

NB-series

Start-up User's Guide Manual

NB-HMI Faceplate V3

NB3Q-TW□□B

NB5Q-TW□□B

NB7W-TW□□B

NB10W-TW01B



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1. Related Manuals

No.	Model	Title
V106	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals NB-Designer OPERATION MANUAL
V107	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals SETUP MANUAL
V108	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals HOST CONNECTION MANUAL
V109	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals STARTUP GUIDE
V443	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals PRACTICES GUIDE REMOTE SOLUTION
V462	NB□Q-TW01B NB□W-TW01B	NB-series Programmable Terminals PRACTICES GUIDE NEW FUNCTIONALITIES FOR NB-DESIGNER V1.50

1.1. Intended audience

The details and information provided are intended to supplement the manuals described above. It is not intended to provide a Programmable Terminal or NB-Designer manual but a Practical Guide to use the Faceplate project and re-use this work in other projects.

2. Precautions

- (1) When building an actual system, check the specifications of the component devices of the system, use within the ratings and specified performance, and implement safety measures such as safety circuits to minimize the possibility of an accident.
- (2) For safe use of the system, obtain the manuals of the component devices of the system and check the information in each manual, including Safety Precautions, Precautions for Safe Use.
- (3) It is the customer's responsibility to check all laws, regulations, and standards that the system must comply with.
- (4) All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of OMRON.
- (5) The information in this guide is current as of October 2018.
It is subject to change without notice because of product's update.

Special information in this document is classified as follows:



Precautions for Safe Use

Describes precautions on what to do and what not to do to ensure safe usage of the product.



Precautions for Correct Use

Describes precautions on what to do and what not to do to ensure proper operation and performance.



Additional Information

Additional information to read as required.

It contains helpful and reference information for the users.

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Company names and product names in this document are the trademarks or registered trademarks of their respective companies.

3. NB-HMI Faceplate introduction

NB series Faceplate is intended to gather most common functionalities with the target to reduce development time to start working with NB series HMI. Reuse, adapt and customize pages allow to speed up the creation of a project at least in the common functionalities without spending time: just "copy and paste" and adjust.

The project structure and functionalities are described in the following sections. Besides, the project implements multilanguage feature in all pages, including English and Spanish. To add new languages, refer to Section 7.1 from this manual.

A use example of the Faceplate V1 project is described in a short video attached "First-Steps NB-HMI Faceplate.mp4".

The changes between NB-HMI Faceplate V2 and NB-HMI Faceplate V3 are described in this manual, there is a summary in next chapter and a quick overview of these changes in the attached video "NB-HMI Faceplate V3-Release notes.mp4".

4. New pages and features NB-HMI Faceplate V3

In this chapter, the changes between NB-HMI Faceplate V2 and NB-HMI Faceplate V3 are summarized. In this third version of NB-HMI Faceplate, the following changes have been done and the below functionalities have been added:

- Tree project structure: the structure of the screens access in the project has changed. For more details, see next chapter.
- Main screen: it is more visual with the added icons.
- Data storage (USB) and OMRON devices main pages: navigation has been improved.
- Screen tree page: from main screen, the user can access (bottom right) to a screen tree page where the navigation and access to all the pages is summarized. It is also possible to access each of the pages.
- Energy Monitoring KM-N2/3: screens for visualizing the measured data by the KM-N2 or KM-N3.
- Insulation Resistance Monitoring K7GE: screens for visualizing the measured data by the K7GE.

5. Faceplate project structure

The project structure is divided as follows:

- NB Configuration: Events and alarms and User permission.
- Omron Interfaces: OMRON-TM, Safety – G9SP, CP2E, Inverter, E5CC TC, energy monitoring KM-N2/3 and insulation resistance monitoring K7GE.
- Data Management: Data Storage (USB) and Recipes.
- Connectivity: Host Configuration, VNC Server, FTP Server and Web Interface.

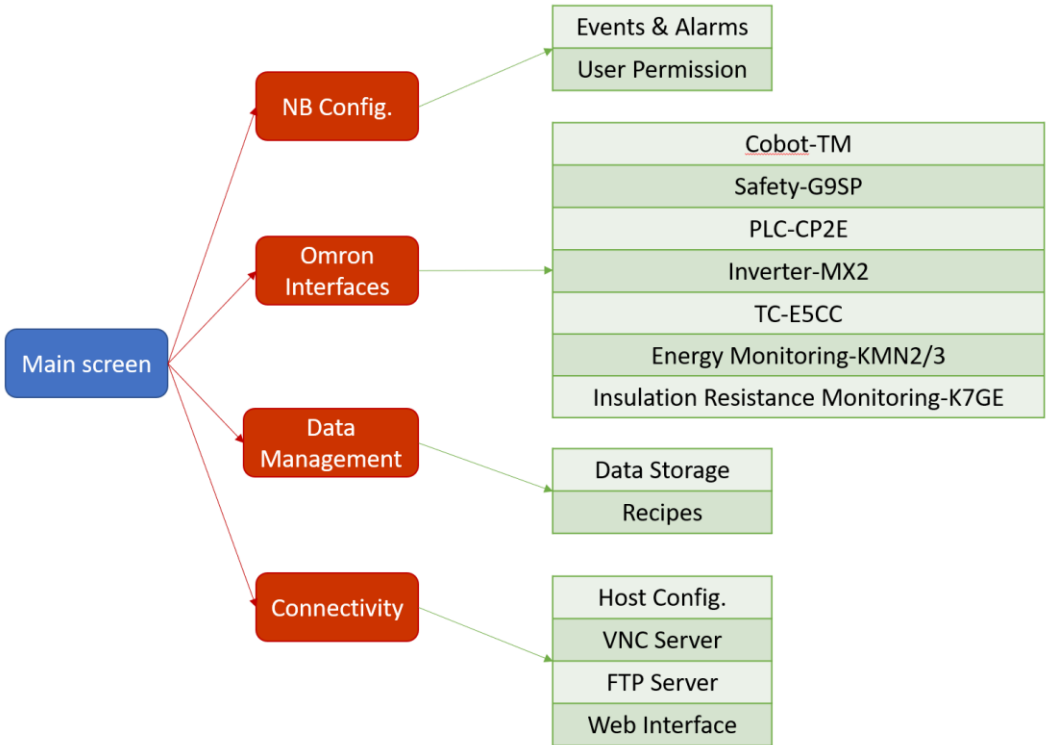


Figure 1: Screen structure

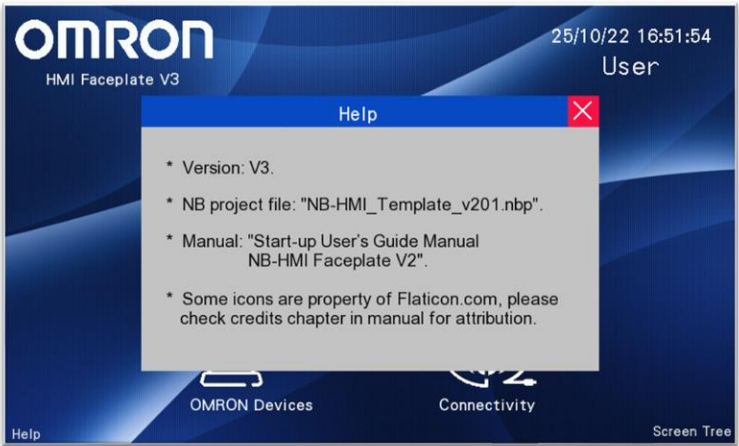
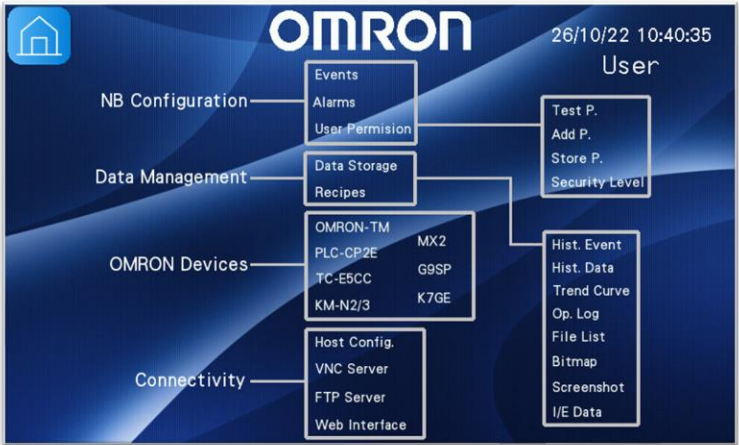

5.1. HMI screens:

From Main screen (0:Main) is possible to access to the screens defined in the previous Figure 1.

