NB-series

Start-up User's Guide Manual

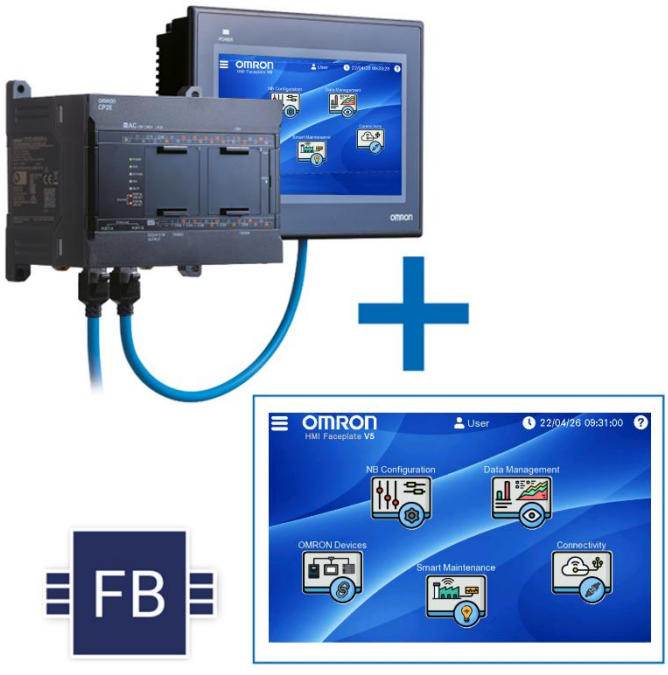
NB-HMI Faceplate V5

NB3Q-TW□□B (-V1)

NB5Q-TW□□B (-V1)

NB7W-TW□□B (-V1)

NB10W-TW01B (-V1)



Contents

1. Related Manuals

Cat. No.	Models	Title
V106	NB3Q-TW☐☐B(-V1) NB5Q-TW☐☐B(-V1) NB7W-TW☐☐B(-V1) NB10W-TW01B(-V1)	NB-series Programmable Terminals NB-Designer OPERATION MANUAL
V107	NB3Q-TW☐☐B(-V1) NB5Q-TW☐☐B(-V1) NB7W-TW☐☐B(-V1) NB10W-TW01B(-V1)	NB-series Programmable Terminals SETUP MANUAL
V108	NB3Q-TW☐☐B(-V1) NB5Q-TW☐☐B(-V1) NB7W-TW☐☐B(-V1) NB10W-TW01B(-V1)	NB-series Programmable Terminals HOST CONNECTION MANUAL
V109	NB3Q-TW☐☐B(-V1) NB5Q-TW☐☐B(-V1) NB7W-TW☐☐B(-V1) NB10W-TW01B(-V1)	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
V468	NB3Q-TW☐☐B-V1 NB5Q-TW☐☐B-V1 NB7W-TW☐☐B-V1 NB10W-TW01B-V1	NB-series Programmable Terminals REPLACE GUIDE FROM NB TO NB-V1

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)
(5) The information in this guide is current as of April 2026.
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.

Copyrights and Trademarks

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 for the common functionalities, without spending time: just "copy and paste" and adjust.

This project has been developed using the newer **NB-Designer version 1.67**; therefore, it is not compatible with previous versions of the software. In addition, it has been designed for **NB7-V1** hardware and is not compatible with previous hardware versions.

The project structure and functionalities are described in the following sections. Besides, the project implements a multilanguage feature with support for up to 12 languages in all pages. To add new languages, refer to Section 8.1 of this manual.

The functionalities added in V4 are:

- TM Cobot pages fix and upgrade to hw5.0.
- Complete safety G9SP CPU, reading of Error Log and Event Log.
- Split of devices in OMRON Devices section and new Smart Maintenance section.
- RT100 Data Collector Module connection.
- K6CM-CI2M connection.
- K6PM-TH connection.
- E5DC: Included in same chapter than E5CC as the configuration with NB is the same.
- EJ1 temperature controller.
- S8VK-X connection.

The new features of NB-HMI Faceplate V5 are summarized in the next chapter and detailed in this manual.

Further information about the NB Faceplate concept, features, and applications is available on the Omron Europe website.
Go to NB Faceplate | OMRON Europe website

A full playlist of 14 tutorial videos is available on YouTube and divided into two sections:

- Introduction videos
- Step-by-step customization guides

All videos include English subtitles, with automatic translation available through YouTube.
Watch the YouTube videos

4. New pages and features NB-HMI Faceplate V5

In this chapter, the changes and new functionalities added in NB-HMI Faceplate V5 are summarized:

- NX1P2 connection*.
- M1 STD connection.
- M1 ECT connection*.
- KM-PMBN-EIP connection.
- E5_C backup and restore functionality.

* For NX1P2 and M1 ECT, a Sysmac Studio template project is provided to facilitate device interfacing.

5. Faceplate project structure

The project structure is divided as follows:

- NB Configuration: Events and alarms and User permission.
- Omron Interfaces: CP2E, NX1P2, Safety - G9SP, Inverters, E5_C, EJ1 and Cobot-TM.
- Smart Maintenance: S8VK-X, K6PM-TH, K6CM-CI2M, KM-N2/3, KM-PMBN-EIP, K7GE and RT100.
- Data Management: Data Storage (USB) and Recipes.
- Connectivity: Host Configuration, VNC Server, FTP Server and Web Interface.

