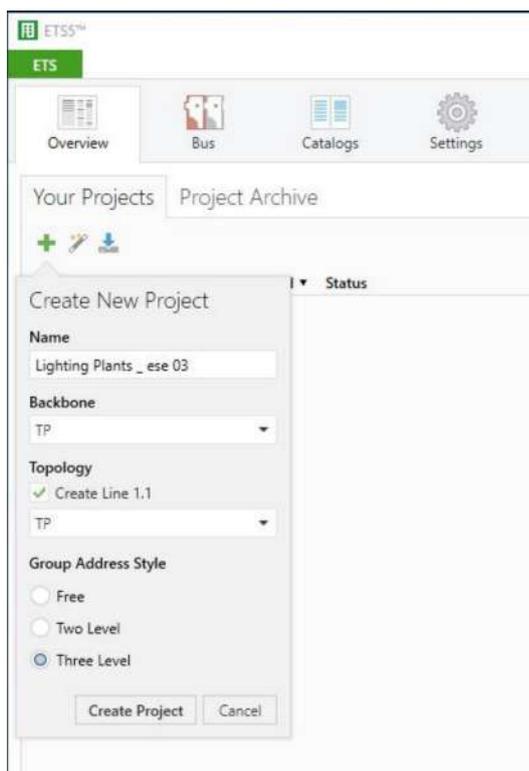
With the cable that comes with the USB interface DL 2101T90, connect a free USB port on the PC (where the ETS software is installed) to the port of the same interface on the Bus system, as indicated in the connection diagram.

Finally, connect the PE points of the various modules that make up the system together to the single phase power supply module PE, as indicated in the connection diagram.

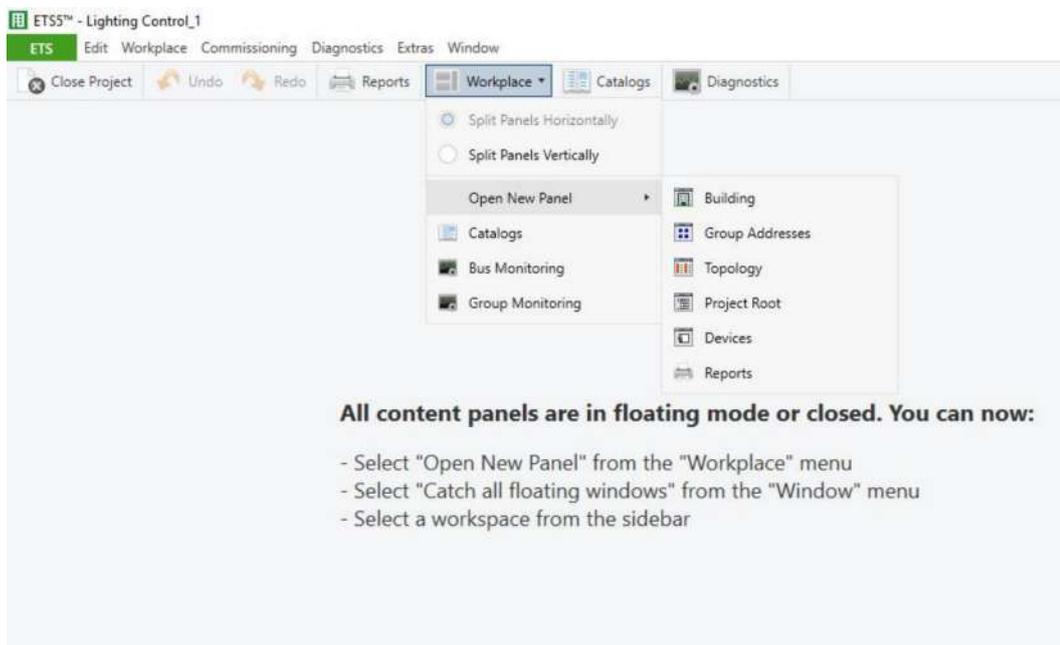
## PROJECT DEVELOPMENT AND SELECTION OF THE APPLICATIONS

Run the ETS software on the PC.

From the **Overview** tab, choose **New Project** (to create a new project) and in the window "New Project" enter a name for the current project (for example **Ligh Plants \_ ese 03**); choose **TP** (Twisted Pair) as Backbone and Topology, leave highlighted Create Line 1.1 and Three level as Group address style; finally, close the window confirming through OK.



