LUMEL

HMI OPERATOR'S PANEL
HMI type

SERVICE MANUAL

CE

Contents

1 Application

The Operator Panel is one of the tools designed for process operators. The panel is a graphical interface between its user and the process. It provides the user with the following functions: control, monitoring, visualization and process management. The operator using the panel has the ability to enter data and control devices via the touch screen. The device is designed to work with PLCs, controllers, transmitters and other devices.

The Operator Panel ensures simple control of a process, e.g. by selecting a predefined set of parameter settings, entering values from the keyboard , generating alarms and warnings, and creating reports that include important parameters changes during the process, e.g. for the quality management department of a plant. Advanced features of the device, such as animations, trends, data acquisition, logging, and securing data facilitate operator's work and provide information for optimizing the process. Advanced visualization and a wide range of functions also help to minimize operational errors, improving the process quality.
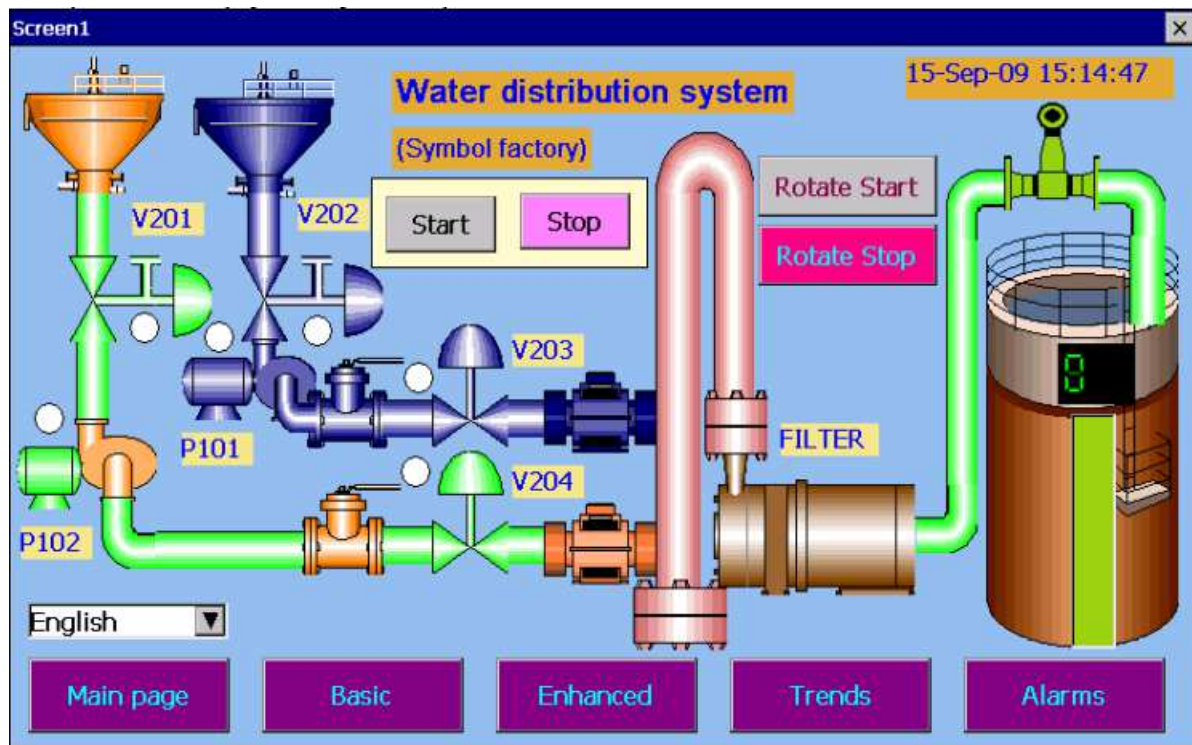
A control algorithm for the panel is created on a PC for specific solutions of the control system and then it is sent to the panel via Ethernet connection or downloaded from USB drive. The algorithm is created with "**Panel Studio"** - an effective programming tool, which does not require knowledge of any programming language and operates on any PC with Windows XP / VISTA / 7/ 8. This software is equipped with communication drivers for many devices and an extensive library of functional modules that facilitate configuring functions of the panel, fault diagnostics and designing dialogues with the user. An application algorithm is created by inserting prepared library objects into design sheets and setting parameters of these objects in accordance with requirements.

2   Panel set

The panel set contains:
- HMI Operator's Panel   1 pc
- Fixing brackets:
  - HMI 450   4 pcs
  - HMI 730/HMI 750   6 pcs
  - HMI 1050   10 pcs
  - HMI 1550   12 pcs
- Users' manual   1 pc
- guarantee card   1 pc
- installation CD for „Panel Studio" software   1 pc

3   Basic requirements and operational safety

Safety considerations:

- Assembly and installation of electrical connections/wiring should be performed by a person with the required permissions for installation of electrical equipment. .

- Before activating the panel, check the correctness of connections.

- The panel meets the requirements of electromagnetic compatibility in industrial environment.

- The product is not authorized for use in life-support systems, aircraft navigation and military systems and in other systems where its failure may be life threatening or lead to disaster.

4   Installation

Guidelines:
1.   The device is designed for indoor use.
2.   HMI panel should be installed in a suitable enclosure / panel / cabinet.
3.   Avoid exposing panel screen to direct sunlight.
4.   Avoid installing the panel in areas of high vibration, close moving parts.
5.   Avoid installing the panel in the proximity of devices that emit strong radiation / noise, such as motors, transformers, frequency converters, inverters, UPS, etc.
6.   Avoid installing the panel in areas exposed to vapours, gases, oils, greases, chemicals, etc.
7.   Install the panel in an opening, which is in accordance with its specification, using all mounting brackets provided.
8.   Ensure adequate ventilation in order to avoid exceeding the allowable operating temperature indicated in the product specifications.
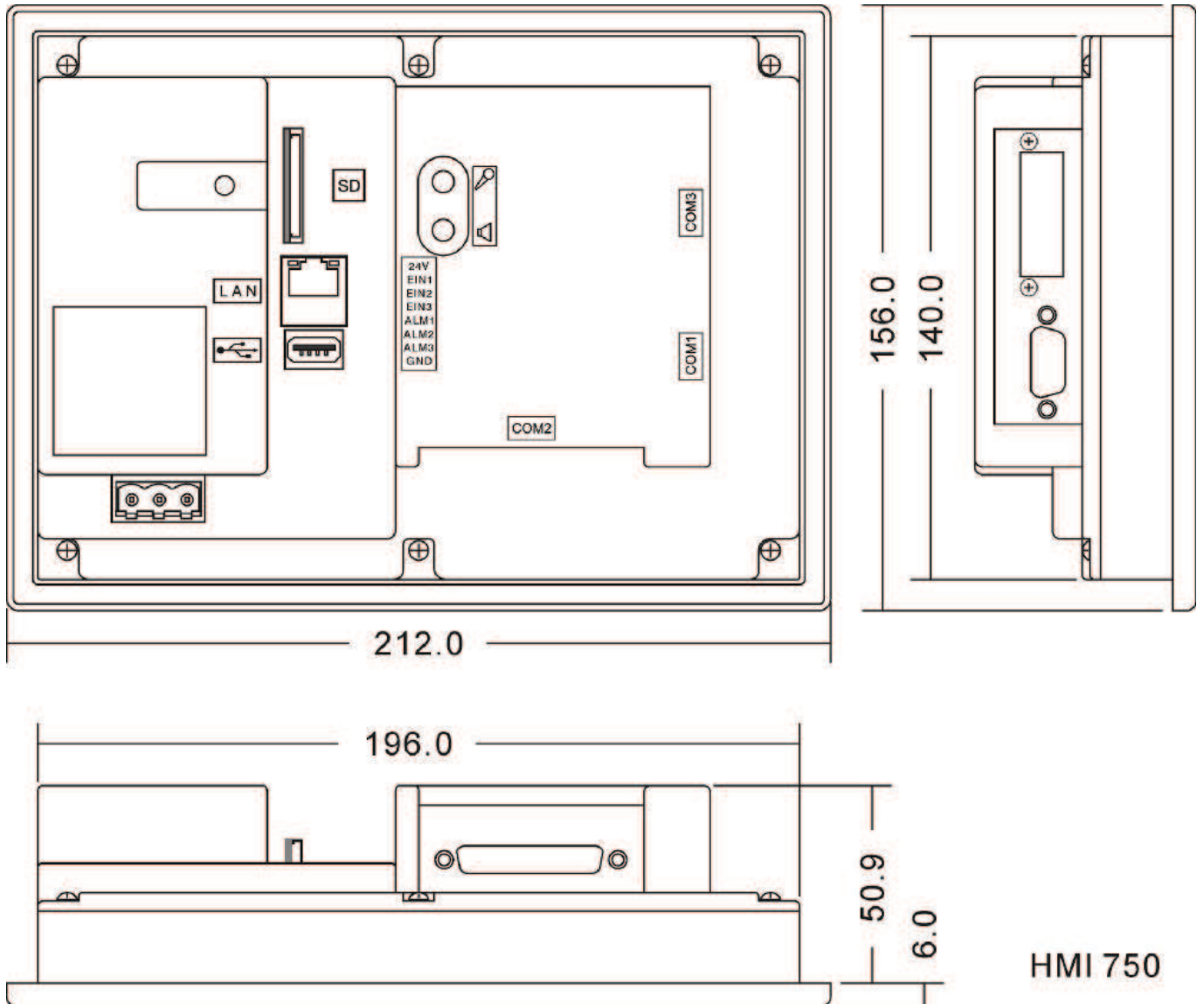9.   Improper installation will void the guarantee.