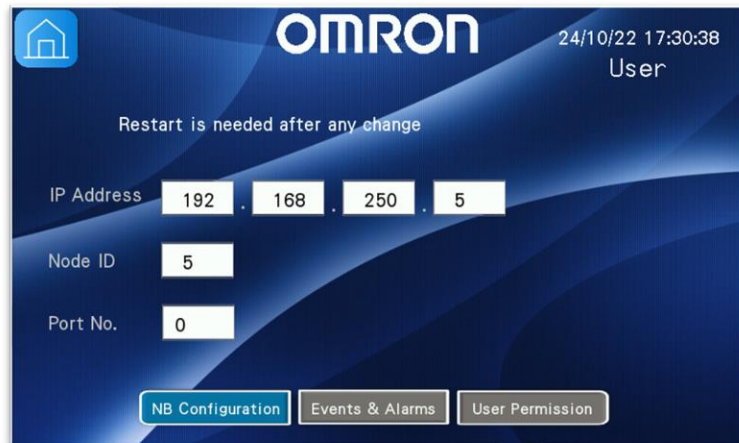


Figure 2: HMI Main Screen (0:Main)

An overview of the different screens is described below.

<p>0.1</p>	<p>Main screen - Help pop up (102:Help)</p>	 <p>The screenshot shows the OMRON HMI Faceplate V3 main screen. A 'Help' pop-up window is displayed in the center, containing the following text:</p> <ul style="list-style-type: none"> * Version: V3. * NB project file: "NB-HMI_Template_v201.nbp". * Manual: "Start-up User's Guide Manual NB-HMI Faceplate V2". * Some icons are property of Flaticon.com, please check credits chapter in manual for attribution. <p>The background screen shows the OMRON logo, the text 'HMI Faceplate V3', the date and time '25/10/22 16:51:54', and the user name 'User'. Navigation icons for 'OMRON Devices' and 'Connectivity' are visible at the bottom.</p>
<p>0.2</p>	<p>Main screen – Screen Tree (19:Pages Tree)</p>	 <p>The screenshot displays the OMRON HMI main screen with a 'Screen Tree' menu. The menu is organized as follows:</p> <ul style="list-style-type: none"> Events <ul style="list-style-type: none"> Alarms User Permission Data Management <ul style="list-style-type: none"> Data Storage Recipes OMRON Devices <ul style="list-style-type: none"> OMRON-TM PLC-CP2E TC-E5CC KM-N2/3 MX2 G9SP K7GE Connectivity <ul style="list-style-type: none"> Host Config. VNC Server FTP Server Web Interface Test P. <ul style="list-style-type: none"> Add P. Store P. Security Level Hist. Event <ul style="list-style-type: none"> Hist. Data Trend Curve Op. Log File List Bitmap Screenshot I/E Data <p>The background screen shows the OMRON logo, 'HMI Faceplate V3', the date and time '26/10/22 10:40:35', and the user name 'User'.</p>
<p>1</p>	<p>NB Configuration (20:Main - NBConfig)</p>	 <p>The screenshot shows the OMRON HMI 'NB Configuration' screen. Key settings and controls include:</p> <ul style="list-style-type: none"> Real Time Clock adjustment: Shows the current time as 17:28 and the date as 24/10/2022. ENABLE BUZZER: A button to toggle the buzzer. Screen Saver Time (0-600m): Set to 10 minutes. Language: Set to English (with a UK flag icon). BRIGHTNESS ADJUST: A vertical slider set to 6, with a maximum of 32 and a minimum of 0. IP-Address configuration: A button with a gear icon. Calibrate Screen: A button with a screen icon. Navigation Buttons: 'NB Configuration', 'Events & Alarms', and 'User Permission' are visible at the bottom. <p>The background screen shows the OMRON logo, 'HMI Faceplate V3', the date and time '24/10/22 17:28:09', and the user name 'User'.</p>

1.1 IP-Address configuration (21:NB Setup – Communications)



1.2 Events & Alarms (41:Event_Screen)



1.3 Events & Alarms (42:Alarm_Screen)



1.4 User Permission – Test Permission
(46:User_Permission)



1.5 User Permission – Add Permission
(47:User_Creation)



1.6 User Permission – Store Permission
(45:User_Storage)



<p>1.7</p>	<p>User Permission – Security Level (48:Security_Level)</p>	
<p>2</p>	<p>Omron Interfaces (206:Main-Devices)</p>	
<p>2.1</p>	<p>Omron-TM Robot (30:Omron-TM)</p>	

2.2 Safety – Monitor
(60:Safety_Main)



2.3 Safety – Error I/O
(62:Safety_ErrorIO)



2.4 Safety – Transmission Data
(63:Safety_Transmission Data)



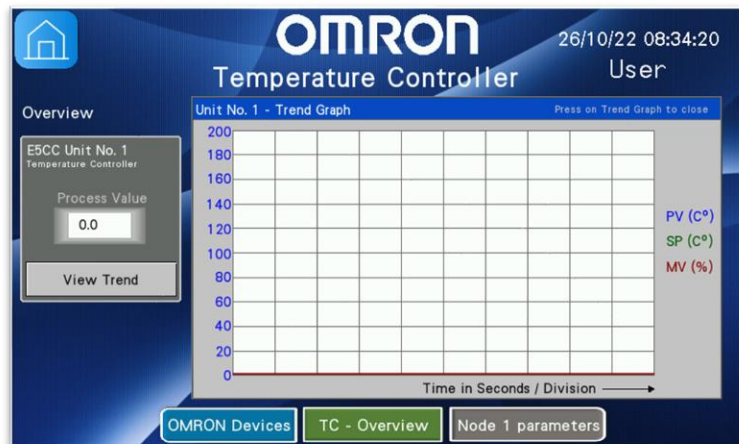
2.5 CP2E PLC (80:CP2)



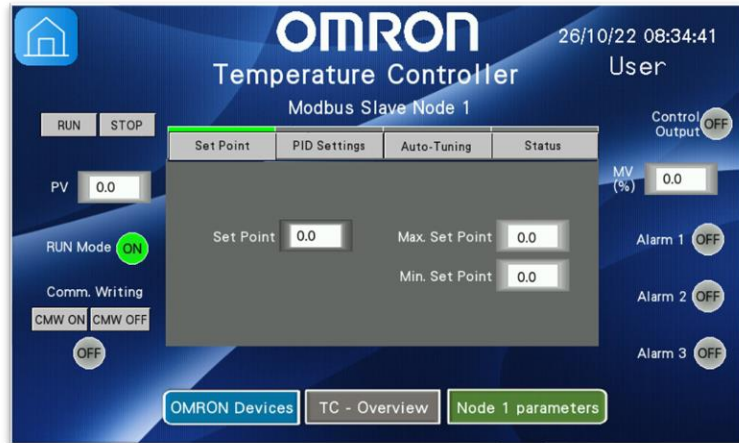
2.6 Inverter (75:Inv_Monitor)



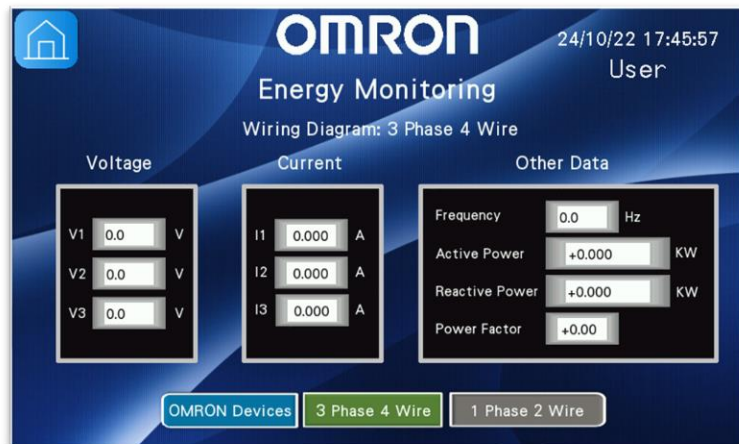
2.7 Temperature Controller – Overview (85:TC_Overview)