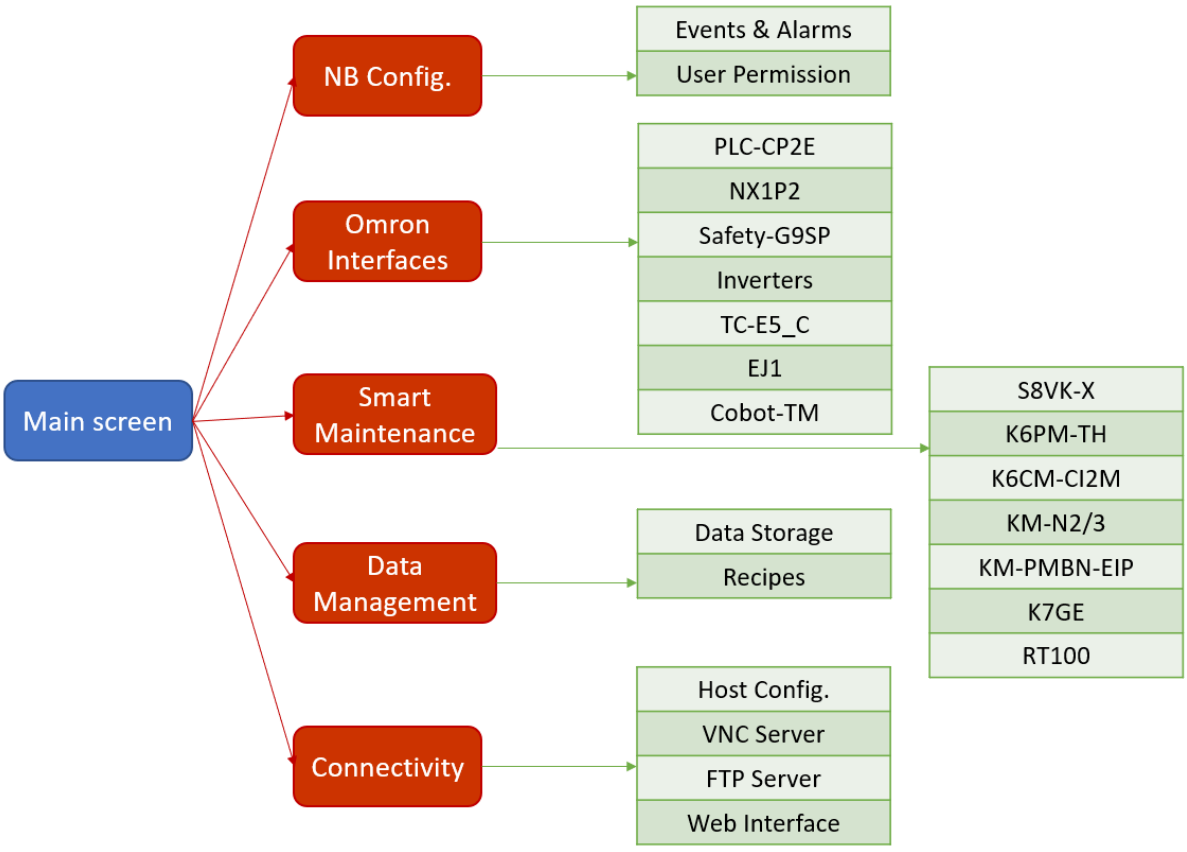


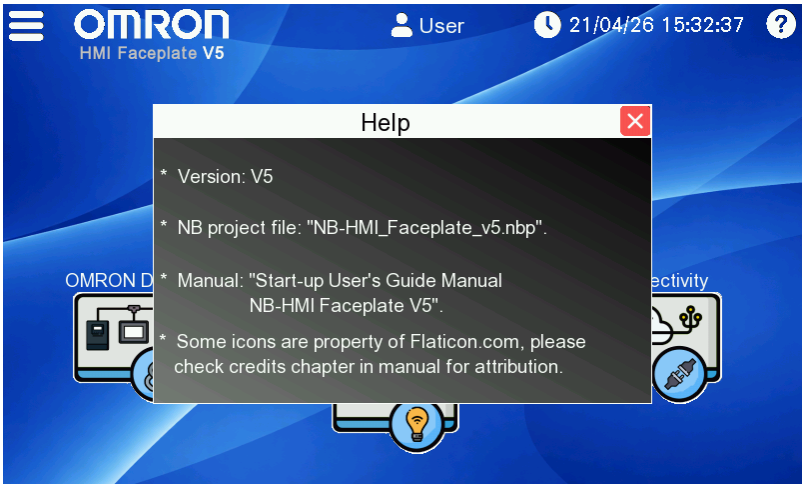
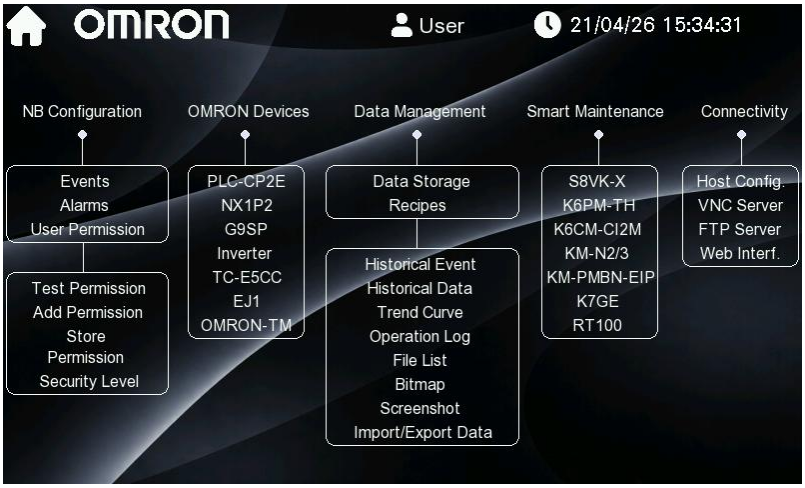
Figure 1: Screen structure

5.1. HMI screens:

The main screen (Page “0:Main”) allows to access to the following main sections:

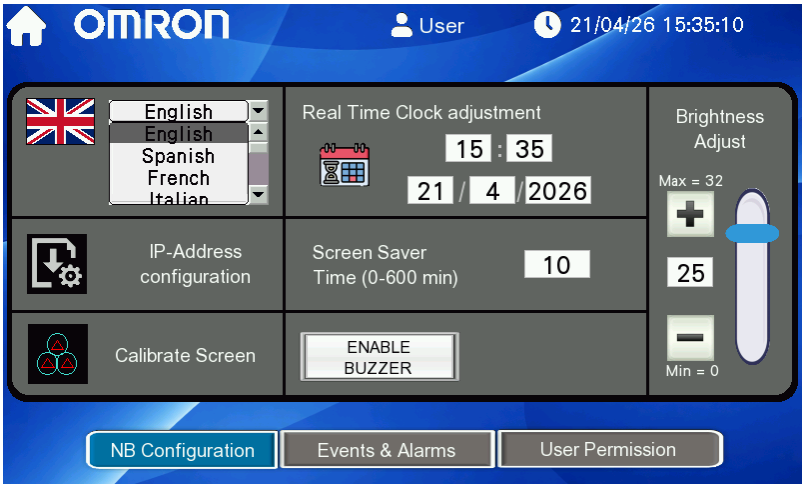
Figure 2: HMI Main Screen (0:Main)

An overview of the different screens is described below.

