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# BTM-T7 template for DMPU

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## USER MANUAL

rev. 1.2.

25 October 2013



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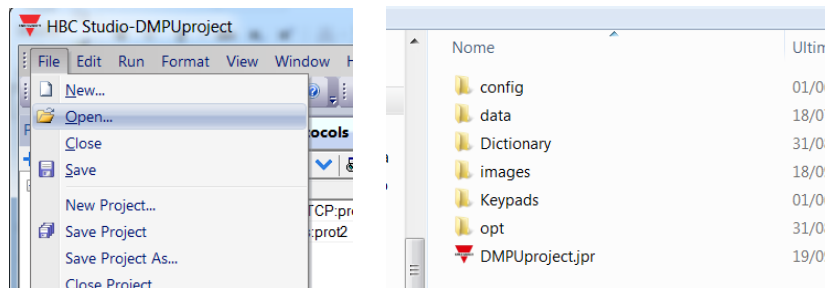
# 1 GENERAL NOTES

This template is useful to quickly configure the BTM-T7 display for DMPU without perform the whole display programming. Read the following guide to adjust the template according to the plant needs. This template is designed to monitor up to 8 motors through 8 DMPUs which are connected to BTM-T7 using TCP/IP communication. The user can quickly use this template only setting the DMPU addresses and the DMPU alarms which must appear when they trip.

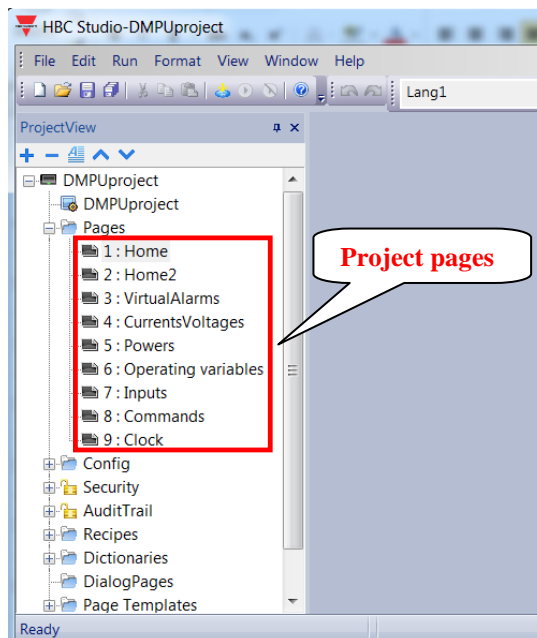
This template is designed to:

- Monitor the virtual alarms status
- Monitor the modules inputs and control the virtual inputs
- Show the electric variables as currents, voltages, active and reactive powers, THD... and the operating variables as estimated time before trip, number of starts, starts per hours...
- Execute the DMPU commands as Reset total kWh and kVArh, Reset latched alarms...

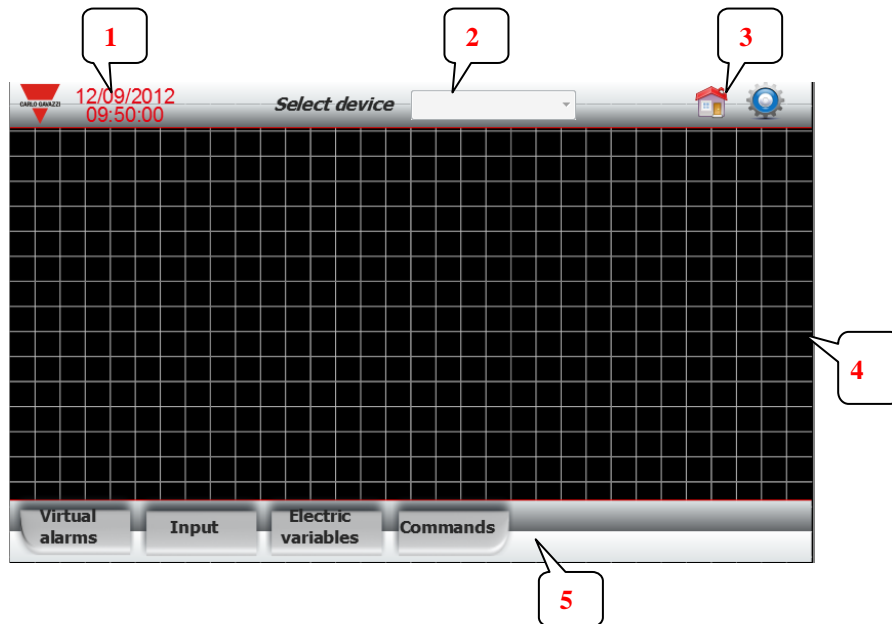
Open the DMPU template project (DMPUproject.jpr file) from “File” → “Open...” menu using the HBC Studio software:



On the “ProjectView” box on the left of the window all the pages used in this project are listed:



All the pages appear as shown below:



- 1- Date and time of the display.
- 2- Drop down list to select the actual DMPU
- 3- Button to show the home page.
- 4- Page content: it changes for every page
- 5- Menu toolbar

All the variables in the page content shown on these pages (except home page) are read from the device selected on the top toolbar:



Change the selected device to show the variables of another configured DMPU (read 2.1 Devices addresses section to set the device list).

The home page is different from other pages because it summarizes the alarms and TCUs status of all configured device at the same time.

## 2 Template personalization

In this chapter the personalization of the DMPU project according to the plant needs is described; it consists of 3 steps:

- Set IP addresses of the used DMPUs
- Define the alarms list monitored by display
- Personalize the home page

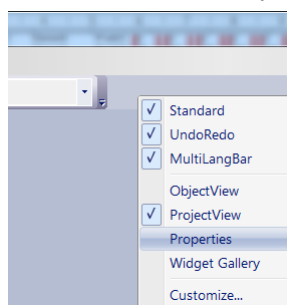
### 2.1 Devices addresses

In this section the list of devices which appears on the “Select device” drop down list is defined; follow these steps:

- Open the “TCPdevices” item on the “ProjectView” box

index	Element Name	Tag	Motor1	Motor2	Motor3	Motor4	Motor5	Motor6	Motor7	Motor8
0	Element1	IP add A	192	192	192	192	192	192	192	192
1	Element2	IP add B	168	168	168	168	168	168	168	168
2	Element3	IP add C	2	2	2	2	2	2	2	2
3	Element4	IP add D	75	241	242	243	244	245	246	247

- Set the number of devices to use (see the “Proprieties” box). If the “Proprieties” box is not present, right click on the toolbar and enable the “Proprieties” item:



- Set the alias name (freely configurable by user) of every device (Set 0, Set 1...); it appears on the “Select device” drop down list.



- Set the IP address of every device in the “Recipe” table (every column identifies a device; the rows represent the 4 parts of IP address). The number of columns changes according to the number of devices defined on the “Proprieties” box.

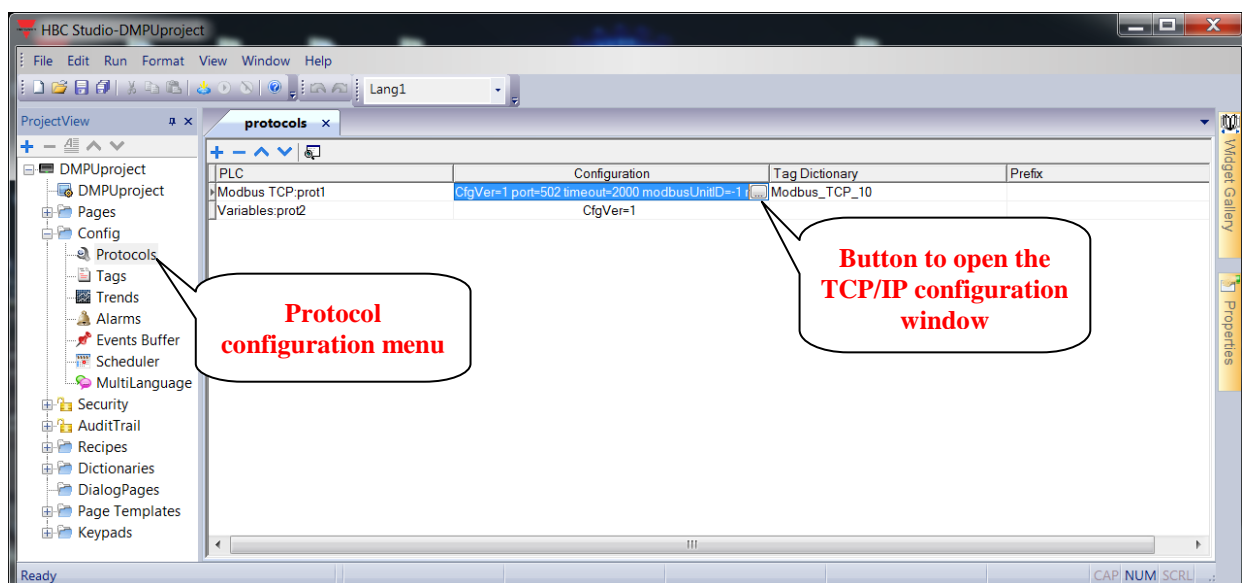
## 2.2 Alarms

In this section all alarms, which the display has to monitor, are configured. This personalization isn't necessary when the alarms management is not required, otherwise follow these steps:

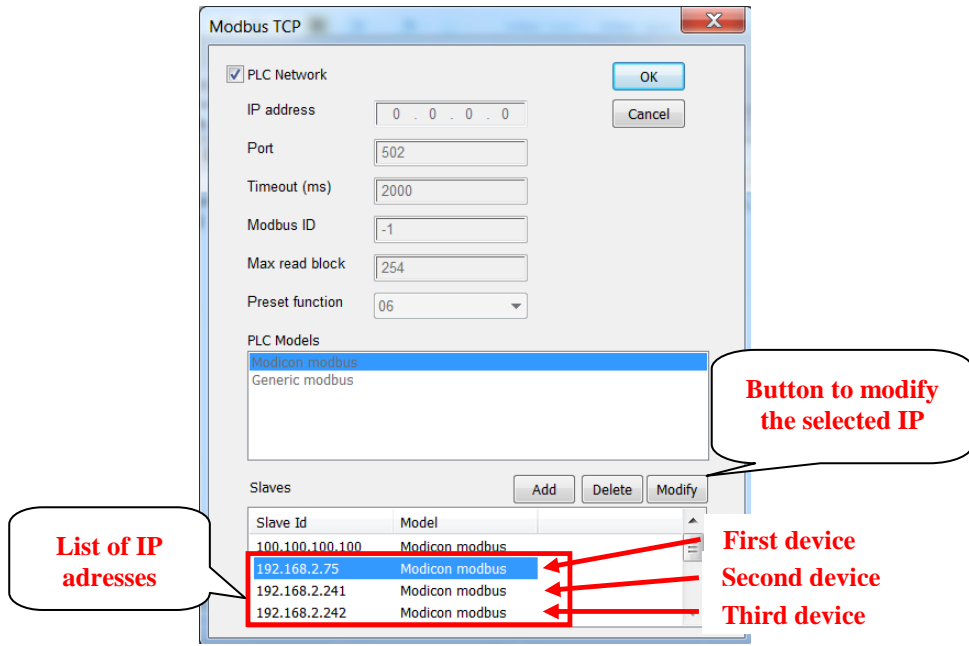
- 1- Set the IP addresses of the monitored devices (the list of IP addresses for the alarms management is different from the list defined on 2.1 Devices addresses section).
- 2- Select the alarms which the display has to monitor.