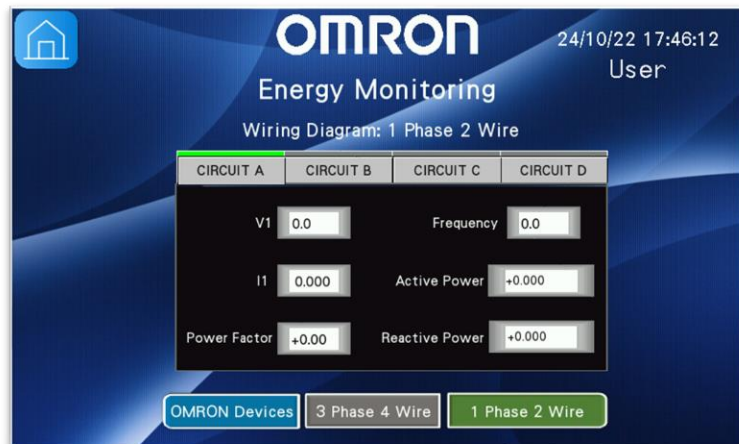
2.8 Temperature Controller – Node 1 Parameters (87:TC_Node 1 Parameters)



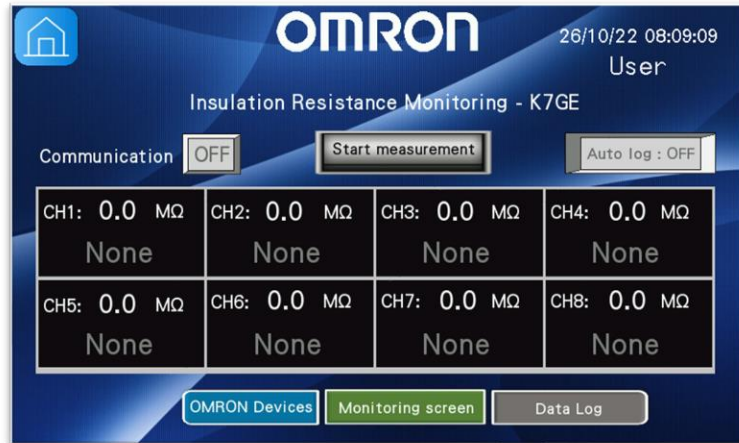
2.9 Energy Monitoring – 3 Phase 4 Wire (110:KMN2/3_3P4W)



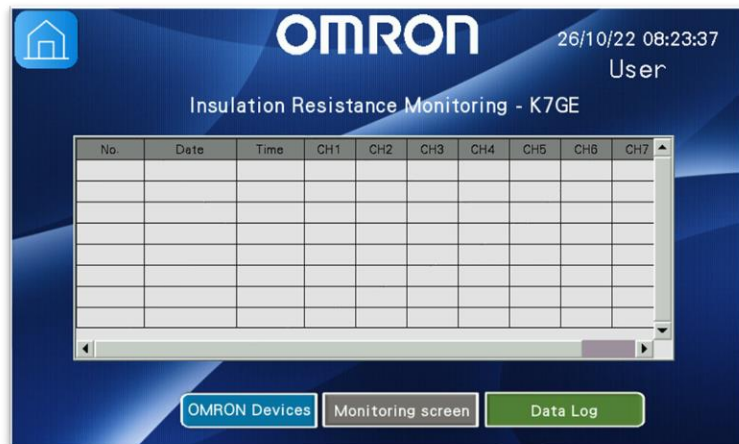
2.10 Energy Monitoring – 1 Phase 2 Wire (111:KMN2/3_1P2W)



2.11 Insulation Resistance Monitoring – General (130:K7GE_general)



2.12 Insulation Resistance Monitoring – Data Log (131:K7GE_DataLog)



3.1 Data Management: data storage (50:Main_USB)



3.1.1 Data Management: data storage – Historical Event (51:Historical Event)



3.1.2 Data Management: data storage – File List (55:File List)



3.1.3 Data Management: data storage – Trend Curve (53:Trend Curve)



3.1.4 Data Management: data storage – Operation Log (54:Operation Log)



3.1.5 Data Management: data storage – Historical Data (52:Historical Data)



3.1.6 Data Management: data storage – Bitmap (56:Image)



3.1.7 Data Management: data storage – Screenshot (57: Screenshot)



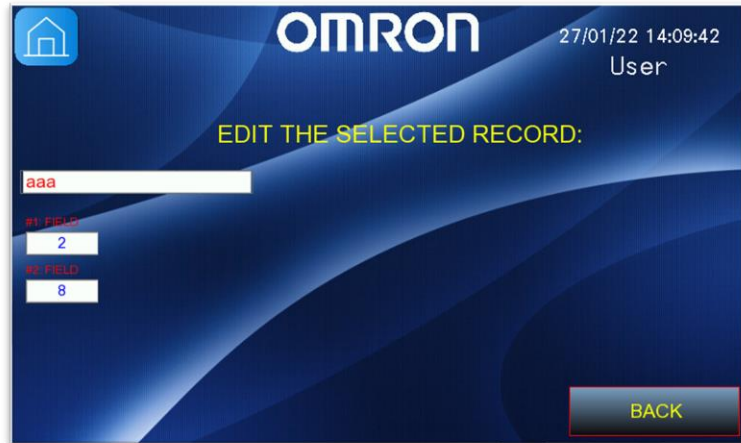
3.1.8 Data Management: data storage – Import/Export DATA (58:ImportExportDATA)



3.2 Data Management: Recipes (35:Recipes1)



3.2.1 Data Management: Edit Selected Record (36:Recipes2)



4 Connectivity (70:Network)



4.1 Host Configuration (71:NetworkConfiguration)



4.2 VNC Server (72:VNC)



4.3 FTP Server (73:FTP)



4.4 Web Interface (74:WebInterface)



6. Screens functionality

In this section, it will be described the different screens' functionalities.

6.1. Main Screen:

This is the main screen from where all the other menus can be accessed. Also, it is displayed the current User Permission and Date and Time.

6.2. NB-Configuration

The NB-HMI system has some addresses for special purposes like:

- Local Bit (LB): Reserved range from LB9000 to LB9999.
- Local Word (LW): Reserved range from LW9000 to LW9999.
- Nonvolatile Local Word: Reserved range from LW10000 to LW10255.

With these System Memory Addresses, it can be adjusted the following PT functions from this screen:

1. RTC (Real Time Clock).
2. Screen Saver Time.
3. Enable/Disable PT Buzzer.
4. Change display Language.
5. Adjust PT Brightness.

All these System Memory Addresses are described in the *V106-E1-20 NB-Designer Operation Manual*. Also, it can be accessed to the PT IP-Address configuration screen (21:NB Setup - Communications), where the IP Address, Node ID and Port number can be modified using the corresponding System Memory Addresses.

6.2.1. Events & Alarms

Event screen:

Here is included the Event History Display component, which is used to search and display the event history information logged in 'Event Setting' database, Event Display and Event component, where the events will be displayed with the oldest event at the bottom and the latest event at the top. It has been included a Scrollbar to navigate through the events displayed.

Four events can be simulated with the different buttons on the right side of the screen.

Alarm screen:

In this screen, four different alarms can be simulated with the buttons on the right side of the screen. Those will generate alarms visualized in the Alarm and Alarm Display components.

For the Alarm component is has been included the possibility to scroll up and down the alarm messages with the two arrows (Command Buttons).

6.2.2. User Permission

In this section, it can be managed the User Permission and Security Level functionalities.

There are the following four screens:

1. Test Permission: Here you can open the Login Window and enter the user credentials (user and password) and, then, check the permission levels which are enabled for that user with the buttons and lamps located on the right side of the screen. This operations will be stored in the Operation Log.

The permissions created are:

- a. Administrator (No. 3).
- b. Engineer (No. 2).
- c. Quality (No. 1).
- d. Operator (No. 0).