0.1	**Main screen - Help pop up** Page: (13: Help)	
0.2	**Main screen - Screen Tree** Page: (14: Pages Tree)	

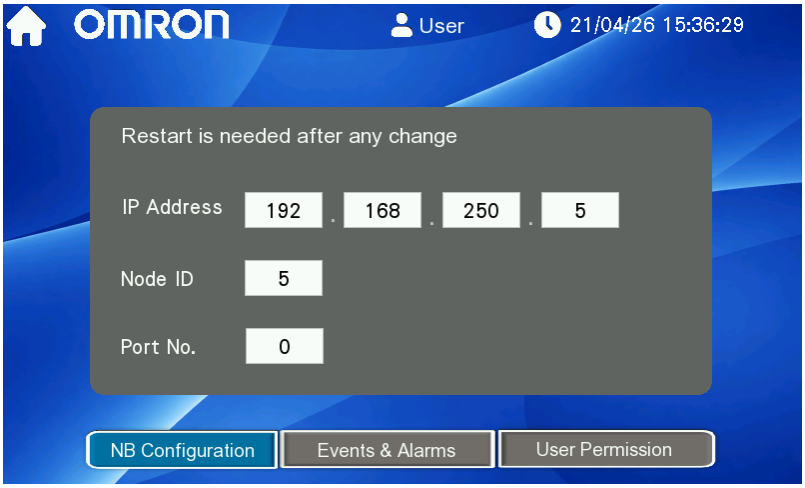
1 NB Configuration

Page:
(100: MAIN - CONFIG)



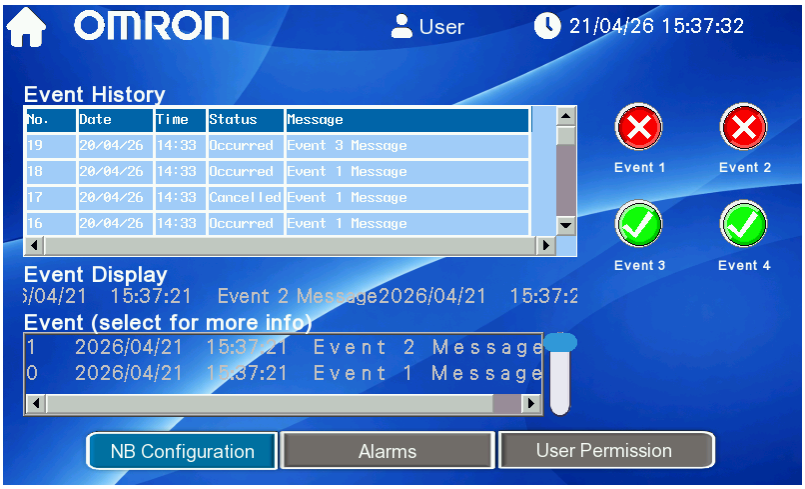
1.1 IP-Address configuration

Page:
(101: IP Config)



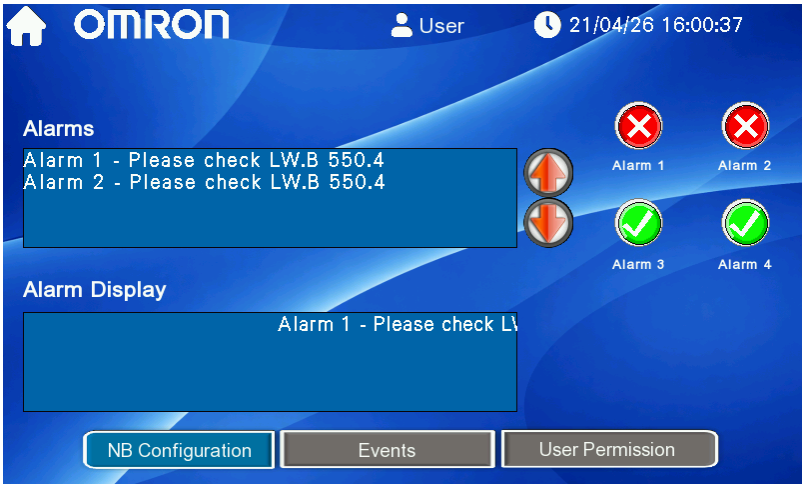
1.2 Events & Alarms

Page:
(102: Events)



1.3 Events & Alarms

Page:
(103: Alarms)

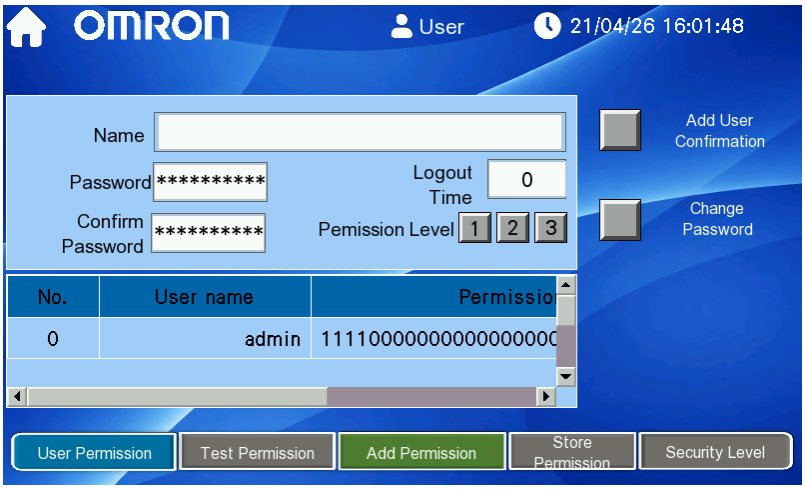


1.4 User Permission - Test Permission

Page:
(104: User Permission)

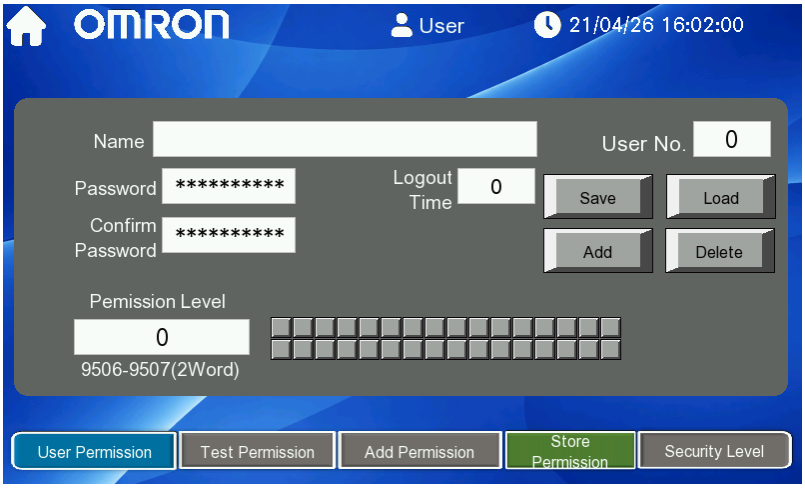
1.5 User Permission - Add Permission

Page:
(105: User Creation)