### Step 1:

- Double click on the “Protocols” item in the “ProjectView” to open the “protocols” sheet:



- Click the button which appears on the cell in “Modbus TCP:prot1” row and “Configuration” column; the following window is shown:



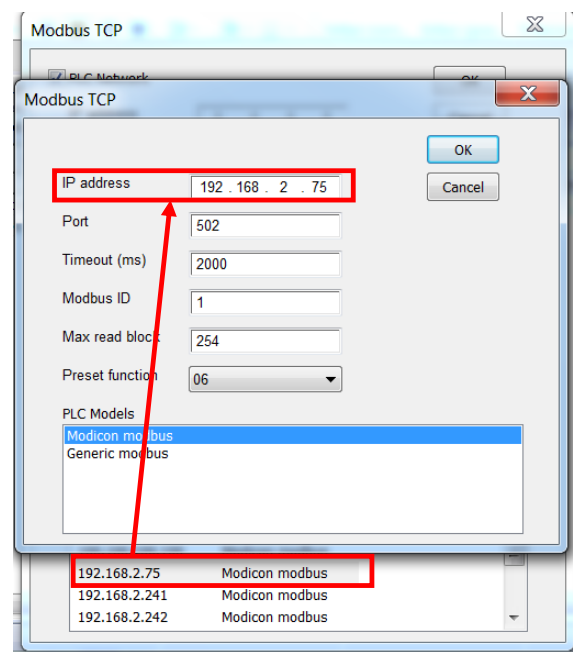
- On the bottom of this window the list of IP addresses for the alarms management are listed; select an item of the list and press the “Modify” button to open the following window and change the IP address



Don't modify or delete the first item (“100.100.100.100”). It is used to manage the list of device defined on 2.1 Devices addresses section.



Delete the unused IP addresses otherwise the display doesn't work fine due to communication error with not connected devices.

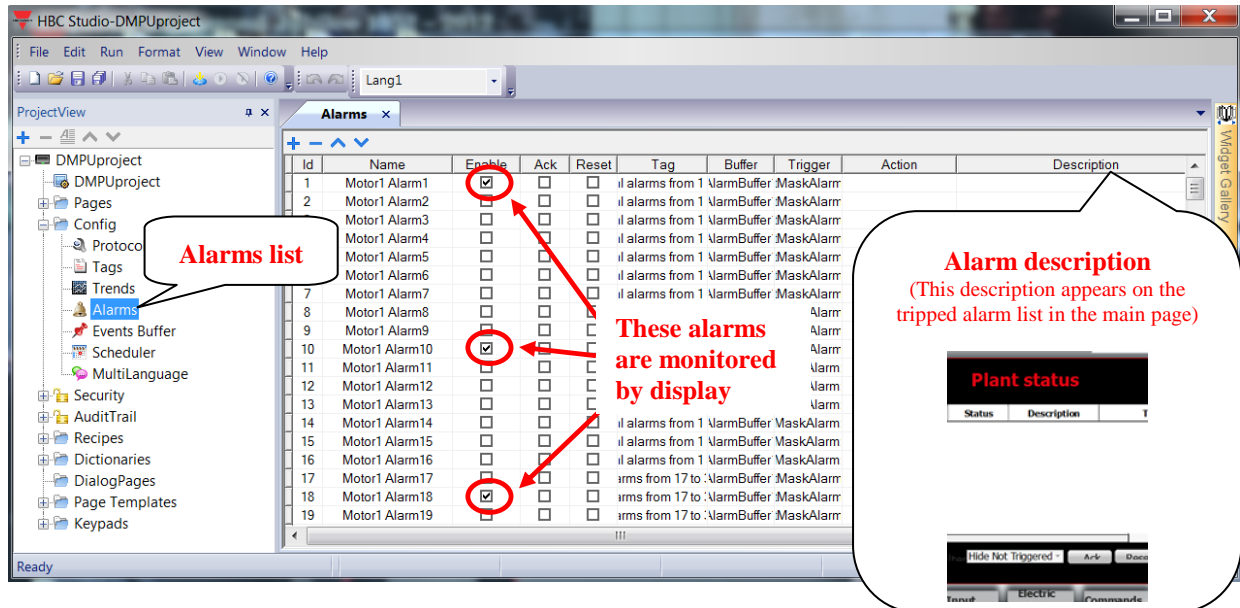


- Change the IP address for every used device.



## Step 2:

Open the alarm list clicking on “Alarms” item in the “ProjectView” (see the figure below).



All virtual alarms of 8 DMPUs are already listed (32 alarms for every DMPU). The alarms are named according to the following structure: “MotorX AlarmY”; where X identifies the device (from 1 to 8 according to the list defined on “Step 1”) and Y identifies the alarm number of X device (from 1 to 32). The display only monitors the enabled alarms; click the checkbox on the “Enable” column to activate the alarm monitoring (it isn’t necessary to delete the unused alarms from the list).

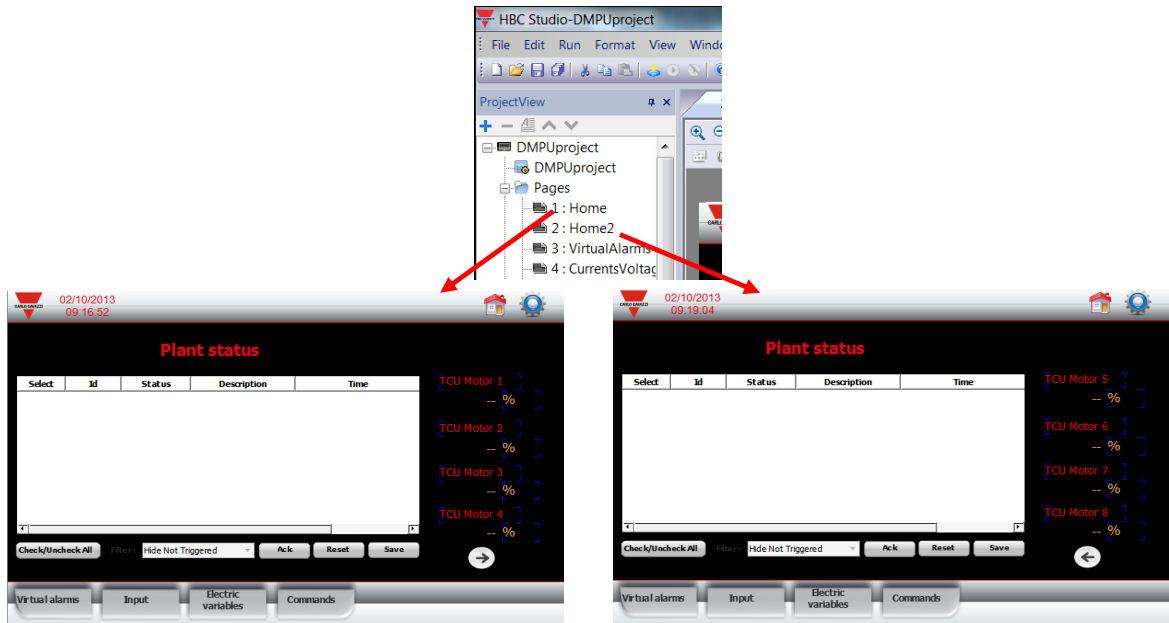
It’s possible to set a description (in “Description” column) which will appear on the tripped alarms list in the home page (see 3.1 Home page section for more details).

## 2.3 Home page

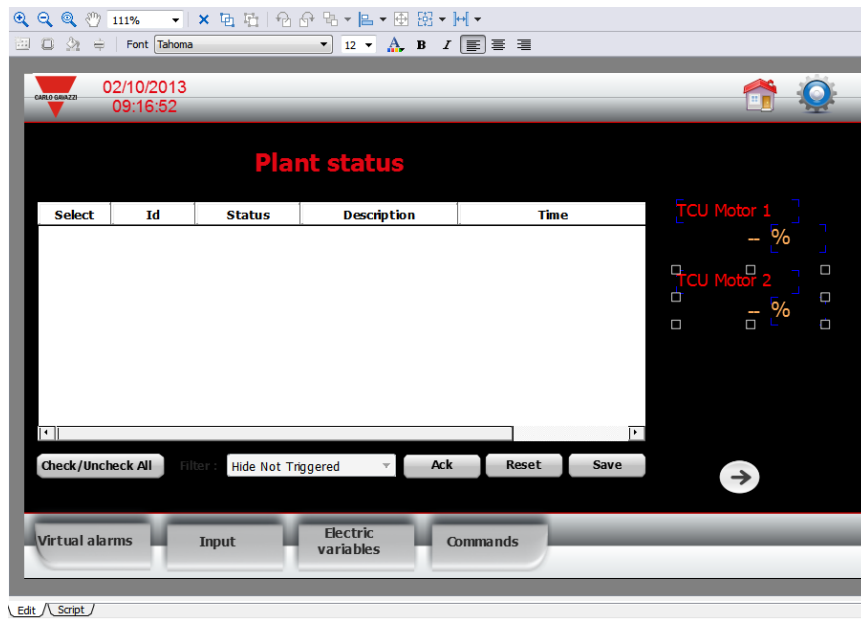
On the home page the tripped alarms and TCU values of all DMPUs are shown (see “3.1 Home page” section for more details about the content of this page).

The home page are designed to show 8 TCU values associated to 8 DMPUs; these 8 TCUs are shown in two several pages, double-click on “1: Home” and “2: Home2” items in the “ProjectView” to open the following pages:





If 8 devices are used the personalization is not necessary, otherwise remove the “TCU Motor X” label and “100 %” value for every unused device (X is the device number from 1 to 8).



Remove the arrow button when the used device are less than 5 (in this case “2: Home2” page are not used).

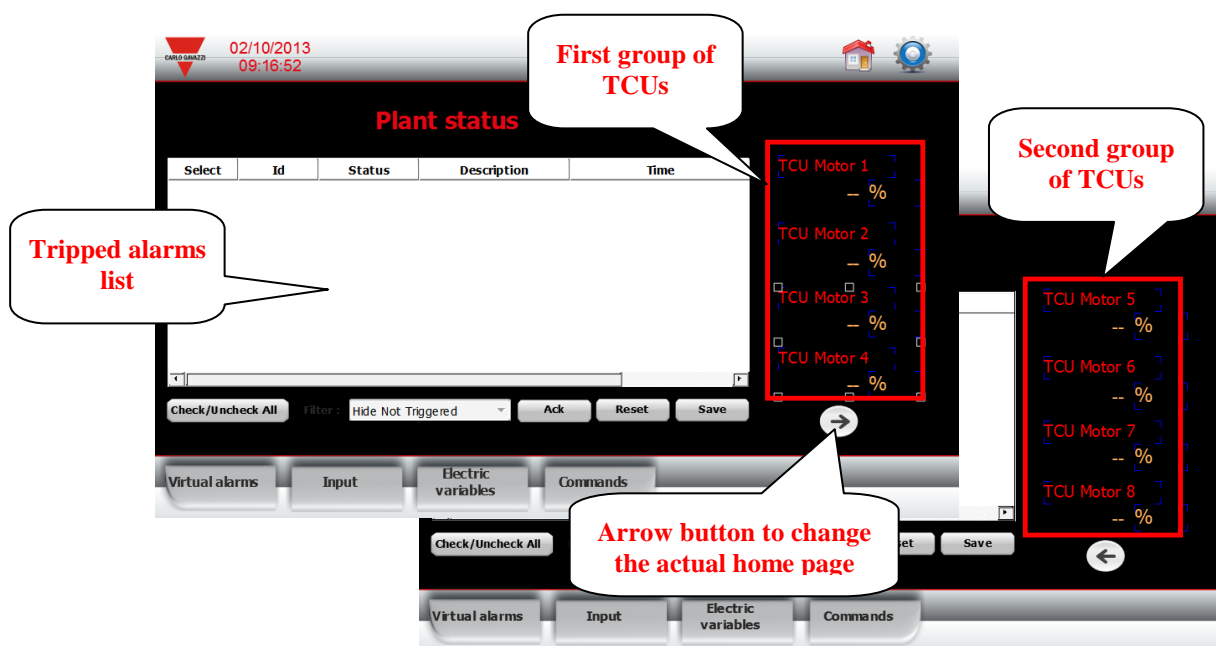
### 3 Pages description

In this chapter all the pages of this project are described.

