



DMPU-PSHMI

USER MANUAL

rev. 0.2.

24 January 2013



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1 HARDWARE CHARACTERISTICS

1.1 Characteristics

Power supply	24VDC \pm 20%
Current consumption	< 300mA
Operating temperature	from -10 °C to +60 °C (R.H. <90% no condensation)
Storage temperature	from -10 °C to +70 °C (R.H. <90% no condensation)
Installation category	Cat. III (IEC60664, EN60664)
EMC	EN61000-6-2, EN61000-6-3
Standard compliance	IEC60664, IEC61010-1, EN60664, EN61010-1
Weight	approximately 195 g
Keyboard	4 programmable function buttons
Display	Alphanumeric display backlit 2 x 8 characters
Dimensions (WxHxD)	96 x 48 x 88.5 mm
Serial ports	<p>2 serial ports (COM 0 and COM 2).</p> <p><u>COM 0</u>: RS485 serial port dedicated to communication between DMPU-HMI and PC. It allows to download the application program created with DMPU-PSHMI into DMPU-HMI and the DMPU-HMI's operating system upgrade.</p> <p><u>COM 2</u>: RS485 serial port dedicated to Modbus RTU communication between DMPU-HMI and DMPU main module.</p>

1.2 DMPU-HMI wiring diagrams

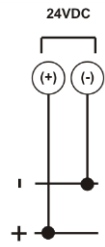


Figure 1-1 Power supply

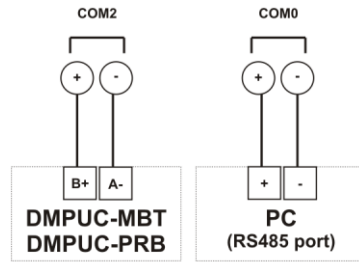


Figure 1-2 Communication ports

1.3 Dimensions

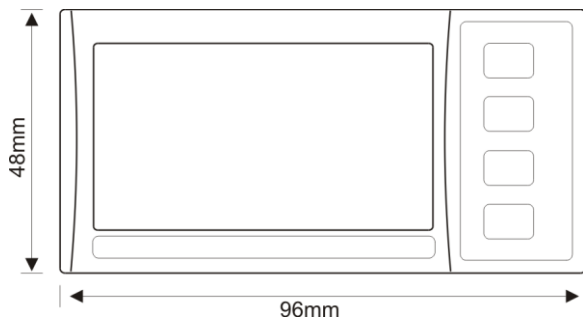


Figure 1-3 Front panel size

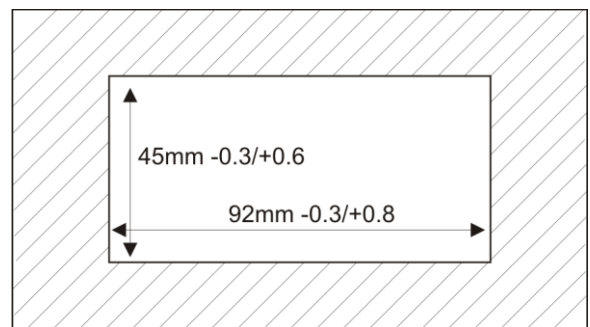


Figure 1-4 Panel cut out



Figure 1-5 Depth size

2 GENERAL NOTES

Read the following guide to properly configure and use the DMPU-HMI interface and the DMPU-PSHMI programming software. The software is the development environment to create the configuration and download it into DMPU-HMI device; this configuration summarizes the pages, alarms messages, the variables from DMPU displayed on the operator interface and the 4 function buttons. This manual describes the hardware and software characteristics to use DMPU-HMI.

2.1 Operating System

DMPU-HMI's software part consists of operating system and application program. The operating system manages all the resources of the microcontroller and makes it available to the application program created by the user.

Install DMPU-PSHMI software (suggested installation directory "Programs\DMPU-PSHMI") on the PC. When downloading a configuration, the PC software automatically checks the compatibility between DMPU-HMI operating system and the application program; if an out-dated system version is present on the operator interface, the PC software provides to update the device's operating system.

2.2 Set up menu

If the application program isn't present on DMPU-HMI, at switch-on the "Set Up" menu is automatically displayed (after showing for a few seconds the message "No Appli" to inform that the device isn't configured). If an application program is present on DMPU-HMI, the initial page is displayed. Press the fourth button at the bottom while switching on to access at "Set Up" menu.

The set up menu has the following items:

- **Version:** shows the operating system version.
- **Language:** selects the working language if the application provides the multilanguage mode.
- **Parameters:** modifies some DMPU-HMI parameters, as the user password to protect the application pages.

Use the fourth button on the bottom to access at menu and the first button on the top to exit. The two buttons in the middle are the up and down arrows and allow pages scroll.

2.3 PC connection

Use the COM0 port to connect the PC (see paragraph "DMPU-HMI wiring diagrams"). This communication port is two wires RS485, so a USB/RS485 converter may be necessary to allow the connection with the PC. In the "Option" software's menu, select the serial port to which DMPU-HMI is connected, like in the following figure:

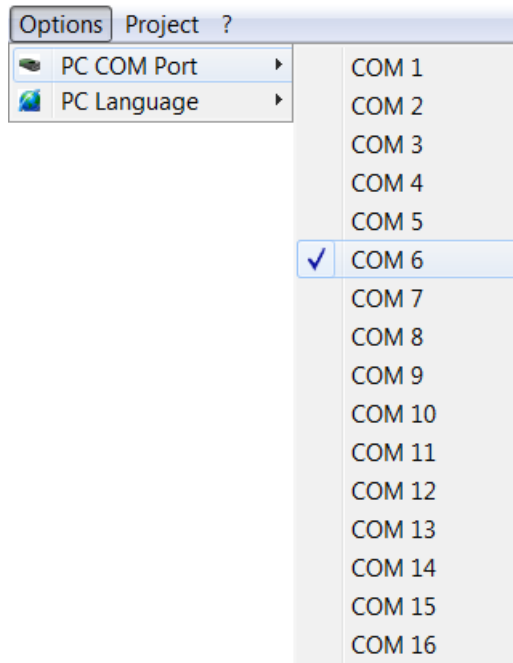


Figure 2-6 Select the PC's serial port in this menu

When the device is connected, the operator is able to:

- Download the application program from PC to DMPU-HMI (described in chapter "PROJECT").
- Download the operating system from PC to DMPU-HMI.

2.4 Password

DMPU-HMI provides a user password to protect the application's pages so, when a protected page is requested, the user must enter the password. The default user password is 1234 but it is possible to change it in the "Set Up" menu (see "Set up menu" paragraph).

3 PROJECT

The following chapter analyses step by step a new DMPU-HMI project creation.

3.1 At the beginning

When opening DMPU-PSHMI programming software, select from the menu “File” the “New Project” item, or push the button on the state bar. Both options are displayed in the following image:

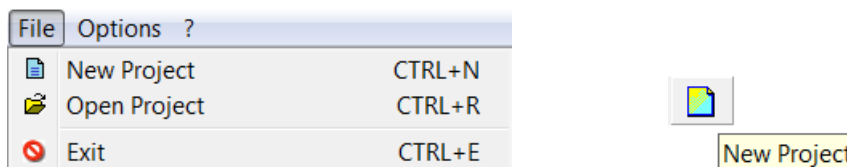


Figure 3-7 Create a new project

The “Project Options” window is shown; in this window it is possible to define the project name, select the first page displayed at switch-on and set external variables to read/write from DMPU main module.

3.2 Project options

The “Project options” window is automatically opened when creating a new project; it’s possible to open again this window while programming through the main interface button on the upper state bar or the “Display” drop-down menu. These options are shown in the following image:

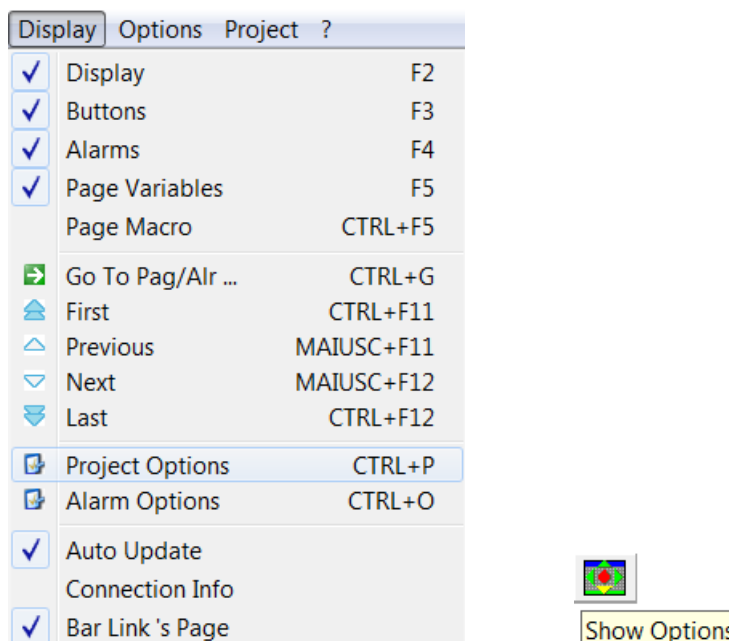


Figure 3-8 Select "project options" from menu

The “Project Options” looks as follows:

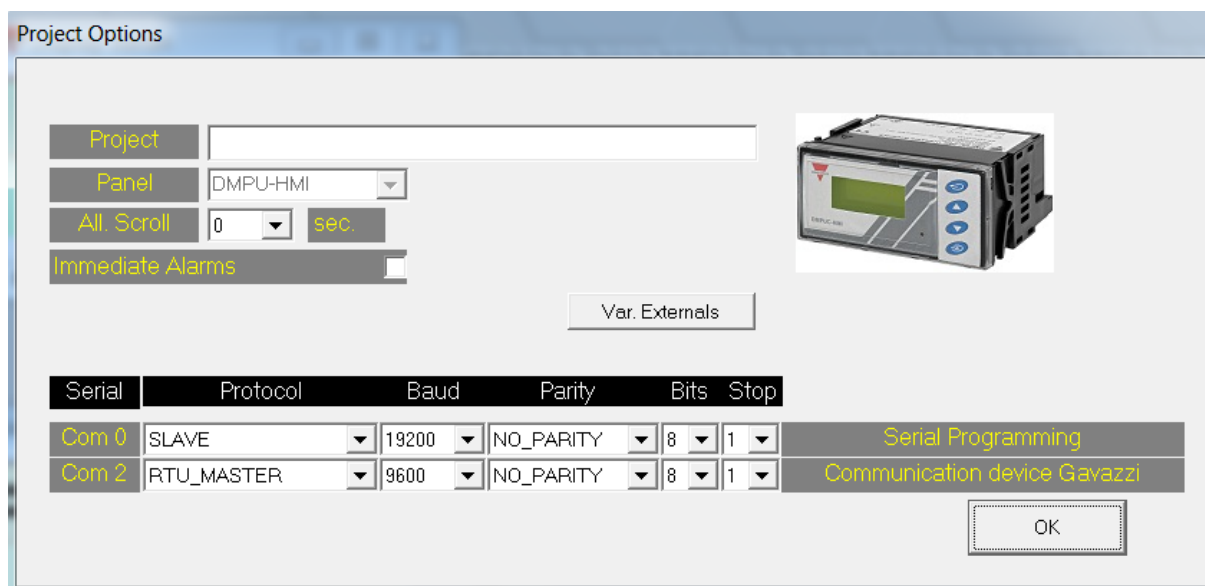


Figure 3-9 Project options window

The parameters in this window are:

- **Project:** project name (free user's choice).
- **All. Scroll:** automatic alarm scroll time expressed in seconds (when multiple alarms are active). If this time is zero, the alarm scroll will be manual (through two middle buttons, arrow buttons), otherwise the alarms are displayed cyclically with a time interval defined in this parameter.
- **Var. Externals:** to configure the external variables to read/write from/on DMPU main module.
- **COM 0:** communication parameters between DMPU-HMI and PC using serial port. In this case DMPU-HMI behaves like a slave device.
- **COM 2:** communication parameters between DMPU-HMI and DMPU main module. The parameters must be the same as in DMPU.

3.2.1 External Variables

The external variables are read or written, from/to DMPU device. In the "Project Options" menu, "Var. Externals" it is possible to decide the used external variables (Figure 3-10). Clicking "Add Variable", the "New External Variable" window is shown (Figure 3-11) to define a variable name (user's free choice). This name and a progressive ID number are added to the variables list on the left (Figure 3-12 and Figure 3-13) where all the variables to read/write from/to DMPU-HMI are summarized. It's possible to show, modify and save the selected variable's parameters in the right box (Figure 3-14); the parameters are the following:

COM: serial port connected to DMPU main module.

Node Address: DMPU slave address from which read/write variables. It's possible to connect more than one DMPU main module to one DMPU-HMI; the node address allows to select from which DMPU module the operator interface reads the external variables.

Address [DEC]: decimal register number to read on DMPU device: see the registers list on the DMPU communication protocol.

Dimension: data format type of the read/written variable; see DMPU protocol.

Select how to manage the variable:

Nothing: the variable isn't read and isn't written.

Read continue: DMPU-HMI reads cyclically the variable from the DMPU regardless of the displayed page, this variable is stored inside the DMPU-HMI.

Write continue: DMPU-HMI writes cyclically the variable's value stored into DMPU-HMI on DMPU regardless of the displayed page.

Reading page: DMPU-HMI reads the variable from DMPU only when the page with this variable is displayed.

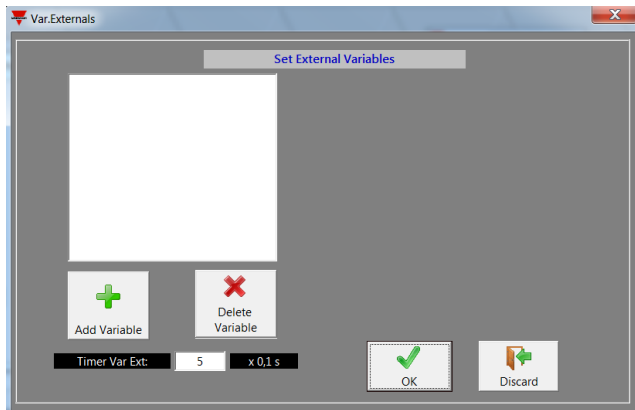


Figure 3-10 External variables settings

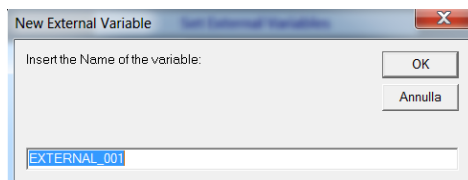


Figure 3-11 New external variable

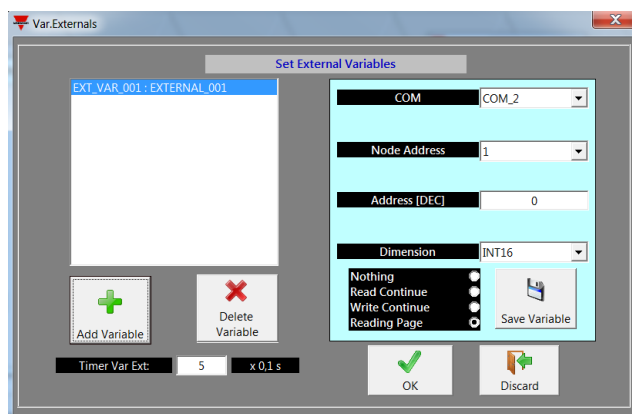


Figure 3-12 External variable parameters #1

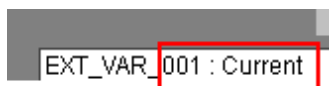


Figure 3-13 Variable's name in the external variable's list

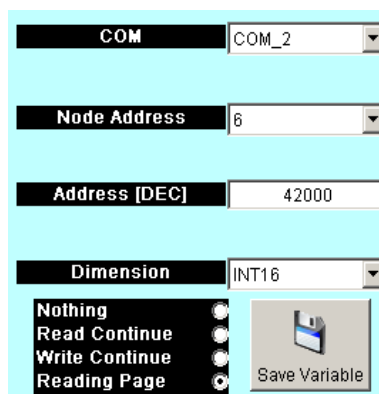


Figure 3-14 External variable parameters #2

3.3 Main interface

The main programming interface is divided into the following parts:

Status bar: button list to access the main software's features.