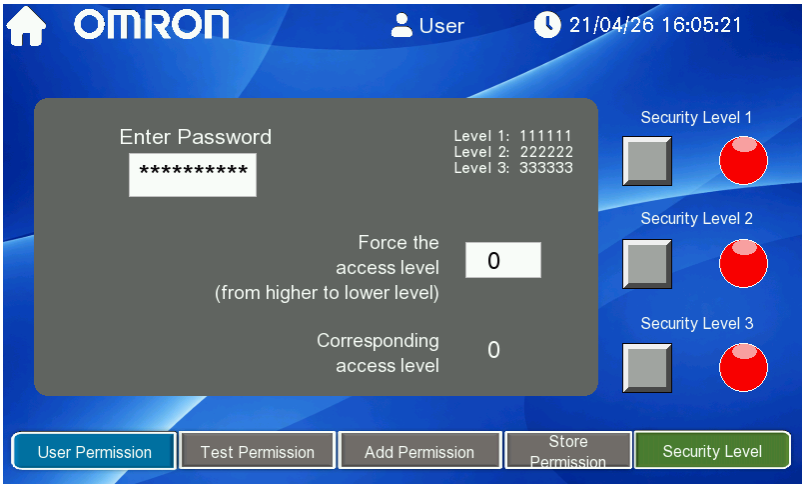
1.6 User Permission - Store Permission

Page:
(106: User Storage)



1.7 User Permission - Security Level

Page:
(107: Security Level)

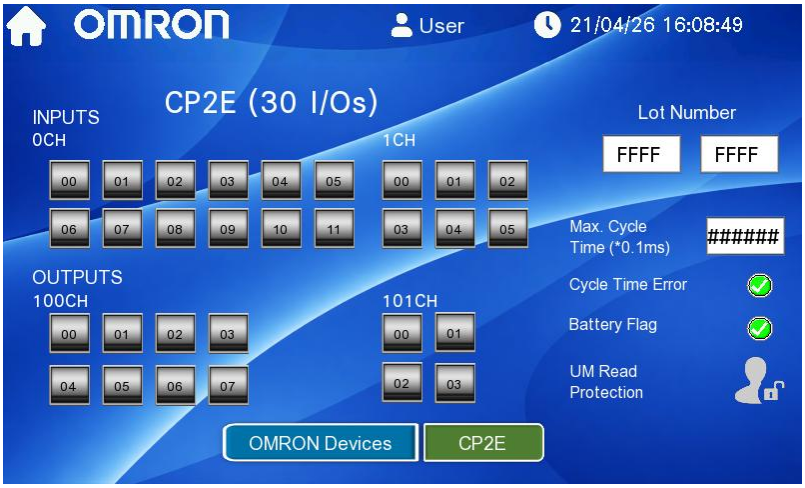


2 Omron Devices

Page:
(300: MAIN - DEVICES)

2.1 CP2E PLC

Page:
(301: CP2E)



2.2 NX1P2

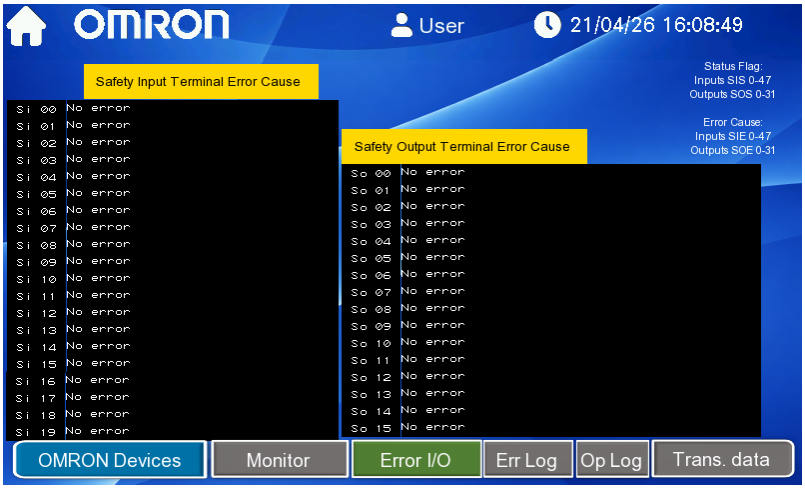
Page:
(302: NX1P2)

2.3 Safety - Monitor

Page:
(303: G9SP Monitor)

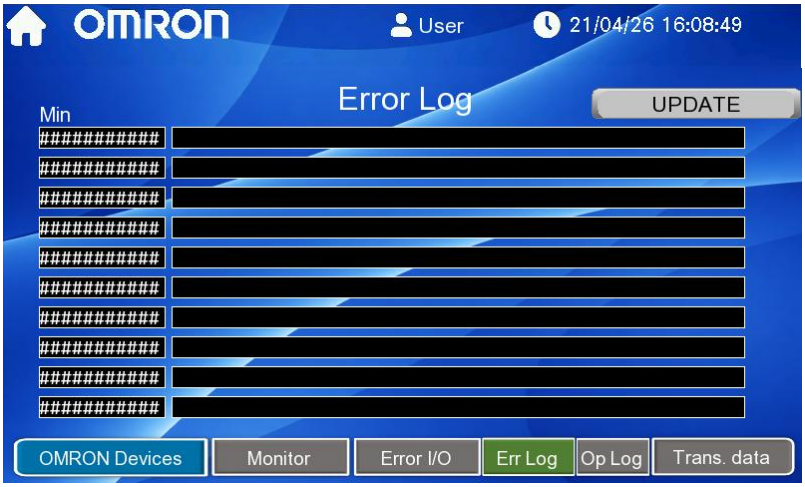
2.4 Safety - Error I/O

Page:
(304: G9SP Error IO)