#### 3.1 Home page

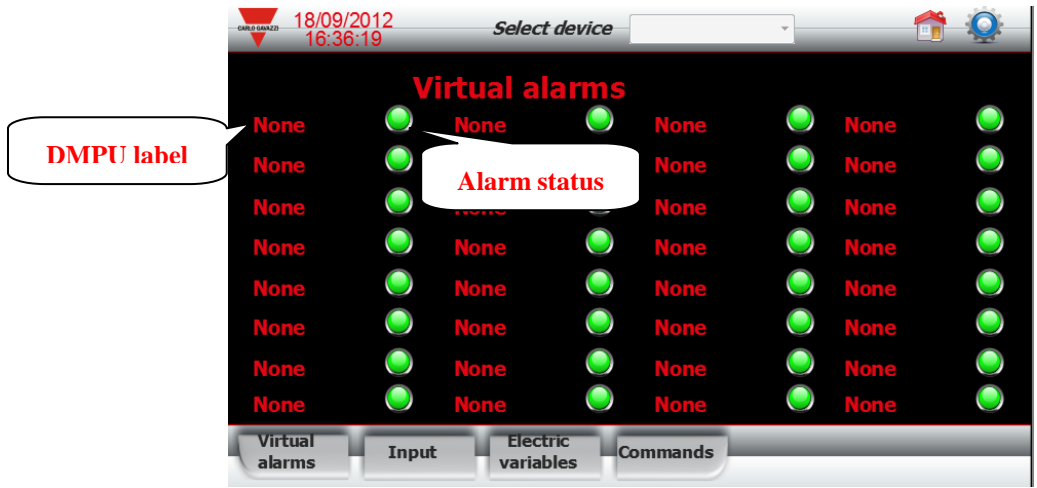
This page summarizes the status of all used DMPU: the table (on the left) shows all the tripped alarms of enabled alarm list (see 2.2 Alarms section, the display only considers the enabled alarms). When an alarm trips it is shown on this table as “Triggered” on the “Status” column; if the alarm get back to not tripped condition it is deleted on this table. The “Description” column content is freely configurable by user (see 2.1 Devices addresses section).

On the right of the page the TCU values of all configured DMPU are shown (there are two home pages: the first home page shows the first group of four TCUs, the second one shows the second group of four TCUs); press the arrow button to change the actual home page.

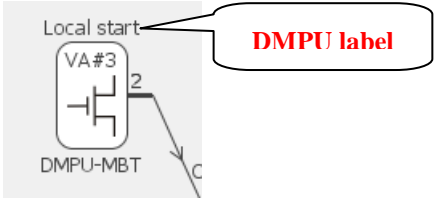


#### 3.2 Virtual alarms

In this page the status of 32 virtual alarms of the selected device are shown (the content of this page is independent of the alarms configured on “2.2 Alarms” section, it shows all the used alarms on DMPU).



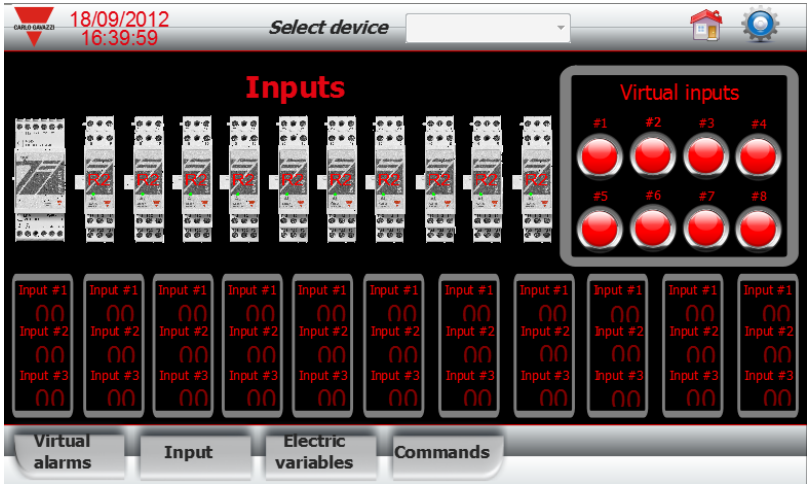
The "None" labels are linked to DMPU labels: when the display is connected to DMPU, these labels are replaced with the stored labels of selected DMPU (these labels are configured through the DMPU-PS configuration software, see the following figure).



The green light shows the alarm status: it becomes red when the alarm trips, otherwise it's green.

### 3.3 Inputs

This page shows the DMPU module configuration, the inputs status and allows to control the virtual inputs:



The module configuration is summarized through the module pictures: when the display is connected the pictures are updated according to the modules used on the selected DMPU:



Picture when DMPU-R2 is used



Picture when DMPU-EL is used



Picture when the module isn't used

The inputs status is shown on the bottom of the page:

- When the input is configured as digital input the status is shown as binary number (0 = not activated input, 1 = activated input).
- When the input is configured as PT100 the status is the temperature value.
- When the input is not configured it is hidden.

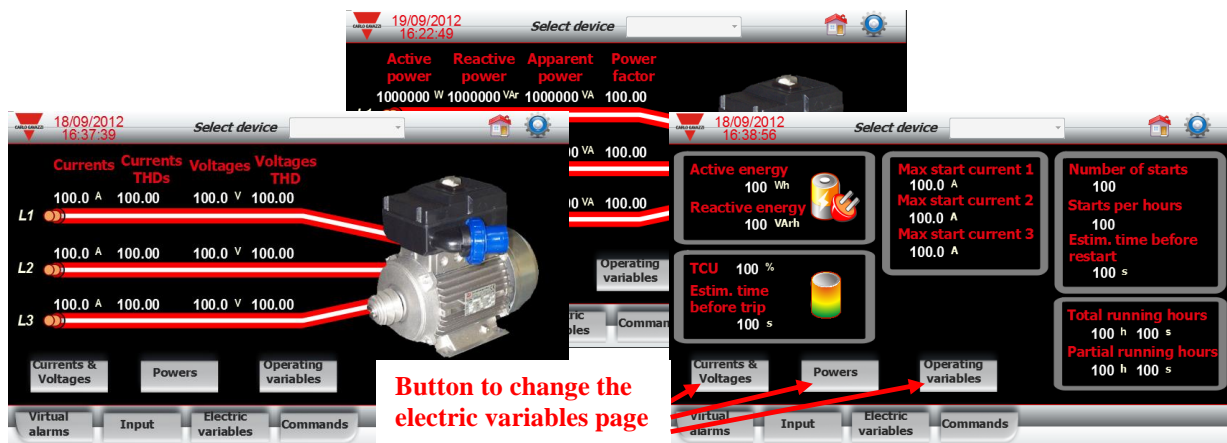
The virtual input buttons are used to control the virtual inputs status:

- When the button is pressed the virtual input is set to "1" (the input is activated).
- When the button is released the virtual input is set to "0" (the input is deactivated).

### 3.4 Electric variables

The electric variables are divided in three pages:

- 4: Currents/Voltages: shows the three motor currents, voltages and total harmonic distortions
- 5: Powers: shows the active, reactive and apparent powers.
- 6: Operating variables: shows the energy consumption, the state of motor heating (TCU and Estimated time before trip),...

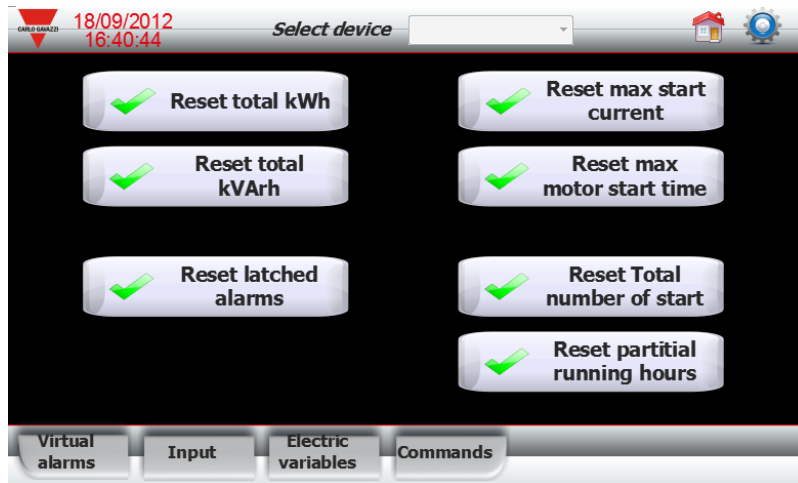


Use the three buttons on the bottom of the page to navigate through these pages.

### 3.5 Commands

In this page are listed some commands of DMPU; press the button to execute the command.





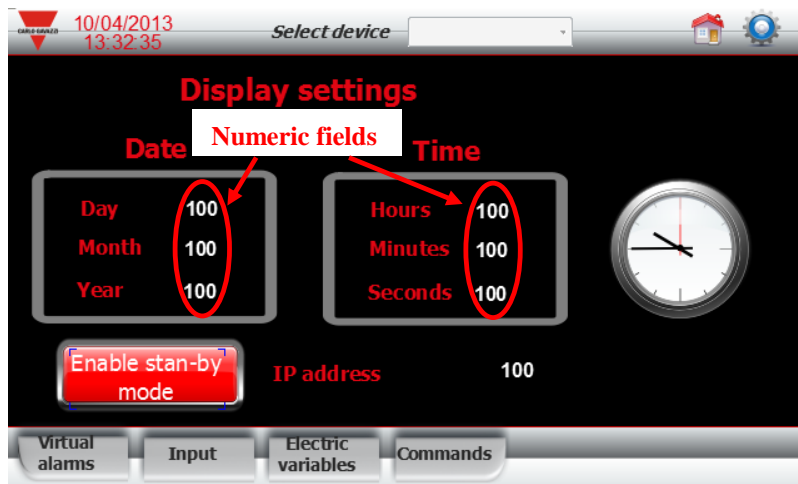
### 3.6 Settings

Press the following button to open the setting page:



In this page are shown:

- BTM date and time
- BTM IP address
- "Enable stand-by mode" button (only available in Modbus RTU project version)



The data and time values could be set pressing the number fields of day, month, year,... (a numeric keypad is shown to set the value).

The "Enable stand-by mode" button is used to lock the BTM serial communication as master device: only master device could be used on the same bus; enable this mode to connect another master device

without disconnecting the BTM (ex. when the PC is connected for instantaneous variables monitoring or configuration downloading).

