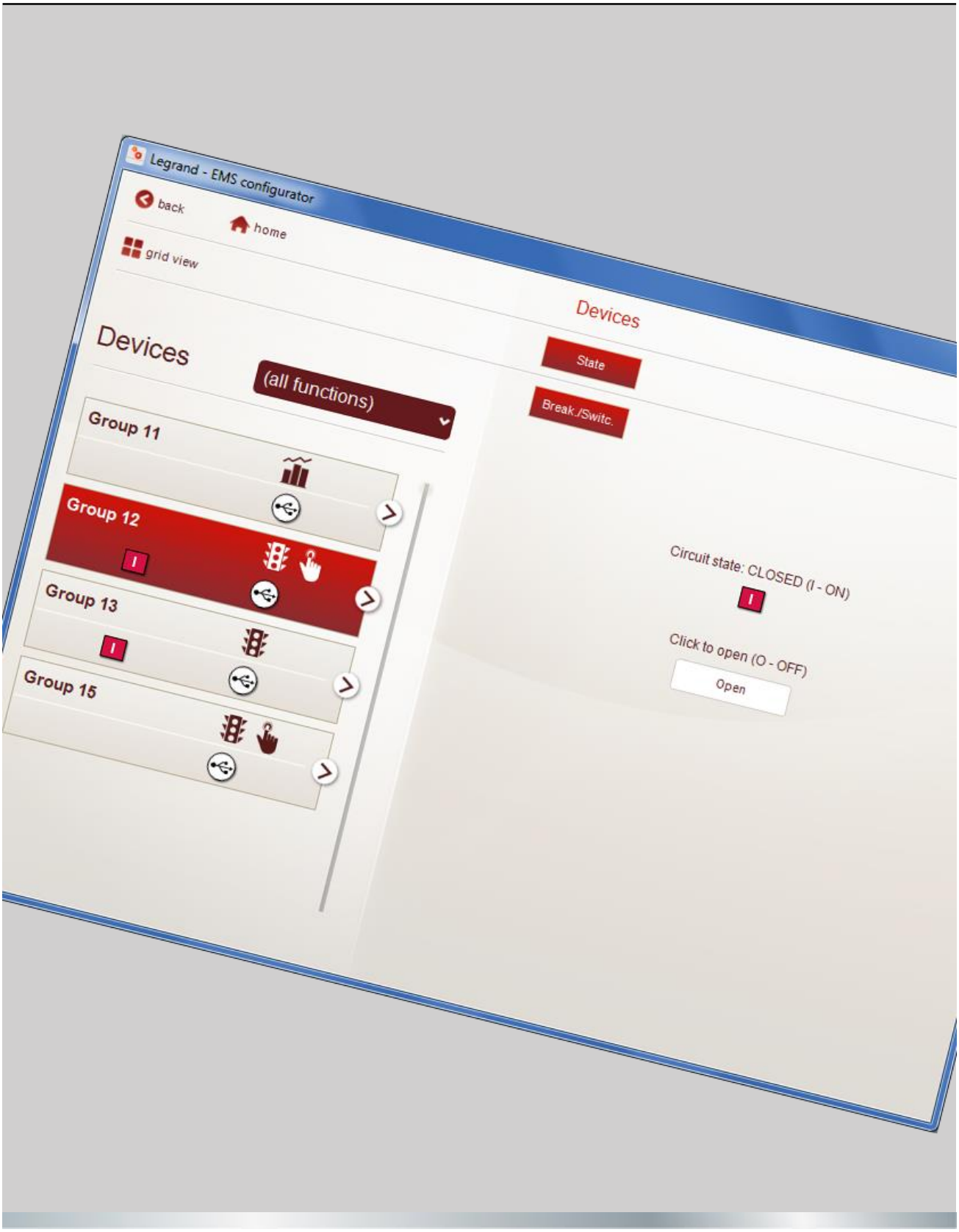
EMS CX³
Configuration Software

Installation Manual



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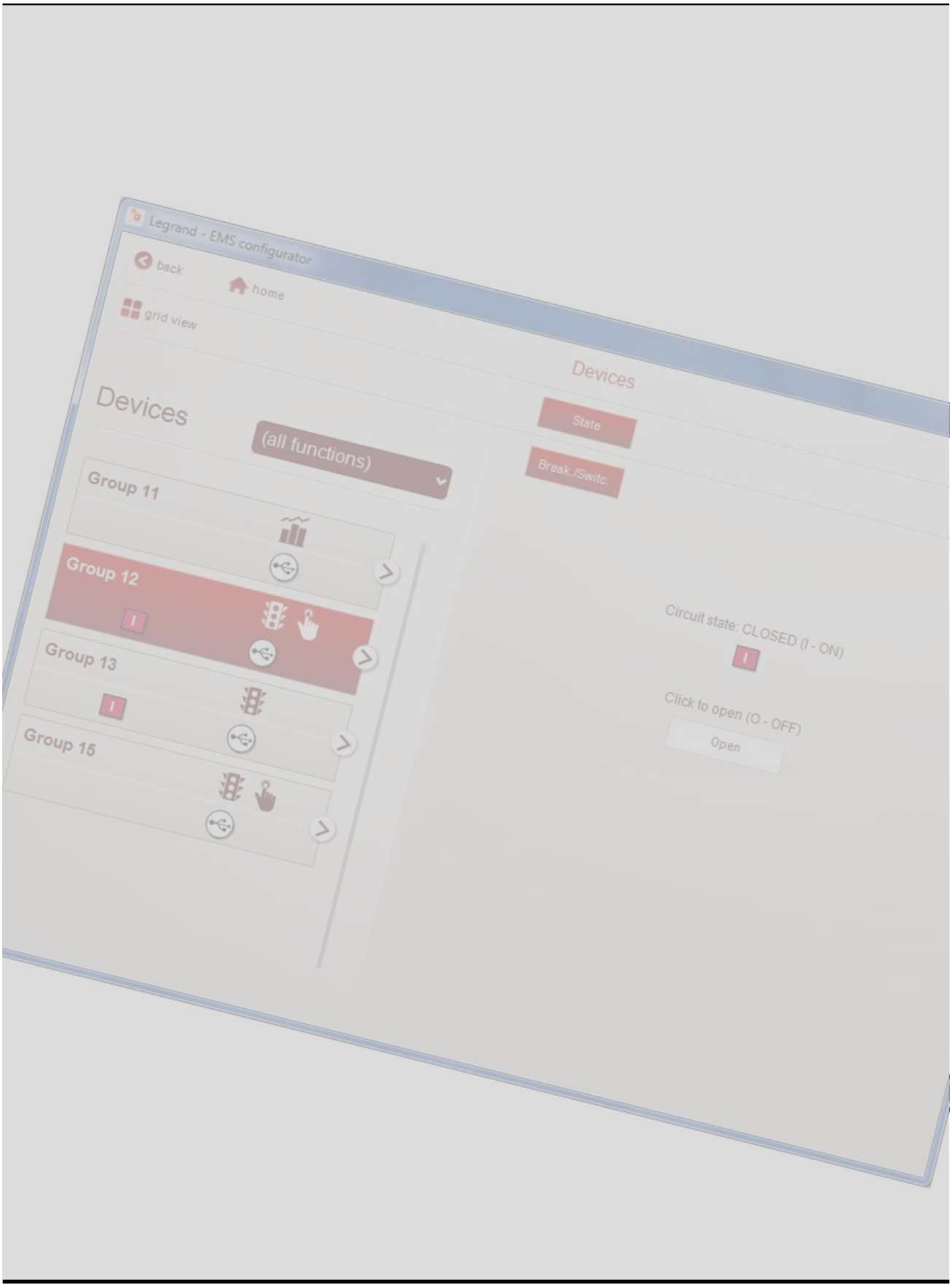

Legrand - EMS configurator
back
home
grid view
Devices
(all functions)
Group 11
Group 12
Group 13
Group 15
Devices
State
Break./Switc.
Circuit state: CLOSED (I - ON)
Click to open (O - OFF)
Open

Contents

Back to "Contents"

1. System requirements

Hardware:

- Intel Core 2 Duo or AMD Athlon X2 processor
- 2GB of RAM
- 320MB of available hard-disk space
- USB port for connection to EMS CX^3 configuration devices

Supported operating systems:

- Microsoft Windows XP (Professional) - Service Pack 3
- Microsoft Windows Vista - Service Pack 2
- Microsoft Windows 7 - Service Pack 3
- Microsoft Windows 10 – all Service Pack

Installation and Display:

- on Computer

2. Fundamental concepts

The EMS Configuration software offers the possibility of configuring EMS CX^3 modules using a simple and intuitive procedure by the creation of a customized project based on personal needs and the actual system installed. The software also performs a check on the configuration, notifying any configuration errors.

Note: EMS Configurator software is free. To be downloaded from the legrand "e-catalogue" web site. Once downloaded it will be useful for all remote configurations of EMS CX^3 modules

3. Compatible devices

Software version 1.06.01

- Range **EMS CX^3**
  - Multifunction measuring devices:
    - Single-phase connection via Closed Rogowski coil(s) – Cat.Nos **4 149 18** and **4 149 19**
    - Three-phase connection via Closed Rogowski coil(s) – Cat.Nos **4 149 20** and **4 149 21**
    - Single-phase or Three-phase (configurable) connection with CT - Cat.No **4 149 23**
    - Three-phase connection via Open Flexible Rogowski coils - Cat.Nos **4 149 22**, **4 149 24**, **4 149 25** and **4 149 27**
  - State and Control modules:
    - Signalling Auxiliary Contact (CA + SD) - Cat.No **4 149 29**
    - Universal State Module - Cat.No **4 149 30**
    - State & Control Module for Latching relays and Contactors - Cat.No **4 149 31**
    - Universal Control Module - Cat.No **4 149 32**
  - Display and Configuration devices:
    - Mini configuration module (local display) - Cat.Nos **4 149 36/37**
    - Modbus/EMS CX^3 interface - Cat.No **4 149 40**

Back to "Contents"

4. Languages available

Languages:

- 中国
- Deutsch
- English
- Español
- Français
- Français (Belgique)
- Ελληνικά
- Italiano
- Nederlands (België)
- Nederlands
- Polski
- Portuguese
- Русский

5. Implementation

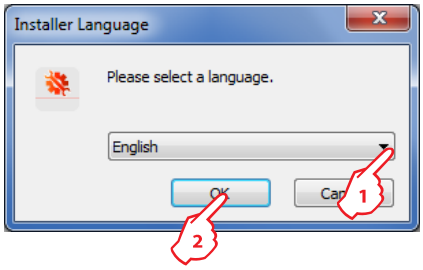
5.1 Material required

- Installation Kit (executable file ".exe")
- A computer with a compatible operating system (XP, 7, etc.)

5.2 Installation

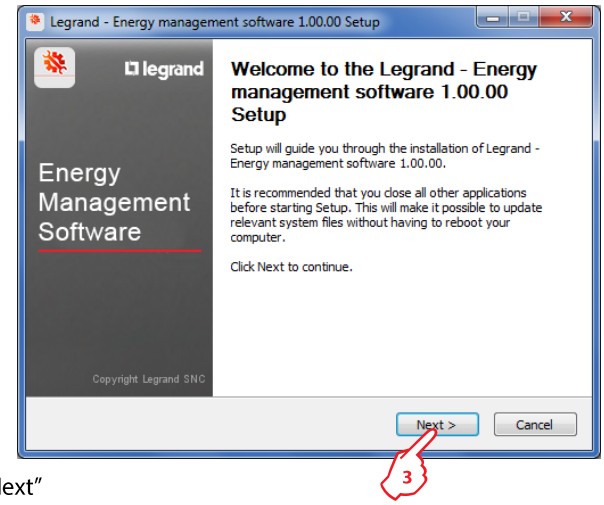
- Run the file Legrand_Energy_management_software_Setup_v.r.b.exe

The installation procedure starts



1. Choose the proper language

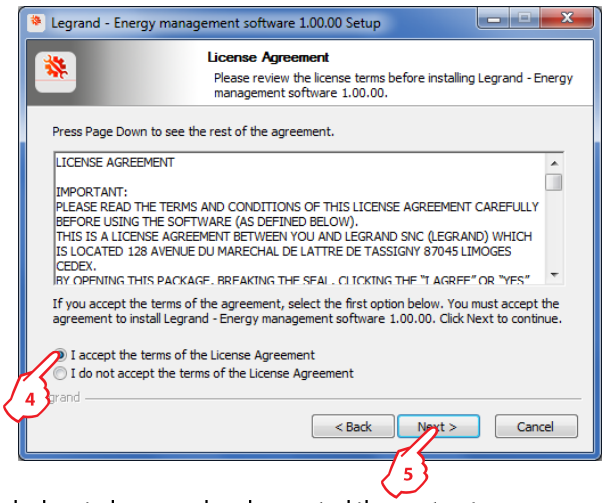
2. Click "OK"



3. Click "Next"

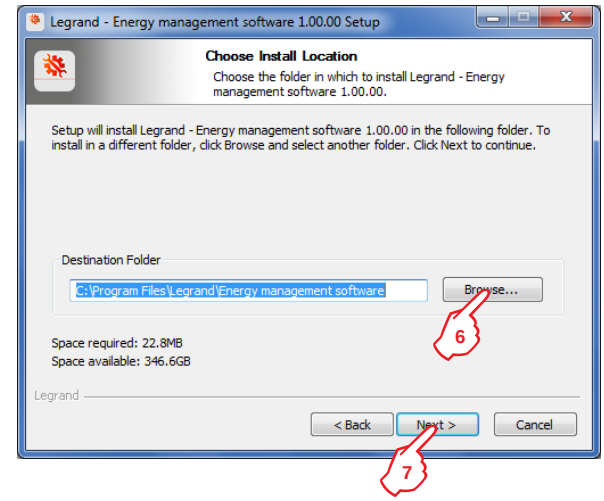
The License agreement page appears

Back to "Contents"



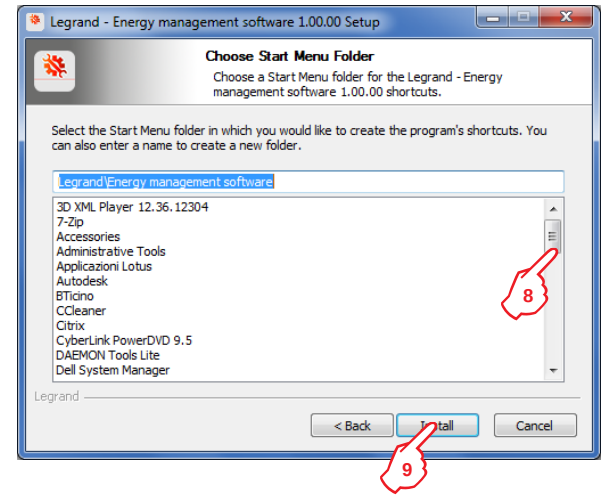
4. Click to declare to have read and accepted the contract

5. Click "Next"



6. Click "Browse" to choose the installation folder

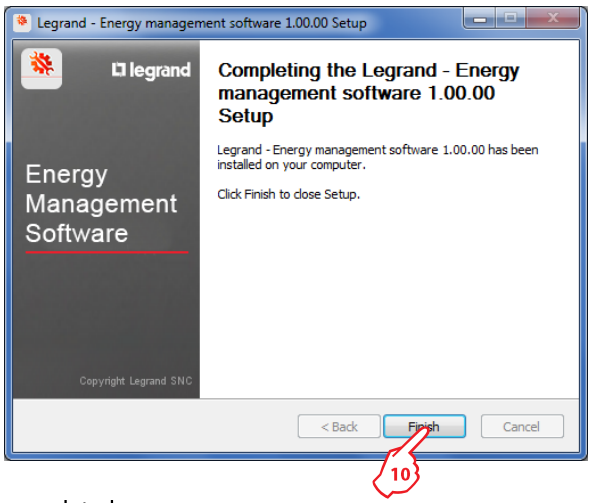
7. Click "Next"



8. Choose a Folder for the Start menu (**default**: Legrand\Measure Software)

9. Click "Install"

Back to "Contents"

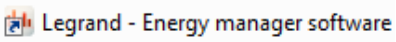


Installation completed

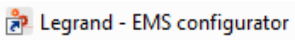
10. Click "Finish"

On the desktop of your computer are created two shortcuts:

- Energy management software:



- EMS Configurator:



In addition, when the software is installed, in the computer path **"C:\Users\UserName\Documents\Legrand EMS"**, is created a folder called "Firmware Update" which contains files ".fwz"; these are files to be used to update the firmware of the EMS CX³ modules according to the procedure described in §5.5 of this manual.