"Display" window (green): preview of the pages displayed on the operator interface; it is possible to scroll the inserted pages and modify the page's text and/or the displayed variables.

"Alarms" window (yellow): preview of the alarm pages which are displayed on the operator interface; it is possible to scroll the pages and modify the texts. These alarms are associated to the 32 virtual alarms present in DMPU. When one of these alarms trips, the relevant alarm page is displayed. If more than one alarm is simultaneously active it is possible to scroll the display with the two middle buttons or use the automatic scroll function in "Project Options" (see the paragraph "Project options").

"Buttons" window: set the buttons functions on the operator interface. The buttons functions are associated to the page which is shown in the actual green "Display" window. Change the actual page to associate the functions for each page.

"Page Variables" window: the list of variables which are used in the current page.

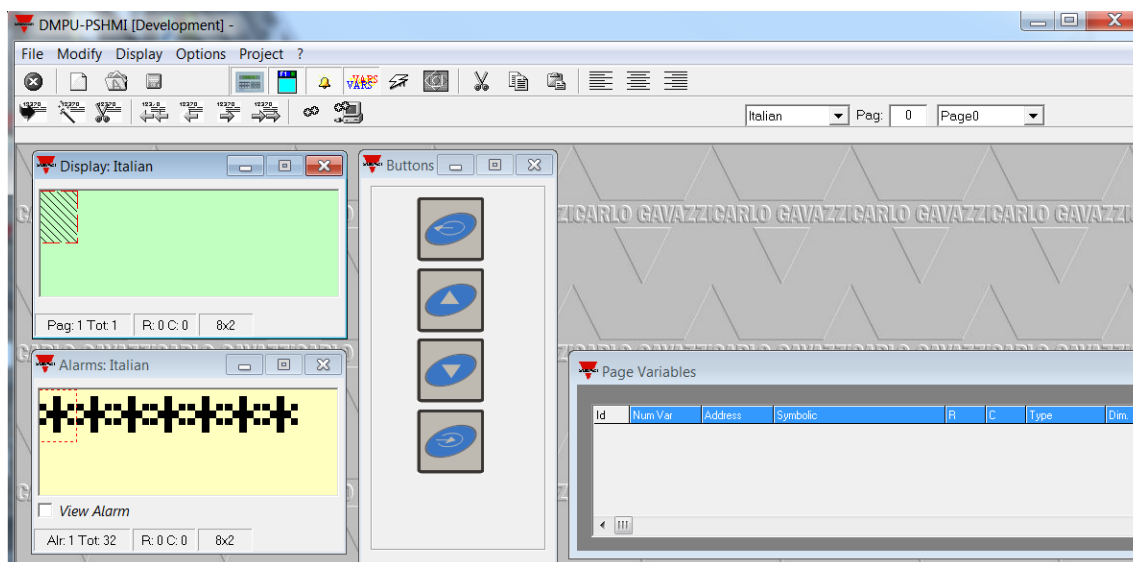


Figure 3-15 Main interface window

3.3.1 Display window

In this form (Figure 3-16) the page content is defined. Insert a text or an external variables defined inside "Project options" in the green box (double-click to open the variable selection window; this window is described later).

Use the button on the state bar (described in "State bar" chapter) to insert more than one text and variables and to scroll the pages (the current page number is shown on the top in the right side of the state bar, Figure 3-17). In the red circle area of Figure 3-17 the current page number and name is highlighted.

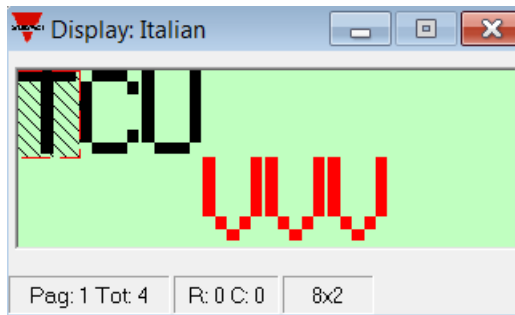


Figure 3-16 Display window



Figure 3-17 Select the current page

The page name is assigned by default with the structure “page XX”, where “XX” is the page number; this name can be changed in “Display” menu - “Page Option”.

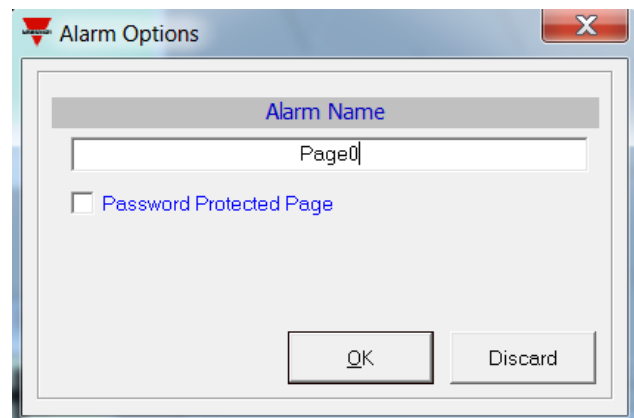
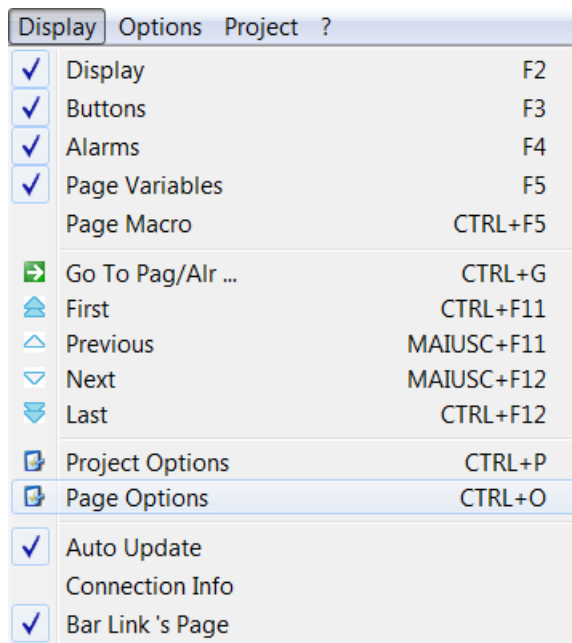