The different users defined for this project, are the following:

- a. Administrator:
 - i. Username: admin.
 - ii. Password: 888888.
 - iii. Logout Time: 10 minutes.
 - iv. Permission: No. 0-3.
 - b. Engineer:
 - v. Username: engineer.
 - vi. Password: 888888.
 - vii. Logout Time: 10 minutes.
 - viii. Permission: No. 0-2.
 - c. Quality:
 - ix. Username: quality.
 - x. Password: 888888.
 - xi. Logout Time: 10 minutes.
 - xii. Permission: No. 0-1.
 - d. Operator:
 - xiii. Username: operator.
 - xiv. Password: 888888.
 - xv. Logout Time: 10 minutes.
 - xvi. Permission: No. 0.
2. Add Permission: This project provides a user creation screen where new users can be created or to change the password of a current user.
 3. Store Permission: In this screen, you can manage the users stored in the PT internal memory. There are four buttons:
 - a. Add: adds a user to the PT running program.
 - b. Delete: deletes a user of the PT running program.
 - c. Save: saves the running program users in the PT internal memory.

- d. Load: loads to the running program the users from the PT internal memory.
4. Security Level: In this project it has been defined three security levels which have the following passwords:
 - a. Level 1: 111111.
 - b. Level 2: 222222.
 - c. Level 3: 333333.

Once the password is introduced you will see the corresponding access level and test the security levels with the buttons and lamps on the right side of the screen.

Besides, it can be forced the current access level to a lower one from this screen.

6.3. Data Management

6.3.1. Data Storage (USB):

Once your USB is connected to the PT, on the right side of this screen you will see that the 'Stick present' lamp icon will change to green color indicating that the USB is ready and recognized. To eject the USB, first use the 'Eject stick' button and wait until 'Stick present' lamp changes to red to remove the USB stick. Also, it is possible to clear the files generated by PT using the 'Trash' button.

Information about some of the screen functionalities:

- Image load from USB stick: Copy example.jpg file to USB memory.
- USB Memory plug in and plug out: Plug in USB memory stick, wait until USB icon changes to green color. Press Eject Icon. Wait until USB icon changes to red color and then Remove USB memory stick.
- Save screenshot to USB Memory: Plug in USB memory stick, wait until USB icon changes to green. Press the "Save Screenshot" button.
- Customize the user-defined Screenshot name: Input an ASCII name by text input component. Press the "Save Screenshot" button. Wait one minute for the image to be transferred and, afterwards, Remove USB memory stick. Confirm that the Screenshots have been saved in USB memory "scr" directory.

From this screen, it can be accessed the following screens:

1. Historical Event Display: The information displayed here with the Event creation will be stored in the USB memory under the path '/usb1/event/Event/file.csv'.
2. Historical Data Display: The values from the Data History component channels can be modified on the right side of the screen. The sampling method defined is 'OFF->ON trigger sampling' and this trigger button is placed at the right bottom of the screen.
Column names can be changed from 'Channel 0..3' to a custom name in object properties.
The file will be stored in the path '/usb1/trend/HistoryData/file.csv'.
3. Trend Curve: To start sampling the values defined in the number inputs on the right side of the screen, the 'Start-Sample' button should be pressed.
Then, with the Scrollbar it will be possible to move through the data which have been stored.
The file will be stored in the path '/usb1/trend/HistoryTrend/file.csv'.
4. Operation Log: In this screen, the operation log is displayed. For testing, it has been placed a Function Key which opens the User Access login pop-up.

The file will be stored in the path '/usb1/log/Record/file.csv'.

- 5. **File List:** This is used to display the file information of the external memory, divided in three parts: On the left, the information on the folder under the current folder, at the upper right part the information of the file and at the bottom right side the PT information on the selected project or recipe file.

On the right side of this screen there are different buttons to Import/Export the project file or recipe.

- 6. **Bitmap:** In this screen it is shown the possibility to read from External Memory (USB) an image. An example could be the electrical drawing of the cabinet or the network diagram.
- 7. **Screenshot:** The Notepad functionality is included in this screen, where the user can draw/write any message. When the message needs to be cleared, the button 'Erase' can be pressed. Besides, it is possible to store the message to the USB stick using the 'Save Screenshot' button placed on the right side of the screen. The name of this file can be modified using the Text Input property at the bottom of the screen.

The file will be stored in the path '/usb1/scr/screenshot.bmp'.

Important note: After the "Save Screenshot to Extended Memory" operation is performed wait for about 1 minute, then, the external memory can be removed to ensure the successful storage of the screenshot.

- 8. **Import/Export DATA:** This page allows to copy data from/to ERW memory area of NB HMI to a CSV file in USB stick. The data in the ERW area will be stored into the external memory in ".erp" format, which is an intermediate step needed for NB HMI to prepare CSV file. Import/export ERW data to/from ERP file is done by NB configuration, and the conversion ERP file to/from CSV is done by dedicated buttons.

On the right, there are "Input number" parts to fill the ERW0 area with the Process Values. This is an implementation example to move few data, you can add more "Input number" parts to fill other ERW areas.

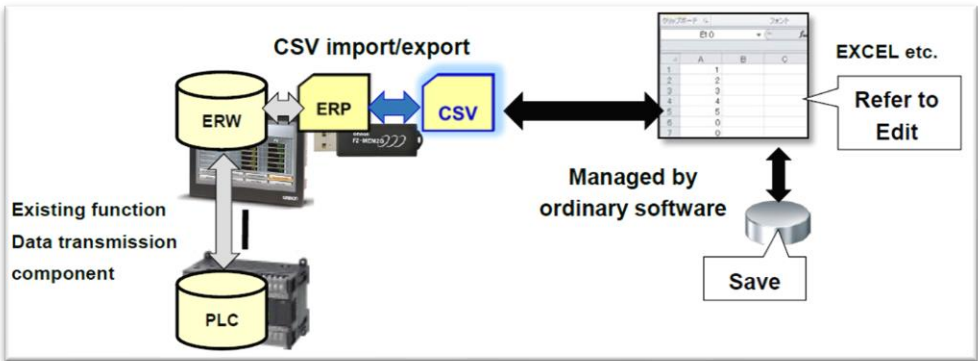


Figure 3: CSV Import/Export DATA

This functionality can be combined with FTP server to import data from a remote PC to the NB or to export data from NB to a remote PC. In the bottom part there is a button to access the FTP server screen.

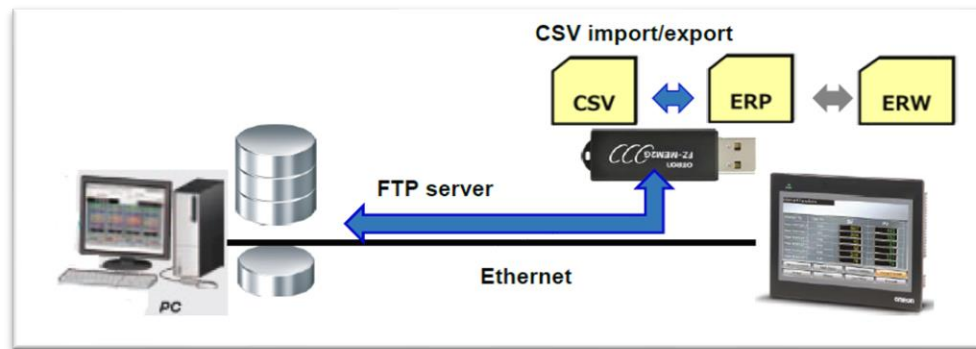


Figure 4: FTP + CSV Import/Export DATA

For more details, refer to V443 NB-series Programmable Terminals PRACTICES GUIDE REMOTE SOLUTION manual.

- Note 1: 'file' will be replaced with the year, month and day when the file was generated (e.g. 20200331.csv – 31st March 2020).
- Note 2: 'screenshot' will be replaced with storage time form (i.e. "yyyy-mm-dd, hh:mm:ss:ms") when the file was generated.
 - Default example: 2020-03-31,14;24;46;701.bmp.
 - User defined screenshot name: test2020-03-31,14;25;05;392.bmp ('test' is the name defined by the user and it is concatenated to the default storage time form).

6.3.2. Recipes:

The most requested recipe management functions, such as searching, inserting and deleting records have been implemented.

In this example, each record consists of a description field (of ten words) and two numeric fields (of one word each). The sum of the length of the description field and each of the fields of the record represent the total length of the record (variable "Rec_Length").