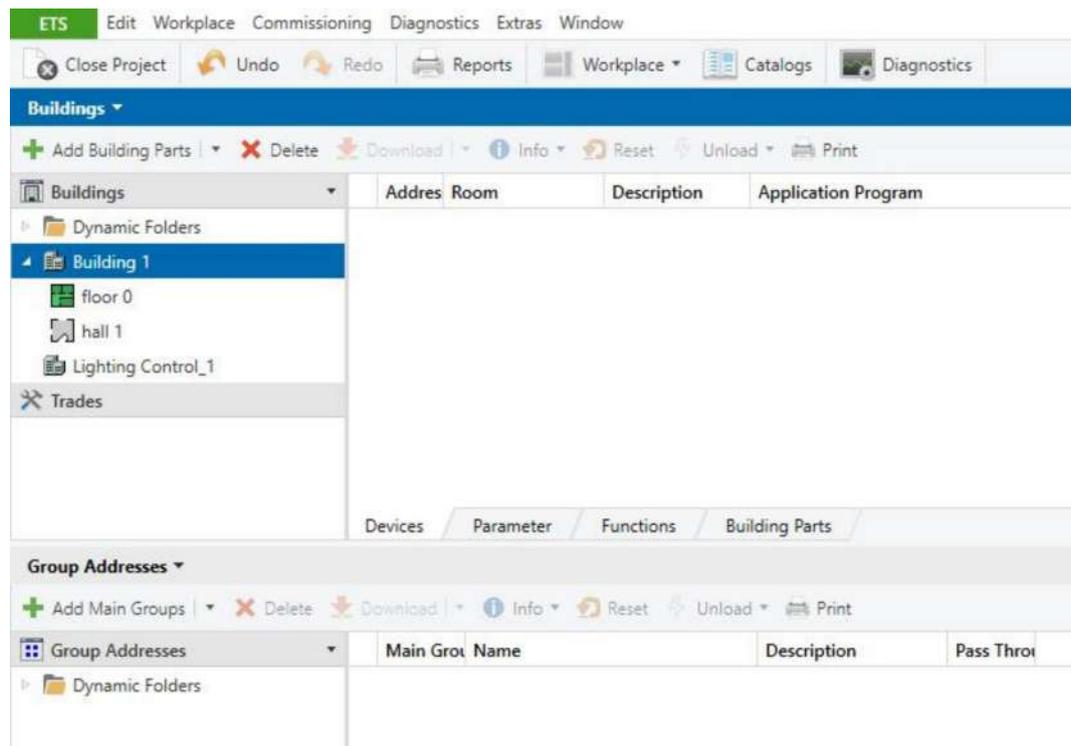
Now, select the project and double click.



From the main toolbar, select **Workplace**, Open New Panel to open two windows: **Building** and **Group Addresses**.

Move in the Building’s window and, with the right mouse button, on Buildings click **Add: Buildings** (Building 1) and confirm with OK.

Now, with the right mouse button, on Building 1 click **Add Buildings Parts or Floors** (Floor 0) and confirm with OK; again, with the right mouse button, on Floor 0 click **Add Rooms** (Hall 1) and confirm with OK.



To add more buildings, building parts or rooms to the same floor, simply repeat the same procedure obtaining a more complex structure. For our purposes, the structure that we have just built is enough.

Now, it is time to insert the modules for our project, except for the EIBus power supply (DL 2101T71) and the interface between the system and the PC (DL 2101T790).

In effect, the interface is seen as a module that is part of the project, but only to program the different modules; therefore, once the functionality is found and the applications are loaded on the modules, this interface can be disconnected from both the PC and the Bus system. For this reason, it is considered a local device and all the others are considered remote devices.

Select Hall 1 and right click on **Add: Devices...**; from the new window, **Catalogs**, select the Manufacturer (Siemens), the Product Family (Physical sensors), the Type (Motion Detector), select:

**Presence Detector, Constant Controller UP 258E22** (Product)  
**5WG1 258-2EB22** (Order Number)  
**25 CO Presence Detector, Constant Contr. 920601** (Application Program)  
(for module DL 2101T79)

Click on the **Add** button and verify that the device has been inserted into our project with its name (physical address).

Repeat the same procedure inserting another device: Manufacturer (Siemens), Product Family (Output), Type (Binary Output, 2-fold), select:



### PARAMETERS, PHYSICAL AND GROUP ADDRESSES SETUP

After the insertion of the DL 2101T79, DL 2101T80, DL 2101T81 and DL 2101T72 modules in Hall 1, select the first inserted device and with the drop down menu right click to select **Professional**. On the right side **Individual Address**, insert a new physical address (the identification name of device\_1.1.5 Area 1, Line 1, Device 5), if it is not already there.

In the Building window, click on the **Parameters** button and make the following settings.

1.1.5 Presence Detector, Constant Controller UP 258E22 > General

General	Operating mode	test mode (5s ramp up with LED)
Brightness measuring	Evaluate status object [sec.] (0 = no evaluation)	1
Constant light level control con...	----- Functional blocks -----	
	Motion detector	<input type="radio"/> deactivated <input type="radio"/> active
	Presence detector	<input type="radio"/> deactivated <input type="radio"/> active
	Presence detector (HVAC) (Heating,Ventilating,Air Conditioning)	<input type="radio"/> deactivated <input type="radio"/> active
	Light control (on-off)	<input type="radio"/> deactivated <input type="radio"/> active
	Constant light level control continuous	<input type="radio"/> deactivated <input checked="" type="radio"/> active
	IR-Decoder	<input type="radio"/> deactivated <input type="radio"/> active

1.1.5 Presence Detector, Constant Controller UP 258E22 > Brightness measuring

General	Measuring method of internal light sensor	indirect (calibration by user)
Brightness measuring	Calibration	<input type="radio"/> via object <input checked="" type="radio"/> with adjustment factor
Constant light level control con...	Adjustment factor ( x 0.1)	5
	Number of values for calculation of average	8
	Send brightness value cyclically	1 second
	Send brightness value on change	no

1.1.5 Presence Detector, Constant Controller UP 258E22 > Constant light level control continuous

General

Brightness measuring

Constant light level control c...