4.1 Dimensions and mounting
4.1.1 Dimensions of HMI 450 panel
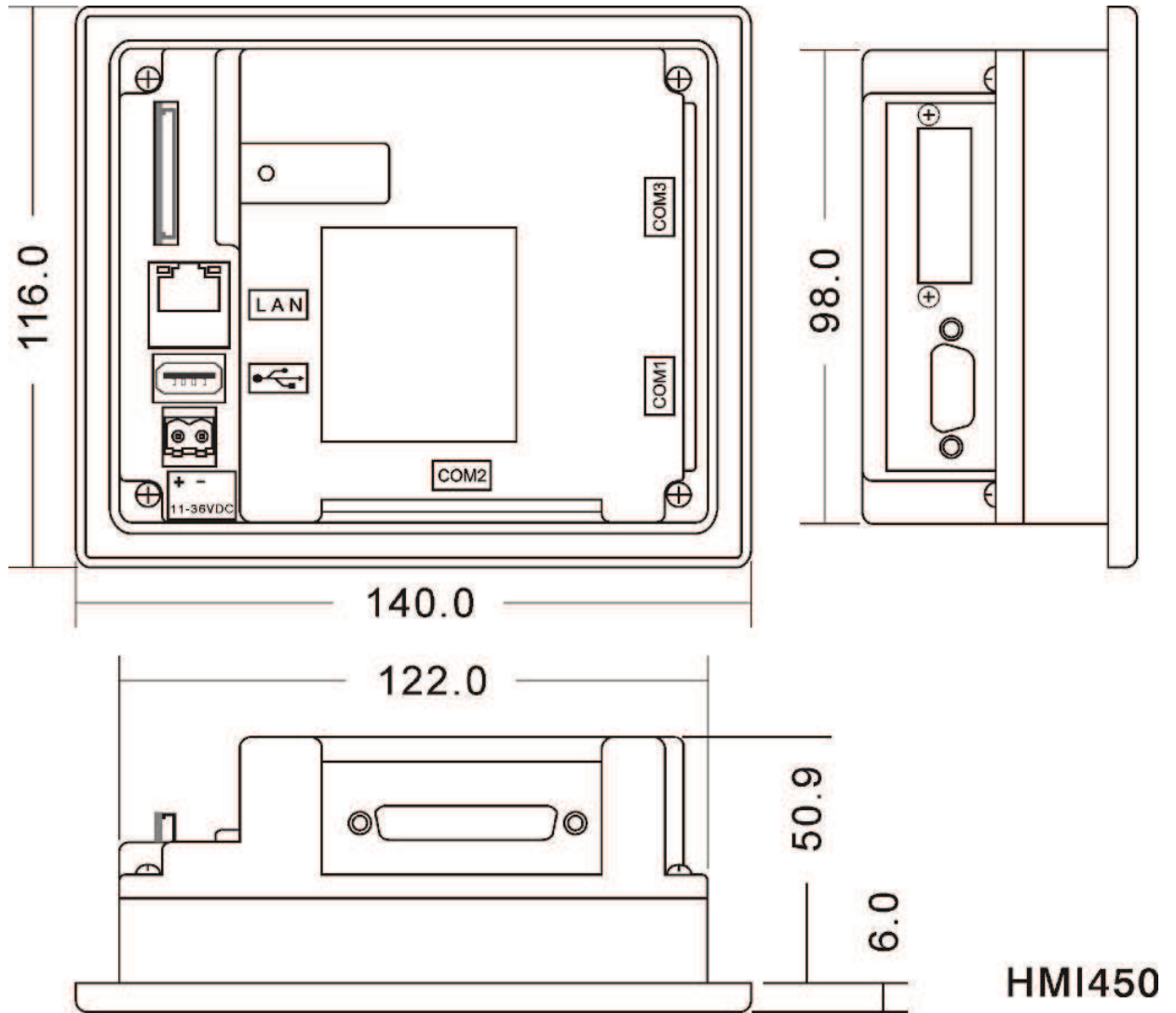
Note: All dimensions are in mm. Tolerance +/- 1 mm
Dimensions of opening for the panel: 123^{+1} X 99^{+1}

4.1.2 Dimensions of HMI 730 / HMI 750 panel

Note: All dimensions are in mm. Tolerance +/- 1 mm
Dimensions of opening for the panel: 197^{+1} X 141^{+1}

4.1.3 Dimensions of HMI 1050 panel

HMI 1050
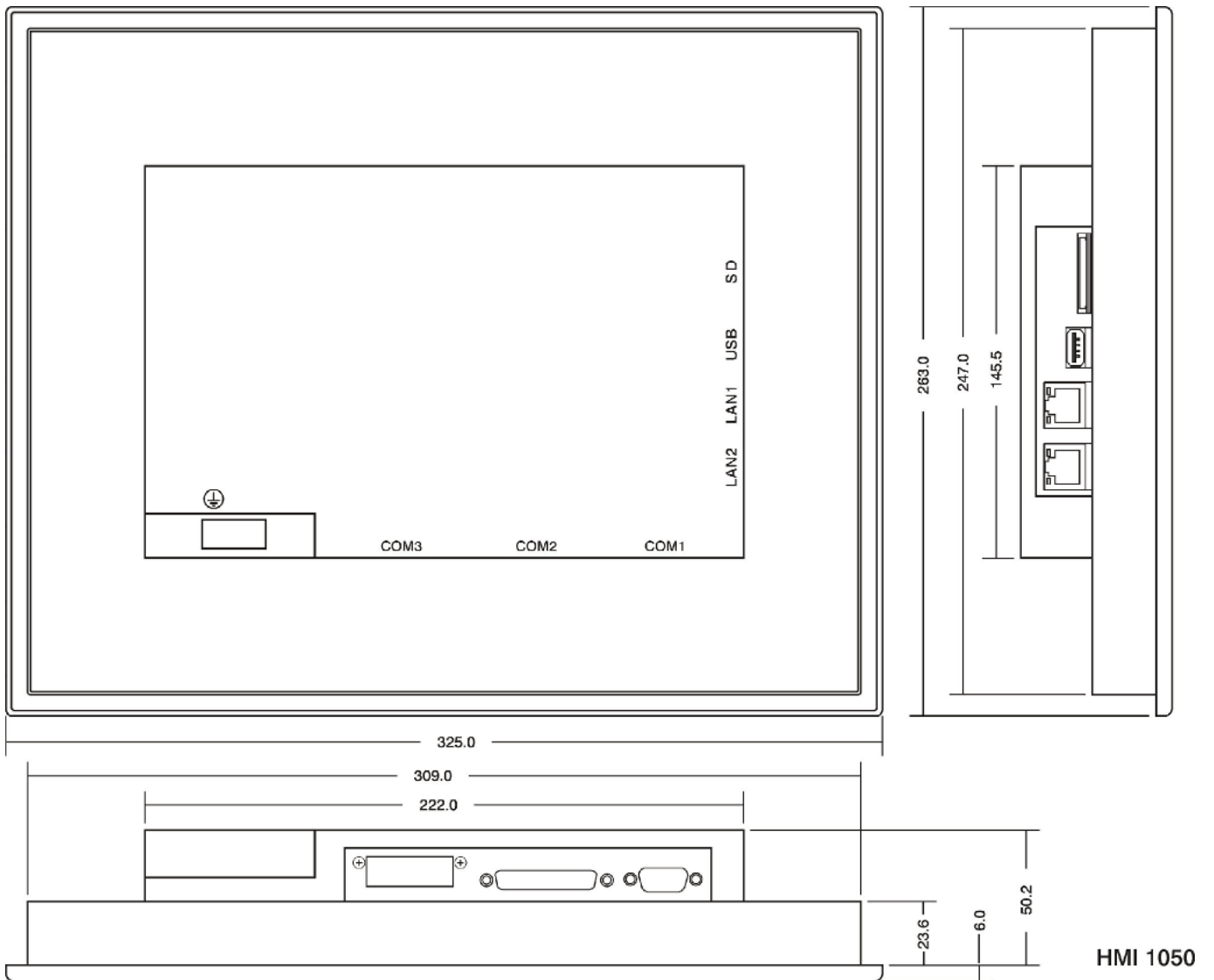
Note: All dimensions are in mm. Tolerance +/- 1 mm
Dimensions of opening for the panel: 310^{+1} X 248^{+1}