Back to "Contents"

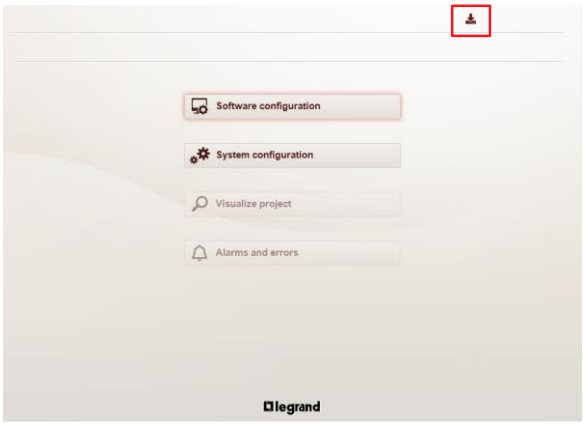
5.3 Software update

5.3.1 Update procedure with Internet connection

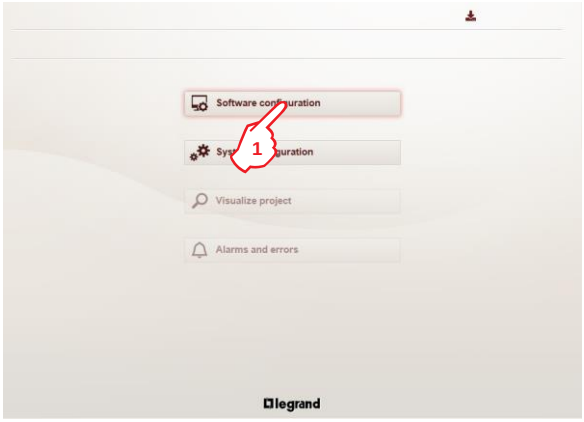
Run the Software.

Software's home page appears.

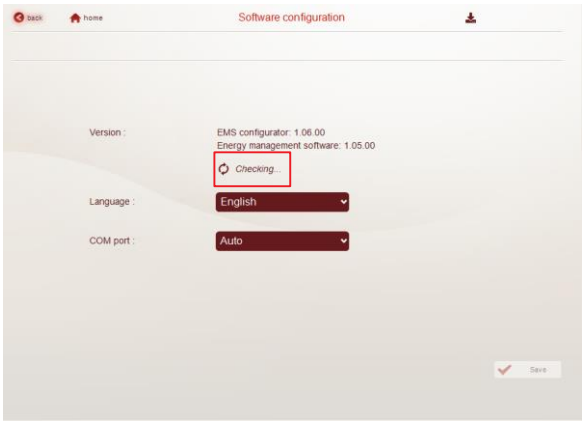
If an update of the software is available, the icon appears in the higher part of all pages of the user interface.



- **Updating the software: follow the procedure**



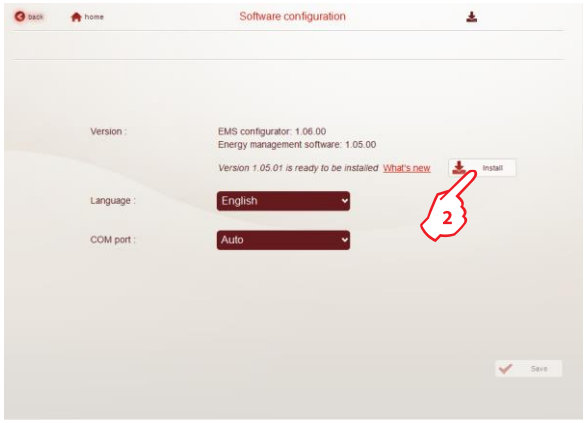
1. Click "Software configuration"



The software checks the availability of the update.

Back to "Contents"

When the Update is available



2. Click "Install" then **3.** Click "Yes" to start the downloading and installing of the new software version.

Back to "Contents"

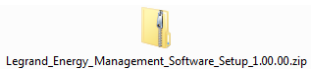
5.3.2 Update procedure without an Internet connection

Verify on the Legrand "e-catalogue" website if a software update is available.

Download the update file from the Legrand site and copy it to your computer. This file will be used to update the software.

Materials required:

– File downloaded from Legrand "e-catalogue":
  - Legrand_Energy_Management_Software_Setup_v.r.b.zip



Energy Management Software = Product Name
v.r.b = Version of the embedded application

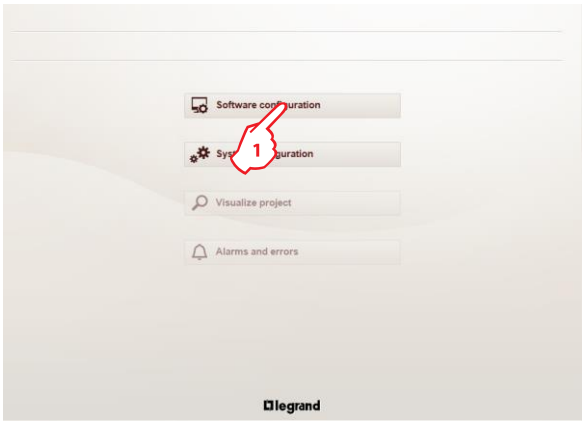
The folder .zip contains the following file:

- Legrand_Energy_Management_Software_Setup_v.r.b.exe: software update package

– Updating the software: follow the procedure

Run the Software,.

Software's home page appears



1. Click "Software configuration"

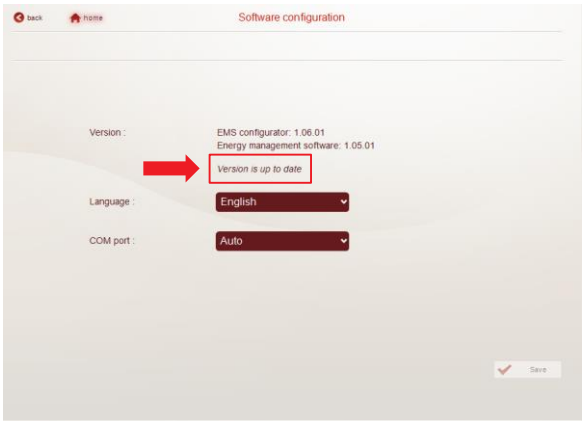
Compare the version of the installed software with the version of the file downloaded from Legrand "e-catalogue". **Update the Software if the file version is more recent than the installed version.**

Back to "Contents"

– Extract from the compressed folder the file:

Legrand_Energy_Management_Software_Setup_v.r.b.exe

– Repeat the installation of the software

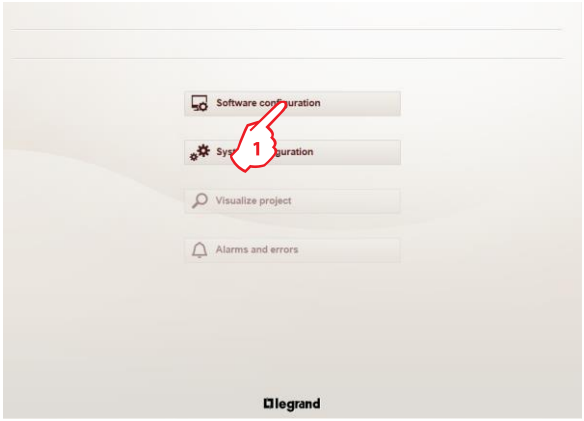


– Verify that the updating has been done checking on the "Software configuration" page.

Back to "Contents"

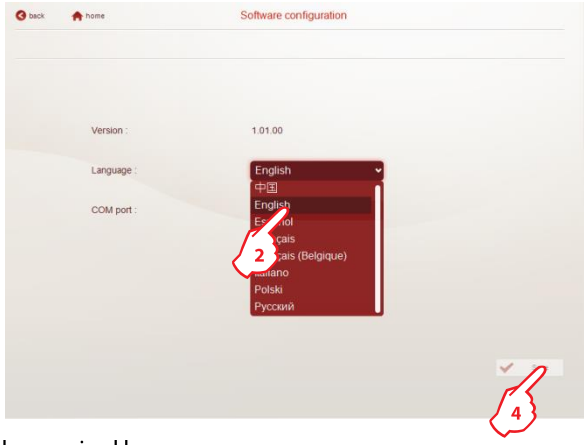
5.4 Modification of the software's language

– Procedure for changing language (if necessary)



In the software's home page

1. Click "Software configuration"



2. Choose the required language

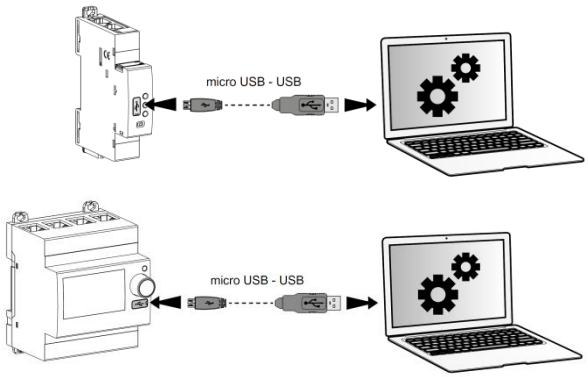
3. Click "Save" to confirm

Back to "Contents"

5.5 Communication port setting

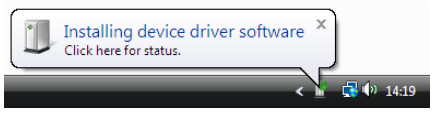
To use the EMS Configuration software, it is necessary to connect the computer to the system on the Modbus/EMS CX³ interface or on the EMS CX³ Mini configuration Module (local display)

– Procedure to configure the communication port (**This procedure is to perform only during the first connection to a Modbus/EMS CX³ interface or an EMS CX³ Mini configuration Module**).

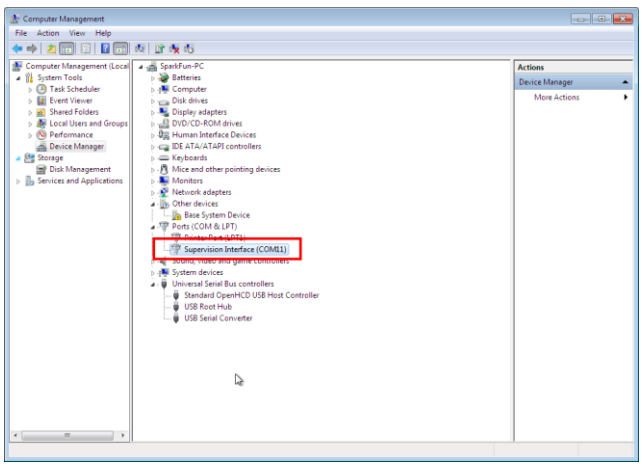


1. Use a USB cable, connecting it between the device's micro USB connector and the PC's USB port.

2. An automatic Drivers installation procedure runs.



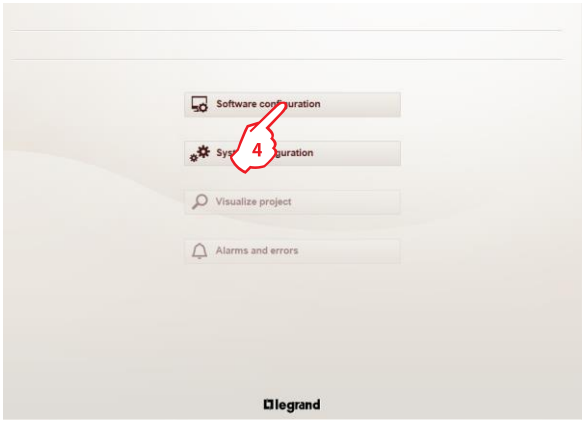
At the end of the installation procedure, it is possible to check the port number assigned from the PC to the device in the "Computer management" window.



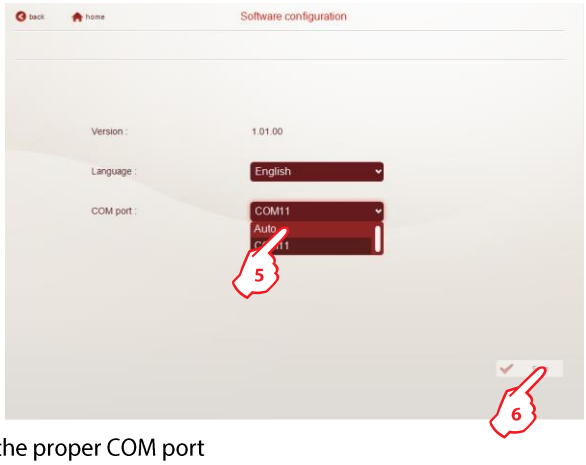
3. Run the EMS Configuration Software

Back to "Contents"

In the software's home page



4. Click "Software configuration"



5. Choose the proper COM port

Note: Automatic detection of the COM port "Auto" is the default configuration.

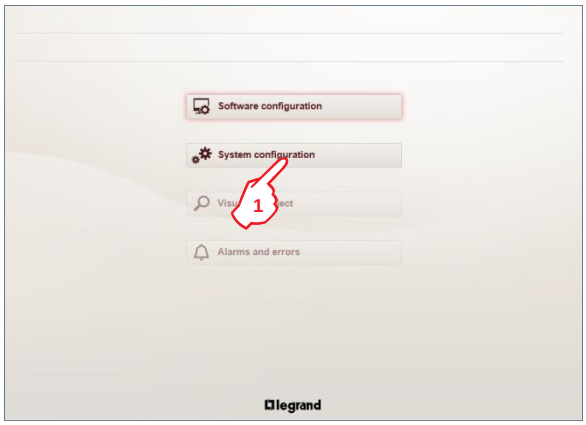
6. Click "Save" to confirm

Back to "Contents"

6. Remote operation

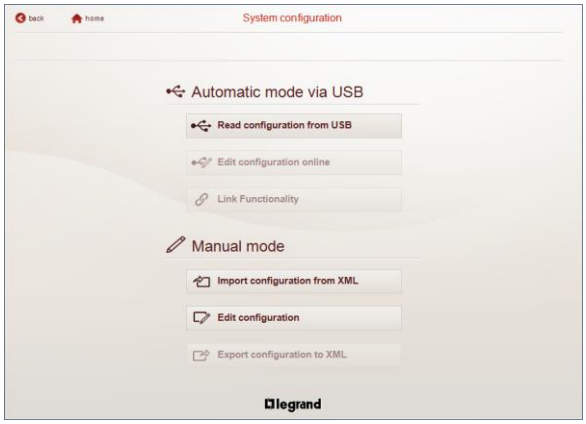
6.1 Configuration and Firmware update of EMS CX³ modules – "System configuration"

Run the EMS Configuration Software



1. In the software's Home page Click "System configuration"

System configuration page appears

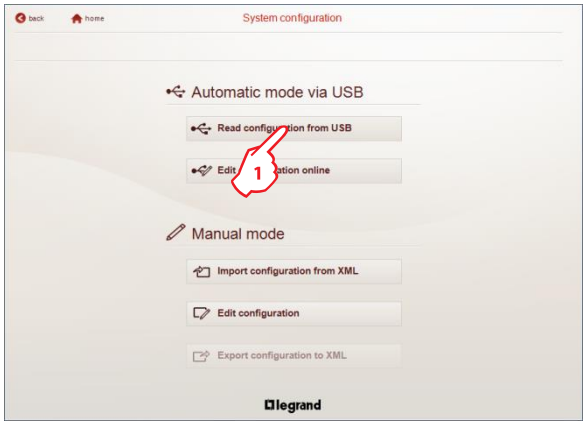


– Possible actions:
  - Read configuration from USB and Module's firmware update
  - Edit configuration
  - Link functions between modules to create automatic actions
  - Export (if necessary) the edited configuration
  - Import a previously saved configuration

Back to "Contents"