----- Actual value -----

Source for brightness value: only internal value

----- Setpoint -----

Setpoint value via:  parameter  parameter, changeable via object

Setpoint value in LUX (250...1600): 400

----- Controller -----

Maximal deviation from setpoint value (hysteresis): +/- 5%

Send dimming value every (controller speed): 1 second

Timeout for automatic off [min] (0 = no automatic off): 0

Additional hysteresis for restart when controller was in standby [LUX]: 100

Start and finish constant light level control with: only dimming-value telegram

----- Controller output -----

Max. step for dimming: 10 (3,9%)

First dim-value, when control starts: copy from parameter

First dim-value (1...255): 128

Max. dimming value Master (1...255): 255

Min. dimming value Master (1...255): 1

Master / slave operation:  no  yes

----- Control characteristic -----

! For best control first create control curve

Start with ON at Obj. 71

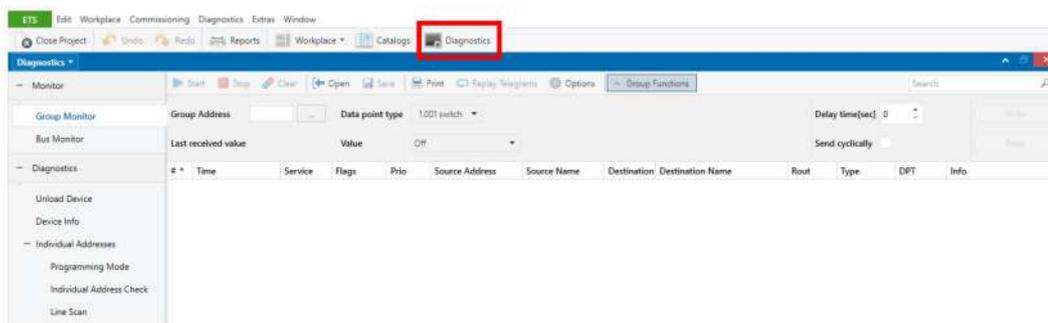
Delay until next step: 10

Note: set the parameter "Adjustment factor" to obtain 500 lux in the room where the experiment takes place.

To see the status of the devices, in the software we find the utility **Diagnos** .

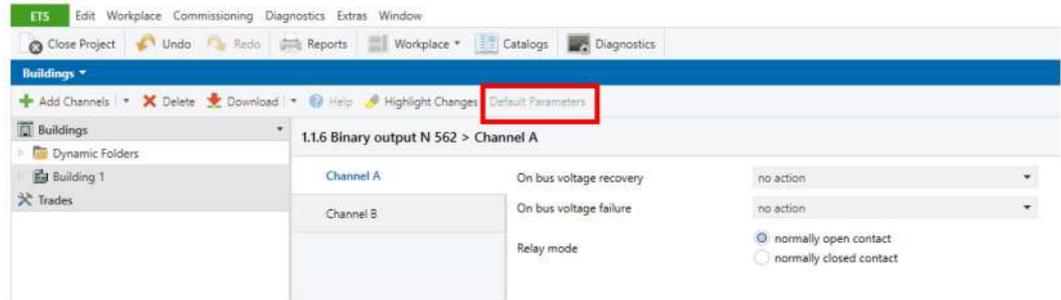
Click on **Group Monitor**, insert the **Group Address** (it will be 0/0/6) and press Start.

Read the value in Lux.



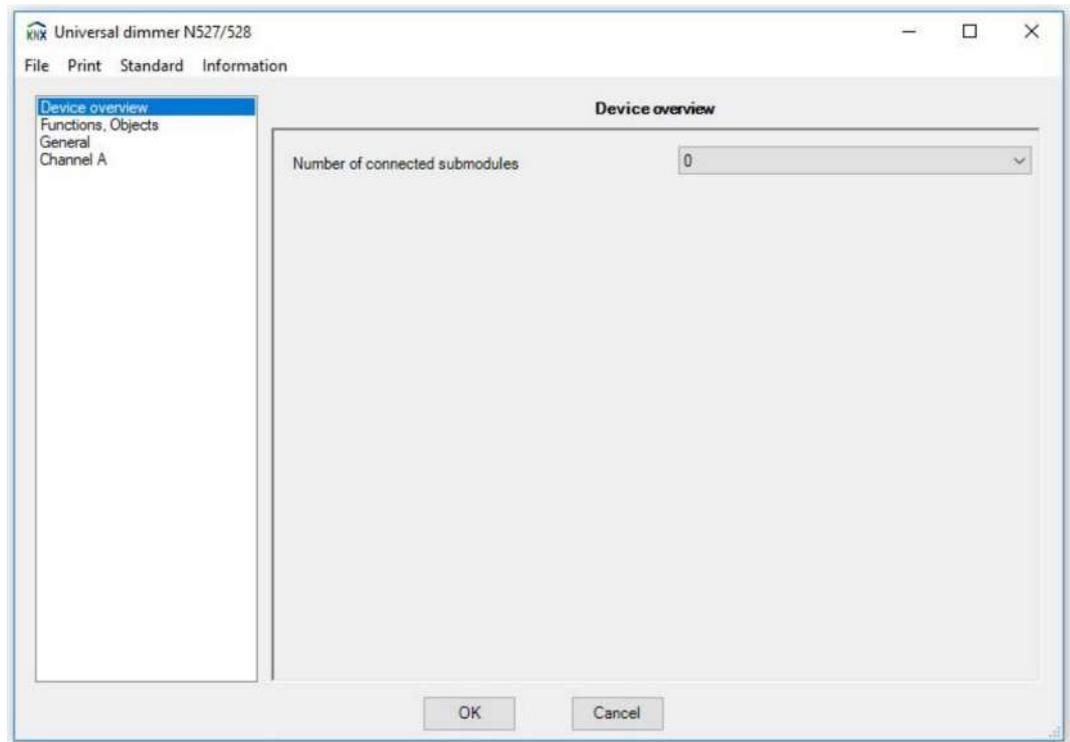
Now, select the second inserted device and with the drop down menu right click to select **Pro-**. On the right side **Individual Address**, insert a new physical address (the identification name of device\_1.1.6 Area 1, Line 1, Device 6), if it is not already there.