4.1.4 Dimensions of HMI 1550 panel
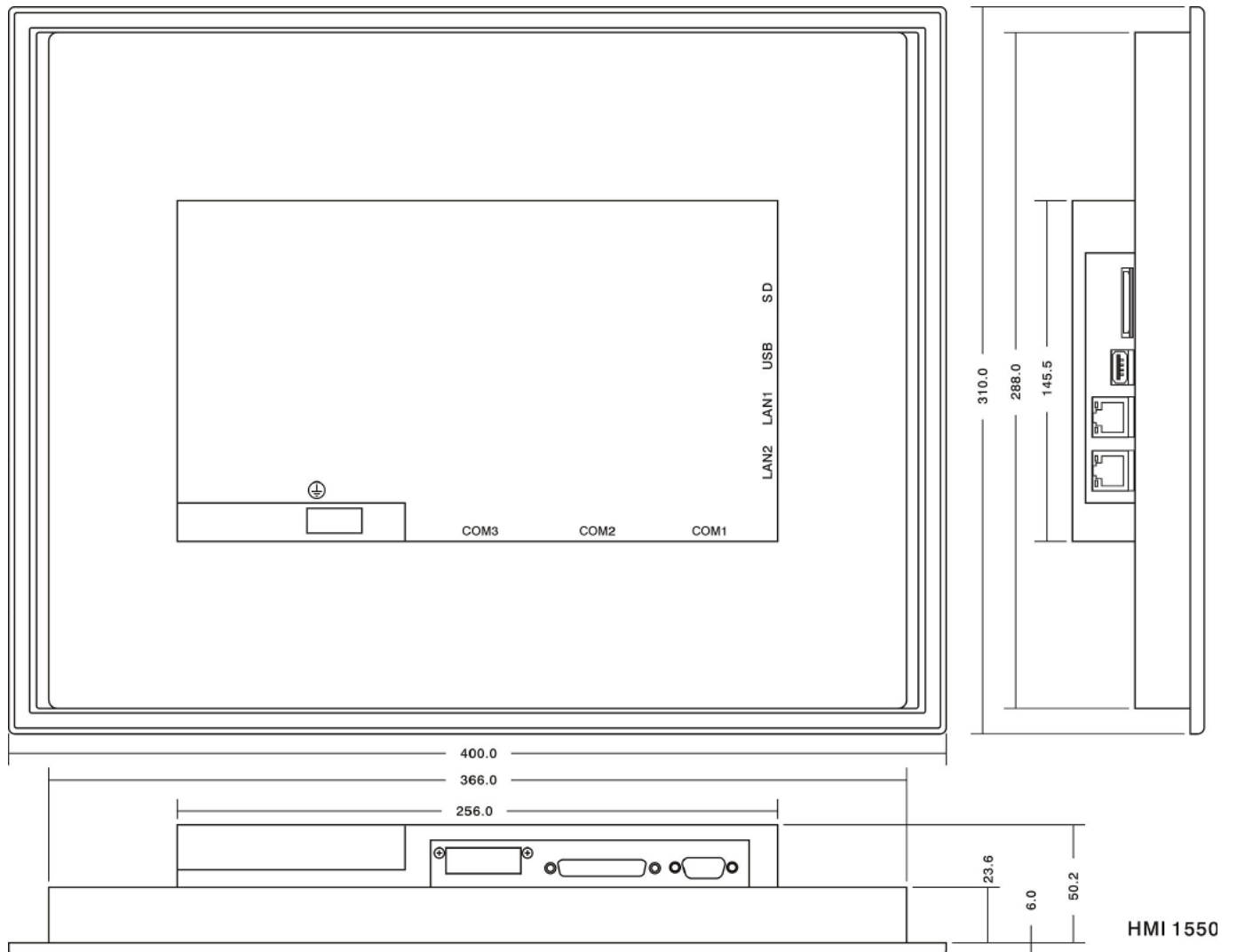
Note: All dimensions are in mm. Tolerance +/- 1 mm
Dimensions of opening for the panel: 367^{+1} X 289^{+1}

4.1.5 Mounting method

Prepare the opening with dimensions according to the table below. The thickness of the board material should not exceed 6 mm. The panel must be inserted from the front of the board with disconnected power supply. After inserting the panel into the opening, fix the panel using brackets on the back plate (see photos below). Avoid overtighting or uneven fixing the brackets, as this may damage the touch panel.

Model	HMI 450	HMI 730	HMI 750	HMI 1050	HMI 1550
Width [mm]	123^{+1}	197^{+1}	197^{+1}	310^{+1}	367^{+1}
Height [mm]	99^{+1}	141^{+1}	141^{+1}	248^{+1}	289^{+1}
Depth [mm]	51	51	51	50	50
Number of brackets	4	6	6	10	12

Mounting brackets for metal housing
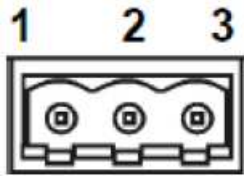

Mounting brackets for metal for plastic housing

4.2   Connections
4.2.1 Power supply
The following options are available.
AC power supply, 90-250 V AC, 47-63 Hz

Terminal	Description
1 ⏚	Grounding
2	N
3	L

DC power supply, 11-36 V DC
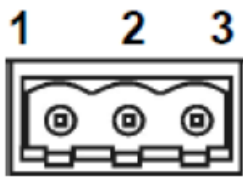
Terminal	Description
1 ⏚	Grounding
2	DC -
3	DC +

DC power supply, 11-36 V DC (only for HMI 450)

Terminal	Description
1	DC +
2	DC -

4.2.2 Interfaces

4.2.2.1   COM1 port, DB9 male (RS232C)
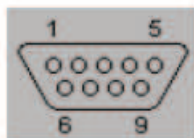
Pin	Signal	Input / Output
1	DCD	Output
2	RD	Input
3	TD	Output
4	DTR	Output
5	SG	
6	DSR	Input
7	RTS	Output
8	CTS	Input
9	RI	Input

4.2.2.2   COM2 port, DB25 female (RS232C/RS422/RS485)
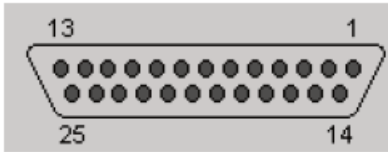
Pin	Signal	Input / Output	Type
1	FG	-	-
2	TD	Output	RS232C
3	RD	Input	RS232C
4	RTS	Output	RS232C
5	CTS	Input	RS232C
6	DSR	Input	RS232C
7	SG	-	5V-/RS232C
8	DCD	Output	RS232C
9	-	-	-
10	-	-	-
11	-	-	-
12	TXDA	Output	RS422/RS485
13	TXDB	Output	RS422/RS485
14	RTSA	Output	RS422
15	RTSB	Output	RS422
16	-	-	-
17	-	-	-
18	CTSA	Input	RS422
19	CTSB	Input	RS422
20	DTR	Output	RS232C
21	5 V +	Output	
22	RI	Input	RS232C
23	-	-	-
24	RXDA	Input	RS422
25	RXDB	Input	RS422

4.2.2.3   Ethernet

RJ45 connection
Ethernet 10/100 Mbps
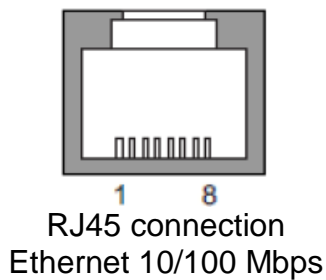
Pin	Description
1	Transmission (TX+)
2	Transmission (TX-)
3	Reception (RX+)
4	Not connected
5	Not connected
6	Reception (RX-)
7	Not connected
8	Not connected

4.2.2.4 USB
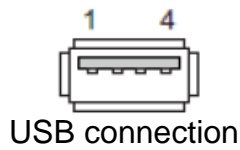
USB connection

Pin	Description
1	+ 5V DC (max 100mA)
2	USB-DN
3	USB-DP
4	GND

4.2.2.5 Audio input /output
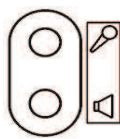
Input / output socket

Audio input for connecting a microphone (for future use)	
Audio output. Used for playing sound files related to an Event / Alarm	

For connection use a headphone jack: ø3.5mm and length 14mm.

4.2.2.6 Digital inputs / outputs

Pin	Symbol	Description	Label in Panel Studio
1	24V +	+ 24V DC power supply	
2	EIN1	Digital input 1	SystemDI_1
3	EIN2	Digital input 2	SystemDI_2
4	EIN3	Digital input 3	SystemDI_3
5	ALM1	Digital output 1	SystemDO_1
6	ALM2	Digital output 2	SystemDO_2
7	ALM3	Digital output 3	SystemDO_3
8	GND	Neutral (ground) 0V DC	
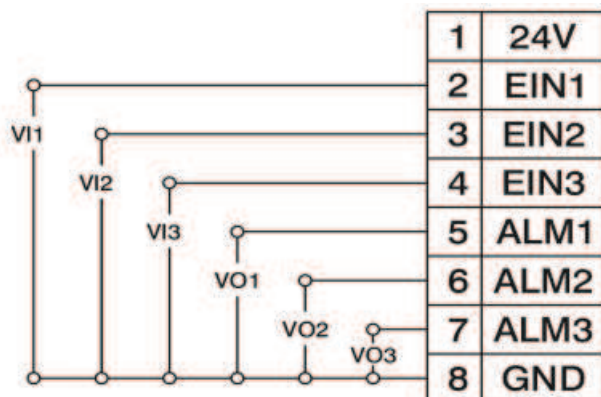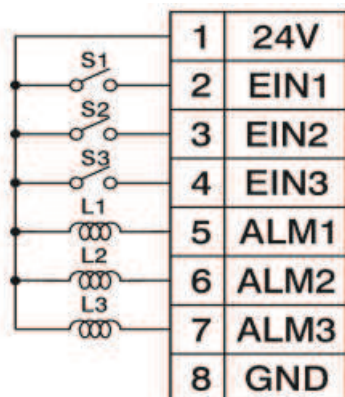
The digital input can be controlled by closing the switch or using 24 V logic signal. The input is active when the switch is closed, or when the input pin is supplied with 24 V voltage.
L1, L2 and L3 may be resistive or inductive load such as a buzzer or relay.
Note: The sum of the currents in L1, L2 and L3 circuits must be less than 10mA.
VO1, VO2, VP3 are digital outputs in 24V standard for operation with PLC's or external devices
P3 are digital outputs in 24V standard for operation with PLC's or external devices.

5   Panel settings
5.1   Starting
The panel is factory-equipped with WinCE 6.0 operating system and "Control Center" firmware for panel management (configuring its settings). The firmware may be updated during its later operation by user via a USB stick. Information about the version of the firmware is available in the "System Info" function described later in this document. To obtain the latest version of the firmware, please contact the product dealer.
The firmware is designed primarily for transferring the application, its start-up; calibrating the touch-screen; setting the clock, IP address, beeper volume, screen brightness, screen-saver time and screen orientation.
After starting, the panel displays the following screen.

5.2   "Run" function

This function is used to run applications in the panel. After sending an application (algorithm) from the PC via Ethernet or uploading it from USB memory, pressing the "Run" function starts the application in the panel.