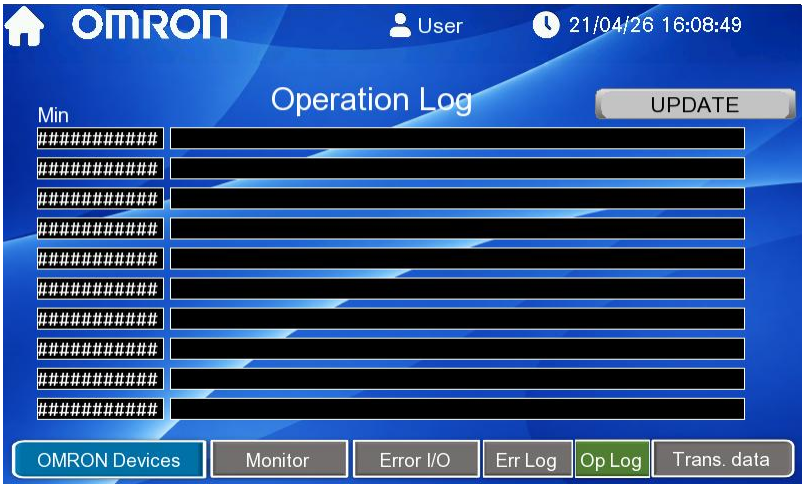
2.5 Safety - Error Log

Page:
(305: G9SP ErrorLog)



2.6 Safety - Operation Log

Page:
(306:G9SP OperationLog)

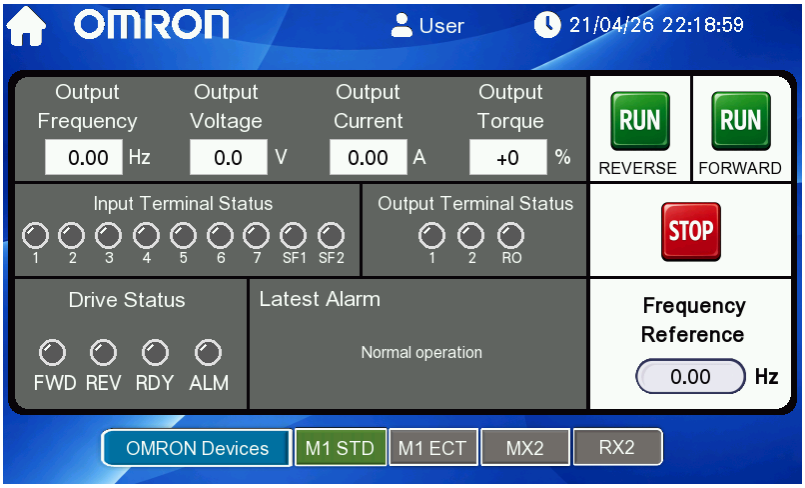


2.7 Safety - Transmission Data

Page:
(307: G9SP TransData)

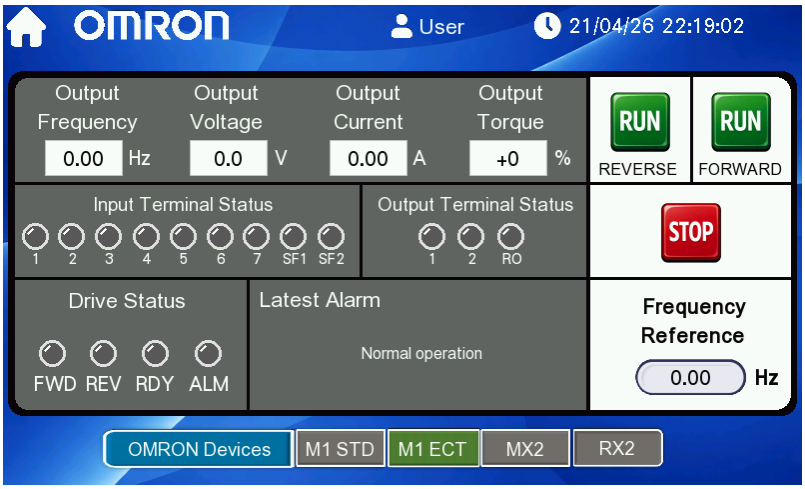
2.8 Inverter M1 STD

Page:
(308: Inverter M1 STD)



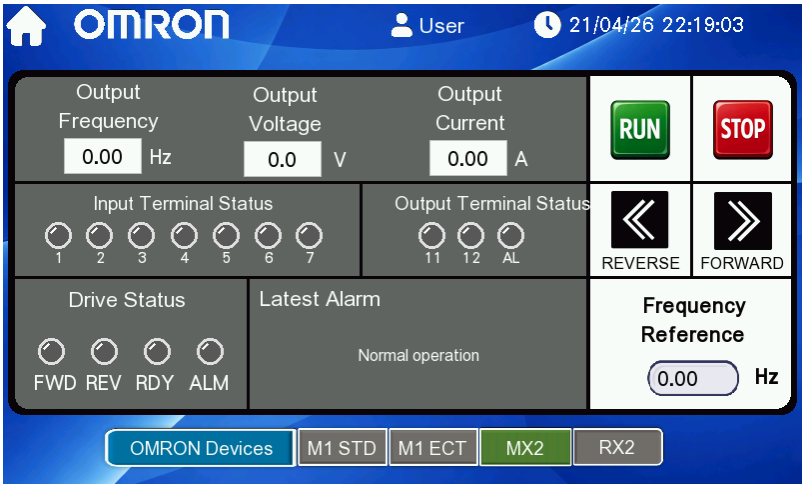
2.9 Inverter M1 ECT

Page:
(309: Inverter M1 ECT)



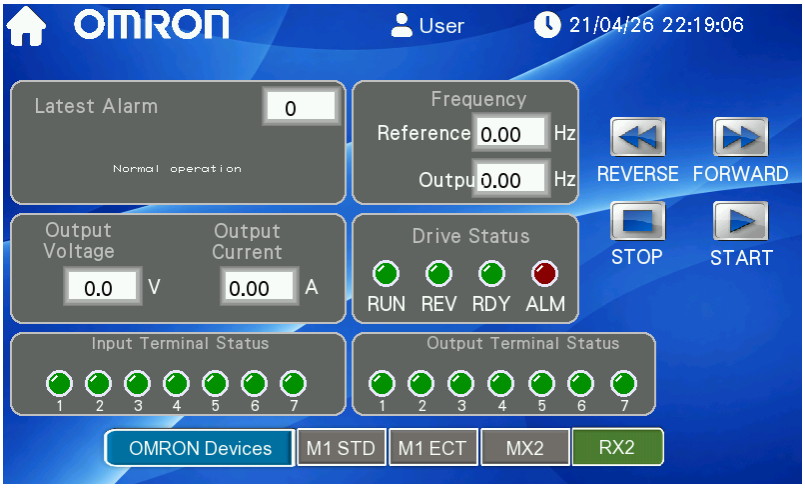
2.10 Inverter MX2

Page:
(310: Inverter MX2)