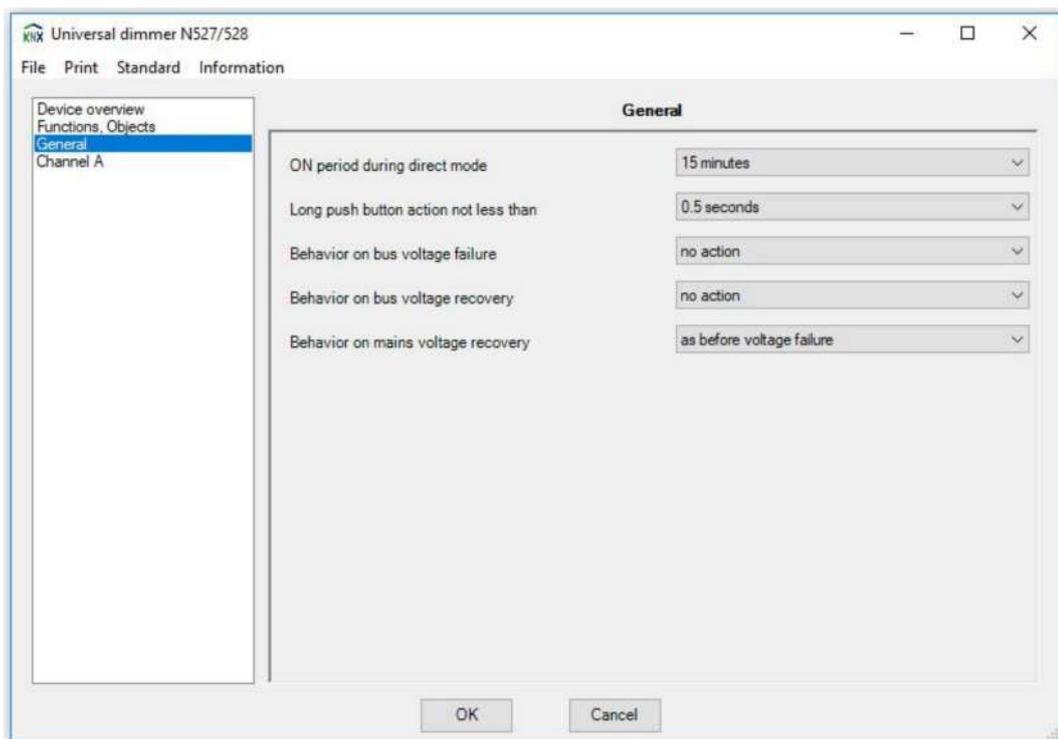
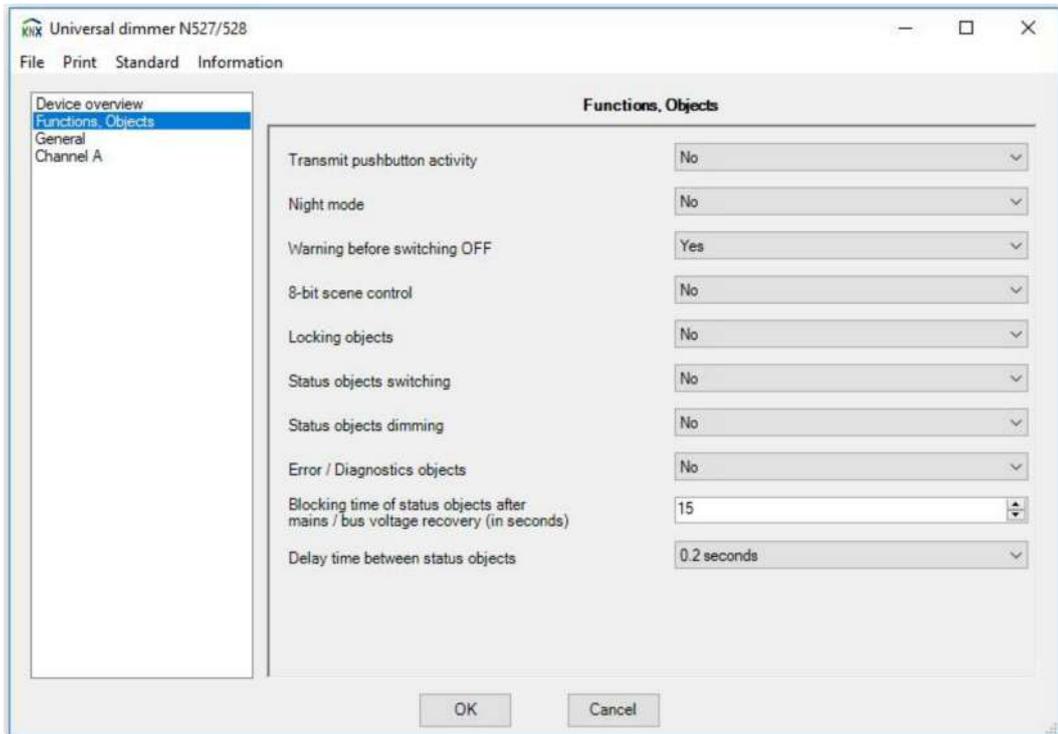
In the Building window click on **Parameters** button; in the parameters window, click on the **Default parameters** button to load the factory default parameters onto the module.