Figure 3-18 Page option

3.3.2 Alarms window

In this form it is possible insert the alarm messages associated to DMPU's virtual alarms. DMPU-HMI allows to show up to 32 alarm pages.

For each alarm message a specific text can be shown on the operator interface when the alarm is active.



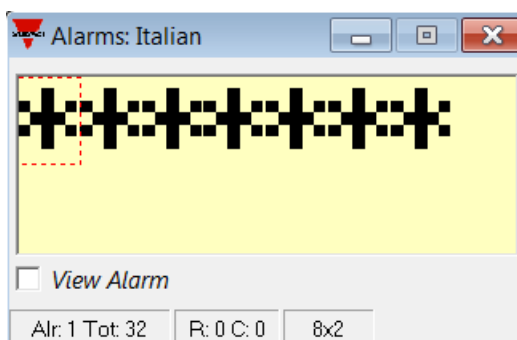


Figure 3-19 Alarm window

In the first row the tripped alarm number and the total number of the tripped alarms (“Alxx Tyy” where “xx” is the alarm number and “yy” is the total number of alarms) is shown.

To customise a specific alarm window, select the alarm in the scroll list, like in following figure:

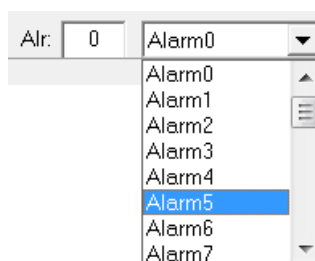


Figure 3-20 Alarm selection

Choose if the alarm message is shown or not when the alarm trips selecting or deselecting the flag on the “Show alarm” box (Figure 3-21): if the alarm message is disabled, the message isn't shown on the operator interface (although the associated DMPU's alarm trips).

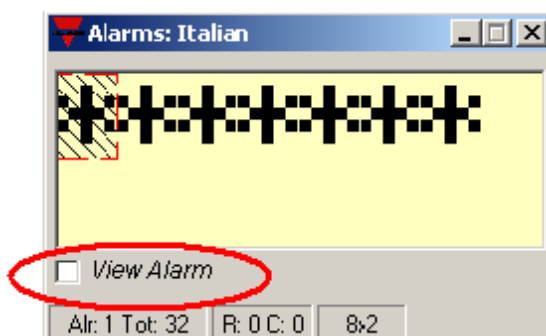


Figure 3-21 Enable/disable alarm display

Define in the “Project option” menu how to display the alarm messages selecting or deselecting the flag on the “Immediate Alarms” box: if the box is enabled, the alarm message will be immediately shown on the operator interface when the alarm becomes active (replacing the current page); otherwise the alarm message is shown only after pressing the fourth button at the bottom of DMPU-HMI. The alarm condition is just shown by the red LED in this case.



Figure 3-22 Enable/disable the immediate alarms display

Use the two middle buttons (second and third one) on the operator interface to scroll among the active alarms.

3.3.3 Buttons window

The buttons window, as the display window, refers to the page currently shown on the state bar (Figure 3-17); every page can have a different buttons setup.

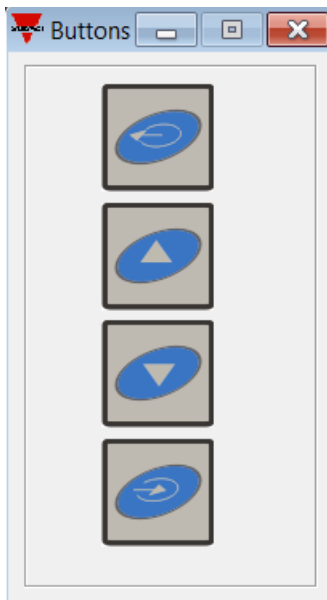


Figure 3-23 Buttons window

Set the macros of the operator interface buttons double clicking on the button image in the buttons window to open the “Macro & Link” window.

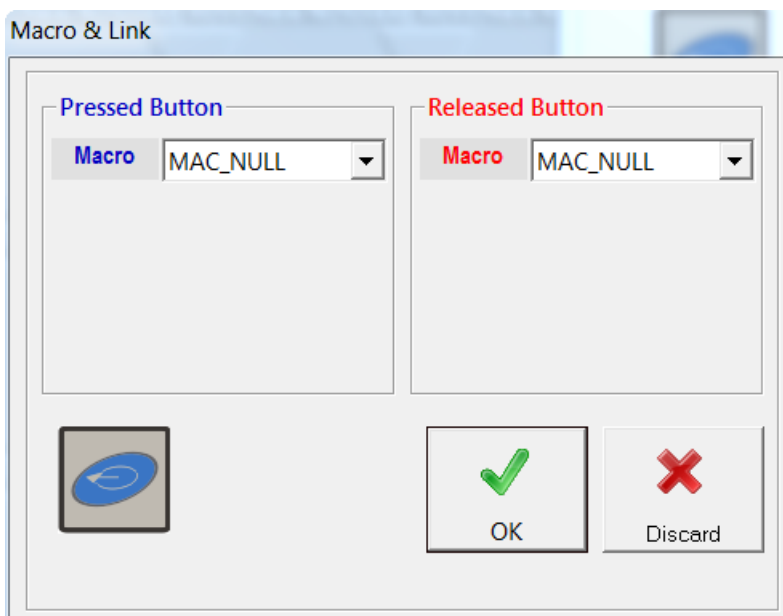


Figure 3-24 Macro & link window

A macro is an operation done immediately by DMPU-HMI at the button pressure or release. The available macro are the following (one or two parameters can be required according to the macro type).