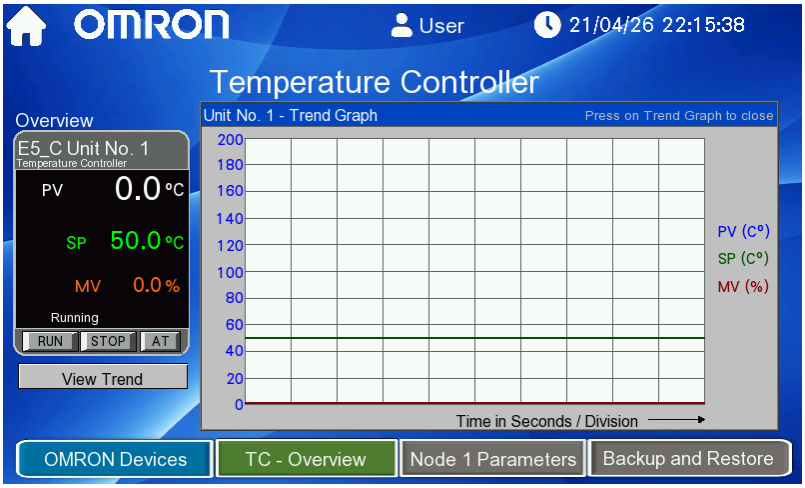
2.11 Inverter RX2

Page:
(311: Inverter RX2)



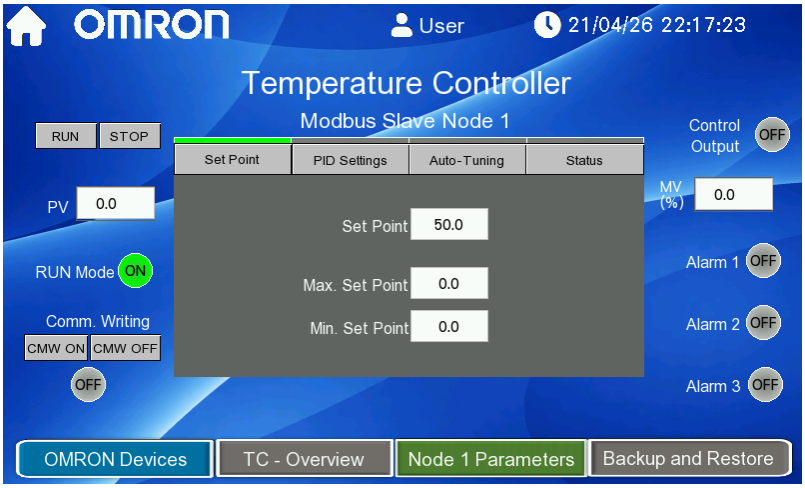
2.12 Temperature Controller - Overview

Pages:
(312: E5_C)
(313: E5_C - Trend)



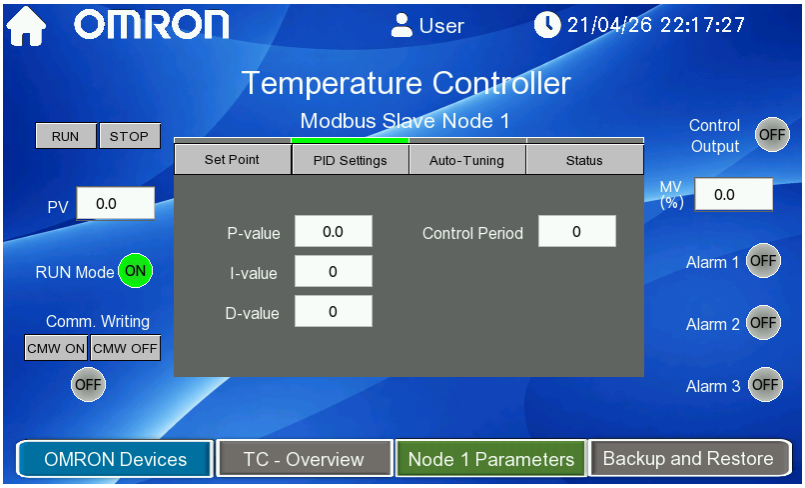
2.13 Temperature Controller - Node 1 Parameters

Pages:
(314: E5_C - Parameters)
(315: E5_C - Parameters (SP))



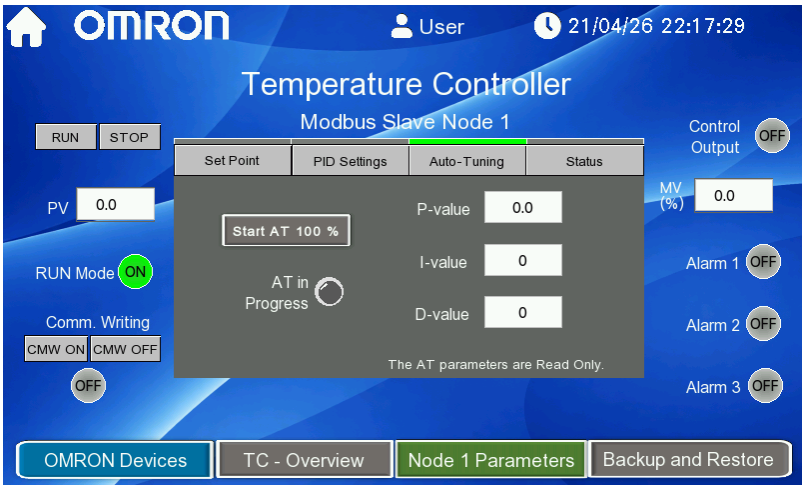
2.14 Temperature Controller - Node 1 Parameters

Pages:
(314: E5_C - Parameters)
(316: E5_C - Parameters (PID))