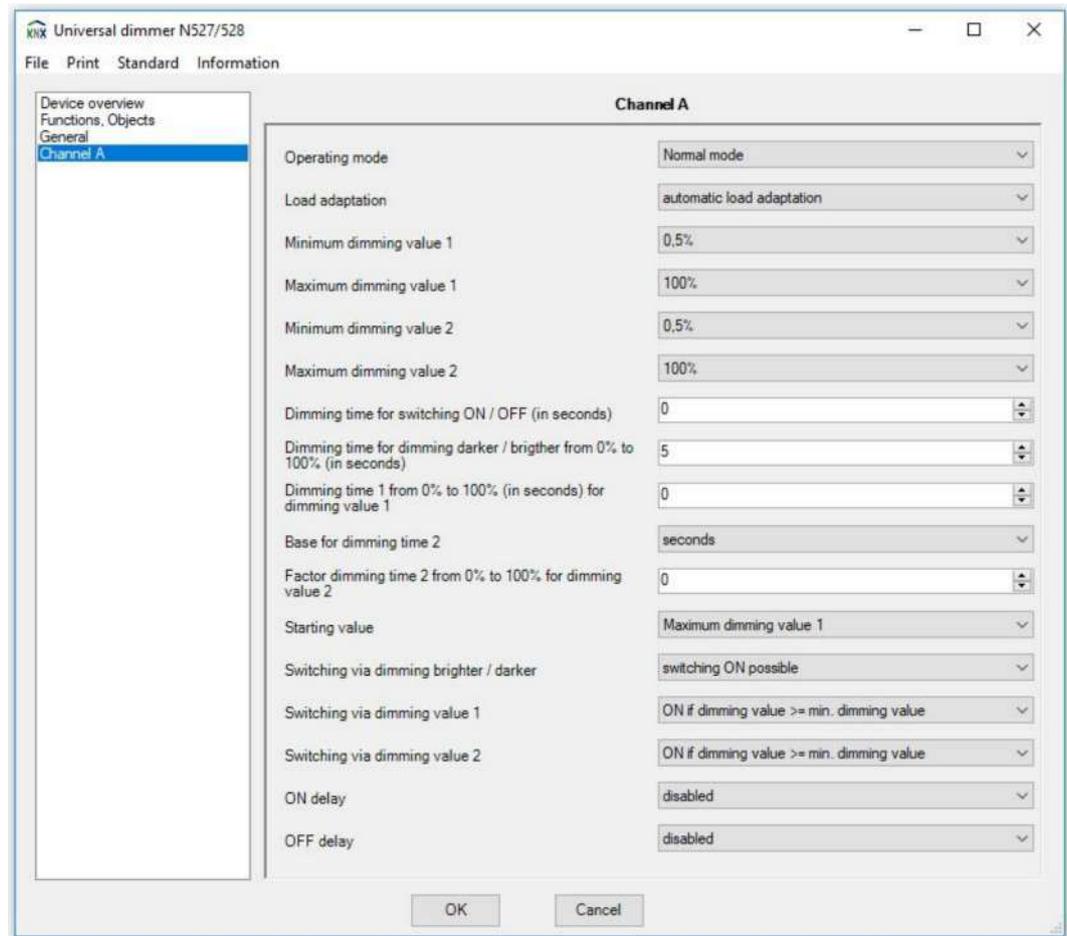


Now, select the third device inserted and with the drop down menu right click to select **Proper-**. In the right side **Individual Address**, insert a new physical address (the identification name of device\_1.1.7 Area 1, Line 1, Device 7), if it is not already there.

In the Building window, click on the **Parameters** button and then “**Open product parameter dialog**”; make the following settings:



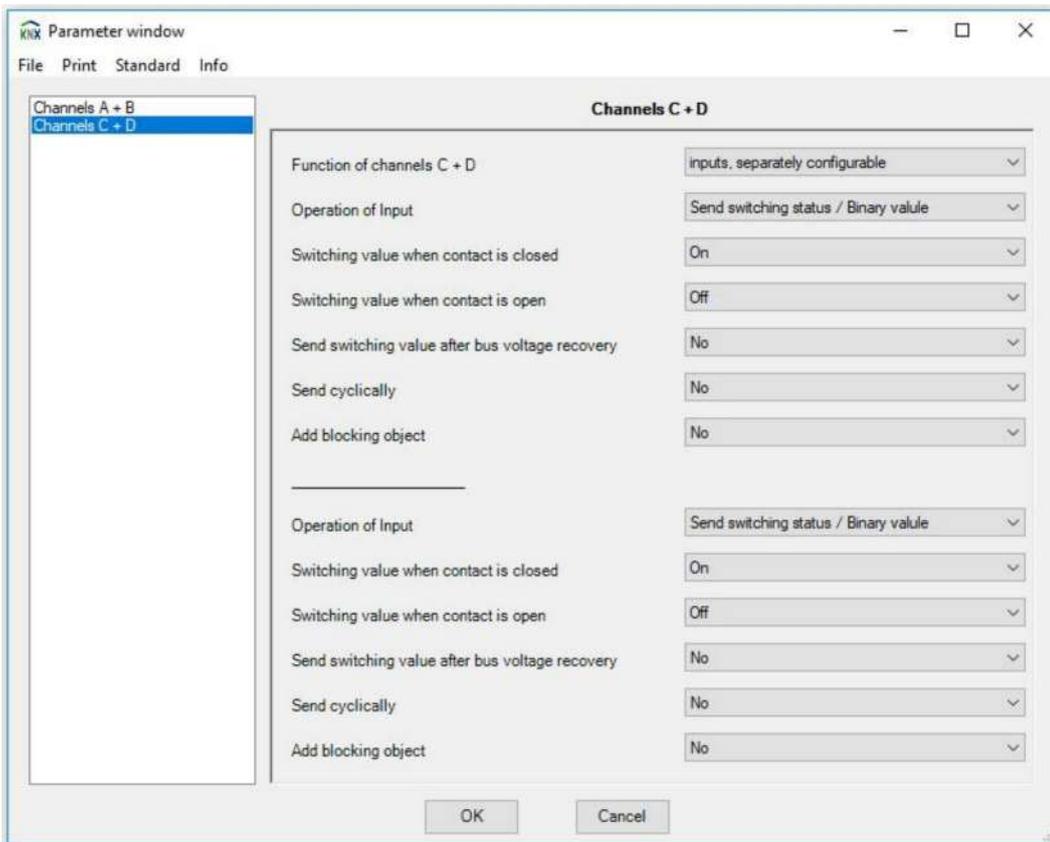
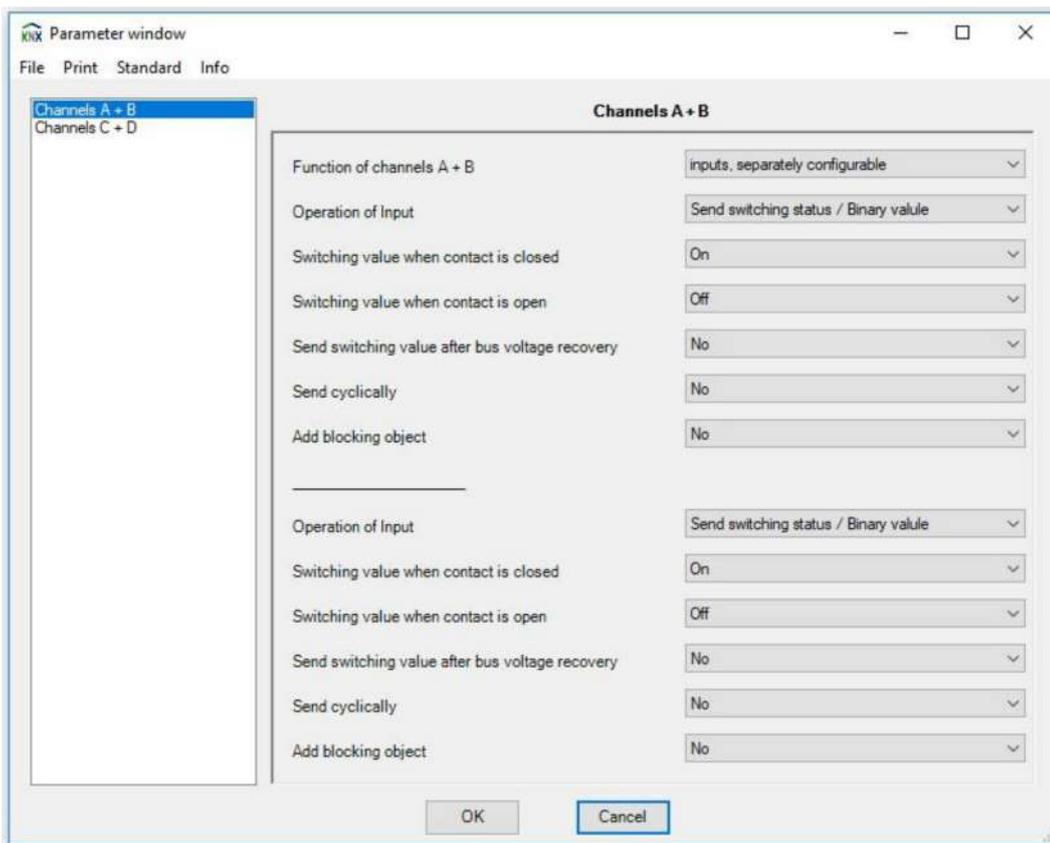




At the end, confirm with **OK**.

Now, select the third device inserted and with the drop down menu right click to select **Properties**. In the right side **Individual Address**, insert a new physical address (the identification name of device\_1.1.8 (Area 1, Line 1, Device 8), if it is not already there.

In the Building window click on the **Parameters** button and then “**Open product parameter dialog**”; make the following settings:



At the end confirm with **OK**.

With these operations, we have completed the first part of the project. If we want to find the analogy with a traditional electrical system, these operations correspond to the installation of the components in the different parts of the hypothetical building.