5.3   "Project" function

This function manages the application (project) in the panel. It may be selected via dialogue field presented below
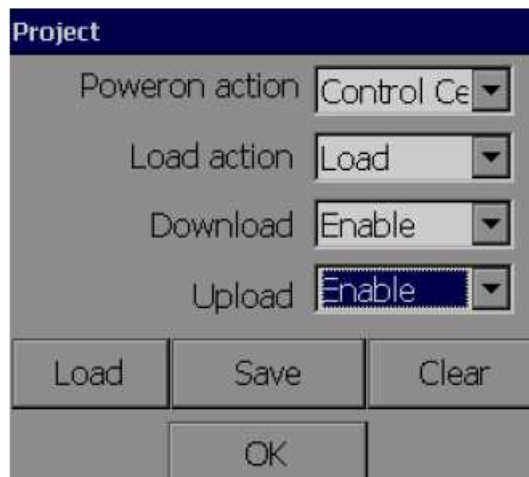
"Power action" field defines the panel action after switching power supply on.
Available options:
*   **Project** – the panel automatically runs the application,
*   **Control Center** – the panel remains in "Control Center" program.

"Load action" field defines the panel action after sending the application from a PC or downloading it for USB drive.
Available options:
*   **Load** – the panel remains in "Control Center" program,
*   **Load&Run** – the panel automatically runs the application.

"Download" field is used to **Enable** / **Disable** sending the application from a PC to the panel.
"Upload" field is used to **Enable** / **Disable** reading the application from the panel by a PC
"Load" button is used to load application from USB drive into the panel.
"Save" button is used to save the application on USB drive.
"Clear" button is used to remove the application from the panel.

The procedure for manual downloading the application from USB drive:
*   prepare the application on a PC, using "Panel Studio" software
*   save the application from the PC to the USB drive,
*   insert the USB drive into the USB slot in the panel
*   tap the touch-screen with your finger and with finger on the touch-screen switch on the panel power supply ,
*   keep the finger on the touch-screen until the initial screen of "Control Center" appears
*   select "Project" function and then click "Load" button,
*   in the next window, browse to the path of the project (application) on the USB drive and click "Load" button,
*   if you want to resign, click "Cancel" button.

5.4 „Instrument" function
        This function enables user to adjust the system clock, change the settings of Ethernet port, screen orientation and language used by "Control Center" software etc.

        Changed clock settings result in permanent removing data logged-in by the application (historical data and alarms). If you want to save the data, then send it to a USB drive before changing the clock settings.
"**Ethernet**" function defines how the panel obtains an IP address. Selecting "**DHCP**" means that the address will be automatically assigned by DHCP server when connecting to the network.
Selecting "**Static**" function allows user to manually assign an IP address, subnet mask, and gateway address for access to an external network (e.g. the Internet).
"**Orientation**" function is used to set the orientation of the screen. Available options include: rotating the screen left by 0º, 90º, 180º, 270º. When creating applications for the panel, pay attention to the target orientation of the panel.
"**Language**" function is used for changing the user interface language only for "Control Center".
Advanced settings ("**Advanced**" button) enable the user to adjust:
buzzer volume, screen backlight brightness, screen saver activation time (0-blocks the function), passwords for "Control Center" program
Password for "Control Center" is a number, which (after defining it) is required for all operations in "Control Center". When defining the password, the user enters a numeric password and then confirms it by re-entering it.
"**Other**" button is used to configure optional equipment of the panel.

5.5 "Touch Calibrate" function
        This function is used to calibrate the touch-screen. When during the operation of the application, buttons do not respond properly or their touch areas are shifted it could mean that the touch-screen must be recalibrated.
        The calibration procedure is based on confirming the position of the marker by touching it in 5 areas of the screen (centre and four corners). The final step is to accept the calibration by touching any chosen area of the screen.

5.6   "System Info" function

The function displays information about used data and available disk space. It also allows the user to update "Control Center" program. The displayed window is presented below.

Presented information includes:
- **Version** – current version of Control Center,
- **Flash** – status of used/available internal flash memory,
- **SD card** – status of used/available space on SD card,
- **USB disk** – status of used/available space on USB disk connected to the panel,
- **IP/MAC** – IP and MAC address of Ethernet interface.

"**Update**" button is used for updating Control Center firmware.

5.7   Resetting the panel (reset)

Reset procedure:
- connect (short) pins 2 and 3 in COM2 port,
- then turn on the power supply of the panel,
- after pop-up window with message "Do you want to format flash disk?" is displayed, select „Yes",
- another pop-up window will be displayed indicating further proceedings,
- remove connection between pins 2 and 3 in COM2 port and press "OK",
- turn off and then turn on the power supply of the panel,
- calibrate the touch-screen.

Reset procedure will clear the entire contents of the internal flash memory and restore the device to factory settings.

6   *Software toolkit for PC*

The toolkit includes:
- **Panel Studio** for creating and editing applications for the panel,
- **Historical Viewer** to view panel historical data on a PC.

"Panel Studio" is designed to create applications for the panel in order to expand operator interface in industrial applications. Using the control panel, the operator may communicate with many different devices using OPC servers that support various protocols via serial port and Ethernet.

"Panel Studio" may be used to expand operator interface by operating various objects with the following functions:
- controlling the elements of the object,
- displaying current status of pumps, motors, etc.
- displaying process parameters such as temperature, pressure, etc.,
- visualization of the process using bar graphs, trends, historical trends, gauges, digital boxes, etc.
- activating alarms and managing current and historical alarms,
- recipe, script management,
- animation of objects by controlling their visibility, flashing, horizontal and vertical offset, etc.
- implementing schedules,
- data logging, security features, supporting multiple languages

Historical Viewer is a tool for viewing historical data collected by the panel. Panel data are stored in the internal memory or on a SD card in a secure format. This data may be stored on a USB drive or imported to a PC by Historical Viewer and then archived in a form chosen by the user.

The software has the following objects and features:
- historical trends,
- a list of historical alarms and events
- data tables,
- searching data with various search criteria: time, period, event, label and notes
- vertical and horizontal displaying of trends
- trend zooming in/out, scales,
- exporting data to cvs files,
- printing: trends, lists of alarms / events, data tables

Detailed instructions for software toolkit are in the help files and in digital documentation in the form of PDF files

6.1   System requirements

Requirements:
- PC with 1GHz processor,
- 1GB of RAM (minimum), 2GB preferred
- 500 MB of available hard disk space (at least 20% free space on the hard drive, an error message is generated below 10%)
- Network Interface Card with RJ 45 connection
- RS232 optional serial port, RS485/RS232 converter for on-line tests, if required,
- USB host port to operate USB flash drives,
- screen resolution better than 1024x768 (for projects on HMI 1050 and 1550 panels),
- operating system: Windows XP/Vista/7/8, Windows 2003 Server.

6.2   Installation

After starting the installer from the DVD or other media, follow its instructions.

Install the following components:
- Microsoft Installer V3.1,
- Microsoft.Net framework V3.5 SP1,
- Panel Studio,
- OPC server,
- Demo projects,
- Historical viewer,
- Remote viewer.

7   Description of selected functions of Panel Studio

"Panel Studio" is designed for creating and editing applications for HMI panel. It enables the user to test and transfer the applications.

7.1   Opening existing projects

An existing project (application) may be read and edited using menu function "File/Open Project" or the "Open an existing project" located in the central part of the main window.
After selecting the function message "Select a Project File" appears to select a file, where the desired project file is stored (a file with the extension ".prj"). When the project is downloaded, it may be modified and further developed. Projects recently opened in the program are listed in the main window written in plain text or in "File / Recently" menu.
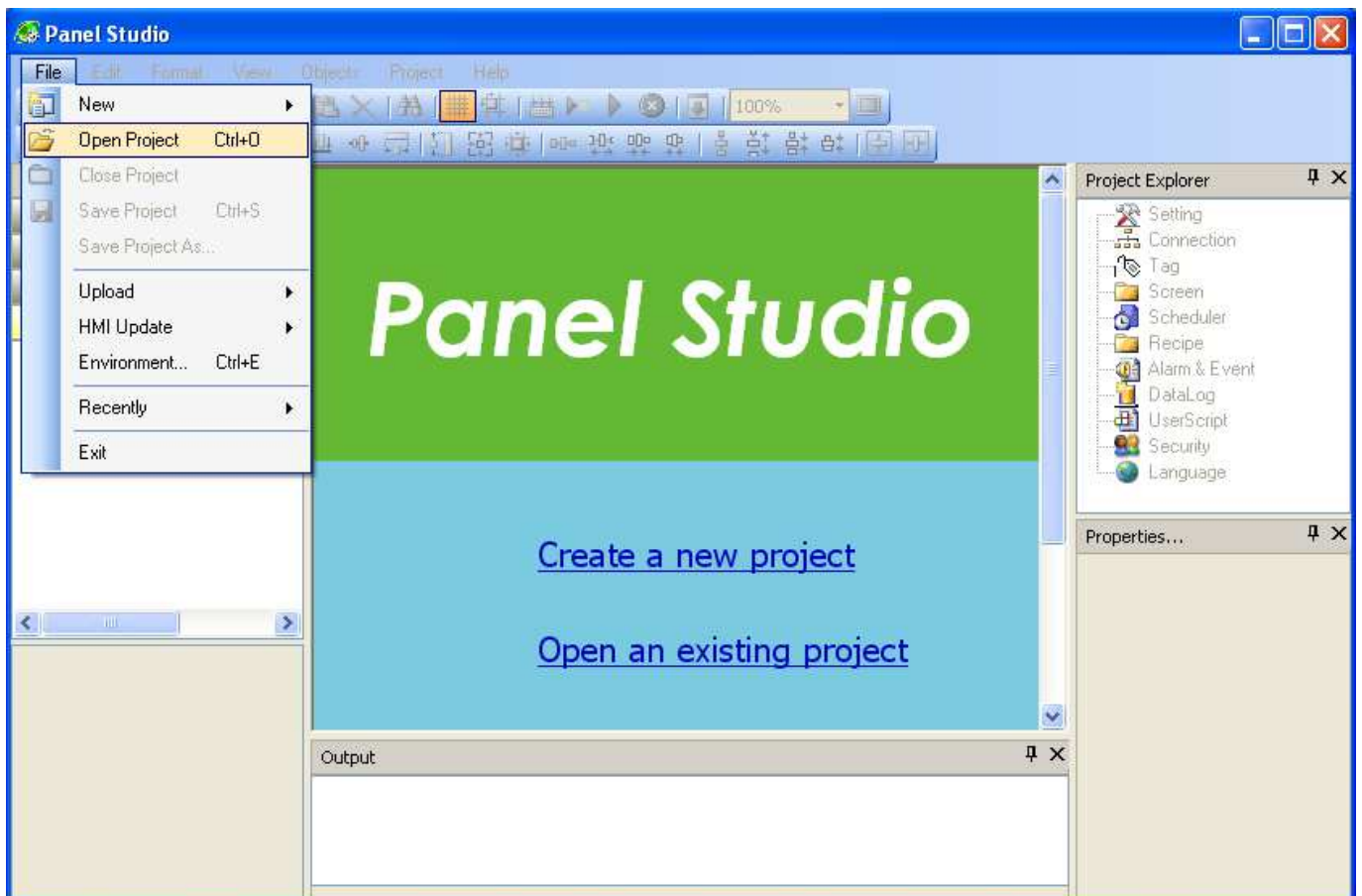
7.2   Creating a new project