The total length of the record and the Total Number of the records present are set in the macro called 'init.c'. The size of the recipe area used for searching the records will depend on the total number indicated (maximum 32,000 total channels).

The demo includes a recipe management page (page 35, called 'Recipes1') and a page for modifying the selected record (page 36, 'Recipes2').



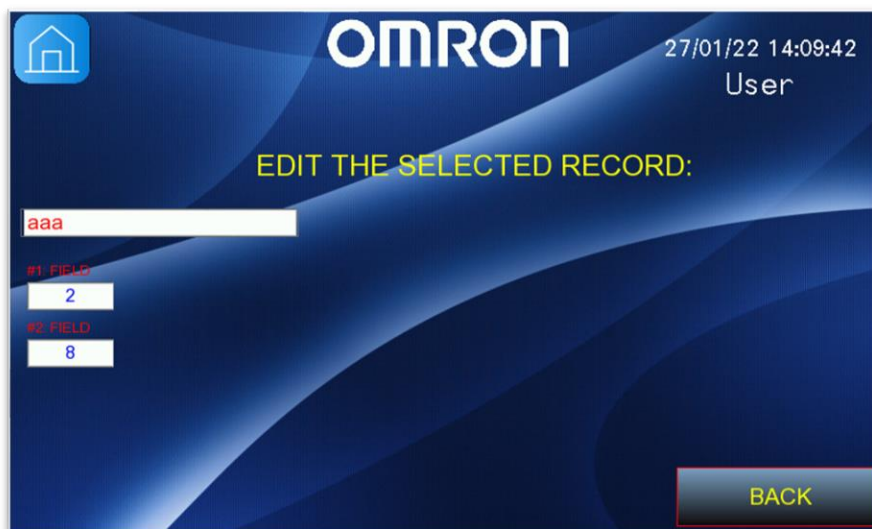
A list of ten recipe records is displayed on the left (by default, each record corresponds to 10 description words and two words for the two fields). With the arrows it is possible to scroll the list, by single line or by single page. The green button returns the selection to the first record in the table; The red button moves to the last record of the table (the size of which is defined in the macro 'Init.c'). The topmost record in the list (highlighted in yellow in the table) always represents the SELECTED RECORD; all record operations will ALWAYS refer to this record.

Also, it is possible to use the green arrow on the left side of the screen to 'jump' to the record indicated in the numeric field below it; the indicated record will then become the new selected record.

On the right side there are the commands for managing the records:

➤ **Command [EDIT THE SELECTED RECORD:]**

By clicking on the icon on the right, you access the page for editing the selected record. The default page includes a string field, for the description (name) of the record (10 words) and the two numeric fields provided for the default recipe. This page can obviously be customized by adding the necessary fields to your case.



➤ **Command [DUPLICATE THE SELECTED RECORD:]**

By clicking on the icon on the right, and upon confirmation, the selected record will be duplicated. The duplicated record is always inserted in place of the current selected record, which following the duplication, moves downwards, along with all subsequent records.

➤ **Command [DELETE THE SELECTED RECORD:]**

By clicking on the icon on the right, and upon confirmation, the selected record will be deleted. All the other records will move upwards accordingly.

➤ **Command [NAME TO SEARCH:]**

Enter up to four characters, related to the name to search, and then press the 'SEARCH' button to start the search procedure. The first record matching the search criterion (if found) will be displayed as the selected record. If the search ends without success, a Record not found message will appear in the "SEARCH RESULT" field (the option to start the search from the first record will be automatically activated). Press the SEARCH button again to proceed with the next possible record; by default, a search of 1,000 records is defined.

Note: Two options allow you to specify whether to start the search from the first record (or from the next one to the selected one) and / or if during the search procedure to distinguish between upper and lower case (default: no distinction). A red dot will indicate that the option is active.

Besides, there is a simulation area to use the recipes which may be present in the PLC:

➤ **Section [PLC RECORD:]**

This screen simulates, using data areas inside the NB panel, data areas typically present in the PLC, in order to verify the actual functionality of the loading and unloading operations of the selected recipe record, even without any PLC physically connected.

The words used (from LW1030 to LW1041) are read/written by the two components 'Recipe Data' provided for the operations of Download and Upload of the selected record. A component transfer 12 words (default record length). This value must be modified if you change the length of the record (refer to Section 7.2 from this manual).

6.4. OMRON Devices

It has been included 7 different devices in this project, which are:

1. Omron-TM Robot: Modbus/TCP communication.
2. Safety controller-G9SP: RS232 Serial communication.
3. CP2 controller: FINS/UDP communication.
4. Inverter MX2: Modbus/RTU Extend RS485 Serial communication.
5. Temperature Controller E5CC: Modbus/RTU Extend RS485 Serial communication.
6. Energy Monitoring KM-N2 / 3: Modbus/RTU Extend RS485 Serial communication.
7. Insulation Resistance Monitoring K7GE: Modbus/RTU Extend RS485 Serial communication.

6.4.1. Omron-TM:

This screen contains an example of the different information that can be read and write from/to the Omron-TM Modbus/TCP Server. Depending on the configuration defined in the TMflow side, could be necessary to perform a Byte Swapping due to the difference in the Endianness. This simple code is included as a Macro function (byteswapping.c) executed cyclically (500ms).

6.4.2. Safety-G9SP:

Inside this section, you can access three screens:

1. Safety – Monitor: it has been included all the Safety Digital I/Os to match the same status from the real safety controller. Also, possible errors are displayed and safety controller status (Error or Stop / Normal and Run).
2. Error I/O information: Here the cause of the SIOs error is described. The possibilities are:

SI:

- a. No error.
- b. Invalid configuration.
- c. External test signal failure.
- d. Internal circuit error.
- e. Discrepancy error.
- f. Failure of the associated dual-channel input.

SO:

- a. No error.
- b. Invalid configuration.
- c. Overcurrent detection.
- d. Short circuit detection.
- e. Stuck-at-high detection.
- f. Failure of the associated dual-channel output.
- g. Internal circuit error.
- h. (Reserved).
- i. Dual channel violation.

3. Transmission data: Here are gathered all the different bits of information that can be configured to be transferred between PT and G9SP.

6.4.3. CP2-Controller:

It has been included all the Digital I/Os to match the same status from the real controller. Also, System Memory PLC information is displayed, such as Lot Number, Max. Cycle Time, UM Read protection (enabled/disabled), Cycle Time error flag and Battery Error flag.

6.4.4. Inverter:

From this screen, NB-HMI communicates with Inverter (MX2) using Modbus/RTU Extend protocol. It is displayed several information such as the Current Fault with its corresponding description below, output voltage and current, drive status and Multi-Function Input/Output Monitor.

Besides, it provides the possibility to modify the Reference Frequency, Reverse/Forward mode and Start/Stop.

- **Note:** For further information refer to Manual I585 Section 8-9.

6.4.5. Temperature Controller:

The Temperature Controller E5CC communicates with the NB-HMI via Modbus/RTU Extend protocol. The Temperature Controller input is of type Thermocouple. This device has two subscreens:

1. TC - Overview: here you can see the temperature Process Value and open a trend graph for each temperature controller unit.
2. Node 1 parameters: there are several parameters for setting and visualization such us: RUN and STOP TC, PV, Run Mode, Control Output, alarms status, Set Point, PID, Auto-Tuning and Status.

- **Note:** For further information refer to h175 E5_C Communications manual.

6.4.6. Energy Monitoring:

Another device communicating via Modbus/RTU in COM2 is KM-N2/3 energy monitoring (uses Modbus/RTU Extend protocol because the same protocol must be in all devices of COM2 serial port). Connected to the device, a split-type Current Transformer (CT) has been used to obtain different measures of the circuits. The section contains two sub screens, one for 3 phase 4 wire wiring diagram and the other for 1 phase 2 wire:

1. 1P2W: with this wiring diagram, it is possible to measure from up to 4 different electrical circuits (4 CTs). For doing it, it is necessary to add 4 "Modbus/RTU Extend" drivers in NB COM2 with their corresponding Modbus addresses (configured in KM-N2/3 for CT1 to CT4 connections). For each circuit, different measures are obtained.
2. 3P4W: only one circuit is possible to measure. It is displayed the values measured about voltages and currents for the 3 phases, frequency, active power, reactive power and power factor.