MACRO	Description	Parameter 1	Parameter 2
MAC_NULL	No operation	/	/
MAC_PAGE	Change page	New page number	/
MAC_WRITE	Write a value in a DMPU-HMI variable.	External variable address	Value to write at this address
MAC_TOGGLE	Reversing a bit state	Address	Bit number [0...15]

For example use the macro “MAC_PAGE” to change the current page defining the destination page number.

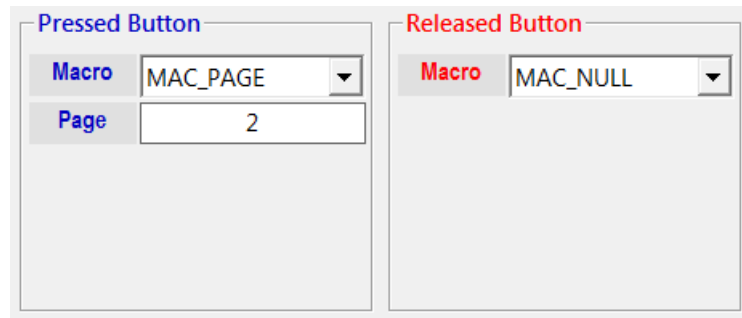


Figure 3-25 Macro & link window with MAC_PAGE macro

For example if the DMPU main module has a virtual input to start the motor (at virtual input activation), set the macros as described below:

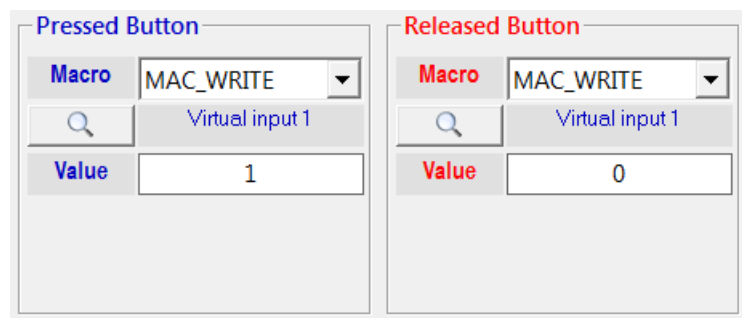


Figure 3-26 Macro & link window with MAC_WRITE to set a virtual input

When the button is pressed the virtual input becomes ON and starts the motor, when it is released the virtual input comes back to rest condition.

3.3.4 State bar






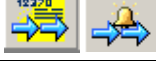







Use the upper state bar, in the main software interface, to manage the project.







Figure 3-27 State bar



In the following table the state bar functions are described:









PAGE MANAGEMENT BUTTONS	
<i>Button</i>	<i>Description</i>
	Insert a page in the current position.
	Add one page in the end without modifying the pages order.
	Delete the selected page.
	Go to the first project page/alarm.
	Go to the previous project page/alarm.
	Go to the last project page/alarm.
	Cut the selected element on display.
	Copy the selected element on display.
	Paste on display the element previously copied.
	Left aligned display text.
	Center aligned display text.
	Right aligned display text.
	Number (on the left) and name (on the right) of the current page.

FILE MANAGEMENT BUTTONS	
<i>Button</i>	<i>Description</i>
	Exit from the current project.

FILE MANAGEMENT BUTTONS	
<i>Button</i>	<i>Description</i>
	Create a new project.
	Open a new project.
	Save the current project.

PROJECT BUTTONS	
Button	Description
	Compile the current project.
	Compile and transmit the application from PC to DMPUC-HMI.

DISPLAYING BUTTONS	
Button	Description
	Show the buttons window.
	Show the alarms window.
	Show the variables window.
	Show the macros window.
	Show the project options window.
	Show the display window.

3.3.5 Drop down menus

At the top of the software window there are some drop down menus.

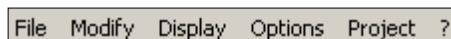


Figure 3-28 Drop down menus

The drop down menus items are:

File	
New project	Create a new project.
Open Project	Open an existing project.
Upload configuration file	Open an example project
Save Project	Save the current project.
Save Project With Name	Save the current project with a different name.
Text Project Management	Import/export the language strings in a ".csv" file.
Project information	Display the project info.

File	
Print	Print a document which summarizes the project giving the opportunity to select what to print.
Exit	Exit from the current project.

Options	
PC COM Port	Select the PC serial port to use.
PC Language	Select the software language.

Display	
Display	Show/hide the display window.
Buttons	Show/hide the buttons window.
Alarms	Show/hide the alarms window.
Page Variables	Show/hide the page variables window.
Page Macro	Show/hide the page macros window.
Go to Pag/Alr ...	Select the page to show.
First	Go to the first project page.
Previous	Go to the previous page.
Next	Go to the next page.
Last	Go to the last project page.
Project Options	Open the "Project Options" window.
Alarm Option	Open the "Page Option" window.
Auto Update	If this item is selected, the operating system on DMPU-HMI is automatically updated if it is different from the one on the PC.
Connection Info	If this item is selected, prompting messages are shown while downloading the configuration.
Bar Link's Page	Enable/disable the down bar where are indicated the buttons used for the page changing.