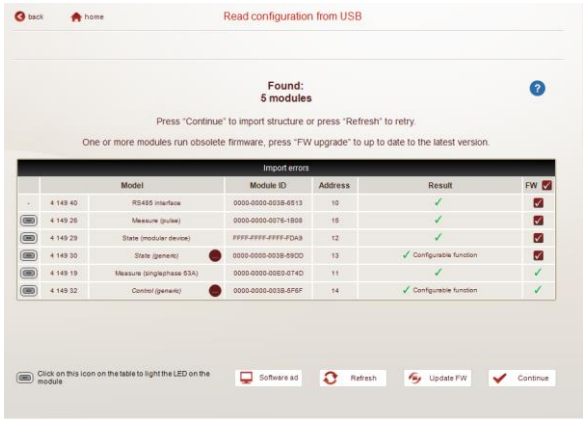
6.1.1 Local addressed system

In the “System configuration” page

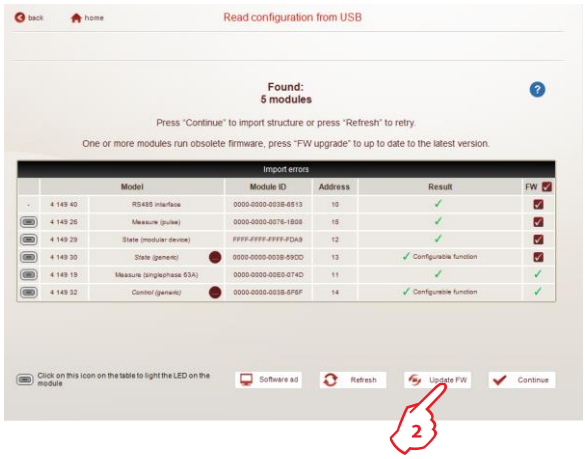


1. Click “Read configuration from USB”

A page with a table of reading results appears



Icon ☑ in the “FW” column means that a firmware update is available for the module

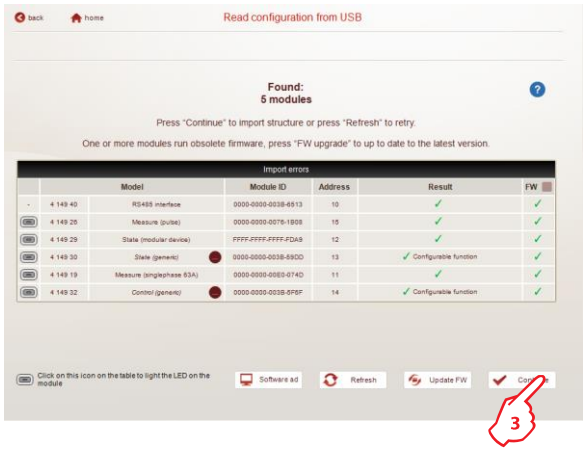


2. Click “Update FW” to perform the update of the firmware of all the modules at once.

Note: for Mini configuration modules (4 149 36/37), the update procedure is to be performed directly connecting it to the PC’s USB port.

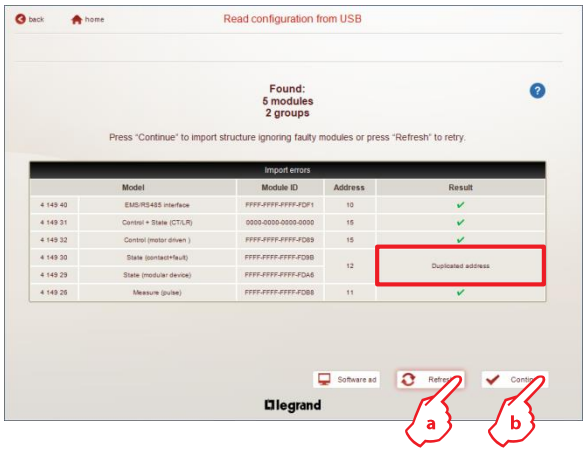
Back to “Contents”

At the end of the update procedure or, if all module's firmware are updated, the page the page looks like below



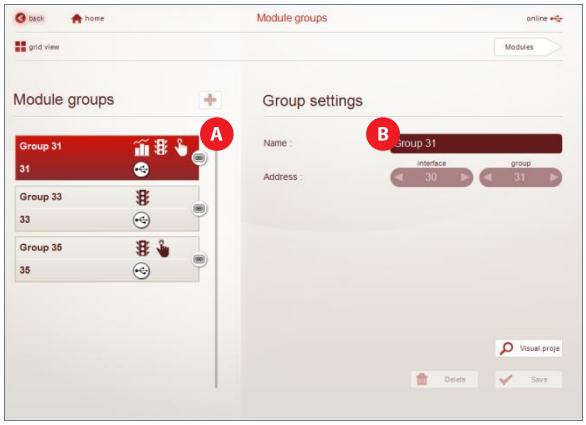
3. Click "Continue" to go to the edit page of the configuration read.

Note: if configuration software detects some mistakes (e.g., addressing, duplicated functions, etc.), error detail are shown in the table.



Correct the configuration according the indications then, **a.** click "Refresh". if the software no longer reports errors, **b.** click "Continue" to go to the edit page of the configuration read.

Back to "Contents"



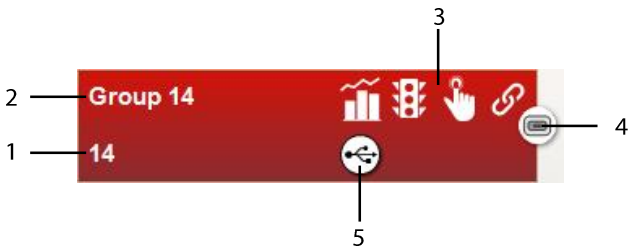
The page is divided into two sections:

section A is the "Read Groups" area.

Note: a Group is a set of several devices with the same address. A group is made with the purpose of grouping different functions, because they are related to the same electrical circuits. For example, it is possible to assign the same address to a signalling auxiliary module (cat. no 4 149 29), a universal control module (cat. no 4 149 32), a measuring module, and so on. In this way on the supervision system the grouped function will be displayed as a unique "device" with all grouped functions.

section B shows the "Group Settings" area, where the configuration fields for the selected group are available.

- **Description of the group selection button**

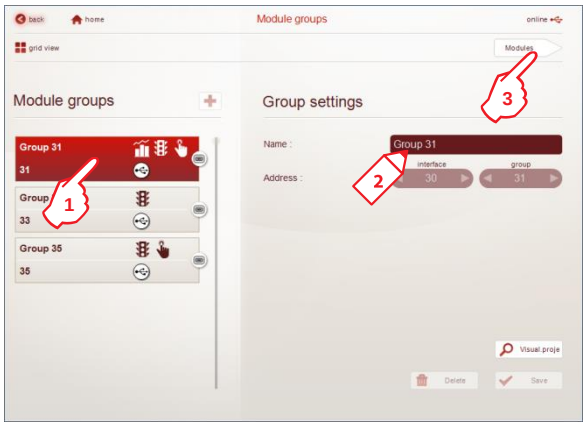


1. Address of the group
2. Name of the group *(name proposed by default - user editable parameter)*
3. Symbols of the functions associated to the group *(depending on the characteristics related to each EMS CX3 module)*
   - Measure
   - State
   - Command
   - Link Function
4. Icon used to turn on the multifunction led button on the front face of all the EMS CX^3 modules included in the group
5. Communication status
   - System connected via USB to a PC
   - Communication error

Back to "Contents"

• **TO VIEW/CONFIGURE THE EMS CX³ DEVICES CHARACTERISTICS UNDER A GROUP**

In the Module groups page

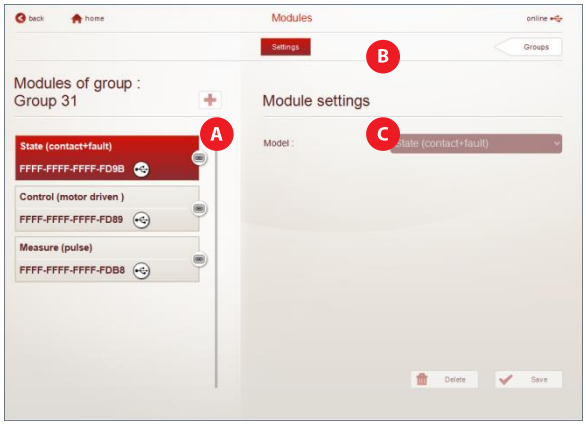


1. Select a Group

2. Rename the Group (if necessary)

3. Click "Modules" to view/configure the devices characteristics

Module's settings page appears



The page is divided into three sections:

section A shows the modules under the selected group with their characteristics and icons

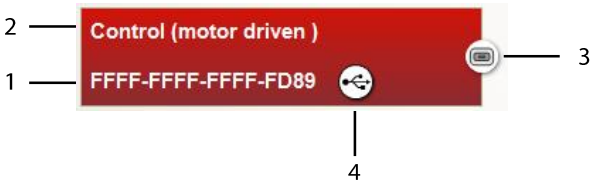
section B is the area where is possible to select two pages:

- Settings: display page of the base configuration of the selected module
- Advanced (if present): page dedicate to configure whole or some settings of the selected module. **Note:** this page change according to the module type, local DIP switch configuration, etc...

section C shows the basic and advanced settings fields of the selected module

Back to "Contents"

- **Description of the device selection button**



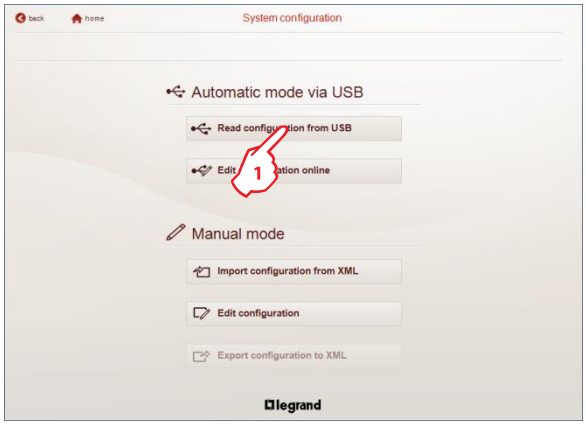
1. Identification number of the module (univocal code that identifies the module)
2. Module function
3. Icon used to turn on the multifunction led on the front face of the module
4. Communication status
   - System connected via USB to a PC
   - Communication error

Note: Whenever you make a modification to the system (adding/removing a module, change of address, change of configuration by DIP switches, etc ...) must repeat the reading procedure of the configuration from USB

Back to "Contents"

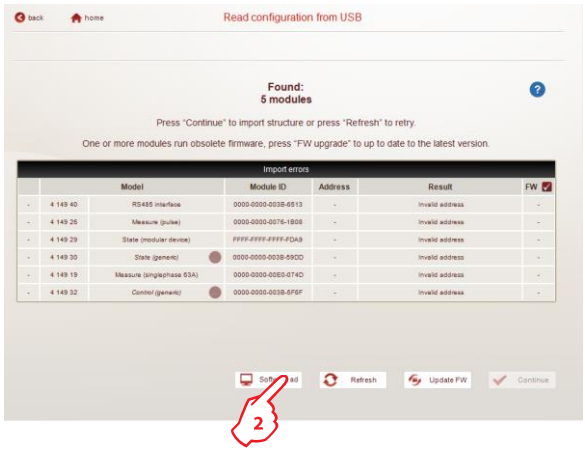
6.1.2 Remote addressed system

In the "System configuration" page

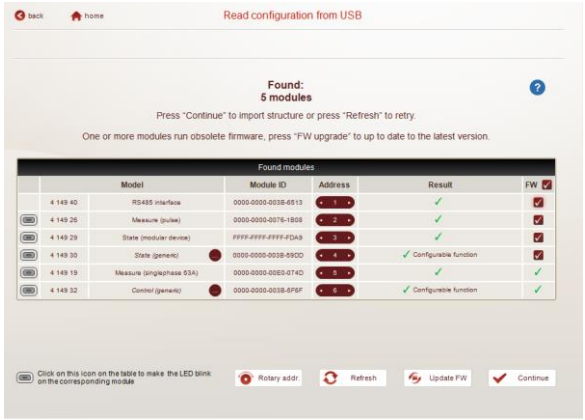


1. Click "Read configuration from USB"

A page with the reading results appears

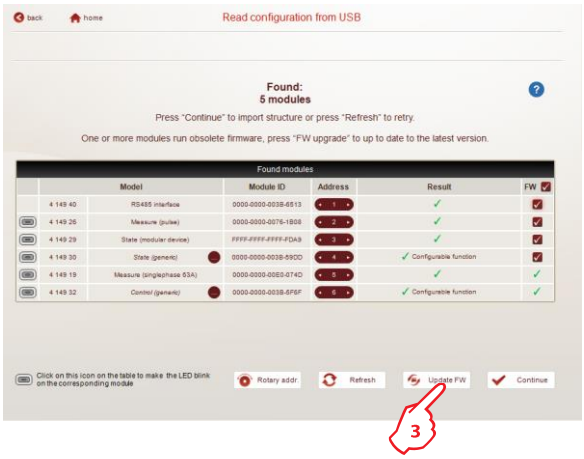


2. Click "Software addressing". Configuration software automatically assigns an address to each module detected



Icon ☑ in the "FW" column means that a firmware update is available for the module

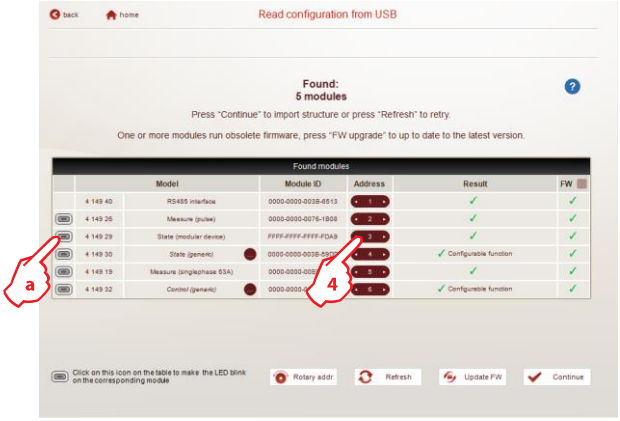
Back to "Contents"



3. Click "Update FW" to perform the update of the firmware of all the modules at once.

Note: for Mini configuration modules (4 149 36/37), the update procedure is to be performed directly connecting it to the PC's USB port.

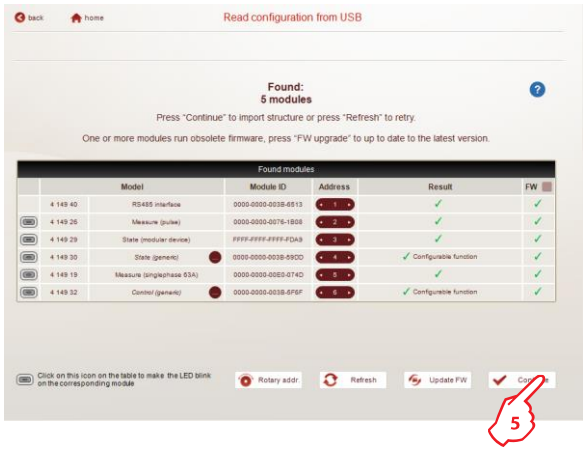
At the end of the update procedure or, if all module's firmware are updated, the page looks like below



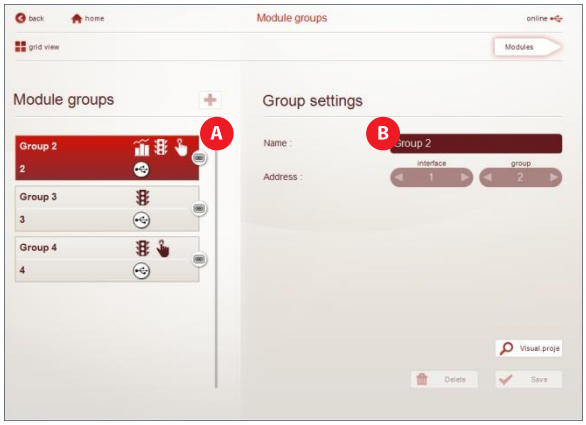
4. Change (if necessary) the addresses assigned by the software according to the real configuration of installed modules.