- **Note:** For further information refer to Power Monitor KM-N2-FLK Users Manual.

6.4.7. Insulation Resistance Monitoring:

Last device in COM2 is the K7GE Insulation Resistance Monitoring. It also uses the Modbus/RTU Extend protocol to connect to NB-HMI. The screens are prepared to measure up to 8 channels. Furthermore, it is used a macro to control the measurement and to display or not the screen objects depending on the number of channels used in the physical device. Two screens are defined for K7GE:

1. Monitoring screen: it shows the user if there is communication, enables the user to control the

start of measuring and to enable the data log, finally shows the used channels resistance measure and its status.

2. Data log: a data log table is used to show the recordings of the measured values. The historical is saved as a csv in an external memory device.
- **Note:** For further information refer to K7GE-MG Insulation Resistance Monitoring Device User's Manual.

6.5. Connectivity

In this screen, all the devices configured to be communicating with the NB-HMI are displayed. It has been included the connection status (Connected / Disconnected) and also it can be modified when one (or several) of these devices are not included in your network to avoid the display of the communication error pop-up message.

Four other screens can be access from this one:

1. Host configuration: When accessing to the *Host configuration* screen (71:NetworkConfiguration), it can be selected the host to be modified and define a new IP Address, Port number or Node ID for it. Then, when 'Send to PT host modification' is pressed, the host will be configured as previously defined.
2. VNC Server: From this screen it can be enabled and disabled the VNC Server as well as change from Monitor mode to Operation mode (and viceversa). The Server configuration should be defined under PT properties, in this case will be enabled after downloading the project to the PT with the same password (psw: 888888) for monitor and operation mode (see Figure 3).
3. FTP Server: In this screen it can be enabled and disabled the FTP Server. Also it is included the FTP Server information (see Figure 3 for PT configuration properties).

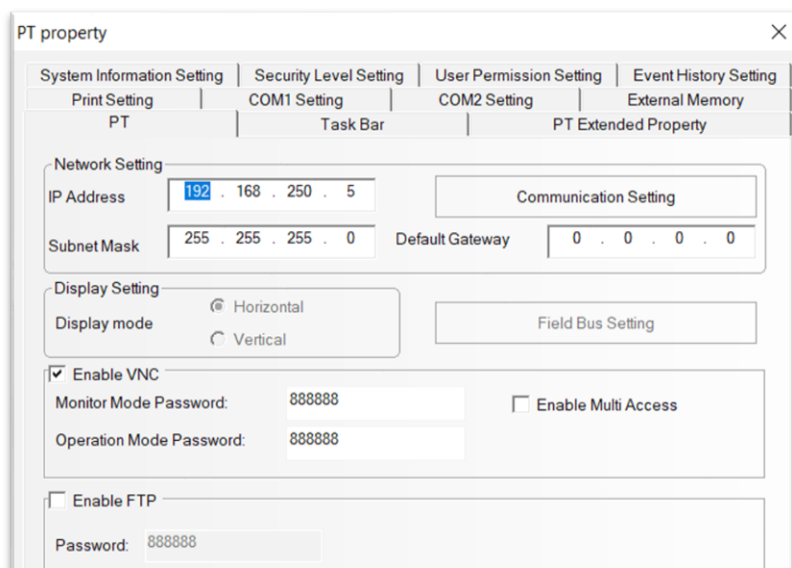
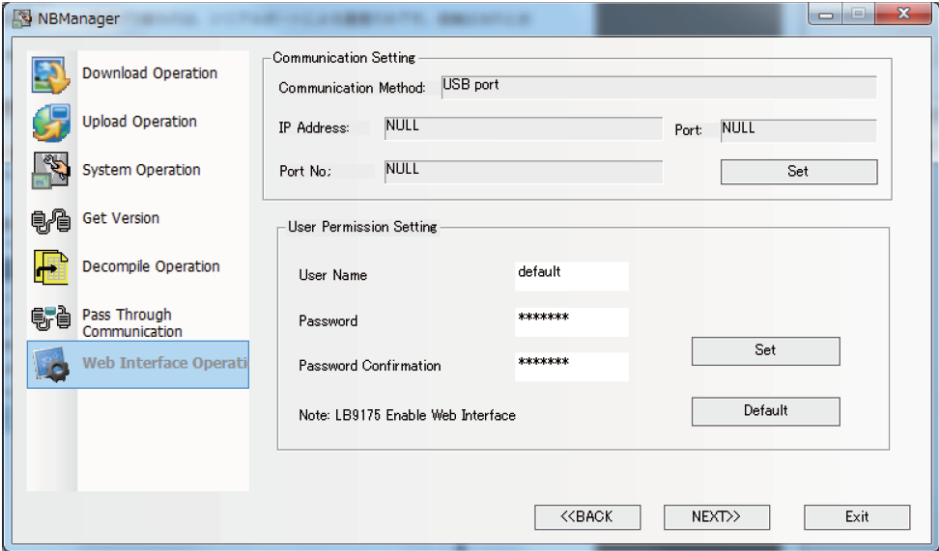


Figure 7: PT properties.

You can combine the FTP functionality with Import/Export DATA to exchange data between

- the NB and a remote PC (see **Error! Reference source not found. Error! Reference source not found.**). In righth side, there is a link button to access Import/Export DATA screen.
4. Web Interface: Here, Web Interface functionality can be enabled and disabled. Furthermore, it is shown the URL for accessing the NB running program. This functionality is for using as “Local Connection” (LAN), so protect the connections with a Managed Switch.

It is also advised to define a password for Web Interface accessing. Go to NBManager software and set them in the following screen:



When user and password are introduced, click “Set” button to transmit them to the NB.

7. Memory addresses

The following memory addresses are used by the template project provided. **Do not use** the same ones if it is intended to reuse the project to avoid any malfunction.

Besides, it should be considered Address of System Memory:

- Local Bit (LB): The reserved range is from LB9000 to LB9999.
- Local Word (LW): The reserved range is from LW9000 to LW9999.
- Nonvolatile Local Word: The reserved range is from LW10000 to LW10255.
 - **Note:** LB and LW map different areas and the addresses pointed by them in the memory are different.

7.1. LB Memory Address

LB	
0	Create Events
1	
2	
3	
4	Trigger Historical Data Sampling
5	Trend Curve
6	ERW<->CSV
7	
8-10	K7GE
11	Free Memory
12	
13-99	
100	Direct Screen (User Login)
101	Test User Permission
102	
103	
104	Test Security Level
105	
106	
107	Free Memory
108	
109	
110	
111-999	
1000	Start_Mode (Recipe Management)
1001	U_Case (Recipe Management)
1002	Reserved (Recipe Management)
1003	
1004	
1005	
1006	
1007	
1008	
1009	
1010	
1011-8999	Free Memory

7.2. LW Memory Address

LW	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Event History															
1																
2	Historical Data															
3																
4																
5																
6	Multi-function Input Monitor															
7	Multi-function Output Monitor															
8																
9	Trend Curve															
10																
11																
12	Trend Curve Scrollbar															
13																
14																
15	Trend Curve (Actual Sampling Point Time)															
16																
17																
18																
19																
20																
21	Trend Curve (Next Sampling Point Time)															
22																
23																
24																
25																
26																
27	Operation Log															
28																
29-37	Temperature Controller															
38-199	Free Memory															
200	Byte Swapping															
201																
202																
203																
204																
205																
206																
207																
208																
209																
210																
211																
212-213	KMN2/3															
214-249	Free Memory															
250	Alarm															
251-549	Free Memory															
550	Reserved				Alarms				Events							
551-552	Event History															
553	Event															
554-571	K7GE															
572-999	Free Memory															
1000	Recipe Management															
1100																
1101-1999	Free Memory															
2000	User Storage															
2001																
2002																
2003																
2004																
2005																
2006-2099	Free Memory															
2100	User Storage															
2101-8999	Free Memory															

7.3. FRW Memory Address

The only memory addresses used, are:

FRW	
FRW1000	Recipe Management
FRW1001	
FRW1002	
FRW1003	
FRW1004	
FRW1005	
FRW1006	
FRW1007	
FRW1008	
FRW1009	
FRW1010	

7.4. ERW0 Memory Address

The only memory addresses used, are:

ERW0	
ERW0_0	ERW<->CSV
ERW0_1	
ERW0_2	
ERW0_3	
ERW0_4	

8. Adapt and customize the project

8.1. How to add a new language

NB Text Library can be used for multi-language support, being able to switch among multiple languages (up to 32 kinds of languages setting – by default is limited to 8). In the Figure, it is shown an example of two languages with two different states.