Project	
Compile	Compile the current project.
Send Application	Send the application from PC to DMPU-HMI.
Compile + Send Appli.	Compile the current project and send it to the DMPU-HMI.
Auto Link	Use this function to set automatically the changing pages buttons for all the pages (all the pages use the same buttons to change page).
Remove Link	Remove the change page links.
Operation System Update	Update the operating system on DMPU-HMI.

Modify	
---------------	--



Cut	Cut the selected object.
Copy	Copy the selected object.
Paste	Paste the selected object.
Cut Page/Alarm	Cut the current page.
Copy Page/Alarm	Copy the current page.
Paste Page/Alarm	Paste the current page.
Insert	Insert a page in the present position.
Append	Add one page in the end without modifying the present order.
Delete	Delete the current page.
Append "x" Pag.	Insert a block of new pages.
Insert new Language	Insert a new language.
Delete current Language	The current language is deleted.
Rename current Language	The current language is renamed.

?	
Help	Show this manual.
Info	Software version.

3.4 Adding display variables

After defining the external variables (see paragraph "Project options") it is possible to insert them on the display double-clicking the display window. In this way the "Variable set up" window is shown:

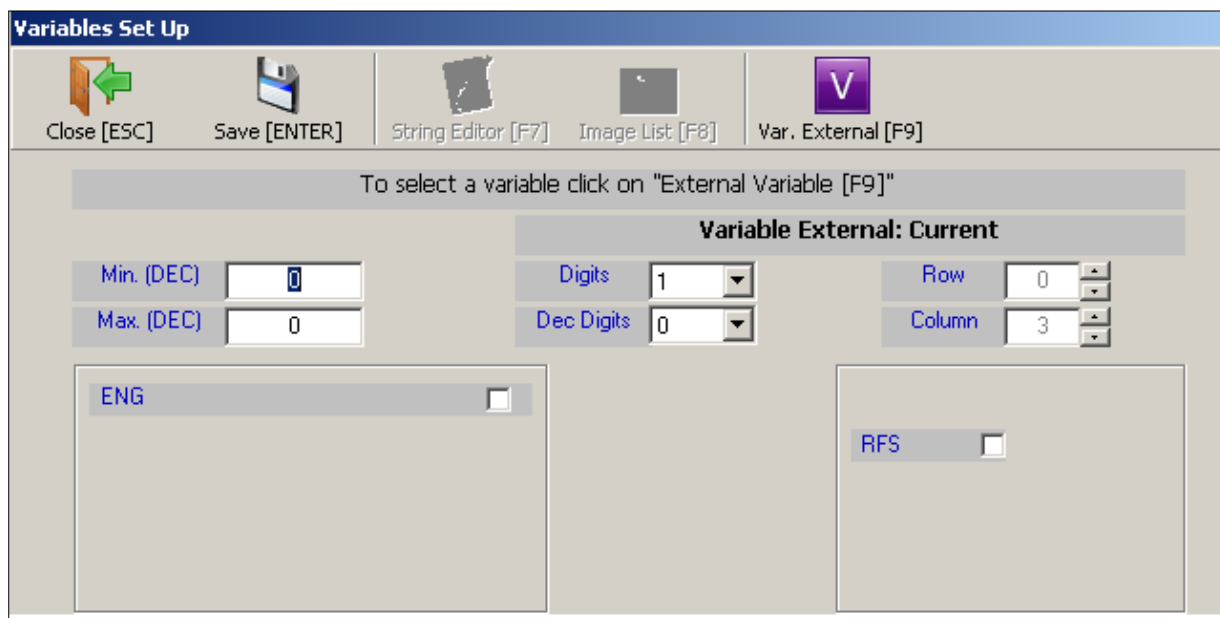


Figure 3-29 variable set up window

In this window the features of the displayed variables are defined:



- **Min. (DEC):** minimum variable value (if it is lower than minimum, underscores characters instead of digits are displayed).
- **Max. (DEC):** maximum variable value (if it is higher than maximum, high scores characters instead of digits are displayed).
- **Digits:** number of integers digits used to display the variable.
- **Dec. Digits:** number of decimal digits used to display the variable.
- **ENG:** displays the variable in engineering units with their conversion factors. This is the line equation. Use this function to re-scale a variable

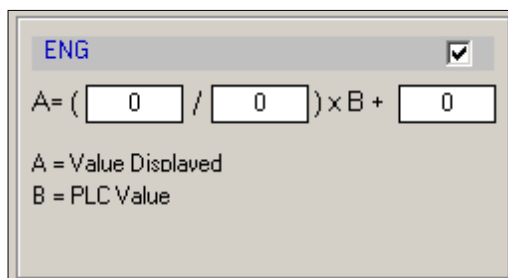


Figure 3-30 Function to re-scale a variable

- **RFS:** the displayed variable is continuously updated (if this function is disabled, the variable is updated only when opening the page).