Note: to identify clearly a module in a row, **a.** click on the icon to turn on the multifunction led on the front face of the module

Back to "Contents"



5. Click "Continue" to go to the edit page of the configuration read.



The page is divided into two sections:

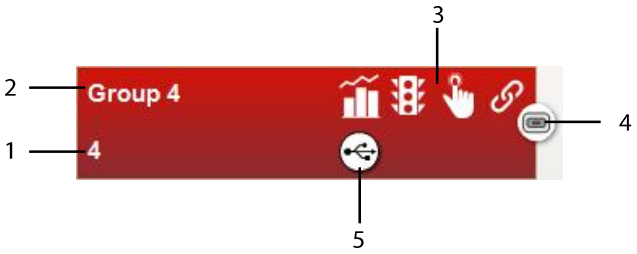
section A is the "Read Groups" area.

Note: a Group is a set of several devices with the same address. A group is made with the purpose of grouping different functions, because they are related to the same electrical circuits. For example, it is possible to assign the same address to a signalling auxiliary module (cat. no 4 149 29), a universal control module (cat. no 4 149 32), a measuring module, and so on. In this way on the supervision system the grouped function will be displayed as a unique "device" with all grouped functions.

section B shows the "Group Settings" area, where the configuration fields for the selected group are available.

Back to "Contents"

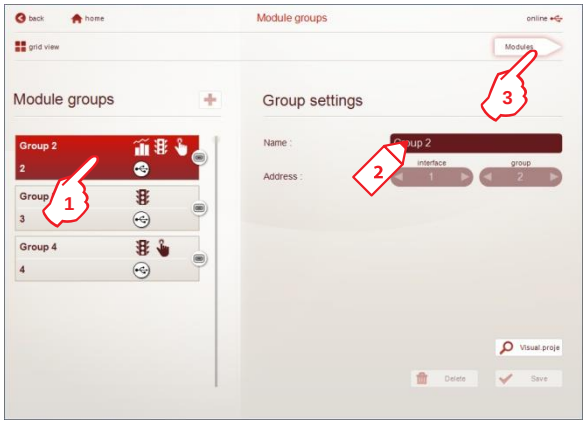
• **Description of the group selection button**



1. Address of the group
2. Name of the group *(name proposed by default - user editable parameter)*
3. Symbols of the functions associated to the group *(depending on the characteristics related to each EMS CX3 module)*
   - Measure
   - State
   - Command
   - Link Function
4. Icon used to turn on the multifunction led button on the front face of all the EMS CX³ modules included in the group
5. Communication status
   - System connected via USB to a PC
   - Communication error

• **TO VIEW/CONFIGURE THE EMS CX³ DEVICES CHARACTERISTICS UNDER A GROUP**

In the Module groups page



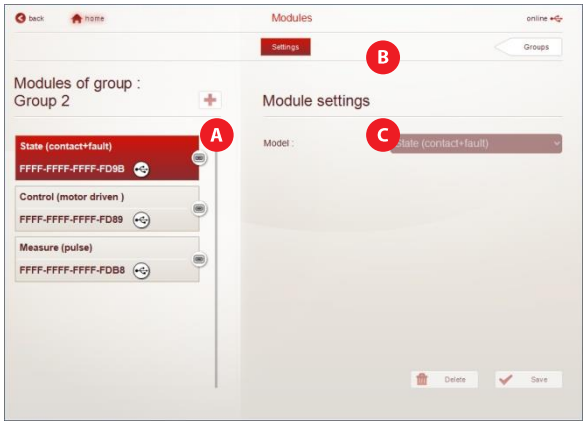
1. Select a Group

2. Rename the Group (if necessary)

3. Click "Modules" to view/configure the devices characteristics

Module's settings page appears

Back to "Contents"



The page is divided into three sections:

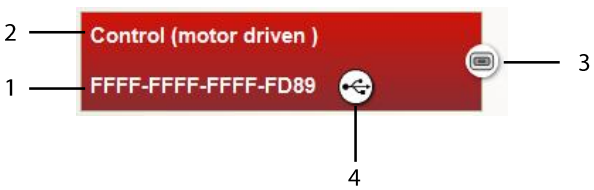
section A shows the modules under the selected group with their characteristics and icons

section B is the area where is possible to select two pages:

- Settings: display page of the base configuration of the selected module
- Advanced (if present): page dedicate to configure whole or some settings of the selected module. **Note:** this page change according to the module type, local DIP switch configuration, etc...

section C shows the basic and advanced settings fields of the selected module

- **Description of the device selection button**



1. Identification number of the module (univocal code that identifies the module)
2. Module function
3. Icon used to turn on the multifunction led on the front face of the module
4. Communication status
   - System connected via USB to a PC
   - Communication error

Note: Whenever you make a change to the system (adding/removing a module, change of address, change of configuration by DIP switches, etc ...) must repeat the reading procedure of the configuration from USB

Back to "Contents"

6.1.3 Remote configuration of a universal state or command module via configuration

Universal State (4 120 30) and Command (4 120 32) modules can be configured in two ways:

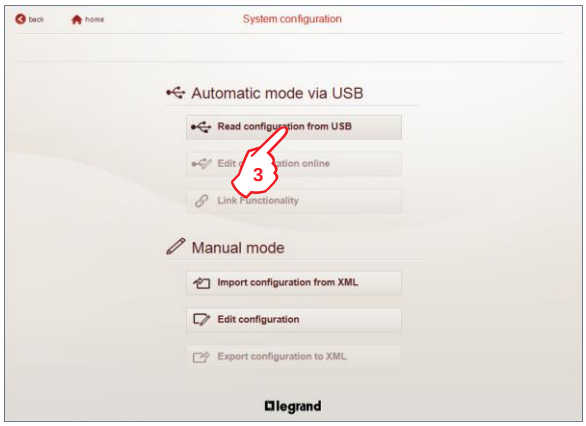
- Locally, setting the dip-switches on the side of the module
- Remotely, via configuration software leaving the dip-switches in "0000" position (factory configuration)

Note: this procedure applies in the same way for a system locally or virtually addressed.

Procedure for remote configuration of modules.

1. Install and wire modules according to the function they must perform in the installation (for wiring diagram refer to the Technical Data Sheet of each module).

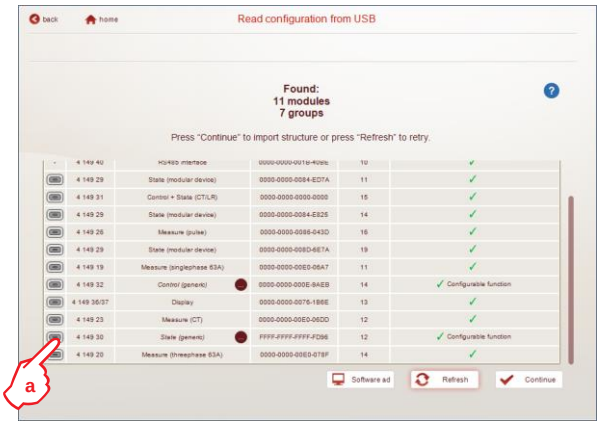
2. Access the configuration software



3. In "System configuration" page click "Read configuration from USB"

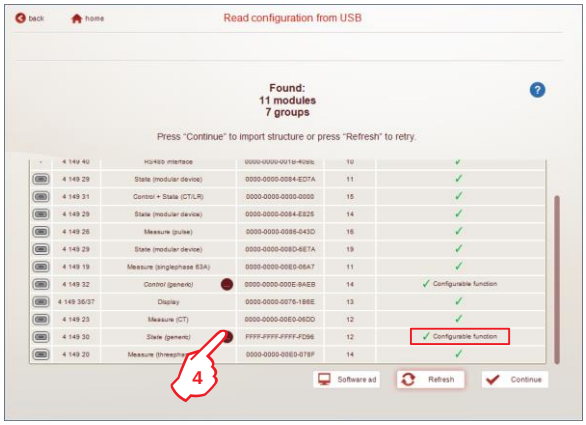
The page with the reading results table is displayed.

Beside the description of each universal module (state or command) with dip-switches in "0000" position appears the icon " " and in the "Result" field appears the text "Configurable function"



Note: to identify clearly a module in a row, **a.** click on the icon to turn on the multifunction led on the front face of the module

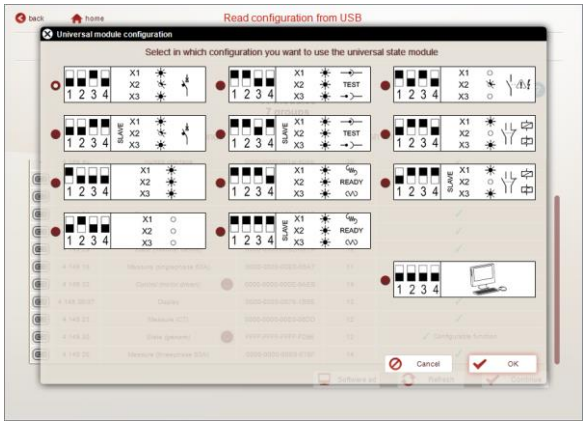
Back to "Contents"



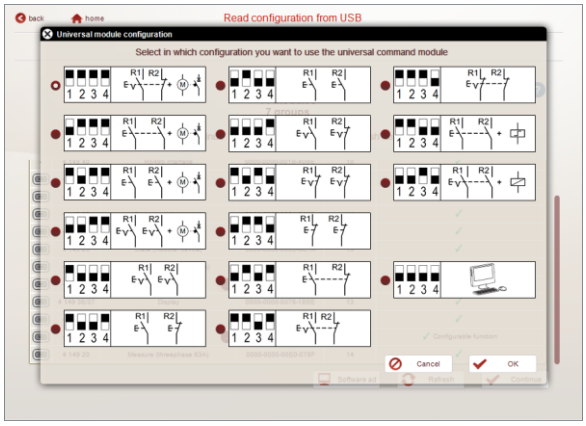
4. Click on icon "…" . A pop-up window appears

The window shows all the possible configurations that can be assigned to the selected module.

- For universal state module (4 149 30) possible configurations are:

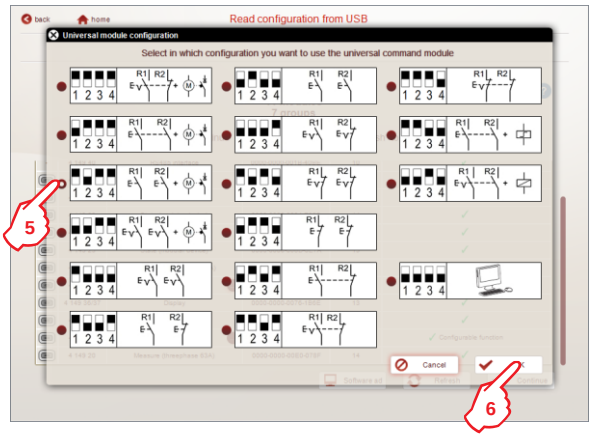


- For universal command module (4 149 32) possible configurations are :



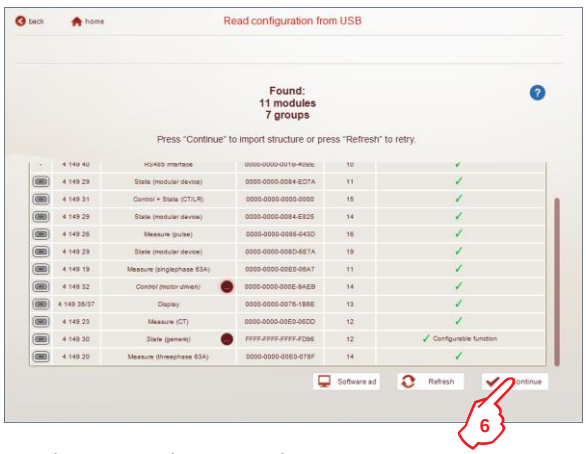
Back to "Contents"

To complete the configuration:



5. Select the appropriate configuration

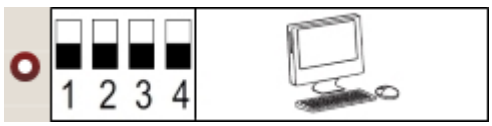
6. Click "OK" to confirm.



Perform the configuration of other configurable modules present in the system (modules for which appears the icon " ... " and the text "Configurable function"), then **7.** click "Continue" to complete programming access the edit page of the configuration read *(use of this part is described on pages 13 to 15 of this Manual)*.

Note: to modify the configuration of an already configured module, it is necessary to return the module to the factory settings by pressing the multifunction button on the front face until the LED becomes steady red *(approximately 20 seconds)*, then repeat the reading procedure via USB and assign a new configuration to the module.

The only exception is if the configuration chosen is the one with all dip-switches in 0000 position



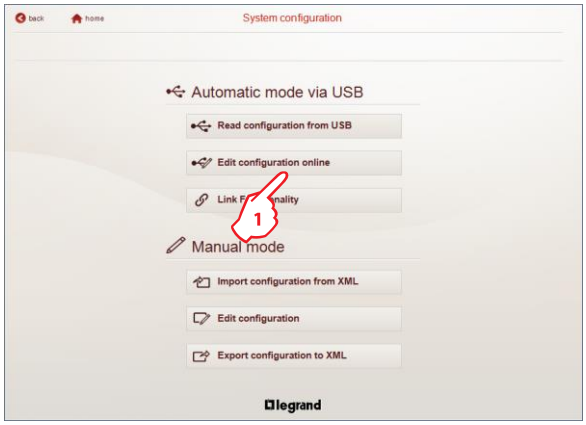
In this case, simply repeat the configuration reading procedure via USB and assign a new configuration to the module without returning it to factor settings.

Back to "Contents"

6.2 Editing a configuration online

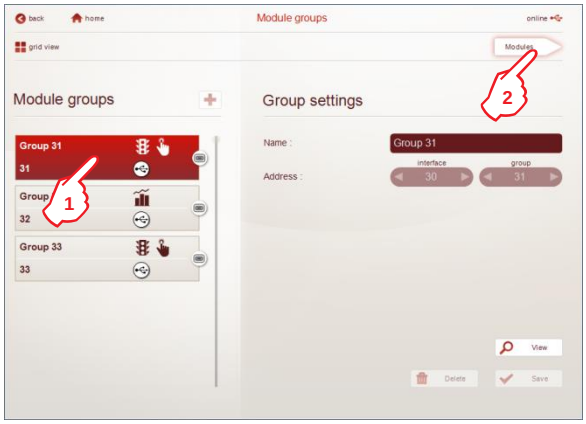
Function used to change settings of Groups and Modules once the reading of a configuration from USB is already done and there are still settings to edit.