To create a new project select "File / New / New Project" or "Create a new project" in the central part of the main window. Then in "New Project" window define the basic features of the project.


These features include:
–   project name in "Name" field, which is also the name of the project file
–   directory on a drive in "Location" field, where the project will be saved ,
–   screen resolution selected from " Resolution" list, corresponding to the resolution of the panel on which the application will work - this parameter cannot be modified after accepting ("Width" and "Height" fields indicate the selected resolution),
–   language of the application in "Language" field,
–   information about the author, version and a brief description of the project in fields : "Author" , "Version ", " Comment ",
–   the password for the project in "Password" field, if the project is to be protected.
After accepting the settings, the program creates the first screen of an application called "Screen1" and displays it in the screen editor. From this moment, the user may add new objects to the screen. The list of available objects is shown in the "Toolbox" and "Objects" menu. To add an object, select it from the list and then use the mouse to select its target area on the screen where. Properties of the selected object may be changed using a pop-up window (double-clicking on the object) or „Properties" window. Objects may be also edited by using the main menu ("Edit" and "Format) or pop-up menu accessible after right -clicking. Access to screens, other objects and features of the project is available through „Project Explorer". Double-clicking on a list item opens a tab for configuring settings of the project. The range of functions and objects depends on the purpose of the project.

Below an example of a simple project is presented – it is used in MODBUS protocol for two read-outs provided by ND20 network parameters meter connected to COM2 port of the panel and displaying their values on the screen.
The next steps should be as follows:

1. Create a new project in the manner described above.
2. Open "Connection" tab from "Project Explorer" window. "Connection" tab is used to define communication links - it is shown in the figure below
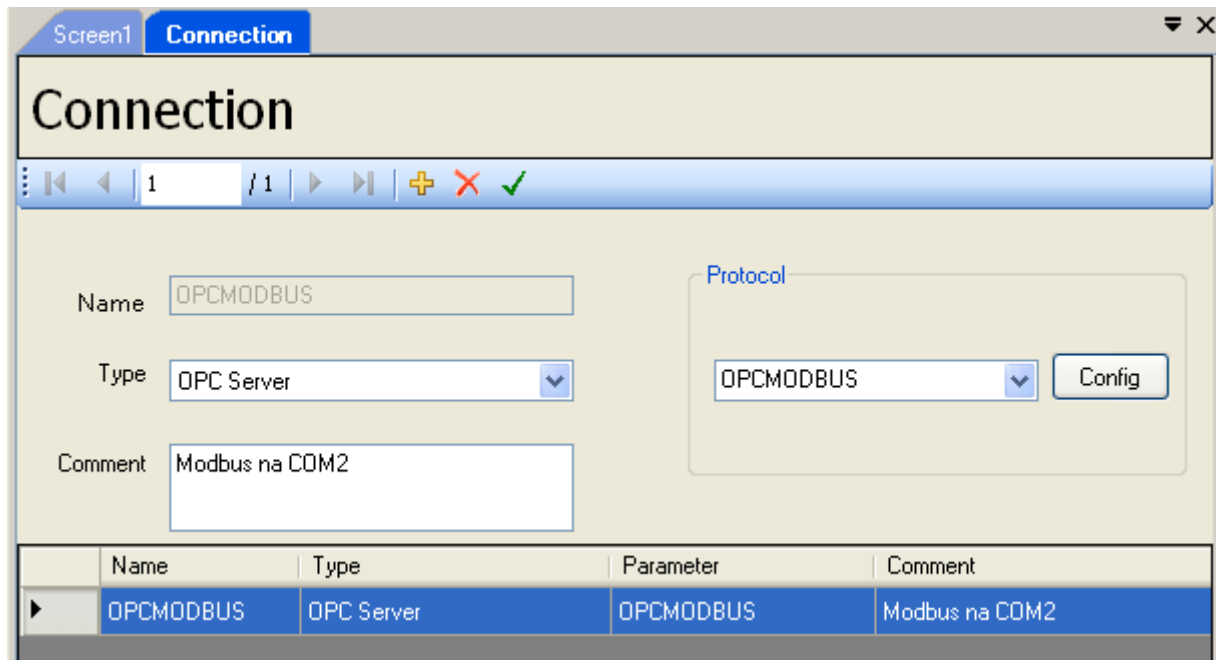
3. Add the connection by pressing ✚ button and set its parameters.
4. Select "OPC Server" from "Type" field. Mark the connection by OPC server.
5. Select "OPCMODBUS" from "Protocol" field. Each available protocol is operated by an individual OPC server.
6. Accept the settings by pressing ✔.
7. Select "Config" button from "Protocol" field and this action will transfer OPCMODBUS server to the configuration program, as shown in the window below.
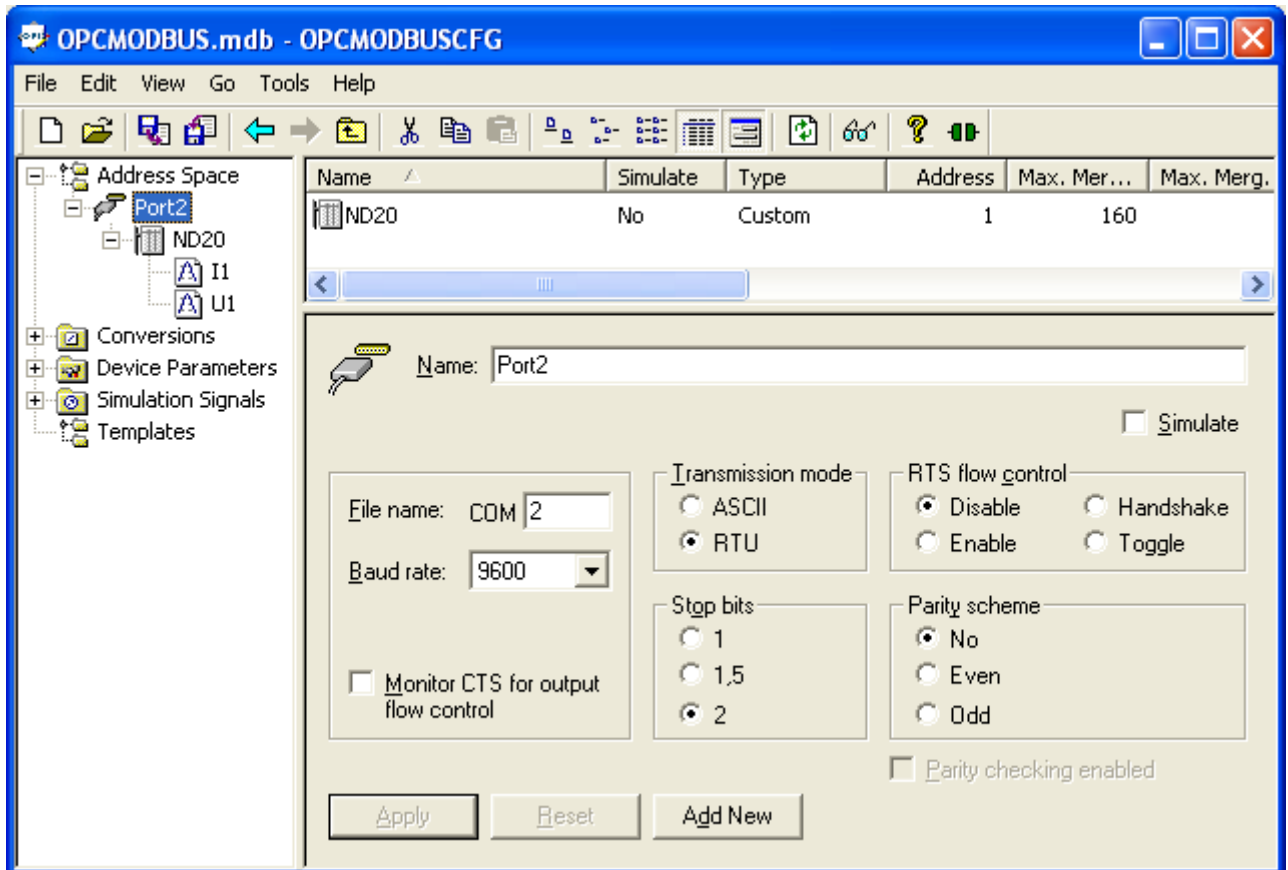
8. Right-click "Address Space "in the list on the left side of the window and selecting "New"
    in the pop-up menu followed by "Port". Parameters for serial port "Port 2" are displayed,
    as shown above. After entering accept them using "Apply".
9. Select "New" from the pop-up menu of "Port2" and then "Device." The configuration will
    be added to the device. Device parameters are displayed, as shown below.
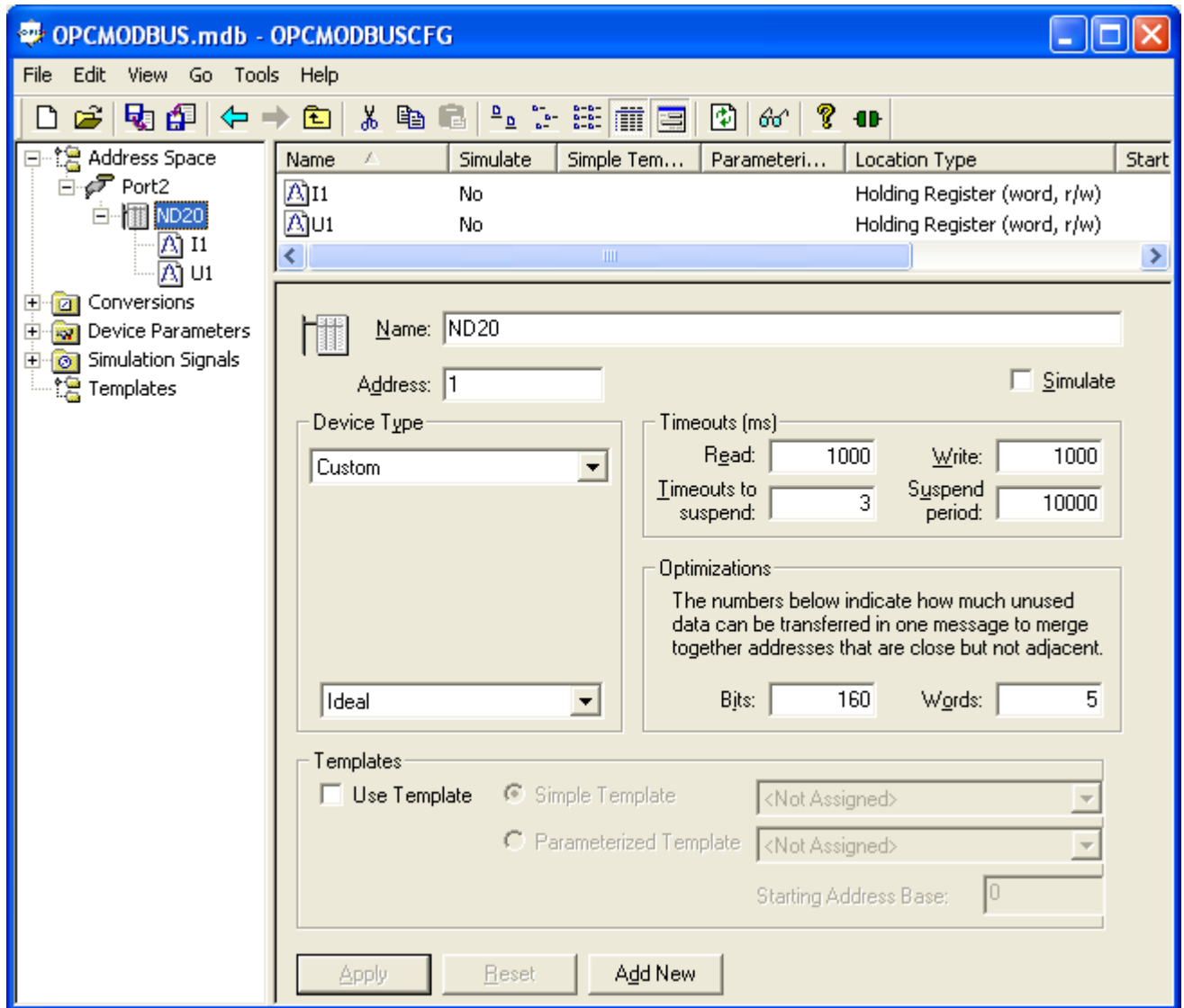
10. Add "U1" to element "ND20" using "New / Data Item" with element settings as shown on the fig. below, accept it using "Apply" button.
11. Add "I1" element to "ND20" with the following settings" Name"="I1", "Description"="Current of L1 phase", "Starting address:"=7003, "Data type"=REAL and accept it using "Apply" button.
12. Set "Word swap" field as "Ideal" in "Device Parameters" and accept it using "Apply" button.