When “Enable stand-by mode” button is pressed the following page is shown:

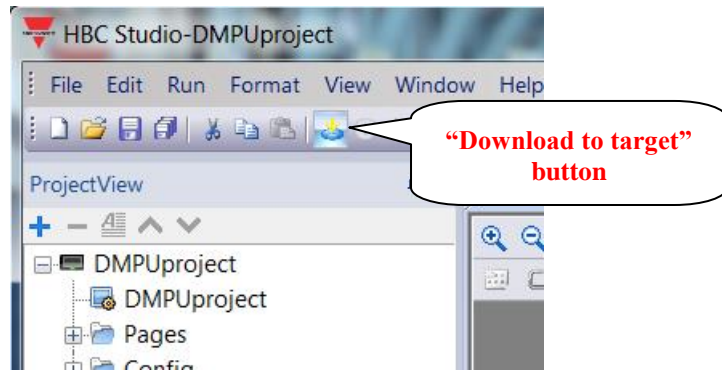


After 25s BTM communication is locked. Press “Leave stand-by mode” button to restore BTM communication.

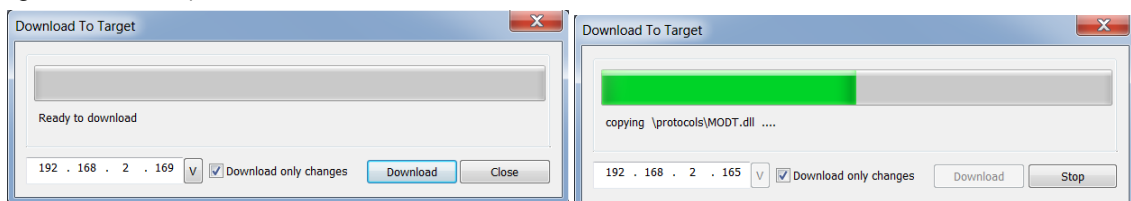
## 4 Configuration download

If BTM display has the factory configuration, install the Runtime system on the display before the configuration downloading following the instruction of 5 Runtime installation chapter.

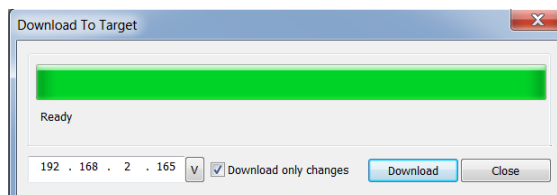
When the personalization is completed, press the button “Download to target” on the toolbar to download the project on the display.



The following window is shown; select the display IP address and press the “Download” button to start the downloading (if it is the first time which this project is downloaded, deactivate the “Download only changes” checkbox).



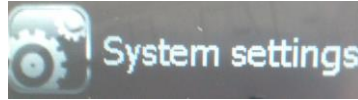
When the download is completed press “Close” button.



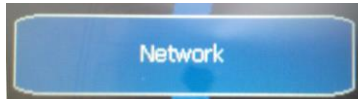
## 5 Runtime installation

At the factory level the BTM display isn't equipped with the system that manages the template project so follow these steps to install the system before the project downloading:

1. Power the display and open the "System settings" menu clicking on the following item:



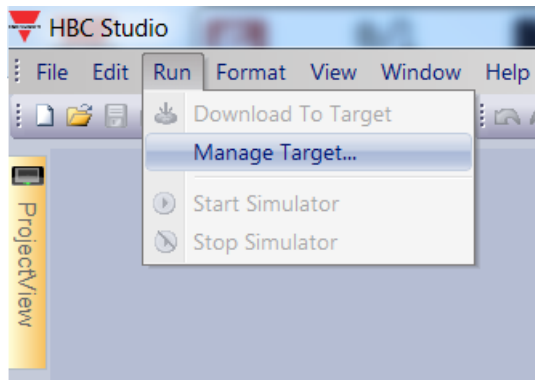
2. The "System settings" menu is shown, select the "Network" item menu changing the highlighted item through "Next" and "Back" buttons:



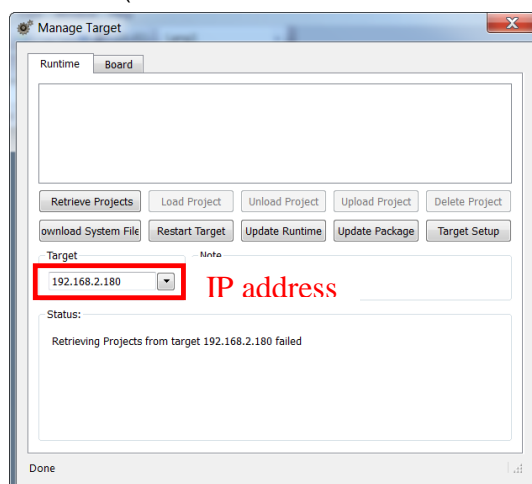
3. Take note the IP address shown on the right:

Ip: 192.168.1.80  
Sub: 255.255.255.0  
Gtw: 192.168.1.1

4. Open the HBC Studio software and select the "Manage target..." → "Run" menu



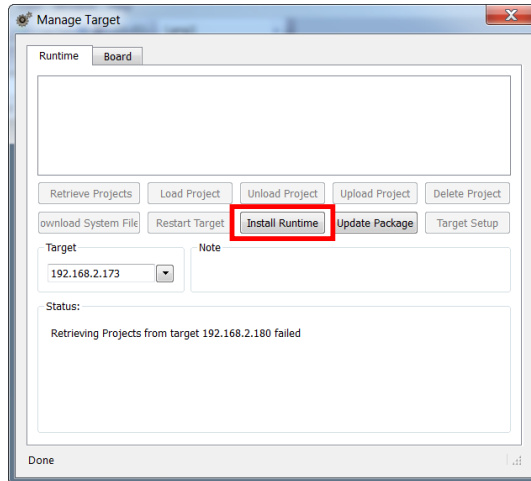
The following window is shown; set the IP address (noted on previous step) on the "Target" textbox and press enter to confirm (the software tries to communicate with the display):



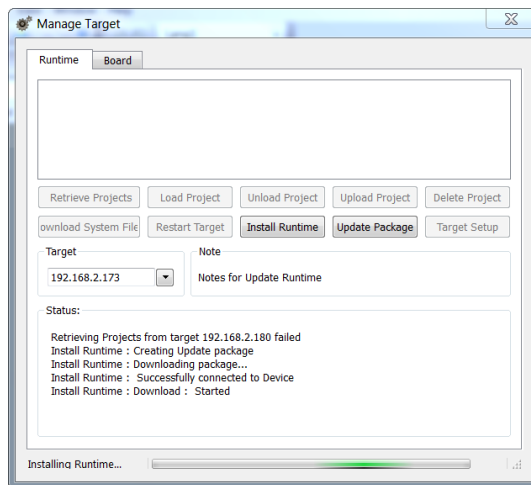
The window appears as follows



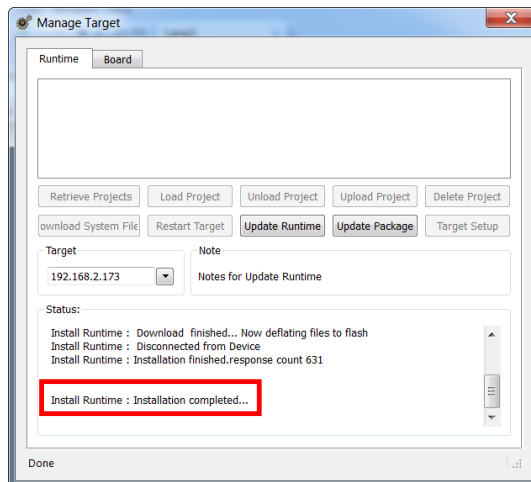




Press the “Install Runtime” button to download the system on the display



5. When the system download is completed the window appears as follows:



6. Close this window and download the project template as described on 4 Configuration download.



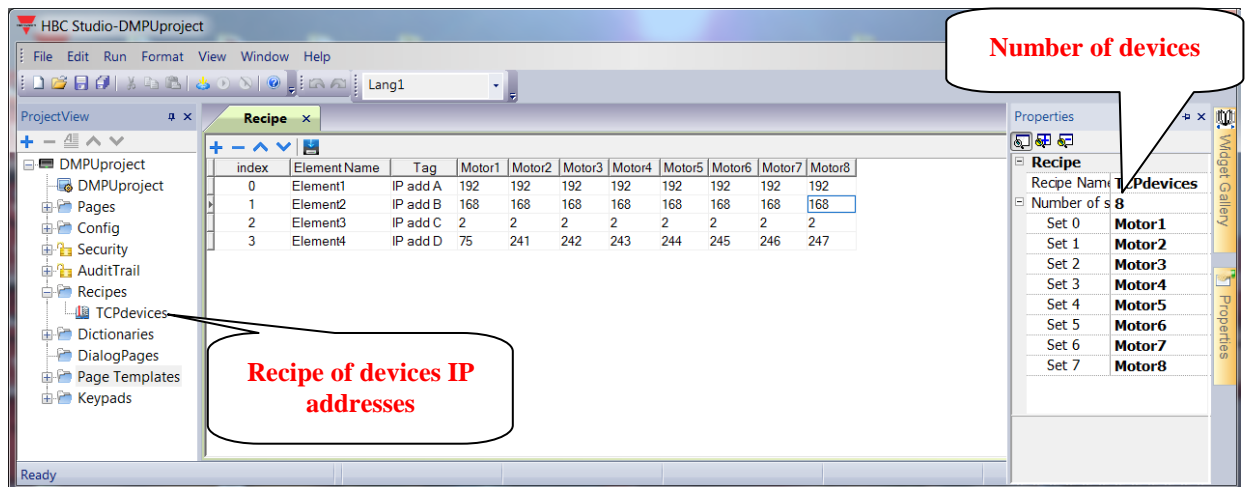
## 6 How to add a new device

In this chapter the addition of a new device on the project is described (read this chapter when more than 8 devices are required); it consists of 3 steps:

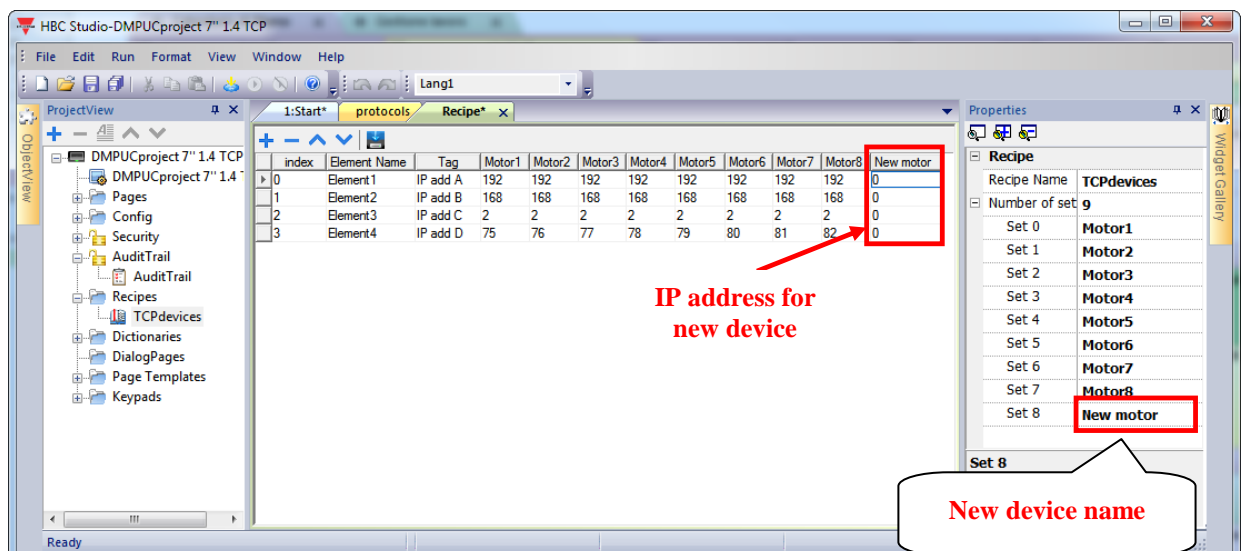
- Add the new device address
- Add TCU tag of new device
- Set the monitored alarms for a new device