In the "System configuration" page



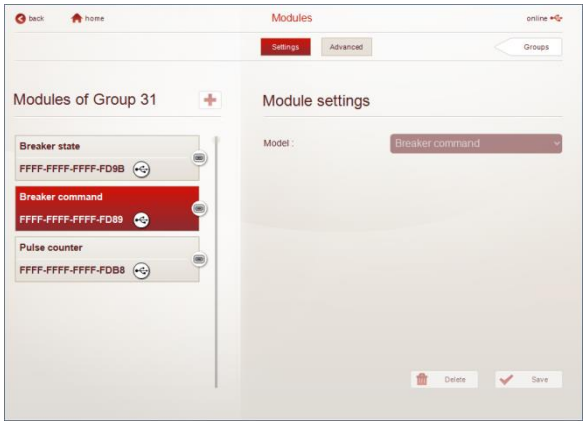
1. Click "Edit configuration online"

The Configuration software redirect the user directly to the Modules group page



1. Select a Group

2. Click "Modules" to view/configure the devices characteristics



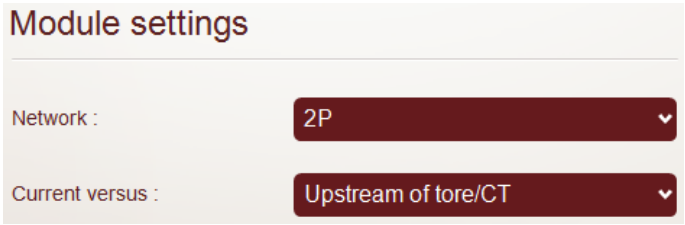
Back to "Contents"

6.2.1 Configurable parameters of each module

This section of the manual describes in detail the configurable parameters of each module

- **Single-phase measuring module with Closed Rogowski sensor(s) up to 63 A** (Cat.Nos 4 149 18 and 4 149 19)

Configurable parameters:

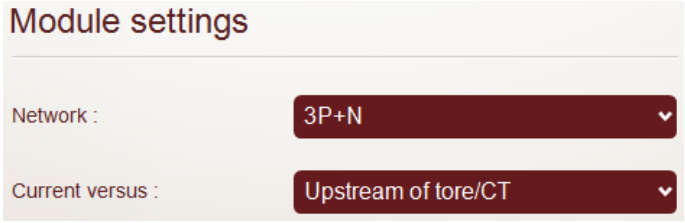


It is possible to set:

- Supply: current direction through the measuring Rogowski coil sensor

- **Three-phase measuring module with Closed Rogowski sensors up to 63 A** (Cat.No 4 149 20) and up to 125 A (Cat.No 4 149 21)

Configurable parameters:

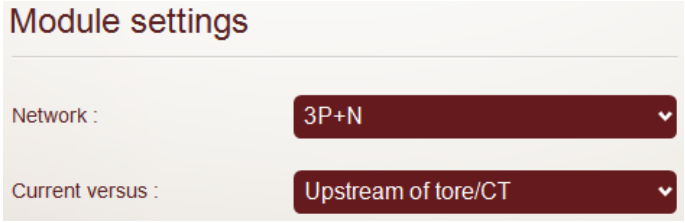


It is possible to set:

- Network: Three-phase network with or without neutral conductor
- Supply: current direction through the measuring Rogowski coil sensor

- **Three-phase measuring module with Open Flexible Rogowski sensors from 630 A to 6300 A** (Cat.Nos 4 149 22, 4 149 24, 4 149 25 and 4 149 27)

Configurable parameters:



It is possible to set:

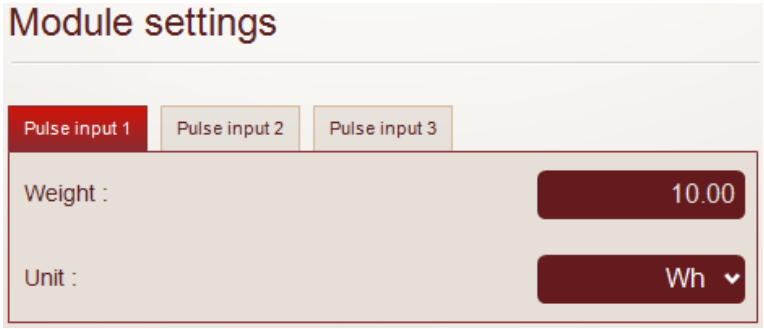
- Network: Three-phase network with or without neutral conductor
- Supply: current direction through the measuring Rogowski coil sensor

Back to "Contents"

• **Measuring module, connected via current transformers** (Cat.No 4 149 23)
Configurable parameters:

It is possible to set:
- Network: Single-phase, Three-phase network with or without neutral conductor
- Supply: current direction through the measuring current transformer
- Current transformer ratio: obtained by dividing "Primary Current of CT" / 5A (e.g., 800A / 5A, CT ratio = 160)

• **Pulse concentrator** (Cat.No 4 149 26)
Configurable parameters:



For each pulse input it is possible to set:
- Weight of the pulse in input (e.g., each impulse = 10.00)
- Unit: measurement unit of the pulse in input. Possible values: pulses, Wh, kWh, MWh, varh, kvarh, Mvarh, VAh, kVAh, MVAh, m3, km3, Mm3, Nm3, kNm3, MNm3, J, kJ, MJ, cal, kcal, g, kg, t.

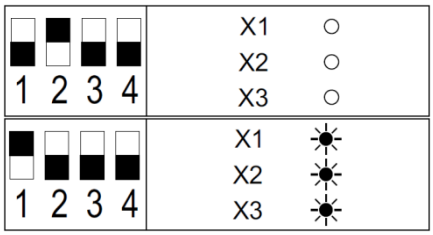
Note: default configuration for the three inputs: 10 Wh/imp

Back to "Contents"

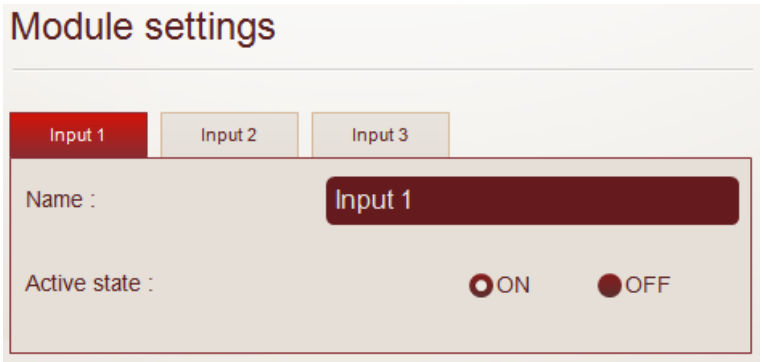
• **Universal signalling module** (Cat.No 4 149 30)

- Generic input

DIP Switches combinations:



Configurable parameters:



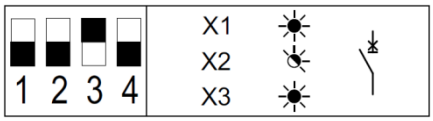
For each input it is possible to set:

- Name
- Active state: "ON" or "OFF"

ON: input is activated when the contact closes (normally open contact in input)
OFF: input is activated when the contact opens (contact normally closed in input

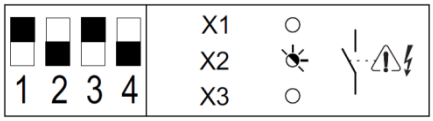
- Breaker state (Open, Close, Tripped)

DIP Switches combination:



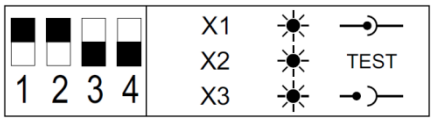
- General tipped

DIP Switches combination:



- Breaker position (Inserted, Drown-out, Test)

DIP Switches combination:

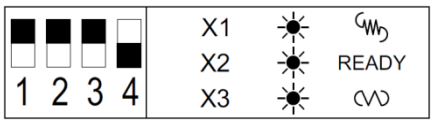


Back to "Contents"

• **Universal signalling module** (Cat.No 4 149 30) *(continued)*

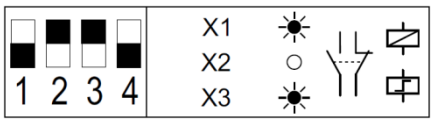
- Spring state (Charged/Discharged, Ready to close)

DIP Switches combination:

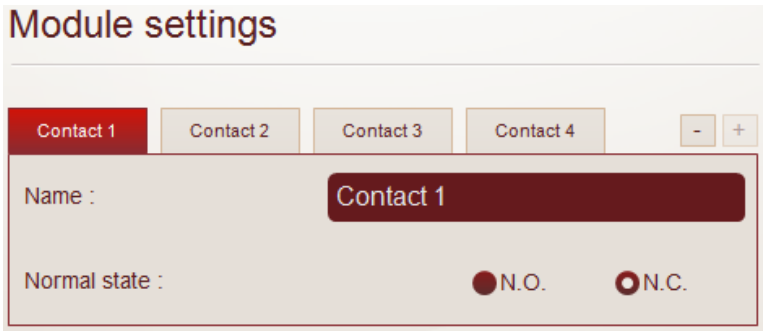


- Contactor/Latching relay state

Following DIP Switches combination:



Configurable parameters:



It is possible to set:

- Number of the contacts of the associated Contactor or Latching relay. Possible to add or remove contacts (via "+" or "-" button)
- Name of each contact
- Normal state of each contact: Normally Open (N.O.) or Normally Closed (N.C.)

Legend:

☀ Steady LED

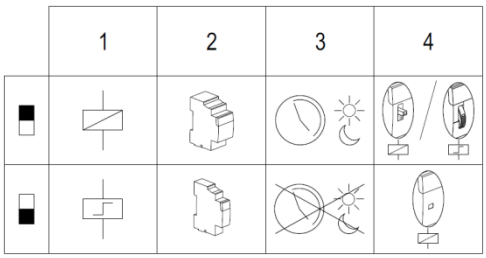
☀ Blinking LED

○ LED off

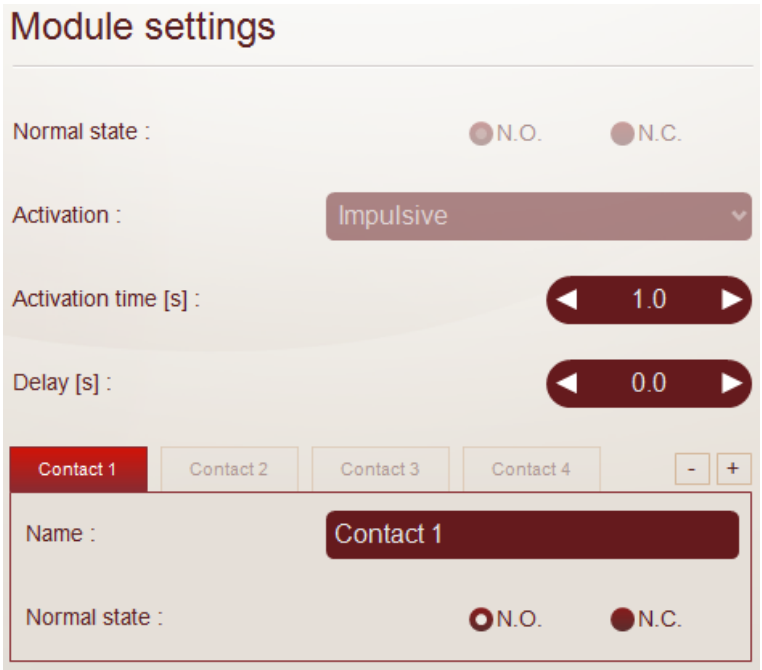
Back to "Contents"

• **Control and state reporting module** (Cat.No 4 149 31)

DIP Switches combination table:



Configurable parameters:



It is possible to set:

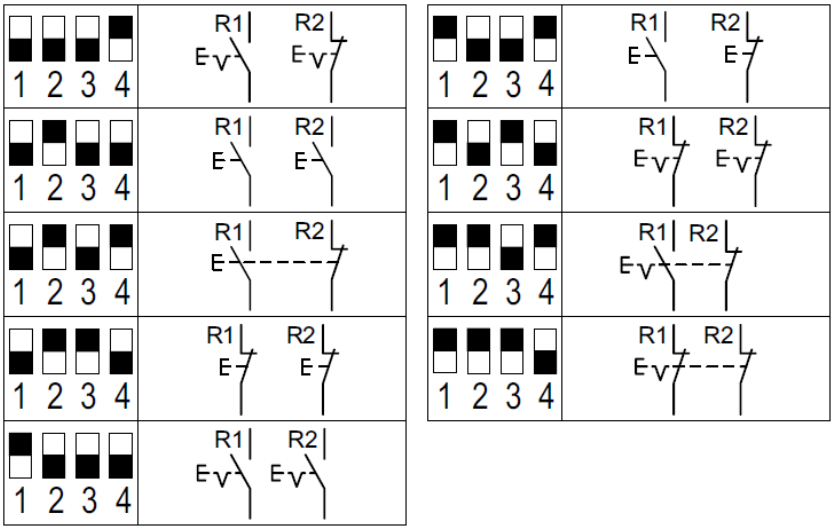
- Activation time (only for configurations for Latching relays)
- Delay: time between sending a command and the output activation
- Number of the contacts of the associated Contactor or Latching relay. Possible to add or remove contacts (via "+" or "-" button)
- Name of each contact
- Normal state of each contact: Normally Open (N.O.) or Normally Closed (N.C.)

Back to "Contents"

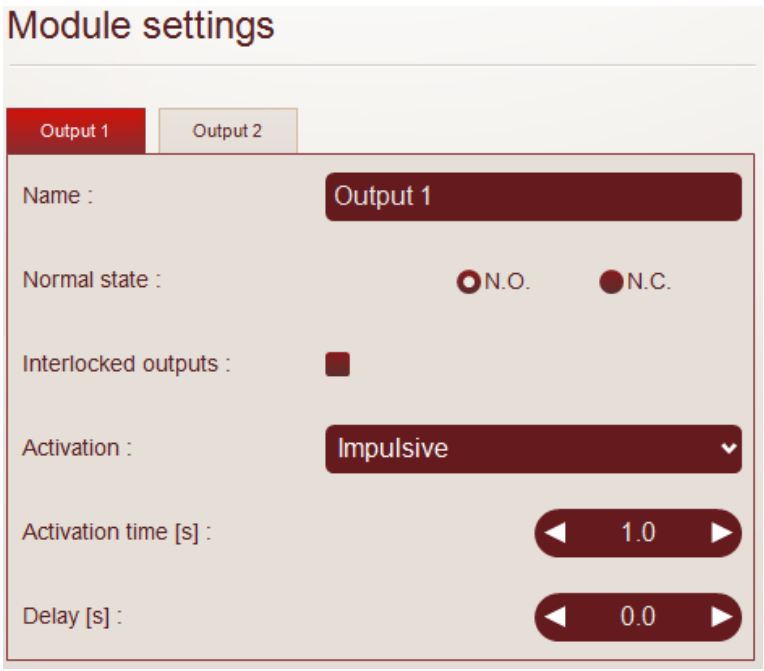
• **Universal control module** (Cat.No 4 149 32)

- Generic output

DIP Switches combinations:



Configurable parameters:



For each output it is possible to set:

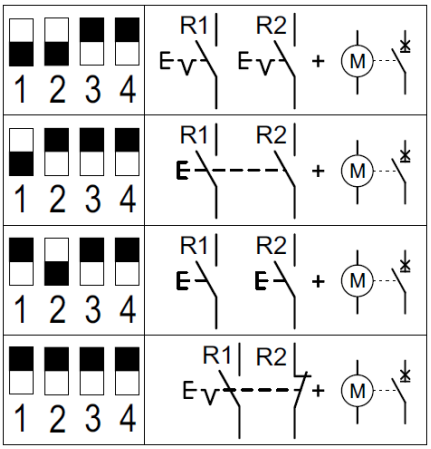
- Name
- Normal state : Normally Open (N.O.) or Normally Closed (N.C.)
- A flag to interlock the two outputs: pressing one of the two buttons or sending a command both outputs are activated
- Activation: Impulsive or Maintained command
- Activation time (only if the command is impulsive)
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Back to "Contents"

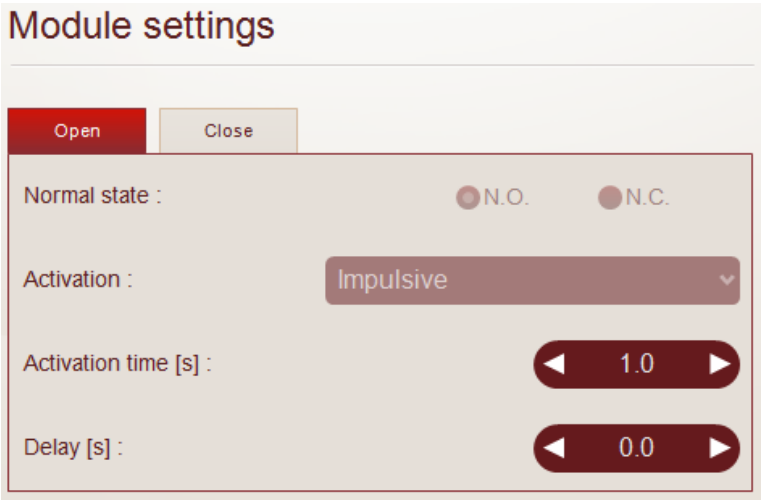
• **Universal control module** (Cat.No 4 149 32) *(continued)*

- Breaker command

DIP Switches combination:



Configurable parameters:



For each output it is possible to set:

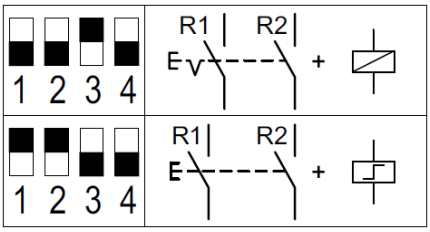
- Activation time
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Back to "Contents"

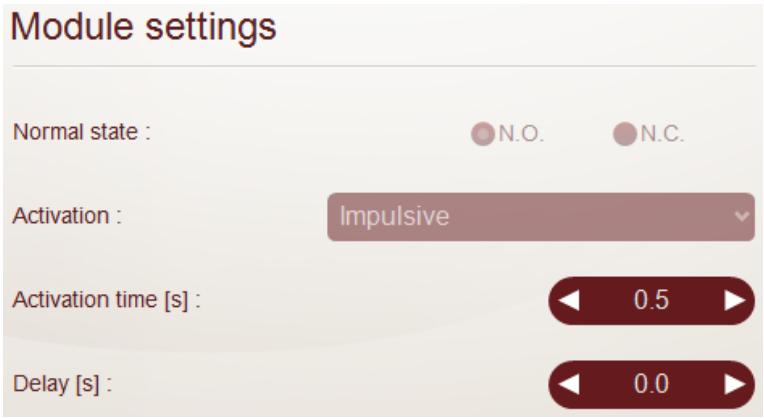
• **Universal control module** (Cat.No 4 149 32) *(continued)*

- Contactor command

DIP Switches combination:



Configurable parameters:



It is possible to set:

- Activation time (only for the configuration for Latching relays)
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Back to "Contents"

6.2.2 Load shedding function

Allows to carry out automatically load shedding in case of the power demand of a circuit exceed a preset threshold (in kW).