Traditionally, this part is realised with a wiring point. In our system, the only wiring which must be performed is the parallel connection of all the EIB components; the functionality is determined via Software. These operations will be the object of the exercise.

First of all, we must notice how ETS assigned a physical address to each device automatically and progressively, but that it was modified (as seen above) in the design phase.

At the end of these operations (physical address and parameterization), the four previously inserted devices will be created in the **Topology** window (opening it from the main toolbar selecting Workplace  Open New Panel  Topology), under 1 New area, 1.1 new line.

By highlighting each one you will see, in the section to the right of the Topology window, the objects related to the set parameters; these objects are the points of fundamental importance for the functions that the devices must perform. The connection between the various objects is defined thanks to group addresses. This operation, once completed, is similar to traditional wiring.

The next step will be to identify the functions that the devices must perform, in a comprehensible way to the Software, through the group addresses:

- **on interf** **ates the relay output A**
- **on interf** **ates relay output B**
- **on interf** **ates relay outputs A and B simultaneously**
- **Input D** **ates the dimmer output and the brightness sensor controls the dimmer output pr**

The assignment of these functions can be performed in the following way: highlight **object 21** of the push button interface in the Topology window and then, with a right click, select **Link with...**; In the window which appears (Link Device Objects - Create new group address), insert the group address **0/0/1** as the new address and confirm with OK; repeat the same procedure for **objects 26, 31 and 36** inserting the group addresses **0/0/2, 0/0/3 and 0/0/4** respectively.

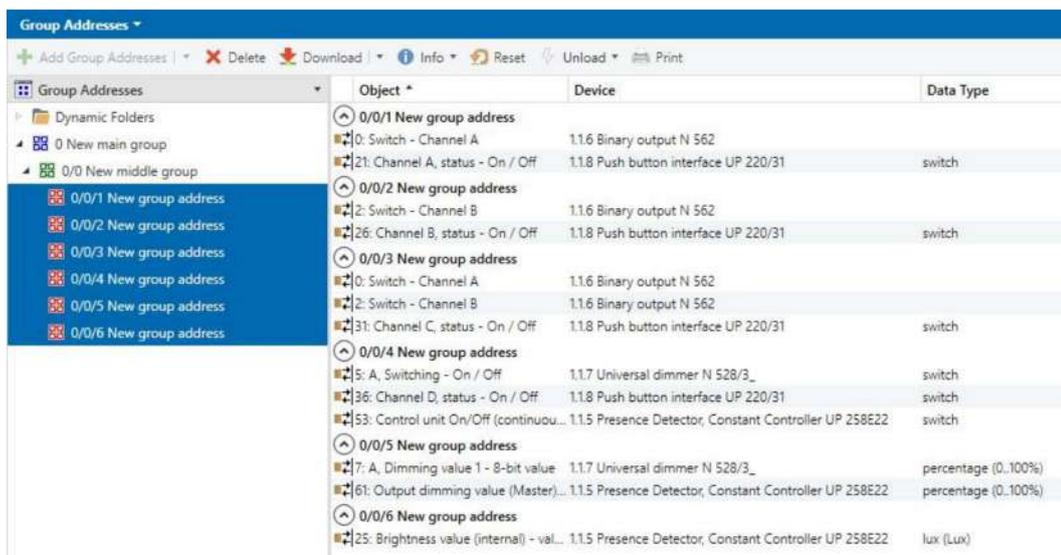
With regard to the universal dimmer, highlight the device and, in the same way as before, link **object 5** to the group addresses **0/0/4** and **object 7** to the group addresses **0/0/5**.

With regard to the binary output, highlight the device and, in the same way as before, link **object 0** to the group addresses **0/0/1 and 0/0/3** and **object 2** to the group addresses **0/0/2 and 0/0/3**.

With regard to the Presence/Brightness Sensor, highlight the device and, in the same way as before, link **object 25** to the group addresses **0/0/6**, **object 53** to the group addresses **0/0/4** and **object 61** to the group addresses **0/0/5**.

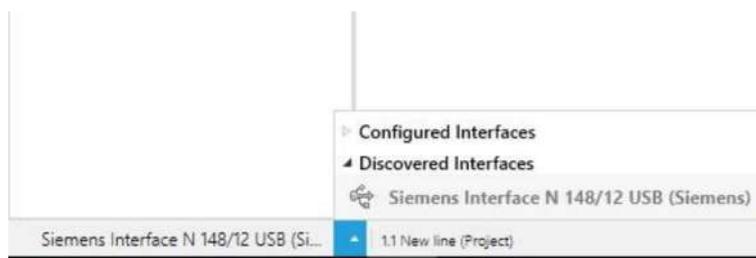
*NOTE: During the assignment of the group addresses among the different device objects, attention must be given to the compatibility of their length (the type of object, for example, 1Bit, 2Bit, 4Bit,..., 1Byte, etc.), otherwise the assignment will not take effect or the software may show an error message.*

At the end of these operations (assignment of the group addresses), a New main group (0) will be created in the **Group Addresses** window (opening it from the main toolbar selecting Workplace Open New Panel if it was not already available), which contains a New middle group (0/0) in which the six main functions **Input A/Output A (0/0/1)**, **Input B/Output B (0/0/2)**, **Input C/Outputs A & B (0/0/3)**, **Input Switching Dimmer (0/0/4)** and **Light sensor/Dimming (0/0/5)**, **Reading of the value Lux (0/0/6)** will be found (their names have been assigned in the right window of their properties in Settings).  
By highlighting each of these, the objects of all the devices which are part of this group address can be seen in the section on the right of the group addresses window.