### 6.1 Add a new device address

Open the “TCPdevices” item on the “ProjectView” box and increase the number of devices:

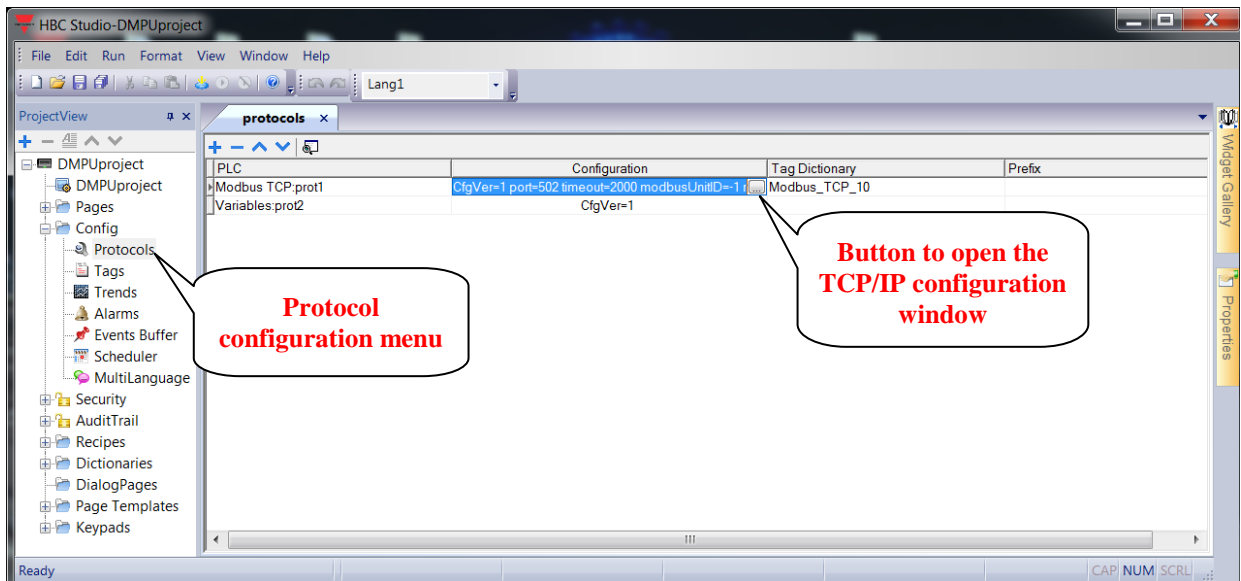


Set the new alias name (freely configurable by user) and the IP address of new device:

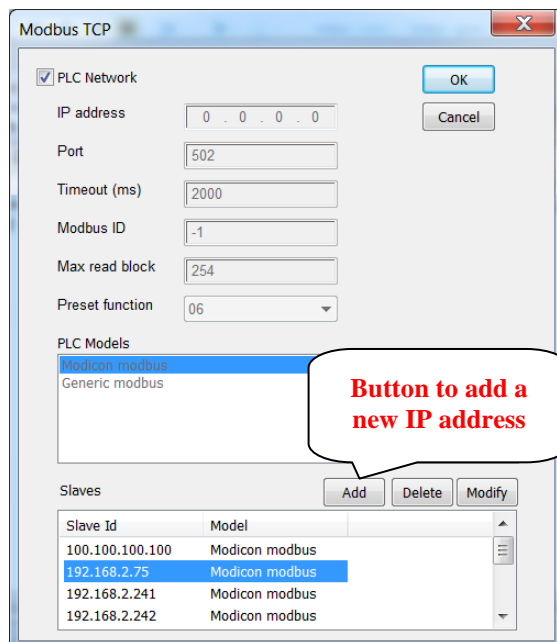


Double click on the “Protocols” item in the “ProjectView” box to open the “protocols” sheet:

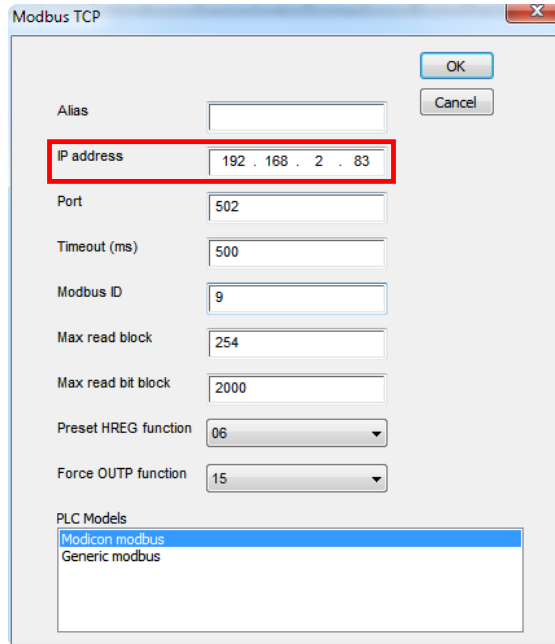




Click the button which appears on the cell in “Modbus TCP:prot1” row and “Configuration” column; the following window is shown:



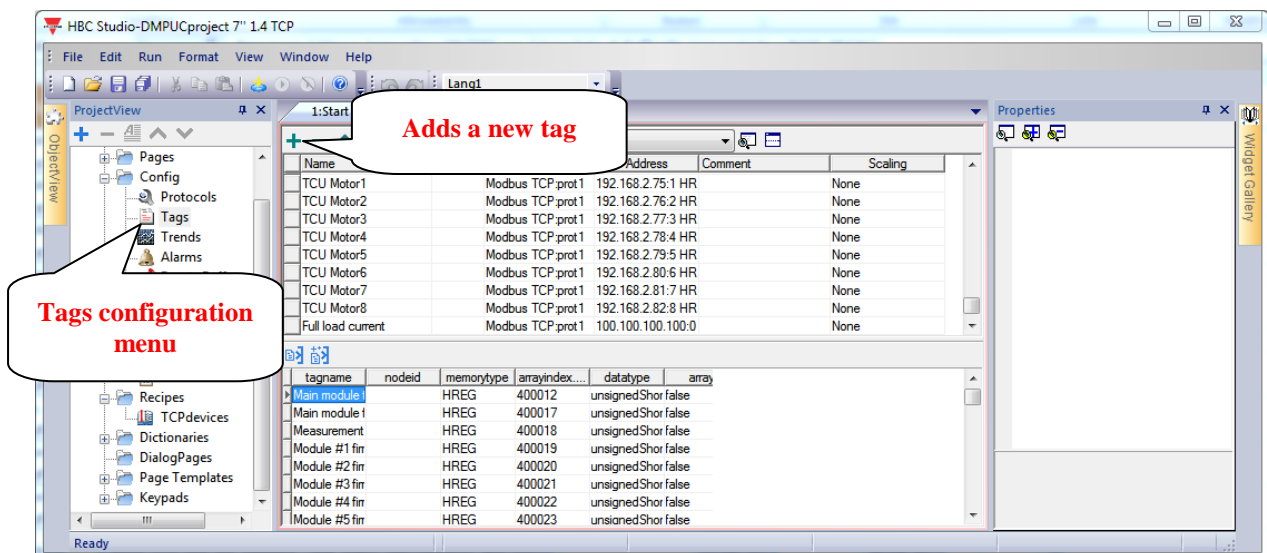
Press “Add” button to add a new IP address, the following window is shown:



Set the IP address of the new device on the “IP address” field and press the “Ok” button.

## 6.2 Add TCU tag

In this section the addition of new TCU motor value in the home page is described. Double click on the “Tags” item in the “ProjectView” box to open the “Tags” sheet; then press “+” button to add a new tag:

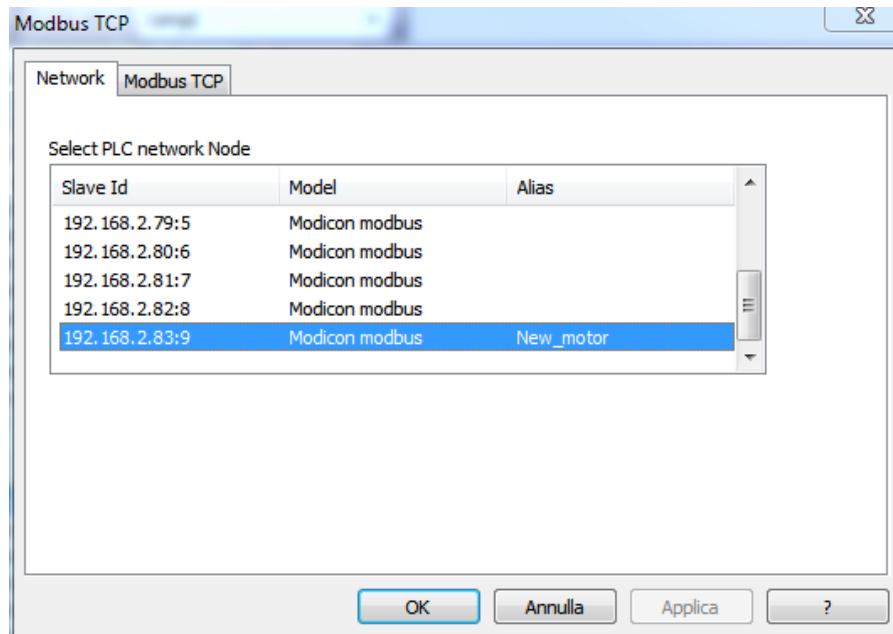


A new row is added in the tags table:

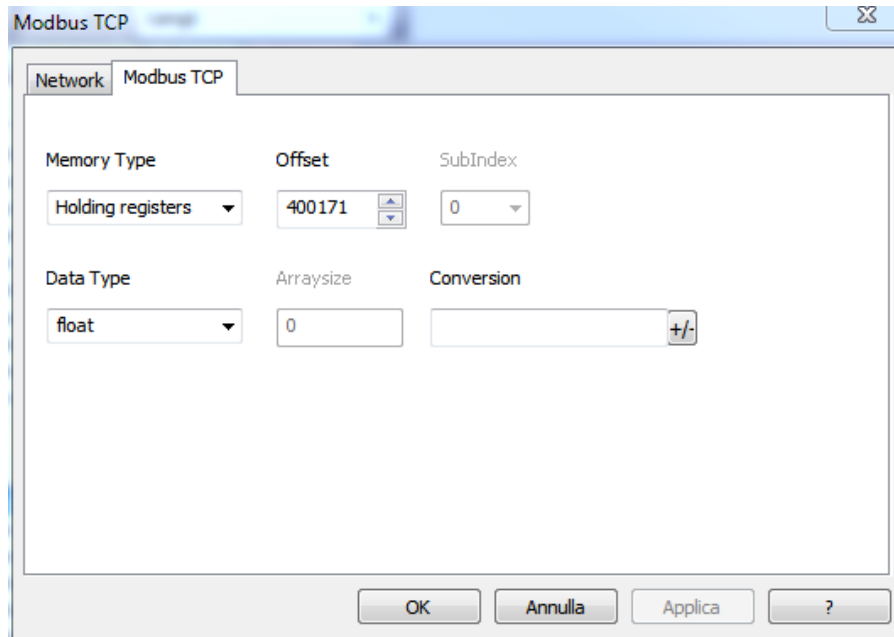
Tag1	Modbus TCP:prot 1	100.100.100.100:0 HRE	None
------	-------------------	-----------------------	------