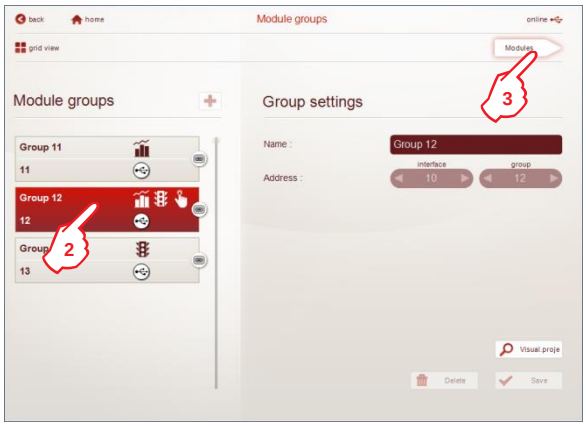
Function is implementable using following EMS CX³ modules:

- Universal Control module (cat. No **4 149 32**) using the default configuration (DIP switches in 0000 position)
- Multifunction measurement modules (cat. nos **4 149 18/19/20/21/22/23/24/25/27**)

• **Procedure to set the different parameters**

1. Assign the same address to the EMS CX³ modules (Universal control module and Multifunction measurement module) that you want to link together

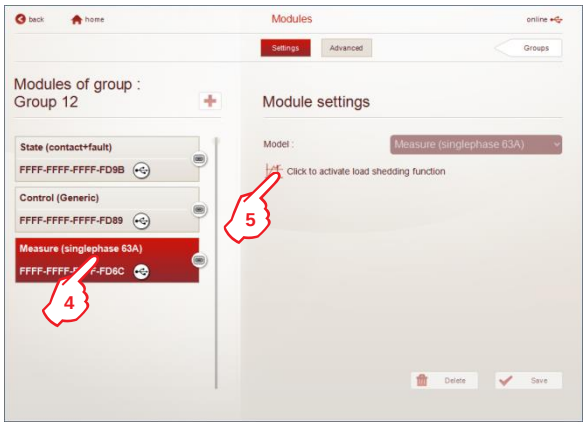
In the "Module groups" page of the software



2. Select the group containing the Universal control module and the Multifunction measurement module

3. Click "Modules" to view/configure the devices characteristics

Module's settings page appears



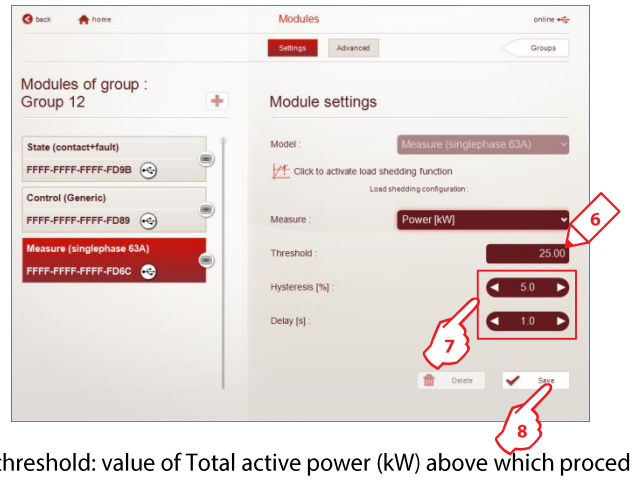
4. Select the Multifunction measurement module

5. Click to activate the load shedding function

For more details, see diagram in page 40

Back to "Contents"

A set of additional parameters are shown



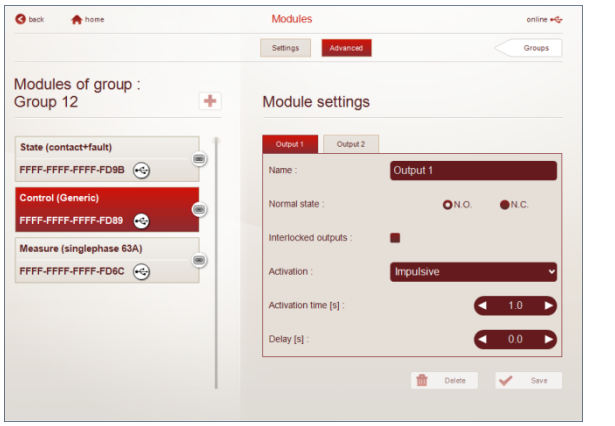
6. Set the threshold: value of Total active power (kW) above which procedure starts.

7. Assign the other control parameters:

- Hysteresis: value expressed in % of the threshold under which the alarm is over and the disconnected loads are restored *(default value 5%)*.
- Alarm delay (s) - *(default value 0s)*:
  during the activation of an alarm is the waiting time between the threshold point and the alarm on the EMS bus
  during the de-activation of an alarm is the waiting time between the hysteresis point and the alarm is deactivation on the EMS bus

8. Click "Save" to confirm

In the Module settings page of the Universal control module



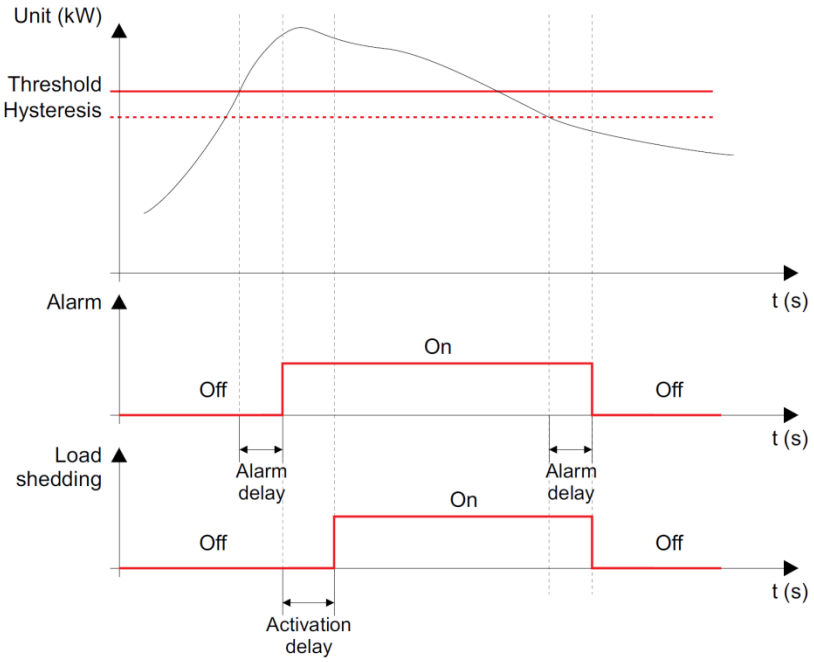
Set following parameters:

- Normal state: is the rest position of the relay; normally open (NO) or normally closed (NC).
- The flag to interlock the two outputs: pressing one of the two buttons or sending a command both outputs are activated
- Activation: impulsive or maintained
- Activation time (s): used for the impulsive work method; represents the time in which the relay remains in the working position.
- Activation delay (s): waiting time between alarm is declared on the EMS bus and the load(s) is (are) disconnected by the universal control module (default value 0s)

For more details, see diagram in page 40

Back to "Contents"

Load shedding diagram



Back to “Contents”

6.3 Link Functionality

This function allows you to link two EMS CX³ modules to create automatic actions that, once programmed, can run independently without a connection to a manager is needed.

The basic rule is the link between an event (circuit breaker that trip, a threshold exceeded, etc.) and an action accordingly (signaling, opening of a circuit by motorized control or contactor, etc.).

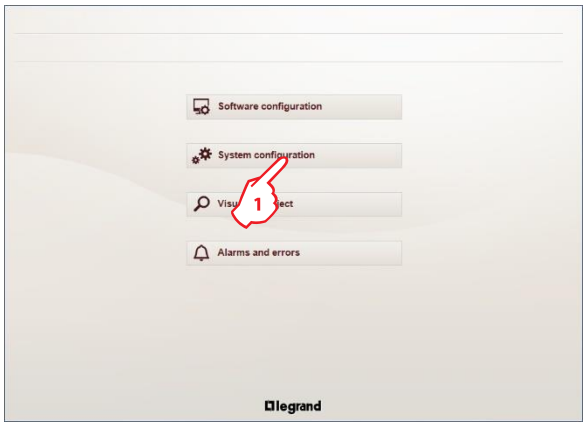
Possible associations are:

	Action module		
Event generator	Command: 4 149 32	State + Command: 4 149 31	State: 4 149 30
Measure: 4 149 18, 4 149 19 4 149 20, 4 149 21 4 149 23, 4 149 22, 4 149 24 4 149 25, 4 149 27	✓	✓	✓ Only with "Generic" configurations
State: 4 149 29/30	✓	✓	✗ Standard configuration
State + Command: 4 149 31	✓	✓	✗ Standard configuration

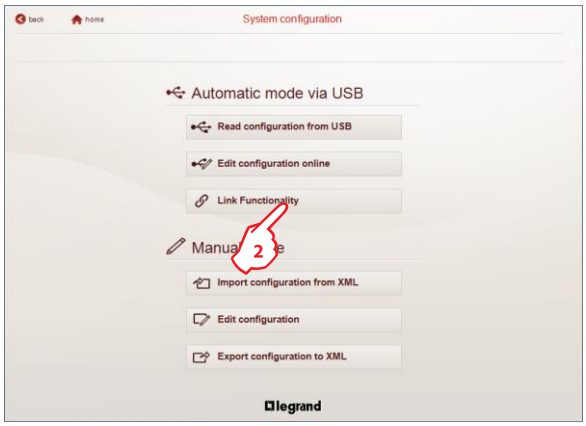
Note:
- association can only be of type 1 to 1 (1 event and 1 action).
- modules already associated can not be used for other associations.

Back to "Contents"

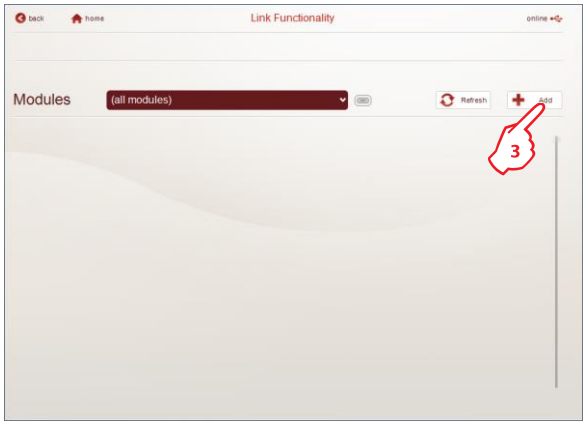
In the software's Home page



1. Click "System configuration"



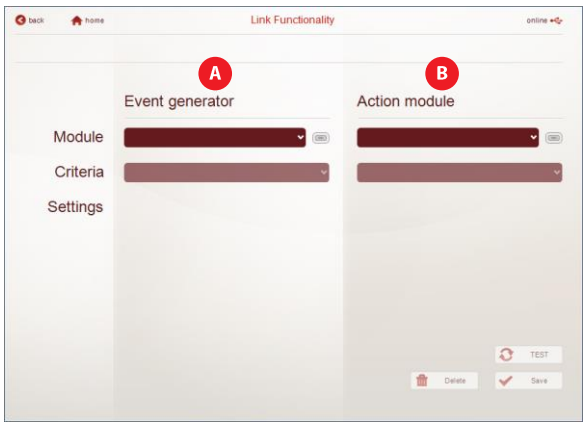
2. Click "Link Functionality"



3. Click "Add"

The page to create links between modules is displayed.

Back to "Contents"



The page is divided into three sections:

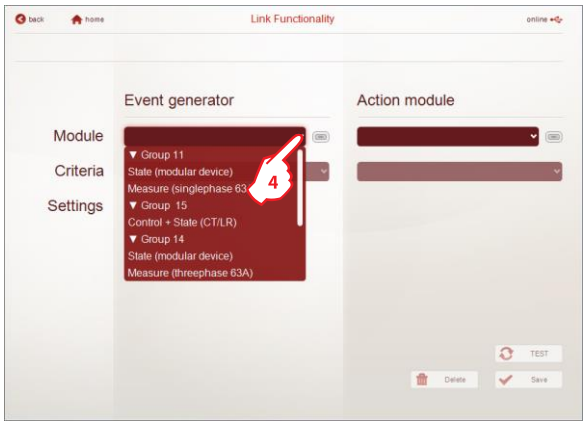
section A is the area where it is possible to:

- select the module that generates the event
- assign to the module the criteria of the event generation (e.g., trip of a circuit-breaker, etc.) and the additional parameters, if available (e.g., for the measuring module it is possible to select the electrical quantity, to set the threshold , the hysteresis and the delay of the activation of the event).
- choose whether the event also generates an alert (for measurement modules, and universal state modules with generic configurations).

section B is the area where it is possible to:

- select the module that performs the action
- assign to the module the criteria of the action (e.g., opening or closing of a breaker, etc.) and the additional parameters, if available (e.g., for a command module configured as "Breaker command" it is possible to set activation time and activation delay time for each output).

Procedure to create links between EMS CX³ modules



4. Click to select the event generator module.

Note:

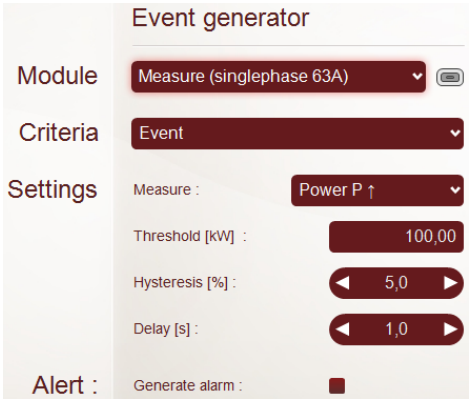
- the devices list is filtered by "Groups"
- only modules that can generate an event are listed:
  - measure modules (4 149 18/19/20/21/22/23/24/25/27), state modules (4 149 29/30) and Command + State module (4 149 31) *[see following pages for details]*

Back to "Contents"

Depending on the configuration and model type, possible criteria that can be selected are different:

• **Single-phase Measuring module with closed Rogowski sensor(s)** (Cat.Nos 4 149 18 and 4 149 19) and **Measuring module, connected via current transformers** (Cat.No 4 149 23) set as 1P

Settings:



Criteria:

▪ Event (fixed parameter)

Parameters:

▪ Measure : V1↑, V1↓, I1↑, P1↑, S1↑, f↑, f↓, PF↓

Note:

↑ = Maximum threshold

↓ = Minimum threshold

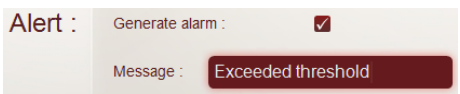
For the active power (P) and for power factor (PF) it is possible to set also negative values as a threshold value.

▪ Threshold: value above or below which the "action/alert procedure" is activated.

▪ Hysteresis : value expressed in % of the threshold under which the alarm is over and the disconnected loads are restored *(default value 5%)*.