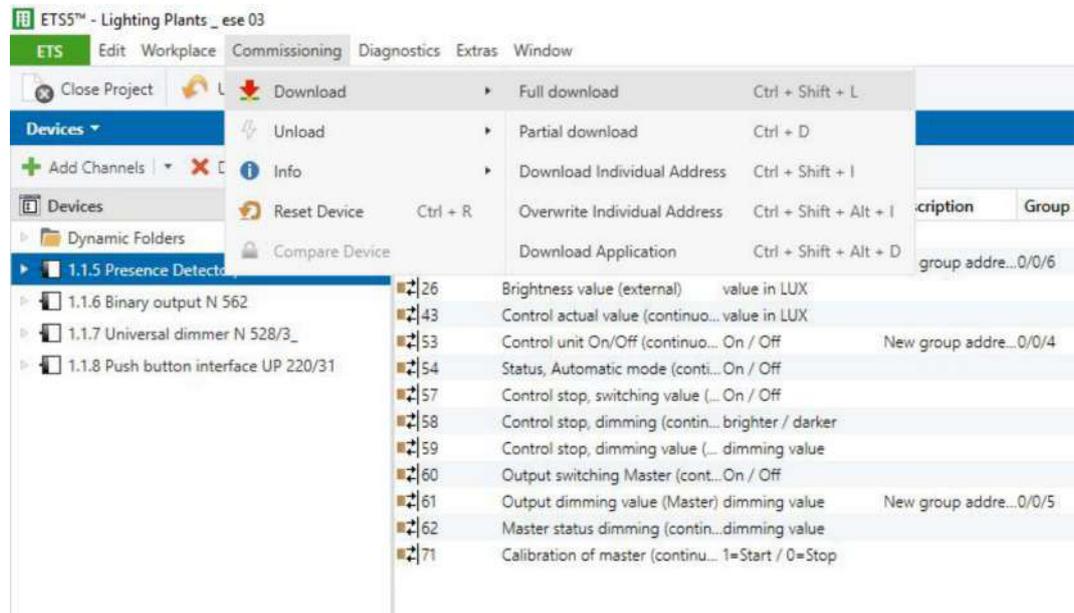
### COMMISSIONING AND LOADING

Check the connection between the USB interface and the PC, from the status bar at the bottom of the window.

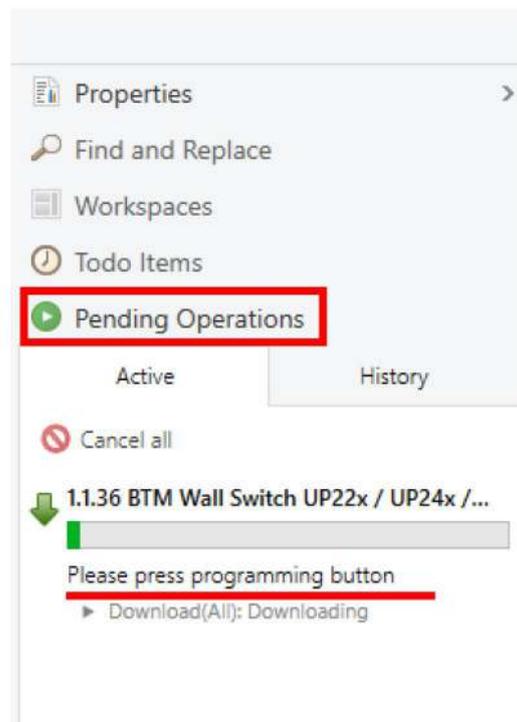


The software does the search (if the connection was not already established in automatic mode) and establishes the connection after a few seconds indicating, in the status bar at the bottom, the USB port connected to the system with the corresponding local physical address assigned automatically that, if you want, you can also change.

In order to load the program on the devices, select the first device (address 1.1.3) in the **Building** or **Device** window and right click to select **Download**  $\Rightarrow$  **Full Download** (otherwise, select from the menu bar **Commissioning**  $\Rightarrow$  **Download**  $\Rightarrow$  **Full Download**).



To the right of the window, the status of the download will be displayed.



*Warning: During the initial phase, the programming button on the corresponding device must be pressed, to activate the programming of the physical address, and after the LED turns off, the application will be downloaded including the set parameters and the group addresses.*

The position of the programming button is shown below:  
For module DL 2101T79:



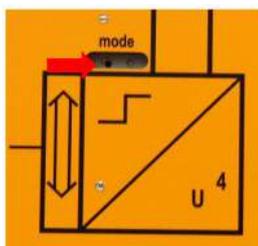
For module DL 2101T80:



For module DL 2101T81:



For module DL 2101T72:



At the end of the programming phase, there will be an indication of the correct loading.

Repeat the procedure described above for ALL the other devices.

*Note: in the event of changes to the parameters and/or group addresses, the devices with these changes must be updated by downloading, following the same procedure described above, but this time, in the Download window, select Download  Download Partial or Download Physical Address or Overwrite Physical Address according to the latest changes made on the module.*

At this point, the "Electric Wiring" is complete.  
In fact, the group addresses "connect" the push buttons to the outputs in a way that is similar to a "point-to-point" wiring in the traditional way.