Name	Group	Driver	Address	Comment	Scaling
TCU Motor4		Modbus TCP:prot 1	192.168.2.78:4 HR		None
TCU Motor5		Modbus TCP:prot 1	192.168.2.79:5 HR		None
TCU Motor6		Modbus TCP:prot 1	192.168.2.80:6 HR		None
TCU Motor7		Modbus TCP:prot 1	192.168.2.81:7 HR		None
TCU Motor8		TCP:prot 1	192.168.2.82:8 HR		None
Full load current		TCP:prot 1	100.100.100.100:0		None
Service factor		TCP:prot 1	100.100.100.100:0		None
Partial running hours rest		Modbus TCP:prot 1	100.100.100.100:0		None
TCU new motor		Modbus TCP:prot 1	100.100.100.100 <input type="button" value=""/>		None

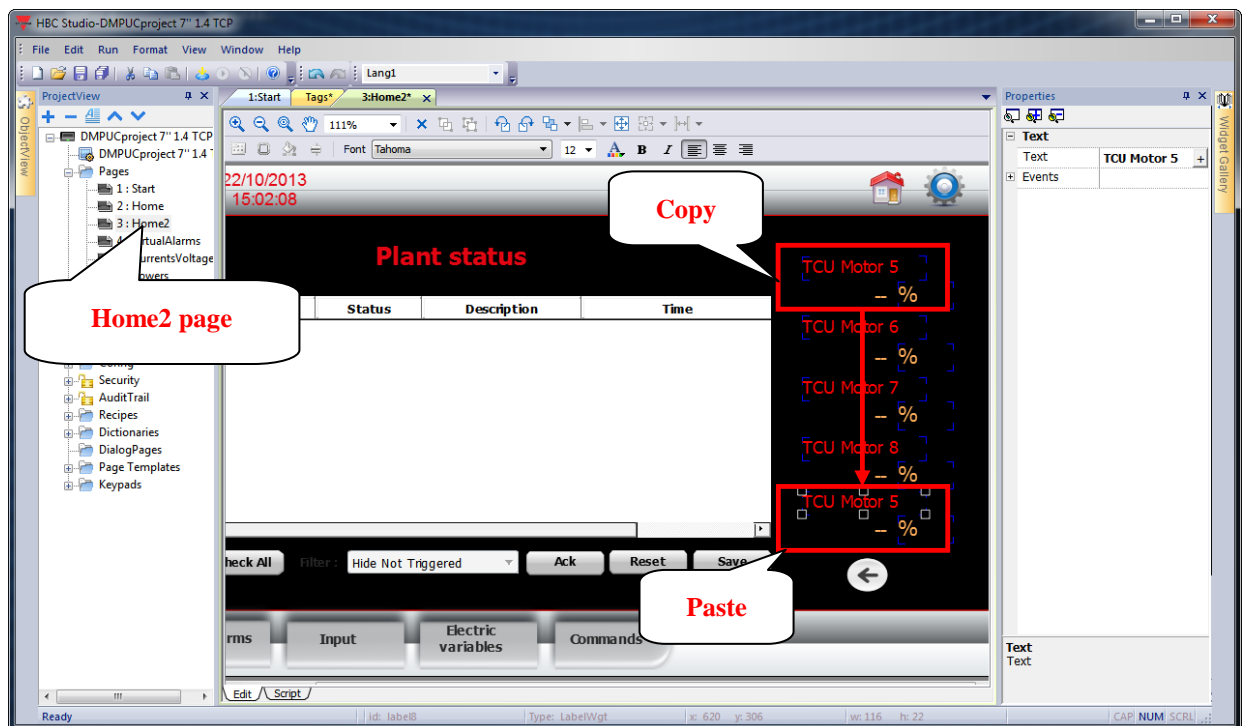
Set the tag name (ex. "TCU new motor") and click the button which appears on the cell in the new tag row and "Address" column; the following window is shown; select the item of new device IP address on the "Network" sheet:



Set the fields values of "Modbus TCP" sheet according to the following figure:

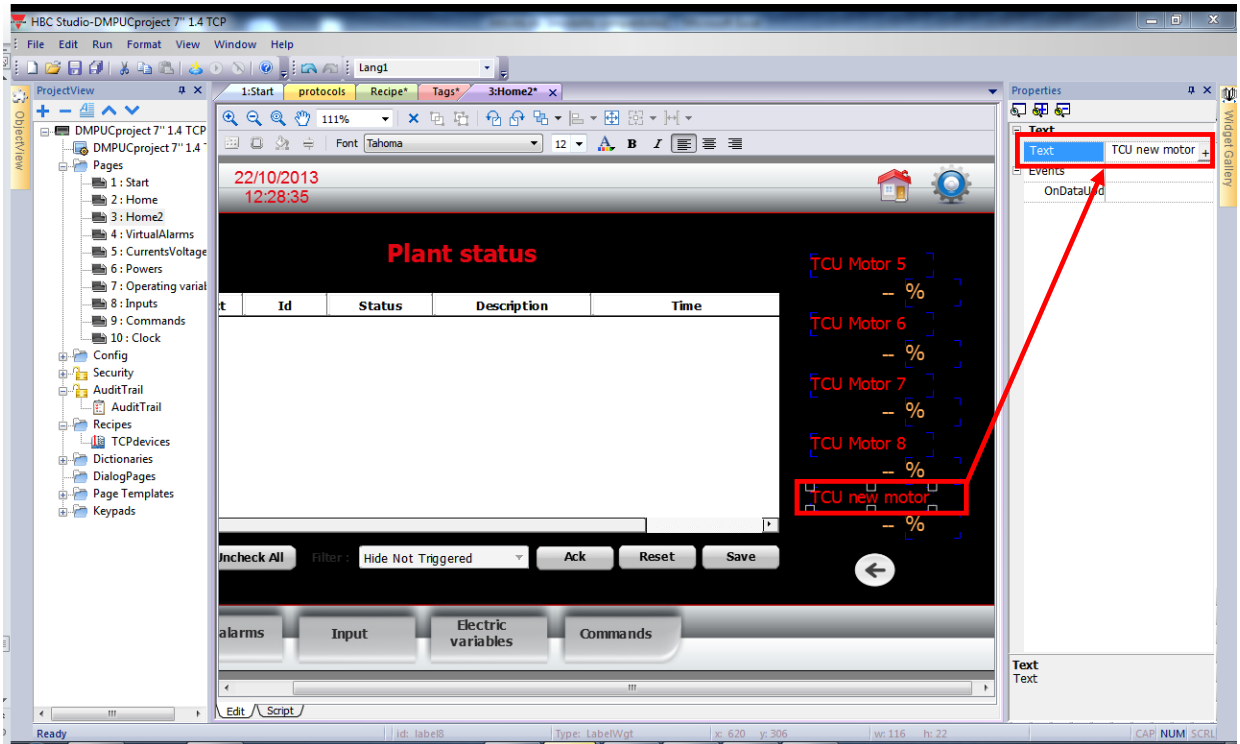


Double click on the “Home2” item in the “ProjectView” box to open the “Home2” page. Copy and paste the following objects to add a new TCU motor value:

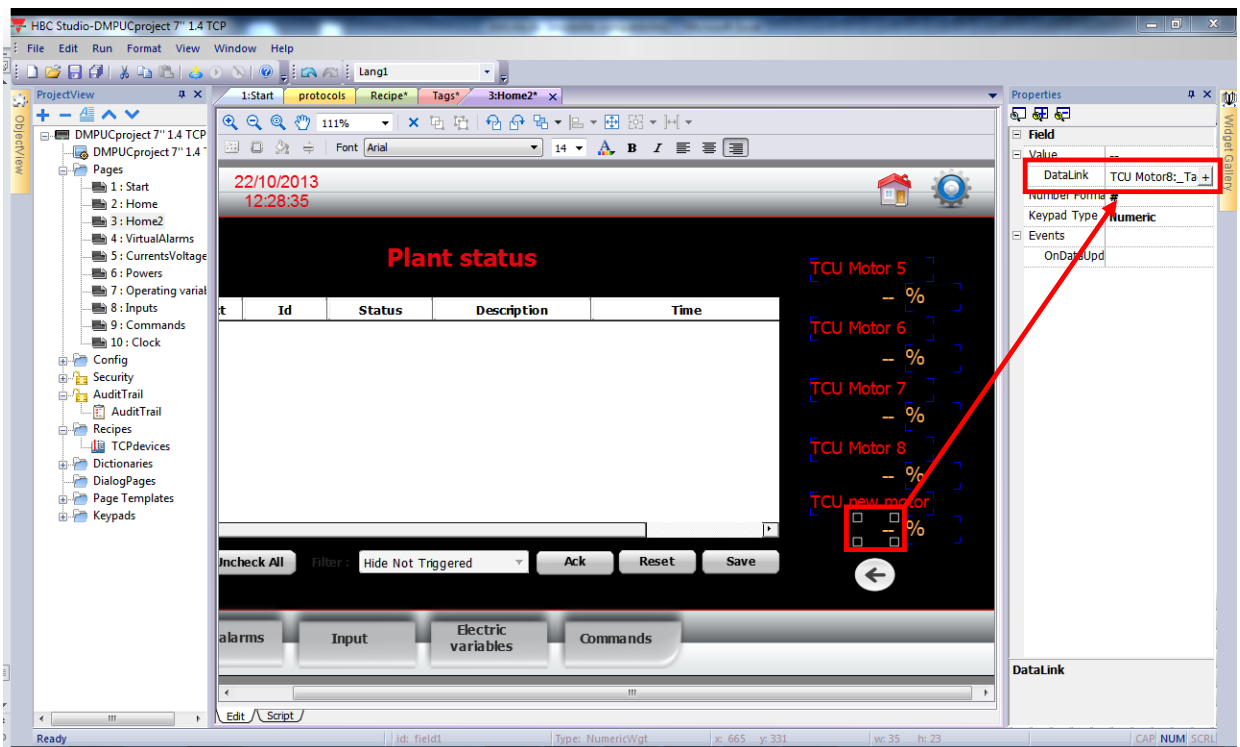


Select the new “TCU Motor 5” text and change the text propriety in “Properties” box (ex. “TCU new motor”):