▪ Alarm delay (s) - *(default value 1 s)*:
during the activation of an alarm is the waiting time between the threshold point and the alarm on the EMS bus
during the de-activation of an alarm is the waiting time between the hysteresis point and the alarm is deactivation on the EMS bus;

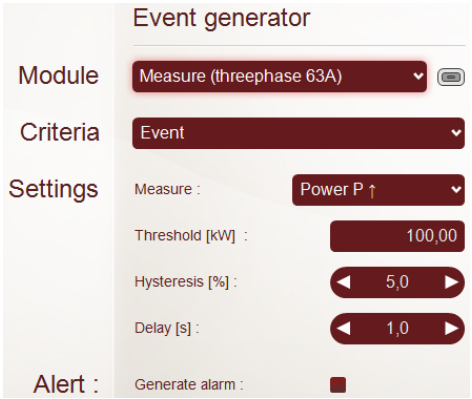
▪ Alert: select whether you want the event also generates an alert. If the field is selected, configuration software gives the possibility to type a message which will be used for the identification of the alert type (see below).



Back to "Contents"

• **Three-phase Measuring module with closed Rogowski sensors** (Cat.Nos 4 149 20 and 4 149 21), **Measuring module, connected via current transformers** (Cat.No 4 149 23) and **Measuring module with Flexible Open Rogowski sensor** (Cat.Nos 4 149 22, 4 149 24, 4 149 25 and 4 149 27) set as 3P

Settings:



Criteria:

▪ Event (fixed parameter)

Parameters:

▪ Measure : U12↑, U12↓, U23↑, U23↓ U31↑, U31↓, I1↑, I2↑, I3↑, IN↑, P↑, P1↑, P2↑, P3↑, S↑, S1↑, S2↑, S3↑, f↑, f↓, PF↓

Note:

↑ = Maximum threshold

↓ = Minimum threshold

For the active power (P) and for power factor (PF) it is possible to set also negative values as a threshold value.

▪ Threshold: value above or below which the "action/alert procedure" is activated.

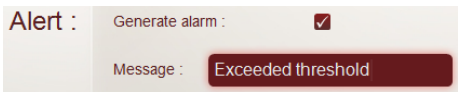
▪ Hysteresis : value expressed in % of the threshold under which the alarm is over and the disconnected loads are restored *(default value 5%)*.

▪ Alarm delay (s) - *(default value 1 s)*:

during the activation of an alarm is the waiting time between the threshold point and the alarm on the EMS bus

during the de-activation of an alarm is the waiting time between the hysteresis point and the alarm is deactivation on the EMS bus;

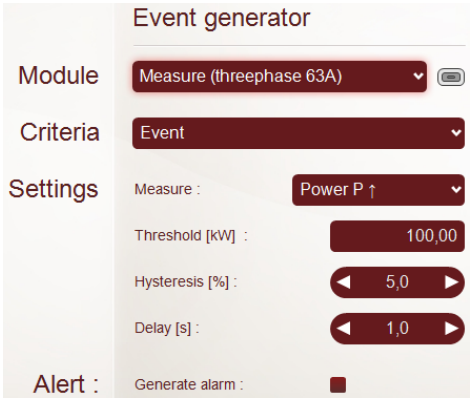
▪ Alert: select whether you want the event also generates an alert. If the field is selected, configuration software gives the possibility to type a message which will be used for the identification of the alert type (see below).



Back to "Contents"

• **Three-phase measuring module with closed Rogowski sensors** (Cat.Nos 4 149 20 and 4 149 21), **Measuring module, connected via current transformers** (Cat.No 4 149 23) and **Measuring module with Flexible Open Rogowski sensor** (Cat.Nos 4 149 22, 4 149 24, 4 149 25 and 4 149 27) set as 3P+N

Settings:



Criteria:

▪ Event (fixed parameter)

Parameters:

▪ Measure: V1↑, V1↓, V2↑, V2↓ V3↑, V3↓ U12↑, U12↓, U23↑, U23↓ U31↑, U31↓, I1↑, I2↑, I3↑, IN↑, P↑, P1↑, P2↑, P3↑, S↑, S1↑, S2↑, S3↑, f↑, f↓, PF↓

Note:

↑ = Maximum threshold

↓ = Minimum threshold

For the active power (P) and for power factor (PF) it is possible to set also negative values as a threshold value.

▪ Threshold: value above or below which the "action/alert procedure" is activated.

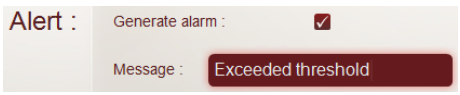
▪ Hysteresis : value expressed in % of the threshold under which the alarm is over and the disconnected loads are restored *(default value 5%)*.

▪ Alarm delay (s) - *(default value 1 s)*:

during the activation of an alarm is the waiting time between the threshold point and the alarm on the EMS bus

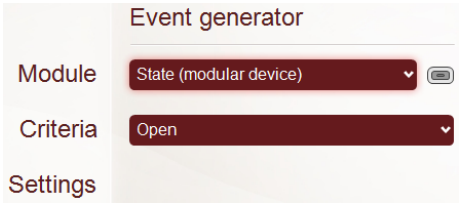
during the de-activation of an alarm is the waiting time between the hysteresis point and the alarm is deactivation on the EMS bus;

▪ Alert: select whether you want the event also generates an alert. If the field is selected, configuration software gives the possibility to type a message which will be used for the identification of the alert type (see below).



Back to "Contents"

• **Signalling Auxiliary Contact CA + SD** (Cat.No 4 149 29)



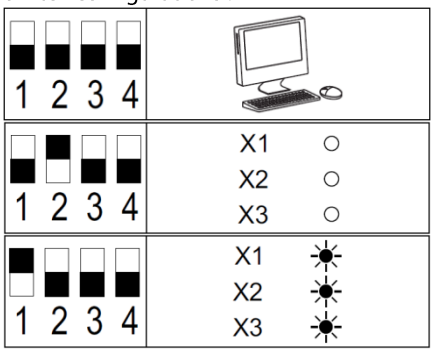
Criteria :

- Open, Close, Tripped

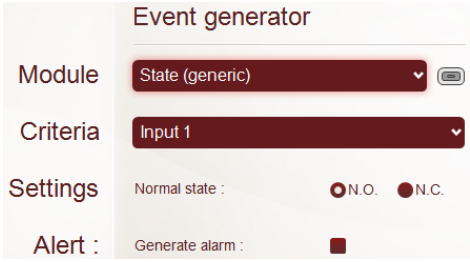
• **Universal signalling module - 3 LEDs** (Cat.No 4 149 30)

- Generic input

Dip-switch configurations :



Settings:



Criteria:

- Input 1, Input 2 or Input 3 **(Only 1 input can be used with Link Functionality)**

Parameters:

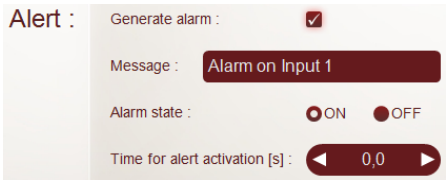
- Normal state of contact : Normally open (N.O.) or Normally closed (N.C.)
- Alert: select whether you want the event also generates an alert.

If the field is selected, configuration software gives the possibility to set:

- a message which will be used for the identification of the alert type.
- Alarm state: "ON" or "OFF"

ON: alert is activated when the contact closes (normally open contact in input)
OFF: alert is activated when the contact opens (contact normally closed in input)

- Time for alert activation (s): waiting time between changing state of the input and activating the alarm on the bus. (see below)

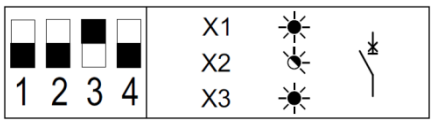


Back to "Contents"

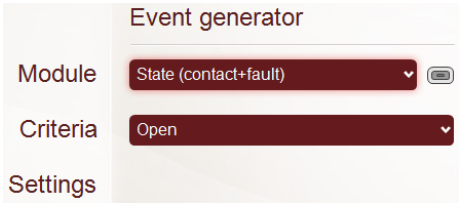
• **Universal signalling module – 3 LEDs** (Cat.No 4 149 30) *(continued)*

- Breaker state (Open, Close, Tripped)

Dip-switch configurations :



Settings:

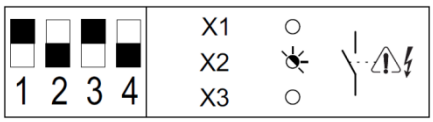


Criteria:

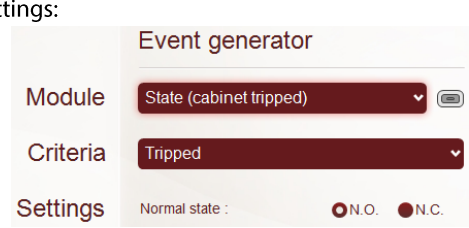
▪ Open, Close or Tripped

- General tipped

Dip-switch configurations :



Settings:



Criteria:

▪ Tripped

Parameters:

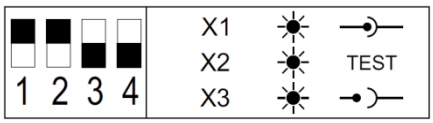
▪ Normal state of contact : Normally open (N.O.) or Normally closed (N.C.)

Back to "Contents"

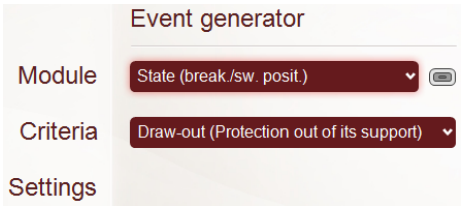
• **Universal signalling module – 3 LEDs** (Cat.No 4 149 30) *(continued)*

- Breaker position (Inserted, Drown-out, Test)

DIP Switches combination:



Settings::

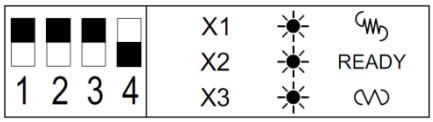


Criteria:

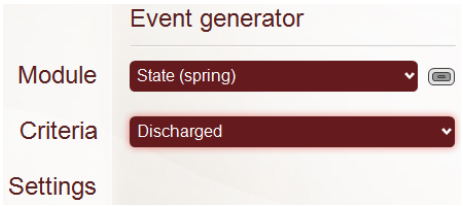
▪ Inserted, Drown-out or Test

- Spring state (Charged/Discharged, Ready to close)

DIP Switches combination:



Settings:



Criteria

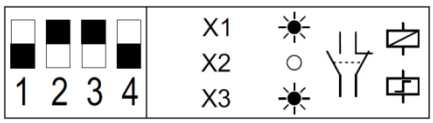
▪ Charged/Discharged or Ready to close

Back to "Contents"

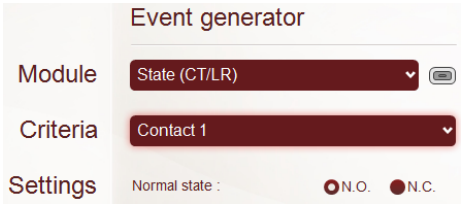
• **Universal signalling module – 3 LEDs** (Cat.No 4 149 30) *(continued)*

- Contactor/Latching relay state

DIP Switches combination:



Settings:



Criteria:

- Contact 1, Contact 2, Contact 3 or Contact 4

Parameters:

- Normal state of each contact: Normally Open (N.O.) or Normally Closed (N.C.)

Note: all these configurations can be realized with universal signalling module (Cat.No 4 149 30) with micro-switches in position 0000 by specializing the module with the configuration software (see § 6.1.3)

• **Control and state reporting module** (Cat.No 4 149 31)

Settings:

Criteria:

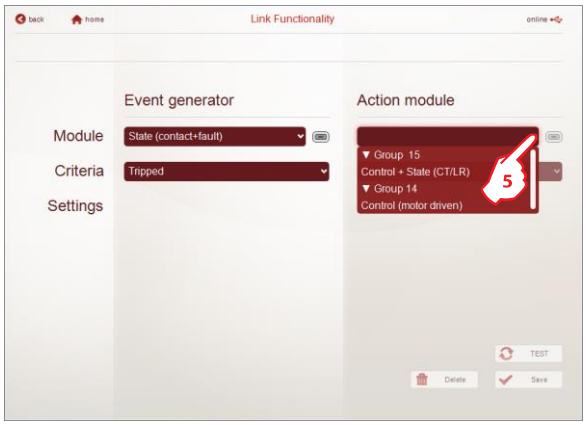
- Contact 1, Contact 2, Contact 3 or Contact 4

Parameters:

- Normal state of each contact: Normally Open (N.O.) or Normally Closed (N.C.)

Back to "Contents"

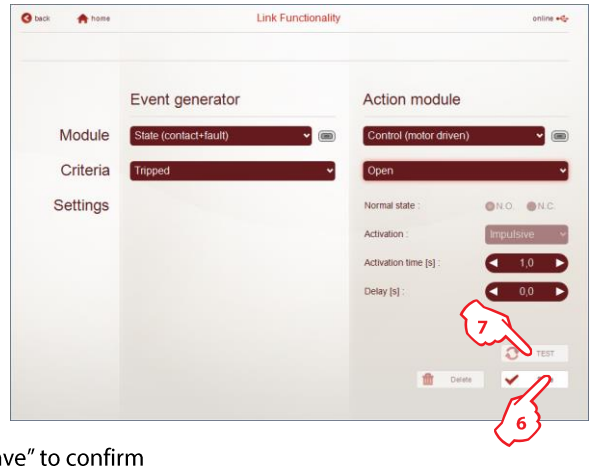
Once the event generator module has been set (e.g., a signalling module 4 149 30 CA + SD with criteria "Tripped"), the "action module" must be selected



5. Click to select the action module.

Note:

- the devices list is filtered by "Groups"
- only modules that can generate an action are listed:
  - Control modules (4 149 32), signalling modules (4 149 30)and Control and state reporting modules *[see following pages for details]*



6. Click "Save" to confirm

7. It is possible to test the action as a result of the event by clicking on the "Test" button.

Note: for safety reasons, before testing the automation process, the software asks for confirmation.

Depending on the configuration and model type, possible criteria that can be selected are different:

- **Control and state reporting module** (Cat.No 4 149 31)

Settings:

Criteria:

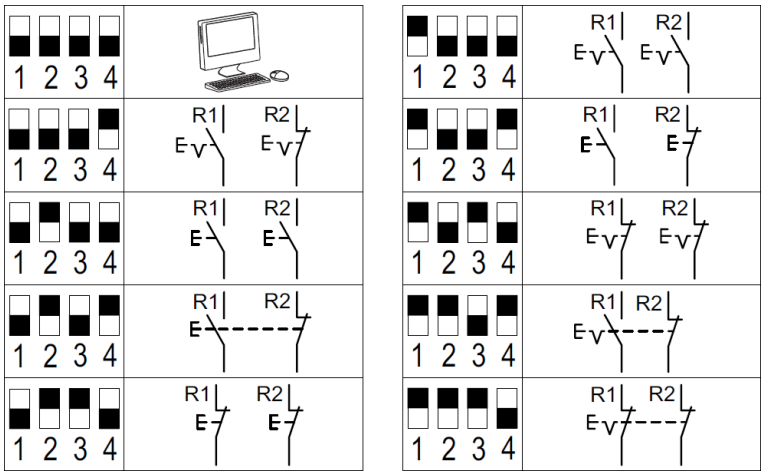
- Open, Close, Open/Close or Close/Open

Parameters:

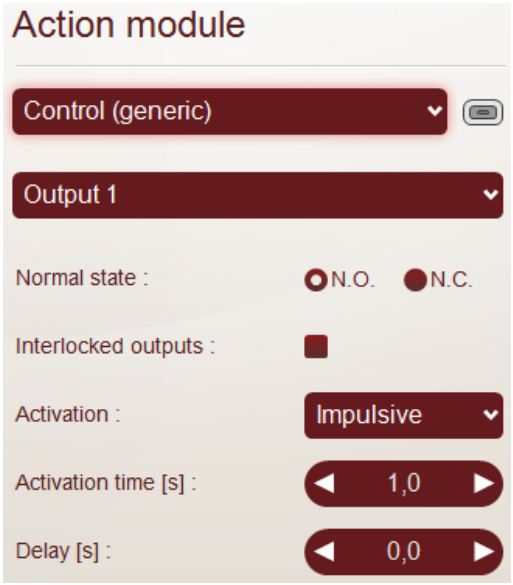
- Activation time (only for configurations for Latching relays)
- Delay: time between sending a command and the output activation

Back to "Contents"

- **Universal control module** (Cat.No 4 149 32)
- Generic output
- DIP Switches combinations:



Settings:



Criteria:

- Output1 or Output 2

Parameters:

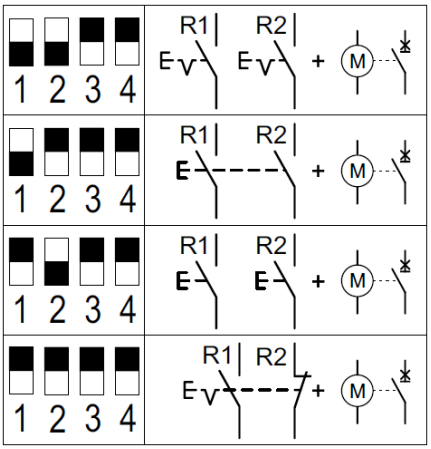
- Normal state : Normally Open (N.O.) or Normally Closed (N.C.)
- A flag to interlock the two outputs: pressing one of the two buttons or sending a command both outputs are activated
- Activation: Impulsive or Maintained command
- Activation time (only if the command is impulsive)
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Back to "Contents"

• **Universal control module** (Cat.No 4 149 32) *(continued)*

- Breaker command

DIP Switches combination:



Settings:

Criteria:

- Open, Close, Open/Close or Close/Open

Parameters:

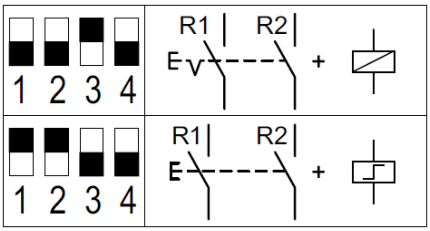
- Activation time (only for the configuration for Latching relays)
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Back to "Contents"

• **Universal control module** (Cat.No 4 149 32) *(continued)*

- Contactor command

DIP Switches combination:



Settings:

Criteria:

- Open, Close, Open/Close or Close/Open

Parameters:

- Activation time (only for the configuration for Latching relays)
- Delay: time between pressing one of the two buttons or sending a command and the output activation

Note: all these configurations can be realized with universal control module (Cat.No 4 149 32) with micro-switches in position 0000 by specializing the module with the configuration software (see § 6.1.3)

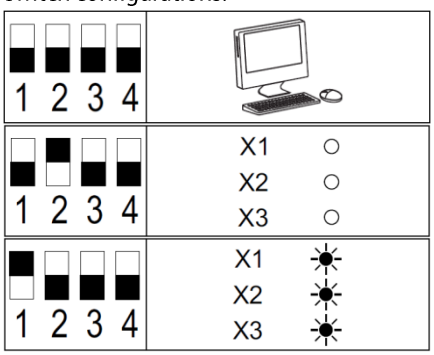
Back to "Contents"

• **Universal signalling module - 3 LEDs** (Cat.No 4 149 30)

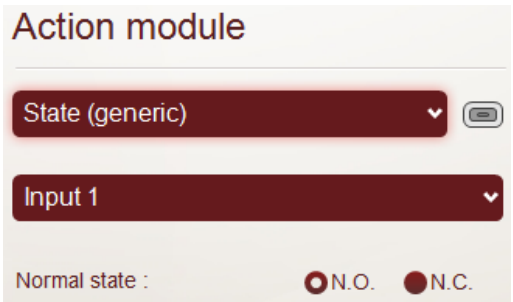
Note: this module can be used as "action module" only if the "event generator" module is a measuring module (4 149 19/20/23)

- Generic input

Dip-switch configurations:



Settings:



Criteria:

▪ Input 1 (activation of the red LED), Input 2 (activation of the orange LED) or Input 3 (activation of the green LED)

Parameters:

▪ Normal state of contact : Normally open (N.O.) or Normally closed (N.C.)

Note :

- **It is not necessary to wire 4 149 30 module's inputs for use it in this configuration.** Selected LED is switched on or off (according to the configured normal state of contact) by the electronic board of the module itself.

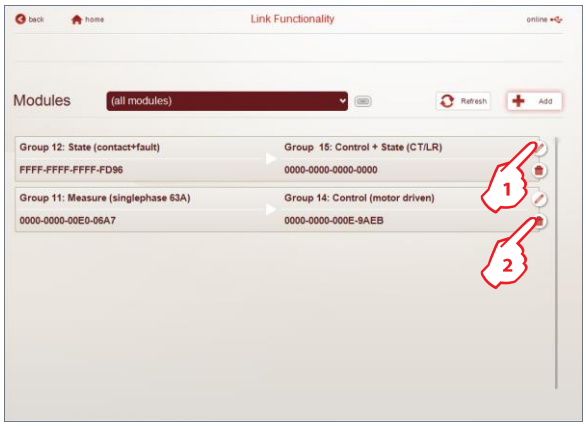
- all these configurations can be realized with universal signalling module (Cat.No 4 149 30) with micro-switches in position 0000 by specializing the module with the configuration software (see § 6.1.3)

Back to "Contents"

Display of created links

Once the creation process is completed, all created links are listed in the "Link Function" page:
- on the left, modules that generate events
- on the right, modules that generate actions in response to the events

Each module is indicated with its name, function and identification number.



In this page it is possible to

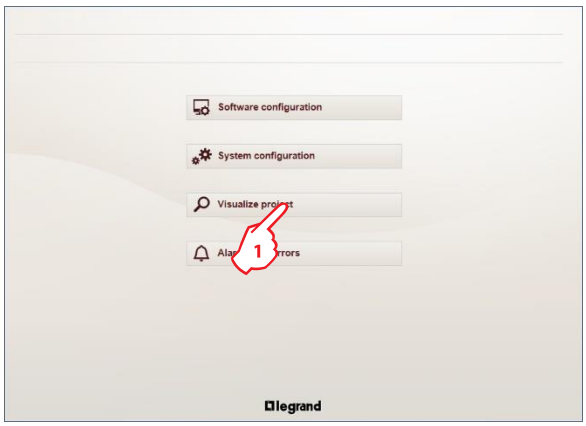
1. Edit a configuration or **2.** Delete a configuration

At the same time, the symbol appears in the device selection button to indicate that there is one or more modules configured with the Link function

Back to "Contents"

6.4 View pages

In the software's Home page



1. Click "Visualize project"

Devices display page appears

The page is divided into three sections:

section A shows the Devices (each device is a group of EMS CX^3 modules with different functions) with their characteristics and status icons.
It is possible to filter Device list per function: State, Command, Measure or "all functions"(default)

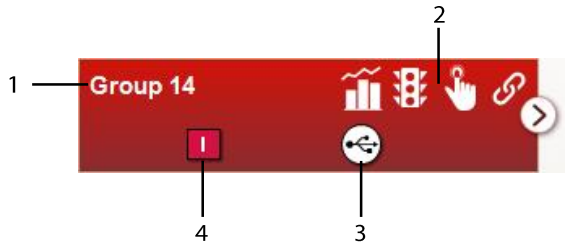
section B is the area where is possible to select several pages (according to the functions present in a Device):

- State: display of devices status, control buttons… for each EMS CX^3 Device/ Group of devices
- Measure: display of the quantities measured by a device:
  - Electricity measuring devices: Energy, Power, Voltages / Currents / Frequency, THD and Harmonics
  - Pulse Collector module: Energy, Water and Gas consumptions

section C shows the values measured by the selected device, status and command button(s)

Back to "Contents"

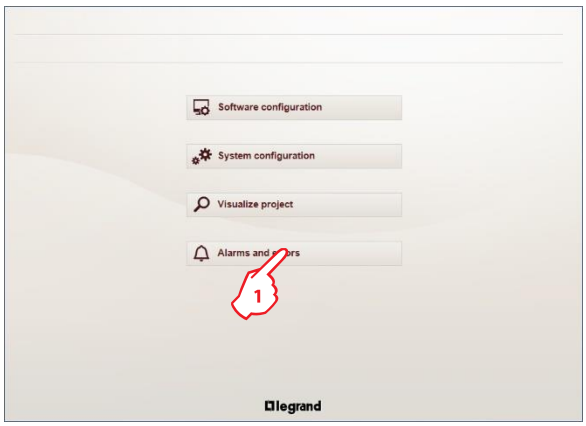
- **Description of the device selection button**



1. Name of the group
2. Symbols of the functions associated to the group *(depending on the characteristics related to each EMS CX3 module)*
   - Measure
   - State
   - Command
   - Link Function
3. Communication status
   - System connected via USB to a PC
   - Communication error
4. This symbol appears only if in the group is present the state function related to a protection device and shows the circuit-breaker state:
   - O Open
   - I Closed
   - O Tripped

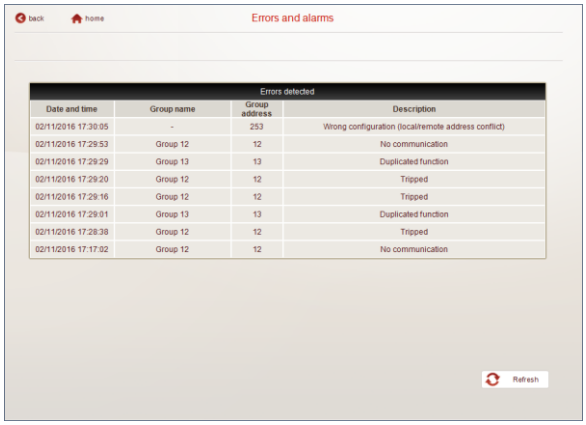
6.5 Historical of alarms

In the software's Home page



1. Click "Alarms and errors"

Alarms and errors display page appears



Page shows the last 20 errors (occurred during the configuration steps or during the operation of the system) with following details:

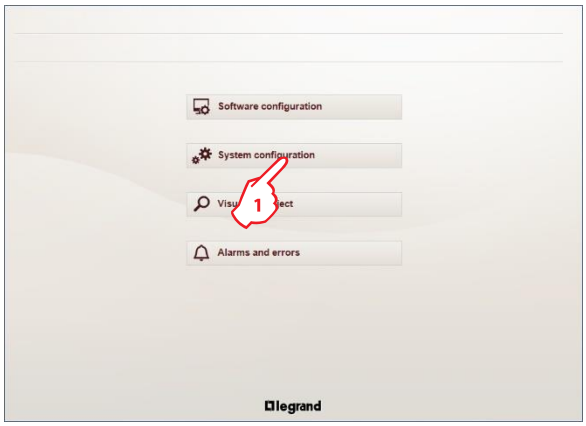
- Data & Time of the error
- Group name
- Group address
- Description of error cause

Back to "Contents"

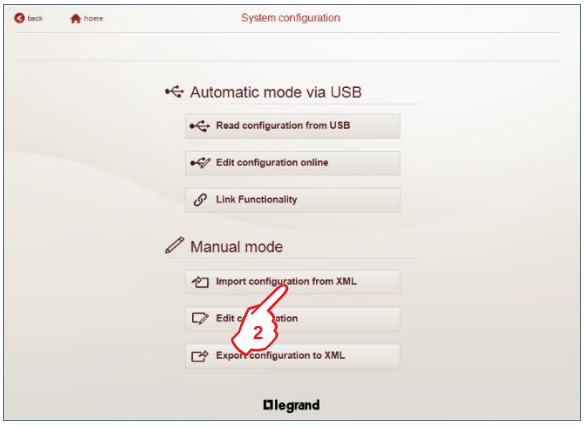
7. Off-line operation

7.1 Import a configuration

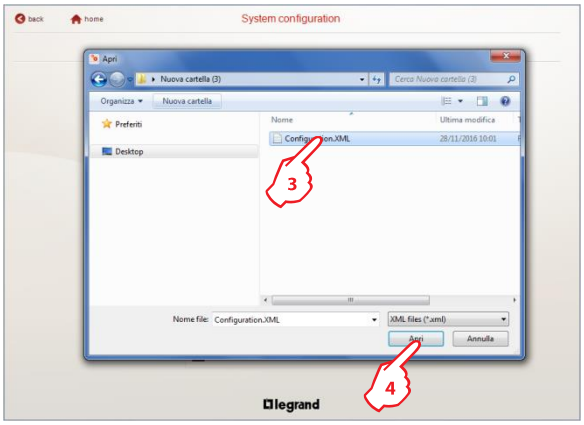
In the Software's home page



1. Click "System configuration"
System configuration page appears



2. Click "Import Configuration from XML"
A pop-up window appears

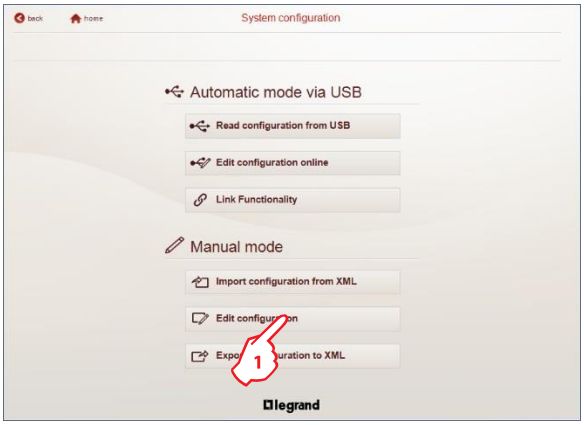


3. Select the file to import (e.g., Configuration.XML), then **4.** click "Open"
Configuration is ready to be edit

Back to "Contents"

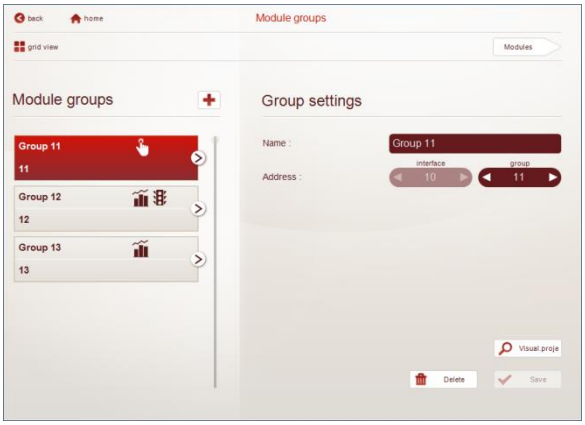
7.2 Edit a configuration

In the System configuration page



1. Click "Edit configuration"

Edit page of the imported configuration appears



In this page it is possible to edit Group's parameters (Names, Address) and modules parameters (according the modules type under a group parameters are different).

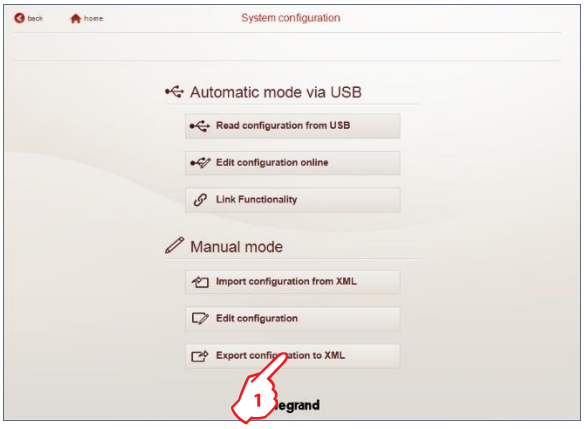
It is also possible to add new groups or duplicate an existing group using the Add button " + "

Note: at the end of each modification click "Save" to confirm changes.

Back to "Contents"

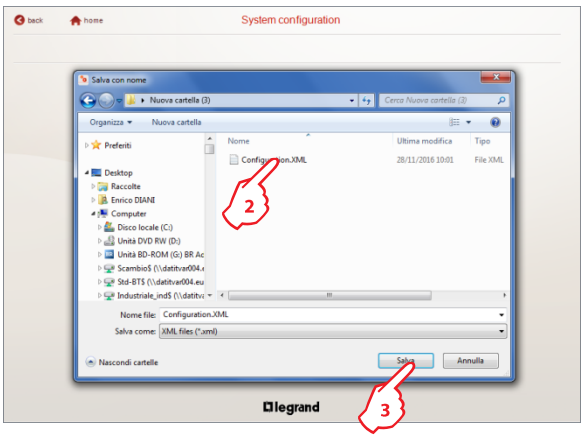
7.3 Export a configuration

In the System configuration page



1. Click "Export configuration"

A pop-up window appears



3. Select the where to save file, then **3.** click "OK"

Configuration is saved on your computer

Back to "Contents"

Back to “Contents”

Back to “Contents”

Back to “Contents”

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