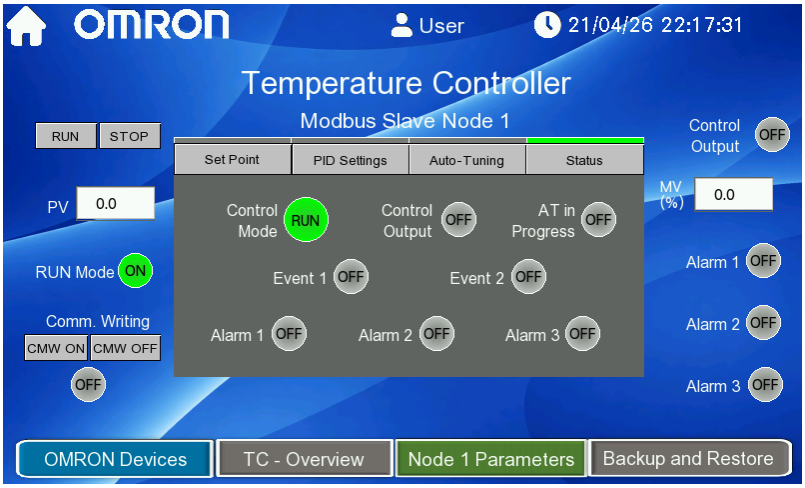
2.15 Temperature Controller - Node 1 Parameters

Pages:
(314: E5_C - Parameters)
(317: E5_C - Parameters (AT))



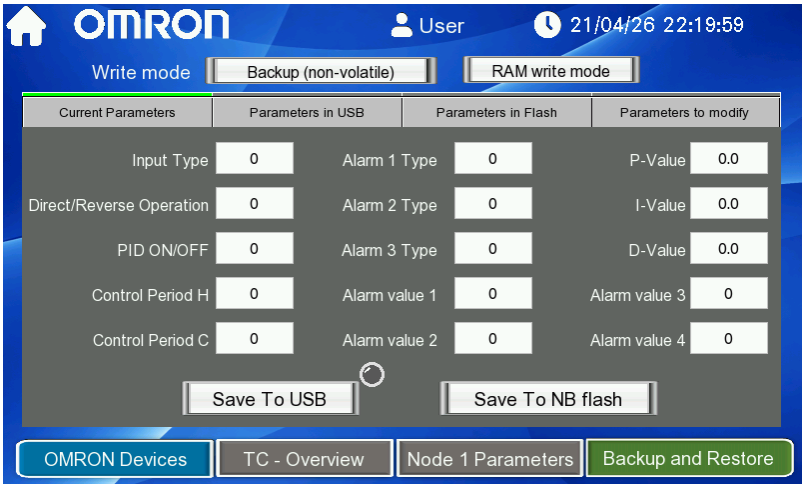
2.16 Temperature Controller - Node 1 Parameters

Pages:
(314: E5_C - Parameters)
(318: E5_C - Parameters (Status))



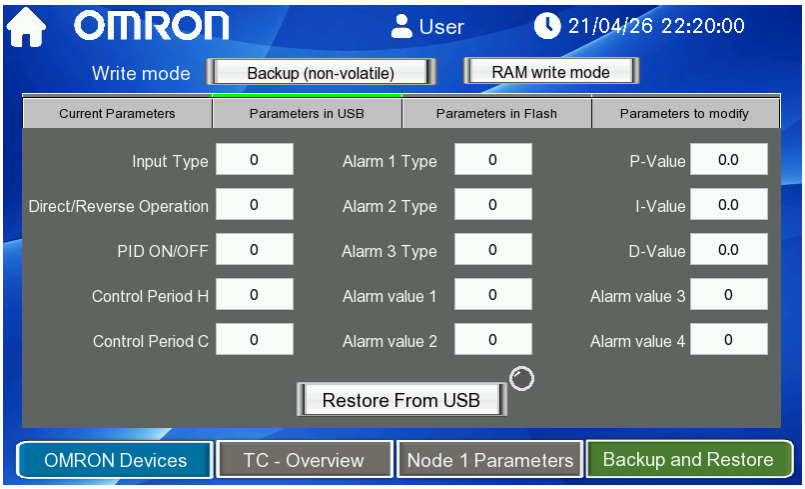
2.17 Temperature Controller - Backup and Restore

Pages:
(319: E5_C - Backup)
(320: E5_C - Backup (Parameters))



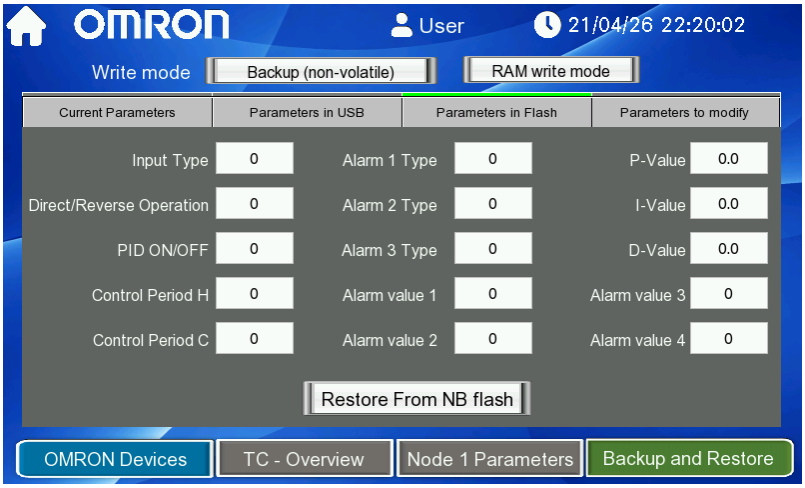
2.18 Temperature Controller - Backup and Restore

Pages:
(319: E5_C - Backup)
(321: E5_C - Backup (in USB))



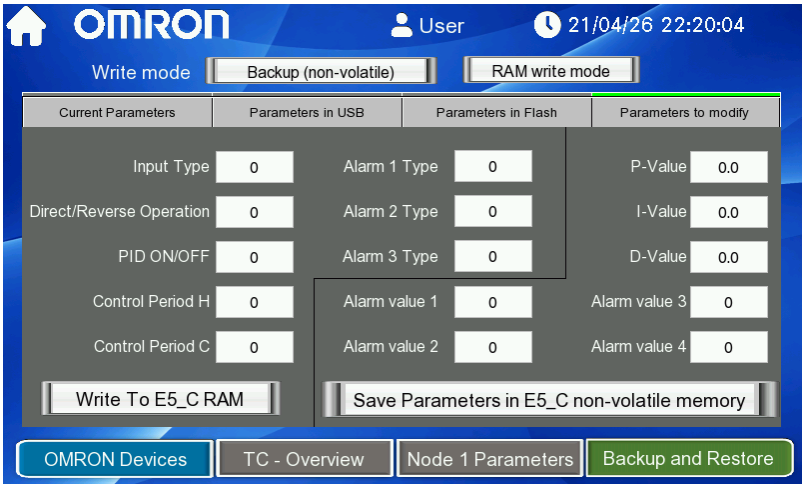
2.19 Temperature Controller - Backup and Restore