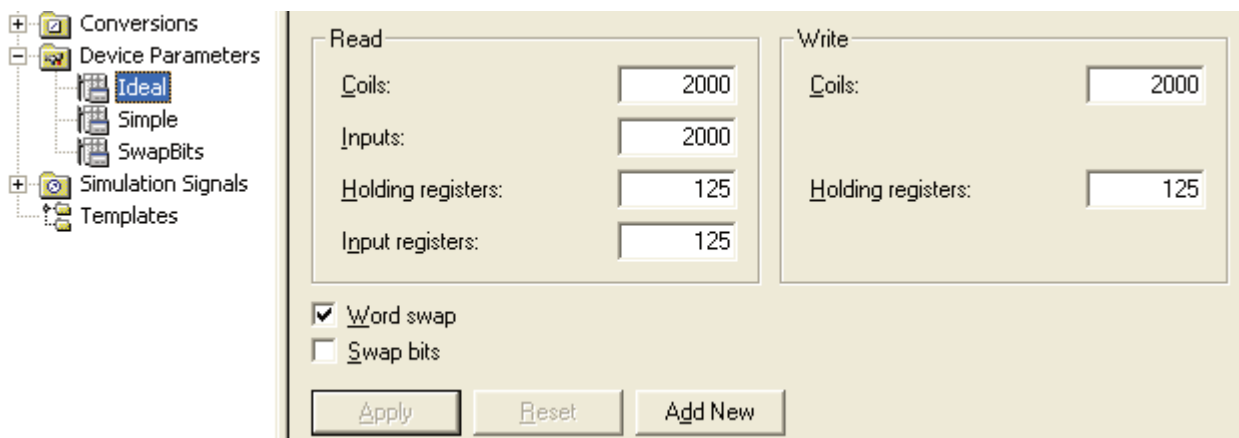
13. Close the program in "File / Exit" menu. It will update the Tag database in the current project.
14. Return to „Panel Studio".
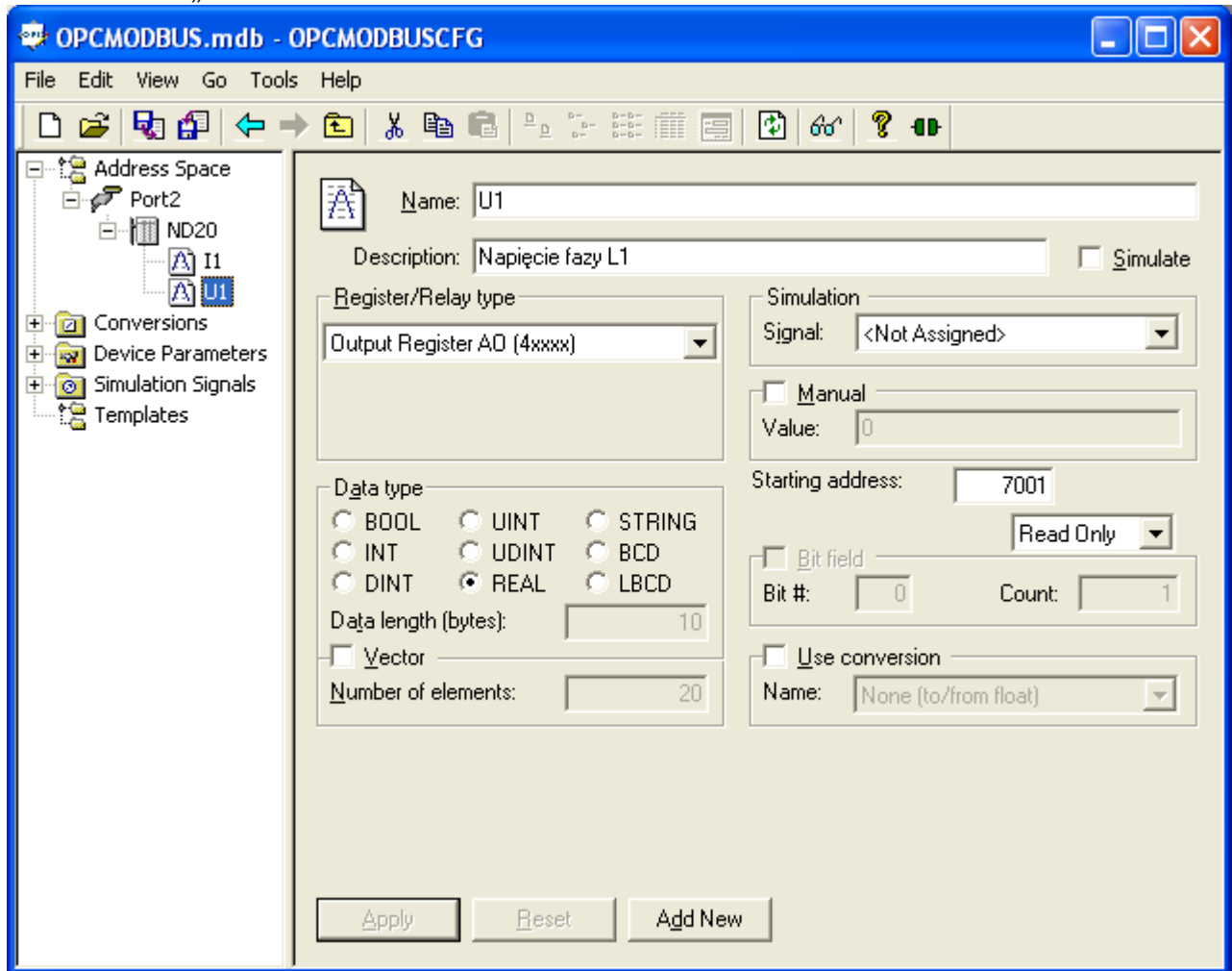
15. Select „Screen1" tab in the edition window.
16. Select "Basic Objects" element in "Toolbox" window
17. Select "TextBox" element from "Basic Objects" list and drag it to "Screen1" window into the desired location.
18. Drag "Label" element to "Screen1" window. It should look as shown in fig. below.
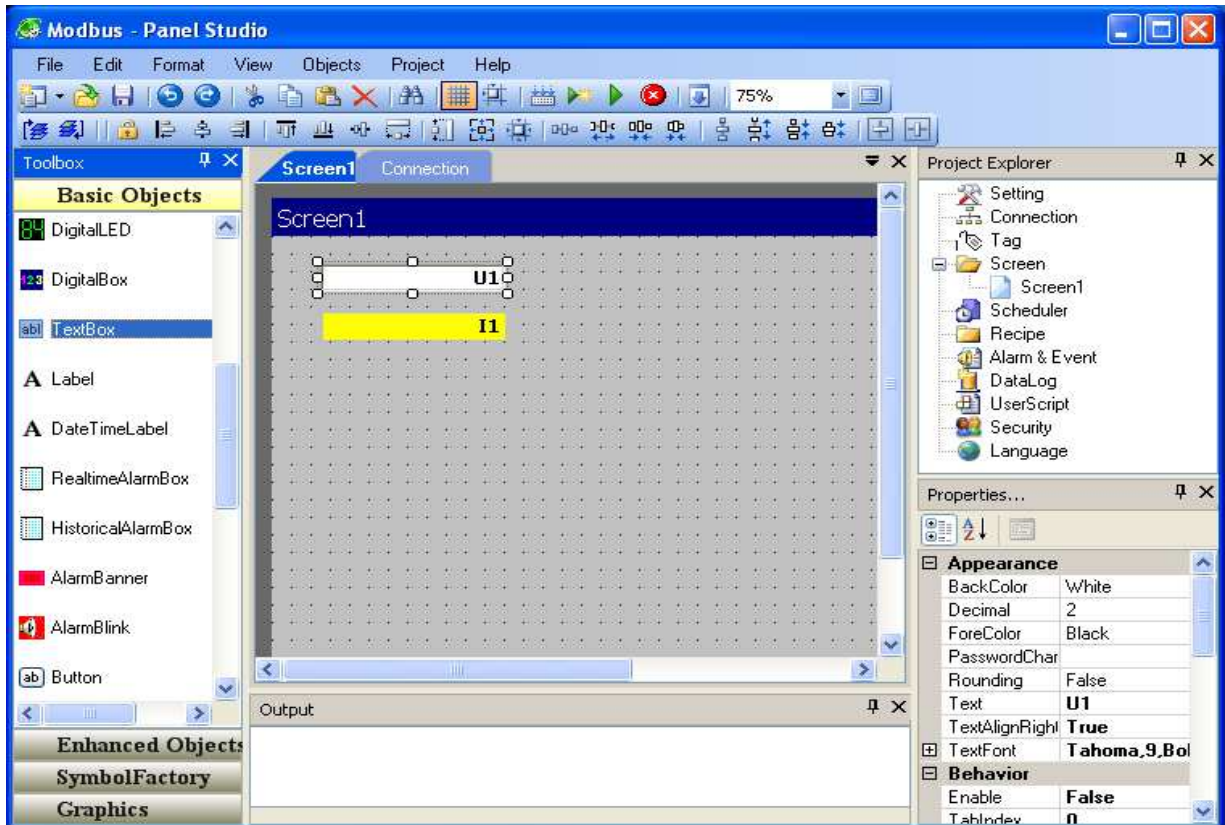
19. Configure "TextBox" control. Double click the element to enter "Properties" or select this function from pop-up menu.
20. In "General" tab set "Text" field as "U1". For "TagBinding" field select or enter tag name "Port2_ND20_U1" and its value will be displayed in this field (in this case the value is "U1" read by OPCMODBUS server via "Port2" from "ND20" device). Accept changes by clicking "OK".
21. Configure "Label" control. Select "General" tag. Set "Text" field as "I1". For „TagBinding" field select or enter tag name "Port2_ND20_I1" and its value will be displayed in this field. Set "BackColor" field as "yellow". In "TextAlign" field select "MiddleRight". Accept by clicking "OK".
22. Check the correctness of the project by selecting "Build" function in "Project" menu. Messages and check results will be displayed in "Output" window.
23. Save the project on the disk using "Save Project" function from "File" menu .
24. Send the project to the panel. Methods for project transfer to the panel are described in section 27.
25. End the project configuration.