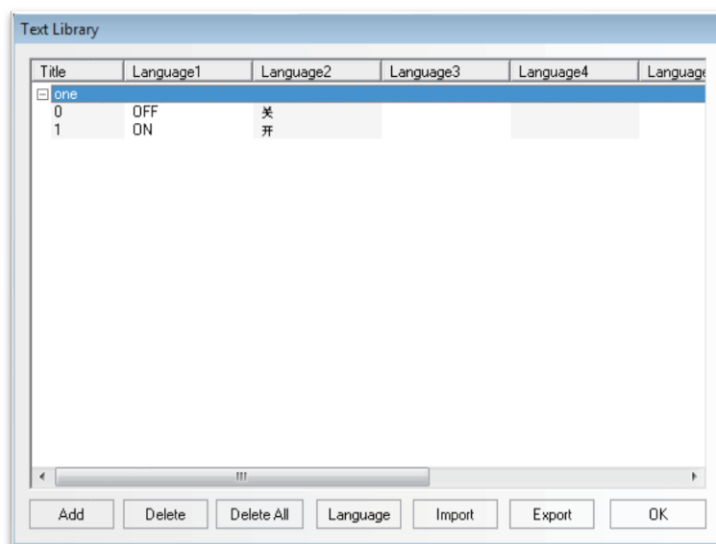


Figure 3: Text Library example.

The switching among the multiple languages can be realized modifying the value of system memory address LW9130. For instance:

- When LW9130 is 0, the contents corresponding to Language 1 in Text Library will be displayed.
- When LW9130 is 1, the contents corresponding to Language 2 in Text Library will be displayed.
- When LW9130 is 2, the contents corresponding to Language 3 in Text Library will be displayed.
- When LW9130 is 31, the contents corresponding to Language 32 in Text Library will be displayed.
- When LW9130 is greater than 31, the contents corresponding to Language 1 in Text Library will be displayed.

- **Note:** Once a text title is registered in the Library, it cannot be modified in the [Text Library] dialog box.

8.1.1. Import/Export Text Library function

a) Export the Text Library:

Text Library can be exported in .csv format following the next steps:

- On the Tool Bar select [Option] – [Text Library], then in the Text Library window [Export] function can be executed and define the path and name for the file to be exported. Confirm the export operation with the pop-up message 'The file is exported successfully'.

b) Open and modify the Text Library:

This .csv file can be opened and modified with spreadsheet software including the new languages under the corresponding column (e.g. Language 5).

Text Lib	V100							
Name:	Test							
Status:	1							
Language	Language1	Language2	Language3	Language4	Language5	Language6	Language7	Language8
0	Hello	Hola	Salut	Ciao				

Text Lib	V100							
Name:	Test							
Status:	1							
Language	Language1	Language2	Language3	Language4	Language5	Language6	Language7	Language8
0	Hello	Hola	Salut	Ciao	Hallo			

Once the Text Library has been modified as desired, it must be saved as 'Unicode Text (*.txt)' format, then, rename the file name with '.csv' extension. The other file formats cannot be recognized as available file to import by NB-Designer.

▪ **Considerations for editing the Text_Lib.csv file:**

- Default cells ('Text Lib', 'Name' and Status') cannot be changed, otherwise import will not be possible.
- The value of 'Status' must be consistent with the actual status lines. E.g. if it is 2, the two status must contain '0' and '1'.
- If new line is used, the content of exported .csv file will include '\$_return_\$\$_enter_\$' as a carrier return and line feed. See following example:

	B5						
	A	B	C	D	E	F	G
1	Text Lib	V100					
2	Name:	one					
3	Status:	1					
4	Language	Language1	Language2	Language3	Language4	Language5	Language6
5	0	OFF\$ retu	オフ\$_return_\$\$_enter_\$2分				
6	1	ON	オン				
7							

c) Import the Text Library:

In the Text Library window, select [Import], look for the .csv file modified and [Open]. Confirm the import operation with the pop-up message 'Import file successfully'.

- If the imported file in .csv format has items with the same name that in the existing Text Library of the system, the selection dialog box will pop up. Then, select "Yes" or "No" according to the circumstances.

➤ **Note:** Refer to the manual 'V106 NB Designer Operation Manual' section '3-8-1 Text Library'.

8.2. Recipe customization

If it is necessary to modify the size of the recipe record (that is, the length of the record and the number of records on which to search) it is first necessary to modify the macro named 'init.c', as shown in the following picture:



In the following section, a practical example of recipe customization is proposed.

- **Note:** The maximum size of the recipe table provided for the search function must not exceed 320,000 channels for 7 or 10 inches models (i.e. 10,000 records with 32 channels each) or 160,000 channels for 3 and 5 inches.

8.2.1. Recipe customization example:

The intention is to configure a recipe table consisting of 5,000 records of 30 words each, considering that the 30 words of each record are divided as follows:

- 8 words (16 characters) of description (name of the recipe).
- 22 words of data.

I. Definition of the recipe size:

Access the macro 'init.c' and modify lines 31 and 32 as indicated below:

```
//DEFINE HERE YOUR RECIPE TABLE SIZE

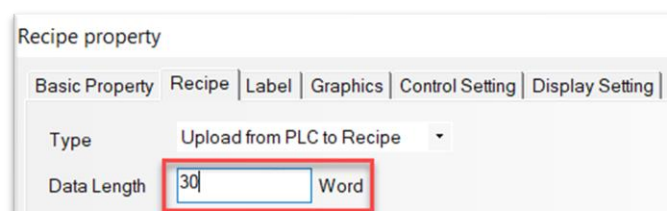
.....
Rec_Length=30; //Record Length (INCLUDING THE RECORD NAME).
Rec_Tot_Num=5000; //Records total number (to define the search area)

.....
//Default TOTAL SIZE: 120000
```

In this way the new dimensions of the recipe table have been defined.

II. Editing the Upload and Download commands of the records:

Since the default length of the records is 12, it is necessary to modify the commands dedicated to the transfer of the recipes from/to the PLC. Double click on the Upload and Download from PLC commands in the bottom part of the screen (PLC data area) and, in the [Recipe Data] tab indicate the new length (in word) of each record (30):



- **Note:** In the 'Basic Attributes' tab, it is also required to change the source/destination address (PLC address) of the recipe data transfer operation.

III. Changing the size of the description:

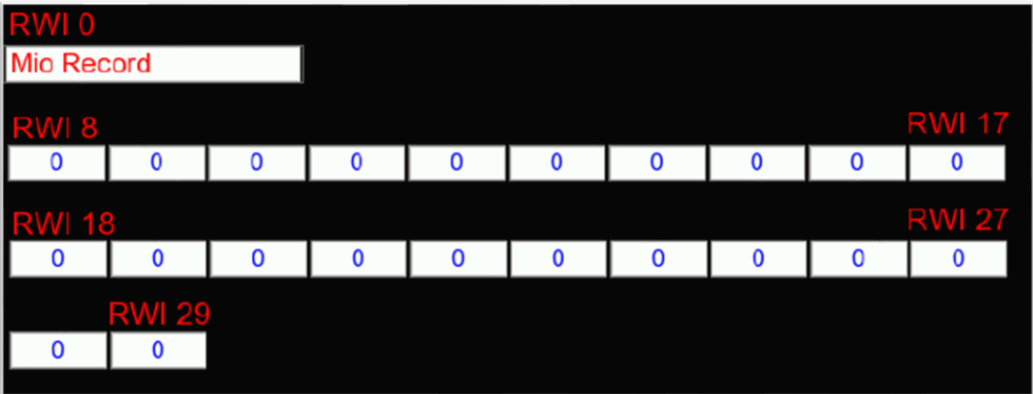
If the length of the description field of each record is different from the 10 words provided by default, it is necessary to indicate the new length in each of the text components present in the recipe management page (also, the one present in the record editing page).

For this example, set 8 words in the 'Word Length' field:

- **Note:** It is not necessary to change the addresses associated with the objects. It may only be necessary for the PLC text component as mentioned above.