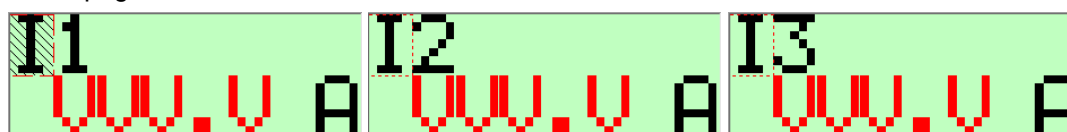
3.5 Predefined configuration

The software allows to use a predefined configuration of the operator interface where are already configured:

- One page for the TCU



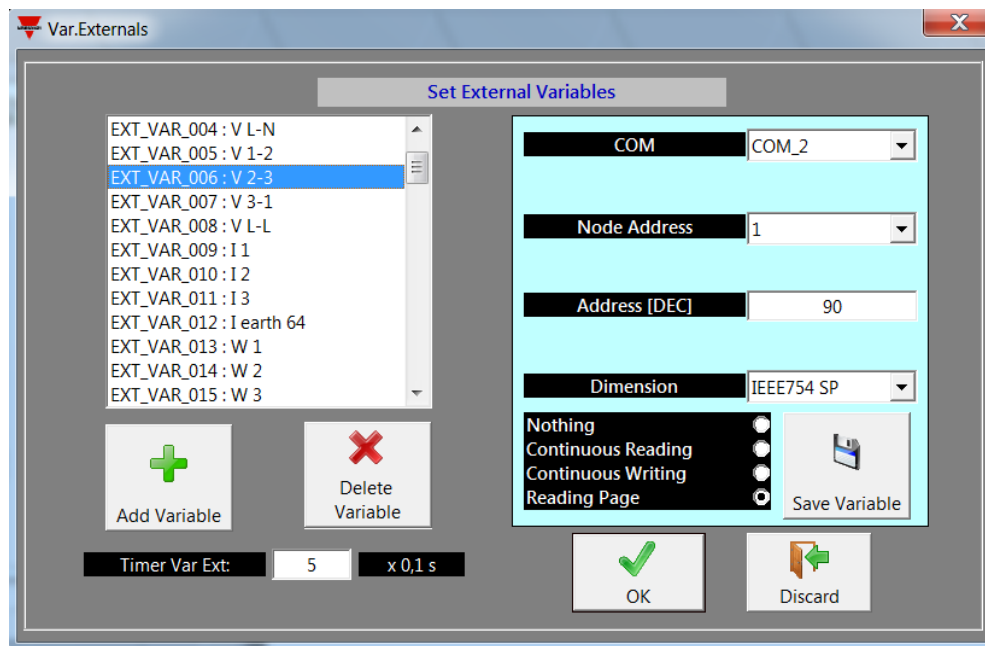
- Three pages for the currents



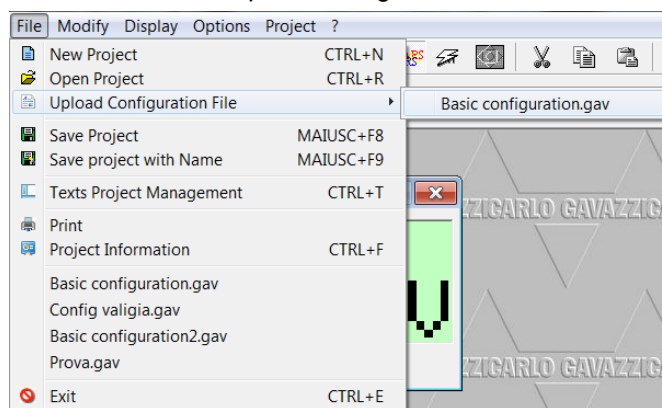
- Three pages for the phase-phase voltages



- A list of most common DMPU variables



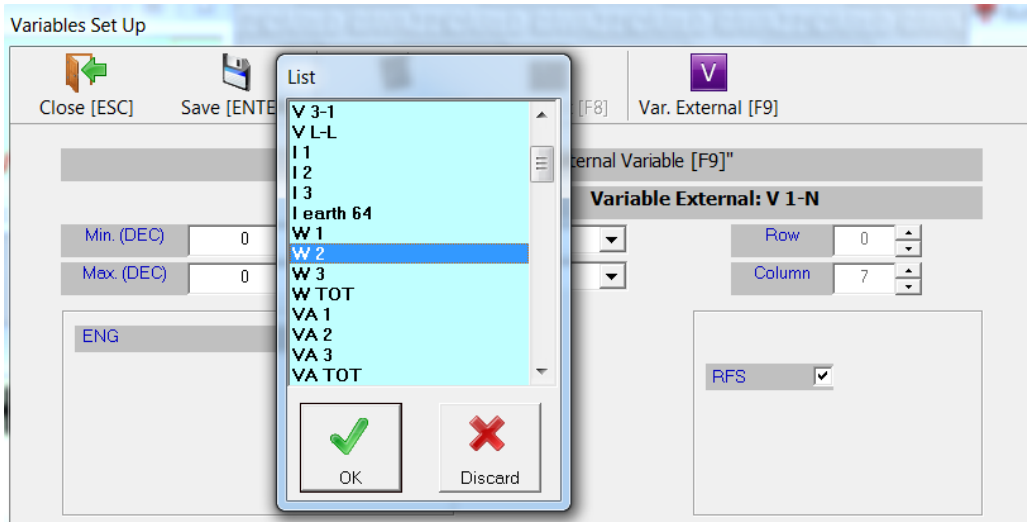
Open this configuration from menu “File”, “Upload configuration file”:



On the variables list the most common DMPU variables are already listed (voltages, currents, powers, THDs, virtual inputs...), so the user can quickly build a new configuration according to the plant needs adding pages and variables.

The variables are set as “Reading page” so they are updated on the operator interface when they are shown on the pages.

Select the variables from variable set up window to add them on the page (see section “3.4 Adding display variables”).



1 Images list

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