### 7.3   Adding ModbusTCP/IP connection

An extension of the project may be a read-out from devices via the Ethernet port. As an example, the configuration of ModbusTCP / IP connection is shown below. We will use the example from the previous section. The procedure is presents below.

1. Open the example from the previous section.

2. Add a new connection in "Connection" tab using ⊕ .
3. When it is not open, double-click "Connection" element in "Project Explorer" window.
4. Select "OPC Server" function in "Type" field, while in "Protocol" field select „OPCMODBUSTCP" from the list. In "Comment" field type "Modbus TCP via Ethernet" and accept settings using ✔ button. The tab should look as shown below.
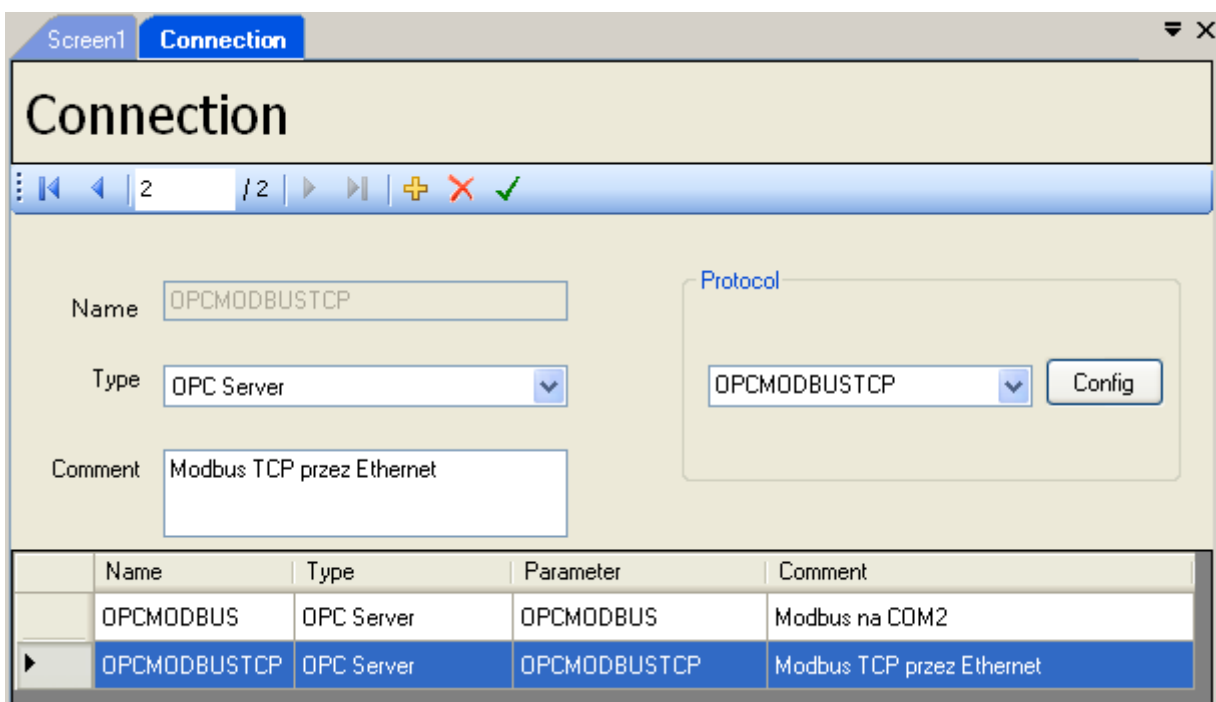
5. Go to connection configuration by clicking „Config".
6. Add "ND1" device to "Address Space" element. Select "New / Device" from the pop-up menu.
7. Configure settings of the added device. Set "Name" field as "ND1", set "IP Address" as IP address from which the data readout will be provided. . Accept settings by clicking "Apply". The window should look as shown below.
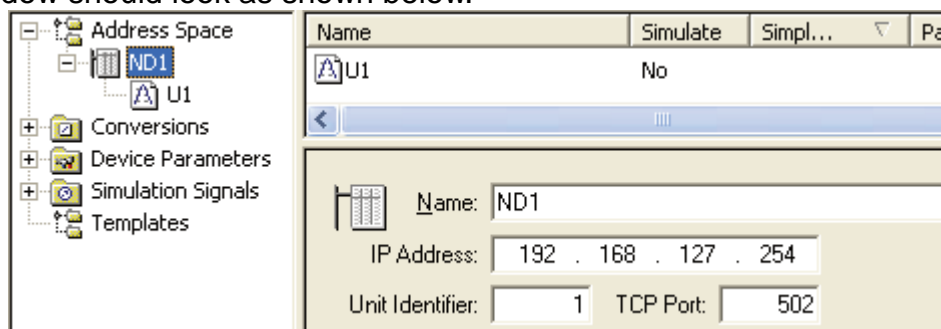
8. Add element of "Data Item:' to „ND1" device. Select it from pop-up menu of "ND1" element in "New / Data Item" function.
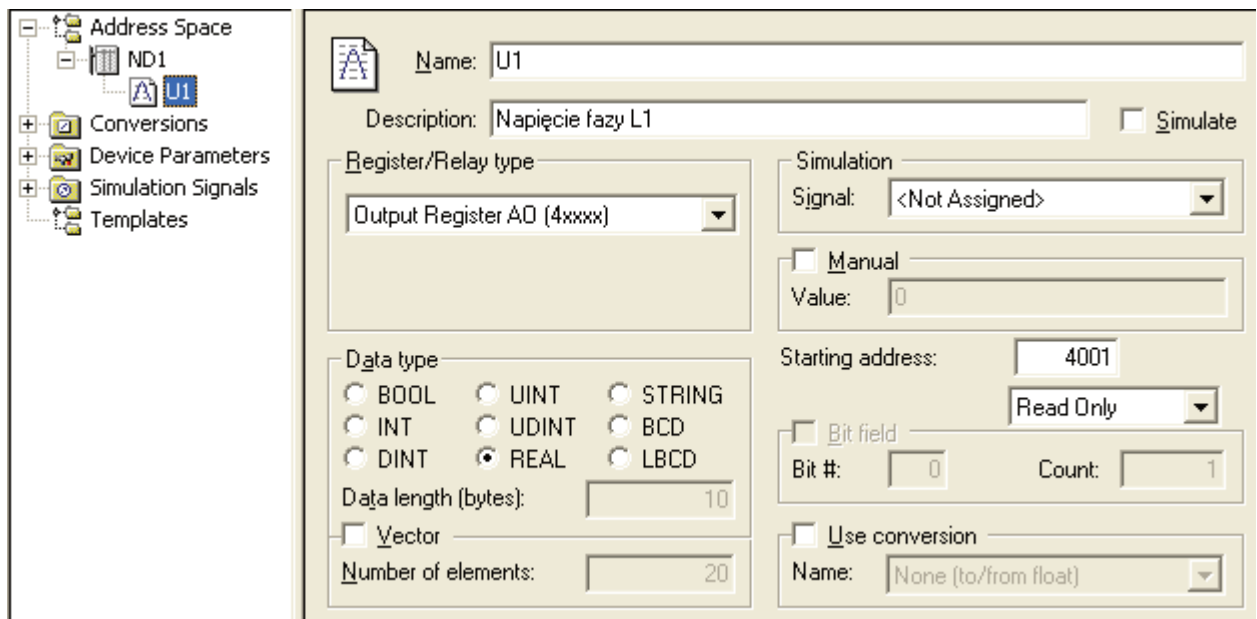
9. Configure parameters of the element. Set "Name" as "U1", "Description" as "Voltage of L1" phase, "Starting address:" field as 4001, "Data type" field as "REAL". Accept settings by clicking "Apply". The window should look as shown below.
10. Close the program using "File / Exit" and return to "Panel Studio". The label database will be updated and "U1" element will be visible in "Panel Studio" a "ND1_U1" tag.
11. Add elements of „TextBox" type to "Screen1" in "Screen1" tab.
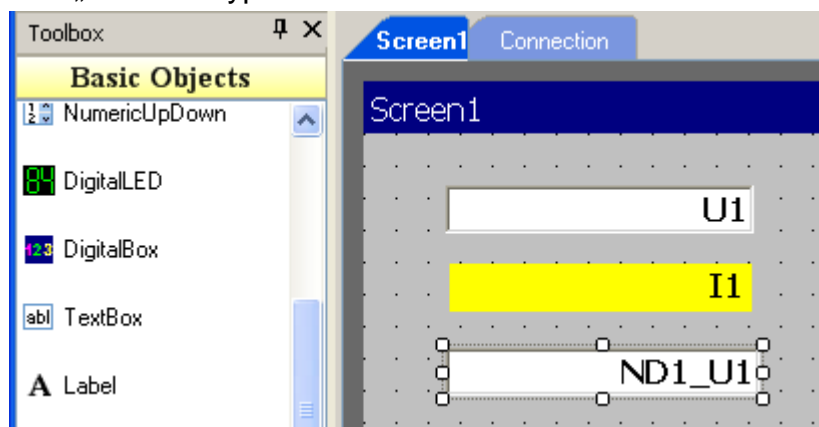
12. Configure added element (double-click it). Select "General" tab: set "Text" field as „ND1_U1", "TagBinding" field as "ND1_U1". Accept the settings by clicking "OK".
13. Save the project.
14. Check the correctness of the project using "Project / Build" function.
15. Send it to the panel using "Project / Download" function

7.4   Sending project to the panel

After creating the application (project) and its functional checking, it may be send to the panel.
Program provides the following options for sending the application to the panel:
- via Ethernet connection by sending the application from the program,
- using USB connection in the panel and a removable disk, after saving the application from the hard drive to the disk.

Procedure of saving the application using Ethernet connection :
- after creating the application, build the project (use "Project / Build" function) and make sure that there are no compilation errors,
- provide connection of the panel and PC to the Ethernet network,
- check the IP address of the panel in "System Info" of the panel menu
- in "Panel Studio" activate "File / Environment" menu
- in "Environment" pup-up menu select "Download and Upload" group
- in "Connection" field select "Ethernet" and enter the IP address of the panel in "IP" field and accept it by clicking "OK"
- then in "Project" menu select "Download", this will result in sending the application to the panel
-

Procedure of saving the application using USB drive:
- after creating the application, build the project (use "Project / Build" function) and make sure that there are no compilation errors,
- connect USB flash drive to your computer via USB port,
- in "Studio Panel" select "File / Environment" menu
- in "Environment" pup-up menu select "Download and Upload" group
- in "Connection" field select "Removable disk" and accept it by clicking "OK"
- then in "Project" menu select "Download", it will send the application to the USB drive,
- insert the USB drive into the USB slot of the panel
- switch the panel on,
- select "Project" function and then click "Load", select the path to the project file and then press "Load" button next to the path selection field,
- this will transfer the application from a portable USB drive to the panel.

8   Technical specification

Display	65535 colours with a touch-screen TFT Wide (HMI 450, HMI 730, HMI 750) TFT (HMI 1050, HMI 1550)
Display dimensions	
HMI 450	4.3 "
HMI 730, HMI 750	7 "
HMI 1050	10 "
HMI 1550	15"
Screen resolution	480x272 pixels (for HMI 450) 800x480 pixels (for HMI 730, HMI 750) 1024x768 pixels (for HMI 1050, HMI 1550)
Screen backlight	LED, operation time 50 000 hours LED, operation time 30 000 hours (HMI 450)
Power supply	11-36 V DC 90-250V AC (except HMI 450)
Power consumption	10W (HMI 450) 12W (HMI 730) 13W (HMI 750) 15W (HMI 1050) 27W (HMI 1550)
CPU	ARM11, 533MHz (HMI 450, HMI 730) ARM Cortex-A8, 667MHz (HMI 750, HMI 1050, HMI 1550)
Flash memory	128MB
SDRAM (RAM) memory	128MB (HMI 450, HMI 730) 256MB (HMI 750, HMI 1050, HMI 1550)
Operating system	WinCE 6.0
Communication ports	
- COM1, DB9 male connection	RS232C
- COM2, DB25 female connection	RS232/RS422/RS485
- Ethernet	10/100 Mbps, RJ45 connection optional for HMI 450 and HMI 730 1 port for HMI 750 2 ports for HMI 1050 I HMI 1550
- USB	Host
IP of the housing	IP65 from the front, IP20 back side and terminals
Real-time clock	with a battery typical life-time: 10 years, sustaining power without charging: 6 months accuracy: +/- 2 sec/day

Operational temperature	0~50°C
Storage temperature	-20~60°C
Ambient humidity	10~90% RH (without condensation)
Vibration strength	amplitude of 0.75mm, 10-58Hz, 2 hours in X, Y, Z directions
Impact strength	10G, 11ms three times in each direction: X, Y, Z

Standards met by the panel:

Electromagnetic compatibility

– interference immunity	PN-EN 61000-6-2
– interference emissions	PN-EN 61000-6-4
Weight	0.5 kg (HMI 450)
	1.2 kg (HMI 730)
	1.4 kg (HMI 750)
	3.6 kg (HMI 1050)
	5.1 kg (HMI 1550)

9 Order codes

HMI –	XXXX	X	X	X	X	XX	X	X

Type	**4.3" HMI 450**	0450	1	0	1				
	7" HMI 730	0730		0	0				
	7" HMI 750	0750			1	1			
	10" HMI 1050	1050			1	1			
	15" HMI 1550	1550			1	1			

Power supply voltage	11...36V DC	1						
	90...250V AC	2						
Audio Input/output 3 DI, 3 DO	no		0					
	yes		1					
Slot for SD	no			0				
	yes			1				
Ethernet	no				0			
	yes				1			
Design	standard					0		
	Custom-made [1]					XX		
Language version	Polish						P	
	English						E	
	other [1]						X	
Acceptance tests	without additional requirements							0
	with additional Quality Control certification							1
	according to the arrangements with the customer [1]							X

[1] only after agreeing with the producer

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