IV. Update the record editing page:

The default page for editing the selected record (page number 36, called 'Recipes2') includes a description field (of 10 words) and two numeric fields (of one word each). It is therefore necessary to configure the record editing page according to the new structure of the table. For this example, considering 8 words of description and 22 words of data (designed for convenience, all 16 words) the new page for editing the record selected may be similar to the following (some reference addresses are also displayed):



- **Note:** The record to be modified (selected record) will always start at the *RWI0* address and will end at the *RWI* address depending on the length of the record (in the case, for example, *RWI29*).

8.2.2. **Additional information**

Many of the commands used trigger macros when pressing. For instance, the 'SEARCH!' button, triggers the execution of the Macro named 'search_rec'.

The code is available for 'copy and paste' operation which is described in Section 7.3 from this manual. For all NB-Designer versions **before v1.51**, it will be necessary to export the variables used in the Macro, simply click with the right mouse button in the variable table shown below and select 'Export Variable ':

Parameters[search_rec.c]						
Data Type	Param name	PLC No.	PLC Address...	Address	Word...	OptMode
unsigned int	Rec_Index		LW	9000	2	Read/Write
unsigned int	Record		LW	1004	2	Read/Write
unsigned int	Rec_Tot_Num		FRW	1000		
unsigned int	Rec_Lenght		FRW	1002		
bit	Start_Mode		LB	1000		

Add Variable

Delete Variable

Modify Variable

Export variable

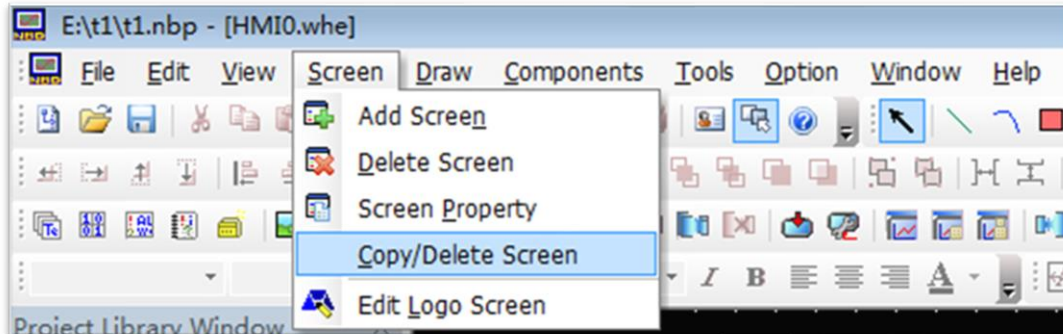
Import variable

An import file will be generated, which can be imported in the macro of another project following the same procedure and selecting 'Import Variable'. For the reuse of all the other macros applies what has already been indicated for the search macro.

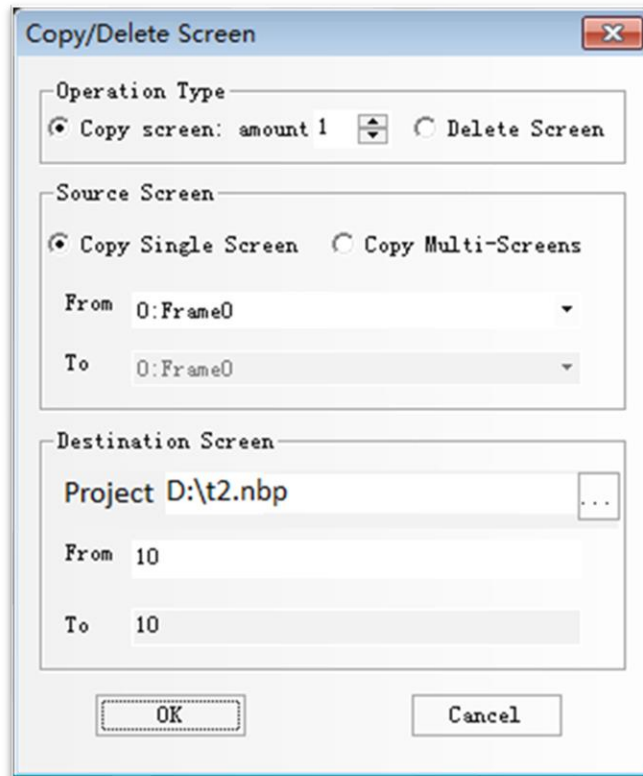
8.3. Copy and Paste functionality

Copy and paste operation between projects can be carried out following the next steps:

- I. Open both projects (NB-HMI template and Destination project).
- II. Open the desired Screen to be copied and select [Screen] – [Copy/Delete Screen] from the menu bar.



- III. A pop-up window will appear to select how many number of screens are going to be copied (single screen or multi-screens) and the destination project. If destination project is not selected, screens are copied within source project. Otherwise, screens are copied to end of screen list in destination project. Also, if destination project is not opened, after click [OK], it will be opened.

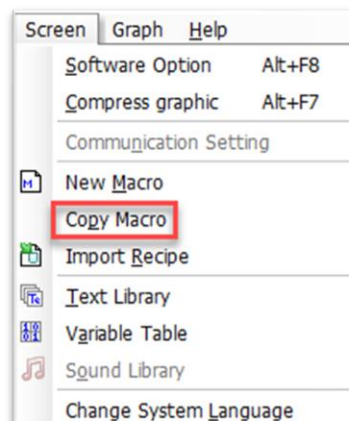


- **Note:** If there are any conflicts such as macro name or memory area addresses, the corresponding pop-ups will be displayed to perform the desired operation. For further information, refer to manual “*PRACTICES GUIDE NEW FUNCTIONALITIES FOR NB-DESIGNER V1.51*”.

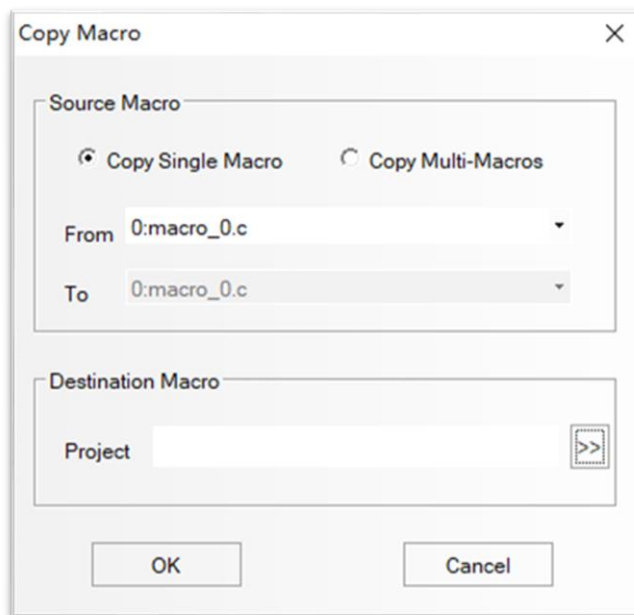
8.3.1. Macro copy and paste

If a macro is used within a screen, it will be copied with the screen copy and paste procedure described above. However, if a single macro needs to be copied, it should be performed the following steps:

- Select in the tool bar menu [Screen] – [Copy Macro].



- II. A pop-up window will appear to select if the copy and paste procedure is for a single macro or multi-macro. Besides, the destination project can be selected.



- **Note:** Because of name conflict, Macros can't be copied within source project. If destination project is not selected, warning message will pop up: "Please select destination project". Otherwise, Macros are copied to end of macro list in destination project. For further information, refer to manual "*PRACTICES GUIDE NEW FUNCTIONALITIES FOR NB-DESIGNER V1.51*".

9. Contributions

This section is to thank the people that have contributed to do the NB-HMI Faceplate, for development purposes and validation of translations:

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10. Credits

Some of the icons used in the screens are from Flaticon.com. In this section the attributions for using them are collected:

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[Data icons created by srip - Flaticon](#)

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[Connection icons created by srip - Flaticon](#)

[Robot icons created by Freepik - Flaticon](#)

[Database icons created by Pixel perfect - Flaticon](#)

[Gear icons created by Prosymbols - Flaticon](#)

11. Revision History

Revision Code	Date	Author	Revised Content
01	April 2020	Antonio Núñez	Original production
02	July 2021	Àngel Matilla	Version 2 update
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