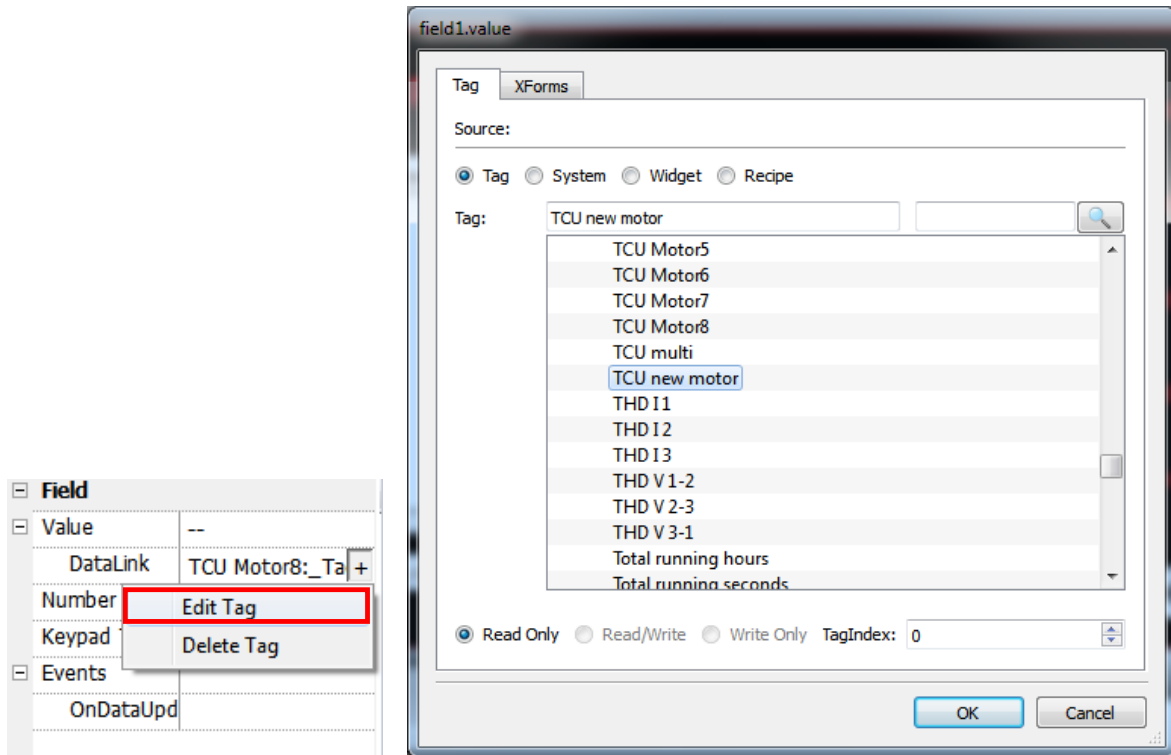


Select the new “—” field and click on “+” button in “Value →DataLink” propriety (in “Properties” box):



Select “Edit Tag” item to open the following window:





Select the new TCU tag, added at the beginning of this section, and press “Ok” button.

### 6.3 Set the monitored alarms

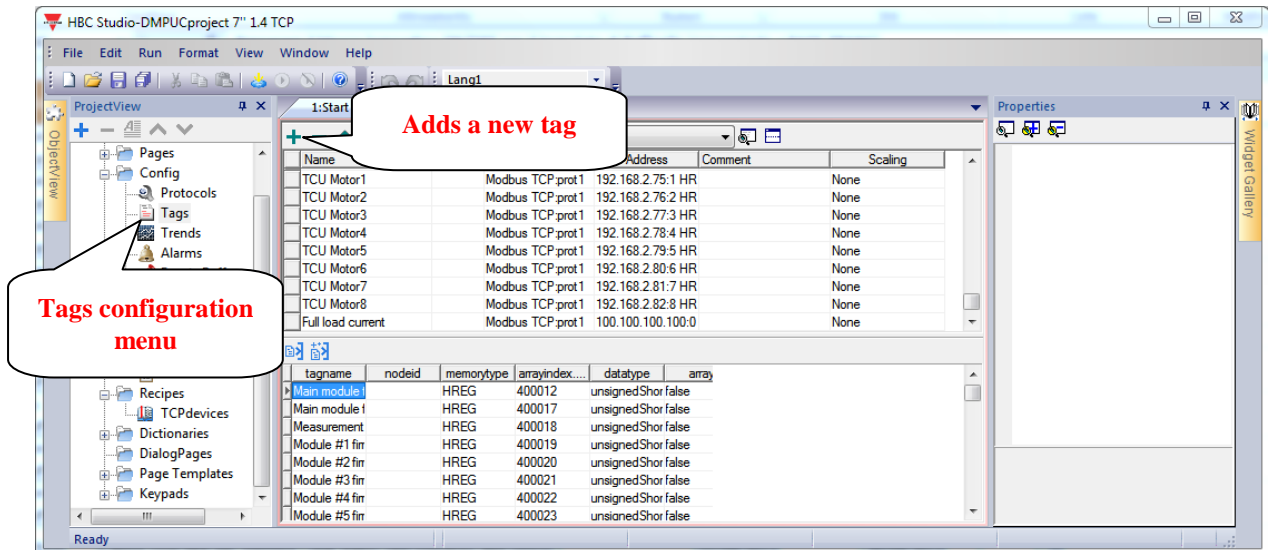
In this section all alarms of new device, which the display has to monitor, are configured. This personalization isn't necessary when the alarms management is not required, otherwise follow these steps:

- Add the tags related to the virtual alarms registers of new device
- Select the monitored virtual alarms

#### 6.3.1 Add virtual alarms tags

In this section the addition of the two virtual alarms registers is described (the first register refers to the virtual alarms from 1 to 16, the second register refers to the virtual alarms from 17 to 32). Double click on the “Tags” item in the “ProjectView” box to open the “Tags” sheet; then press “+” button to add 2 tags:





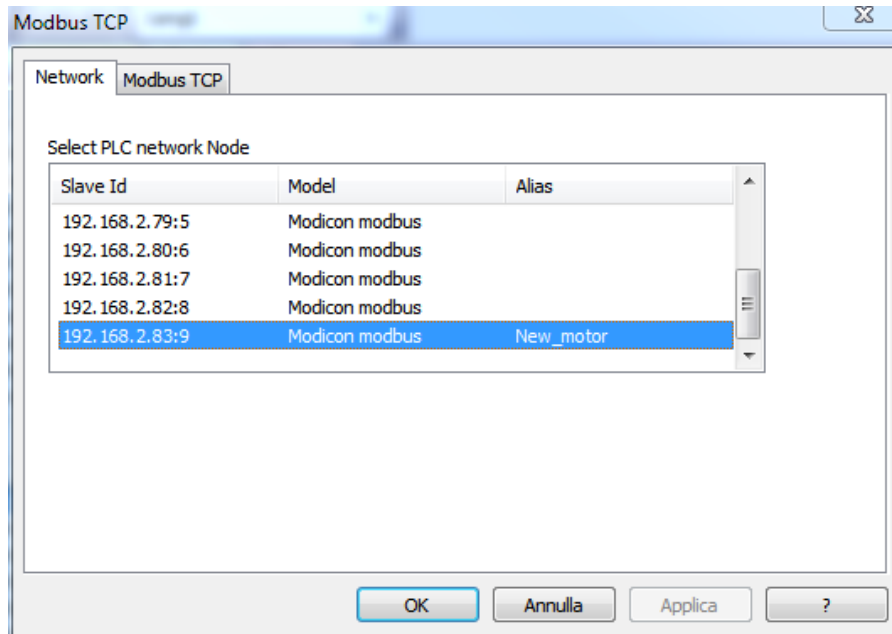
Set the tags names (ex. “Virtual alarms from 1 to 16 new motor” and “Virtual alarms from 17 to 32 new motor”) and click the button which appears on the cell in the first new tag row and “Address” column:

Name	Group	Driver	Address	Comment	St
TCU Motor4		Modbus TCP:prot1	192.168.2.78:4 HREG		None
TCU Motor5		Modbus TCP:prot1	192.168.2.79:5 HREG		None
TCU Motor6		Modbus TCP:prot1	192.168.2.80:6 HREG		None
TCU Motor7		Modbus TCP:prot1	192.168.2.81:7 HREG		None
TCU Motor8		Modbus TCP:prot1	192.168.2.82:8 HREG		None
Full load current		Modbus TCP:prot1	100.100.100.100:0 HF		None
Service factor K		Modbus TCP:prot1	100.100.100.100:0 HF		None
Partial running hours		Modbus TCP:prot1	100.100.100.100:0 HF		None
TCU new motor		Modbus TCP:prot1	192.168.2.83:9 HREG		None
▶ Virtual alarms from 1 to 16 new motor		Modbus TCP:prot1	100.100.100.100:0 HF		None
▶ Virtual alarms from 17 to 32 new motor		Modbus TCP:prot1	100.100.100.100:0 HF		None

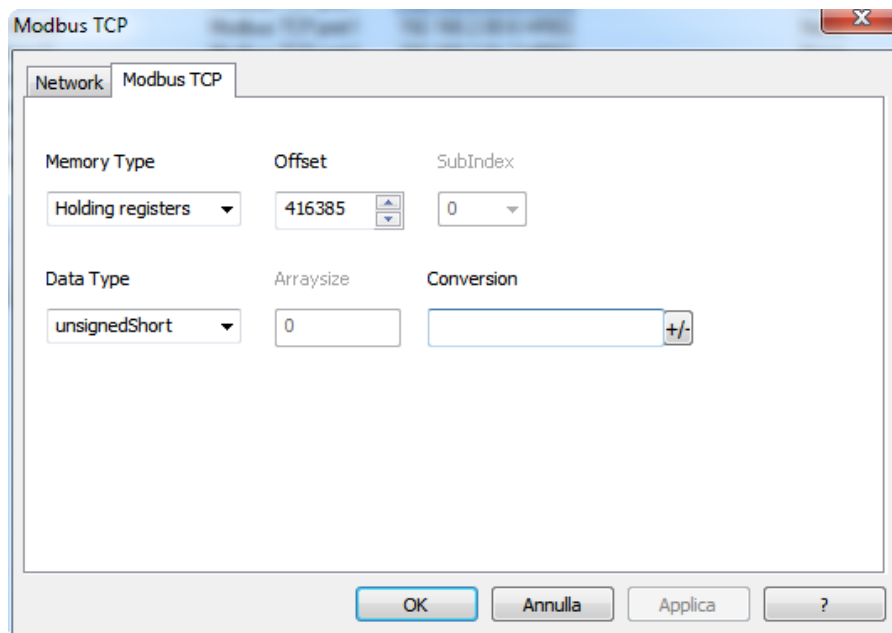
**Tags names**

The following window is shown; select the item of new device IP address on the “Network” sheet:





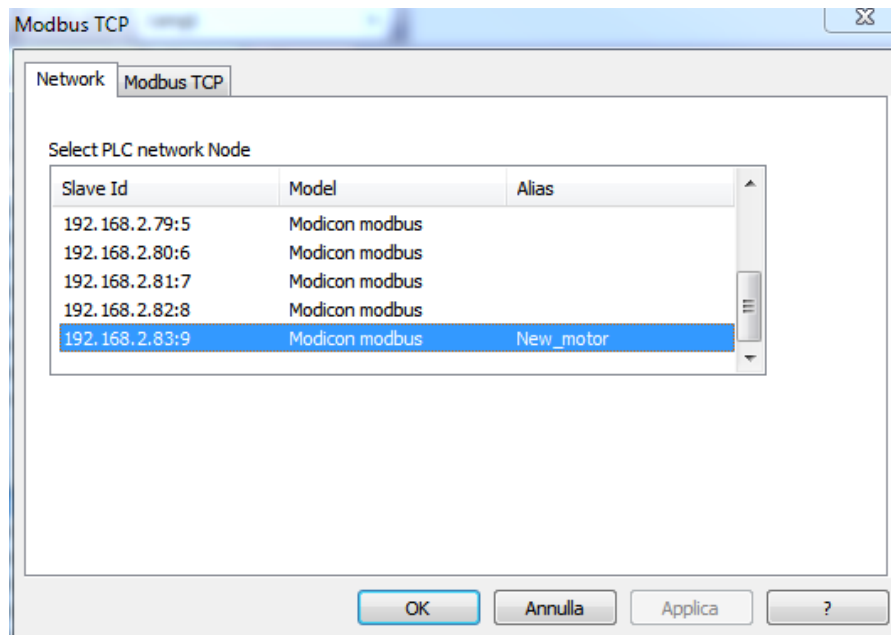
Set the fields values of “Modbus TCP” sheet according to the following figure and press “Ok” button:



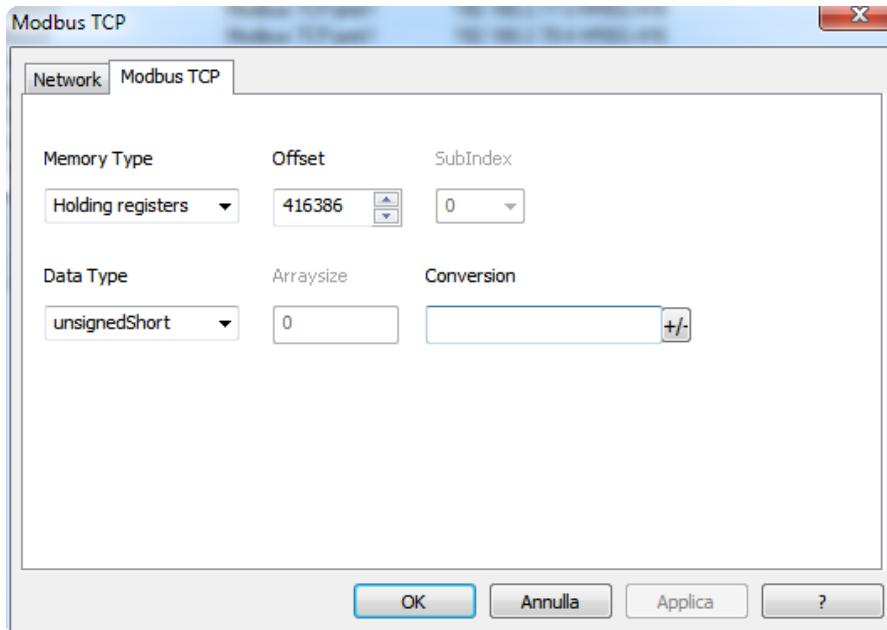
Click the button which appears on the cell in the second new tag row and “Address” column:

Name	Group	Driver	Address	Comment	Sc
TCU Motor5		Modbus TCP:prot1	192.168.2.79:5 HREG 400		None
TCU Motor6		Modbus TCP:prot1	192.168.2.80:6 HREG 400		None
TCU Motor7		Modbus TCP:prot1	192.168.2.81:7 HREG 400		None
TCU Motor8		Modbus TCP:prot1	192.168.2.82:8 HREG 400		None
Full load current		Modbus TCP:prot1	100.100.100.100:0 HREG		None
Service factor K49		Modbus TCP:prot1	100.100.100.100:0 HREG		None
Partial running hours reset cmd		Modbus TCP:prot1	100.100.100.100:0 HREG		None
TCU new motor		Modbus TCP:prot1	192.168.2.83:9 HREG 413		None
Virtual alarms from 1 to 16 new motor		Modbus TCP:prot1	192.168.2.83:9 HREG 413		None
Virtual alarms from 17 to 32 new motor		Modbus TCP:prot1	100.100.100.100:0 HR		None

The following window is shown; select the item of new device IP address on the “Network” sheet:



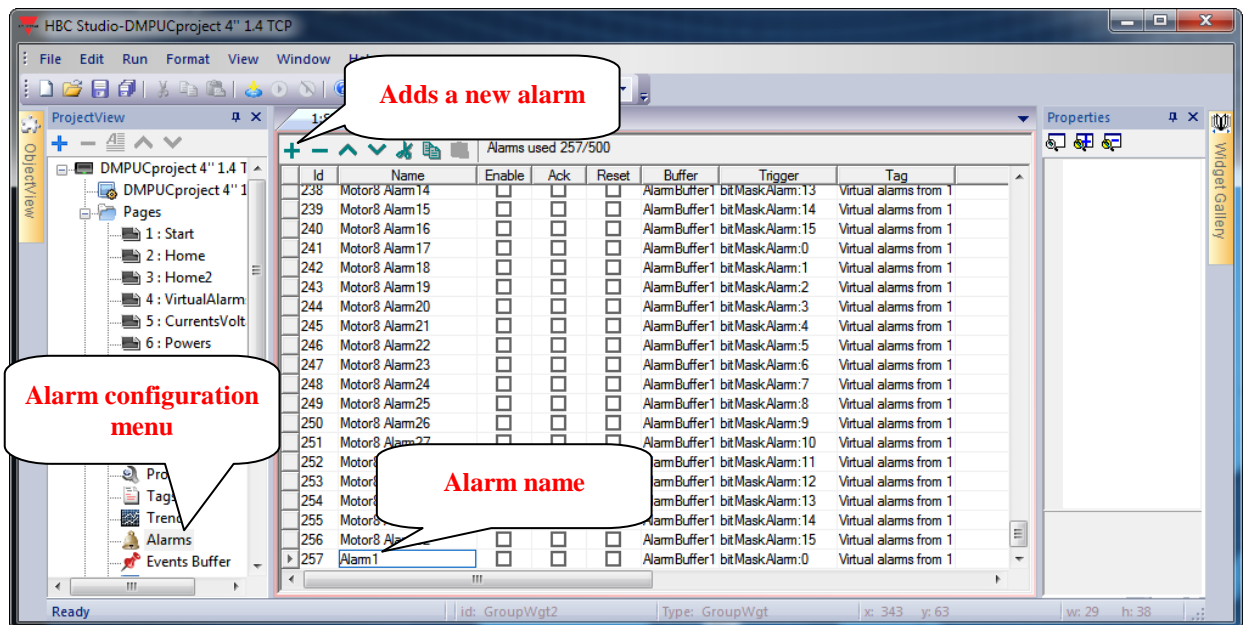
Set the fields values of “Modbus TCP” sheet according to the following figure and press “Ok” button:



### 6.3.2 Select the monitored virtual alarms

In this section all alarms of new device, which the display has to monitor, are added. Follow these steps for every monitored alarm:

- Double click on the “Alarms” item in the “ProjectView” box to open the “Alarms” sheet; then press “+” button to add a new alarm:

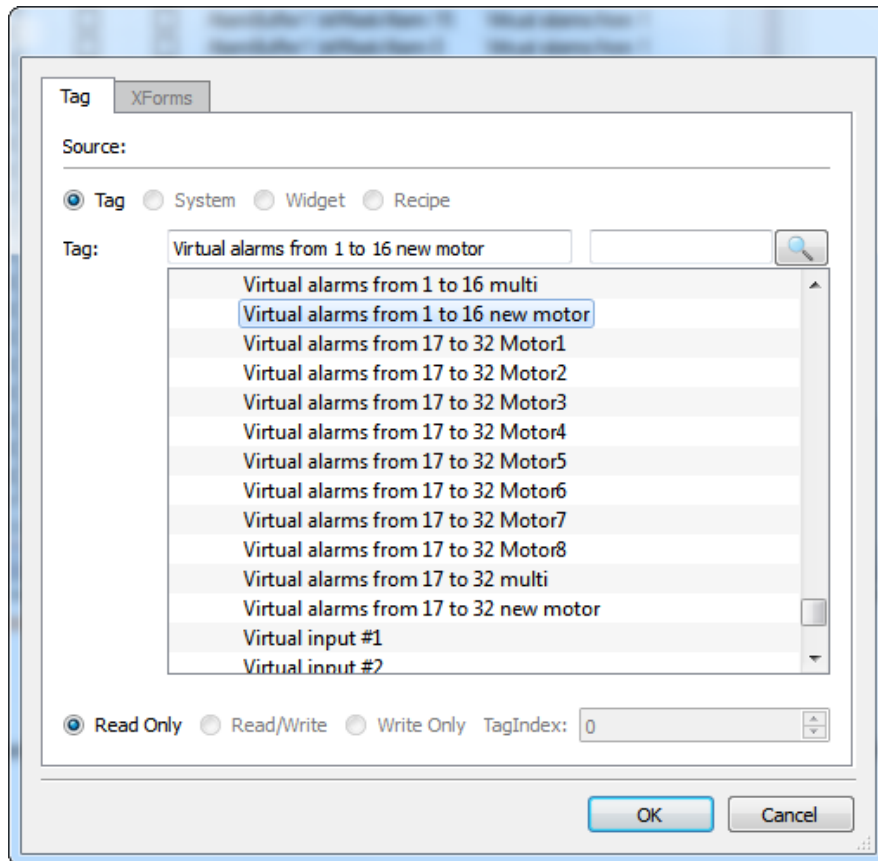


Set the alarm name (freely configurable by user) which appears on the cell in the new alarm row and “Name” column. Click the button which appears on the “Tag” column:



254	Motor8 Alarm30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:13	Virtual alarms from 1
255	Motor8 Alarm31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:14	Virtual alarms from 1
256	Motor8 Alarm32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:15	Virtual alarms from 1
▶ 257	New alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:0	Virtual alarms from 1 <input type="checkbox"/>

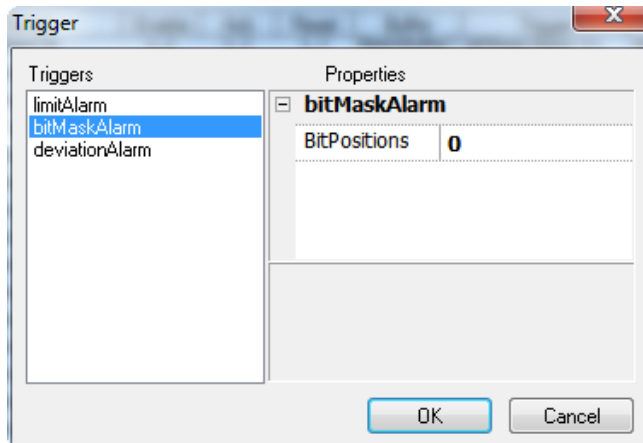
The following window is shown; select the first or second virtual alarms tag (see previous section) according to the position (from 1 to 32) of the DMPU virtual alarm to add:



Press “Ok” button and click the button which appears on the cell in the new alarm row and “Trigger” column:

254	Motor8 Alarm30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:13	Virtual alarms from 1
255	Motor8 Alarm31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:14	Virtual alarms from 1
256	Motor8 Alarm32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:15	Virtual alarms from 1
▶ 257	New alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:0	Virtual alarms from 1 <input type="checkbox"/>

The following window is shown:



Select the “bitMaskAlarm” item and set the “BitPositions” value according to the DMPU virtual alarm to add:

First virtual alarm tag (ex. Virtual alarms from 1 to 16 new motor)	
<i>DMPU alarm number</i>	<i>BitPositions propriety</i>
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	10
12	11
13	12
14	13
15	14
16	15

Second virtual alarm tag (ex. Virtual alarms from 17 to 32 new motor)	
<i>DMPU alarm number</i>	<i>BitPositions propriety</i>
17	0
18	1
19	2
20	3
21	4
22	5
23	6
24	7
25	8
26	9
27	10
28	11
29	12
30	13
31	14
32	15

Press “Ok” button and click the checkbox on the “Enable” column (in alarms table) to activate the alarm monitoring:

255	Motor8 Alarm31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:14	Virtual alarms from 1
256	Motor8 Alarm32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:15	Virtual alarms from 1
257	New alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	AlarmBuffer1 bitMaskAlarm:0	Virtual alarms from 1