Pages:
(319: E5_C - Backup)
(322: E5_C - Backup (in Flash))



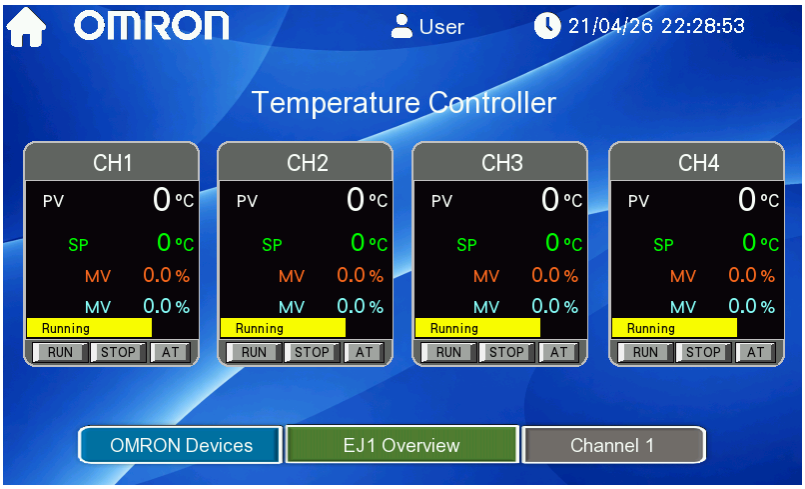
2.20 Temperature Controller - Backup and Restore

Pages:
(319: E5_C - Backup)
(323: E5_C - Backup (Param to modify))



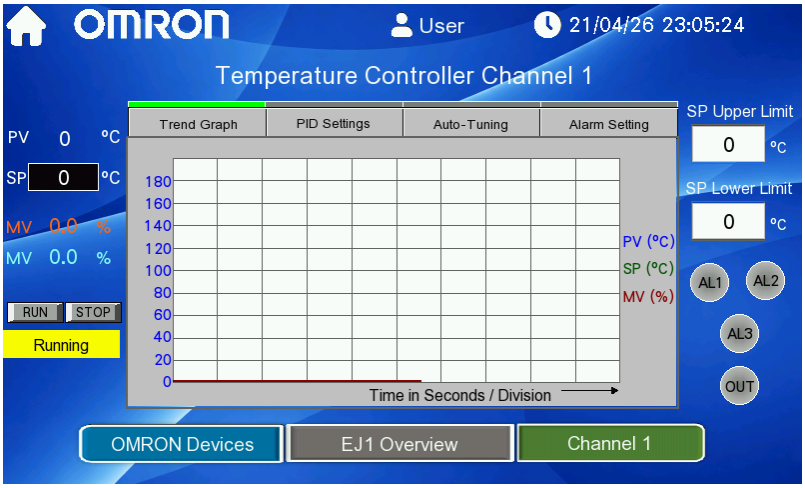
2.21 Temperature Controller channels overview

Page:
(324: EJ1 Overview)



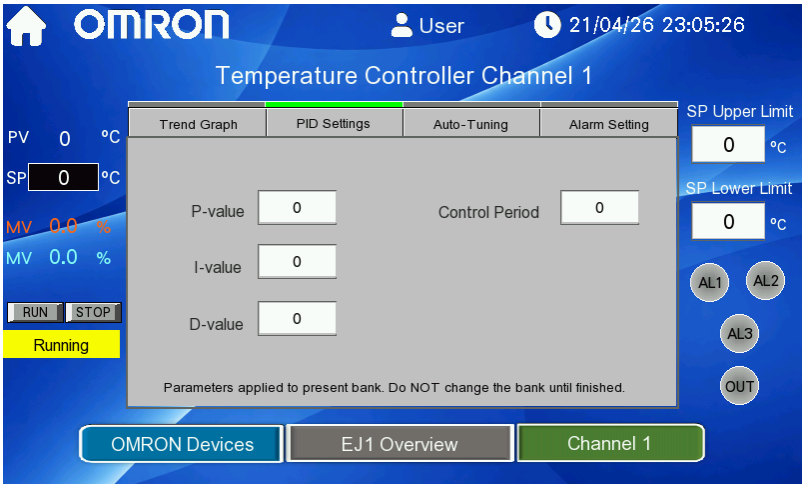
2.22 Temperature Controller - channel 1 trend graph

Pages:
(325: EJ1 CH1)
(326: EJ1 CH1 (Trend))



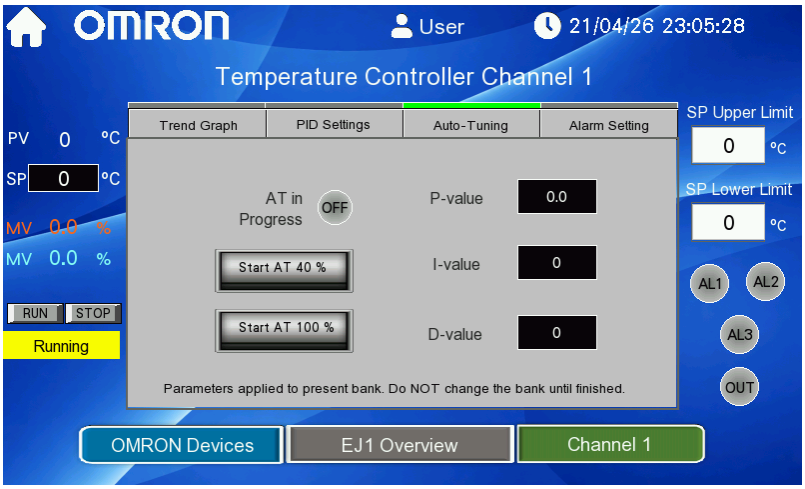
2.23 Temperature Controller - channel 1 PID settings

Pages:
(325: EJ1 CH1)
(327: EJ1 CH1 (PID))



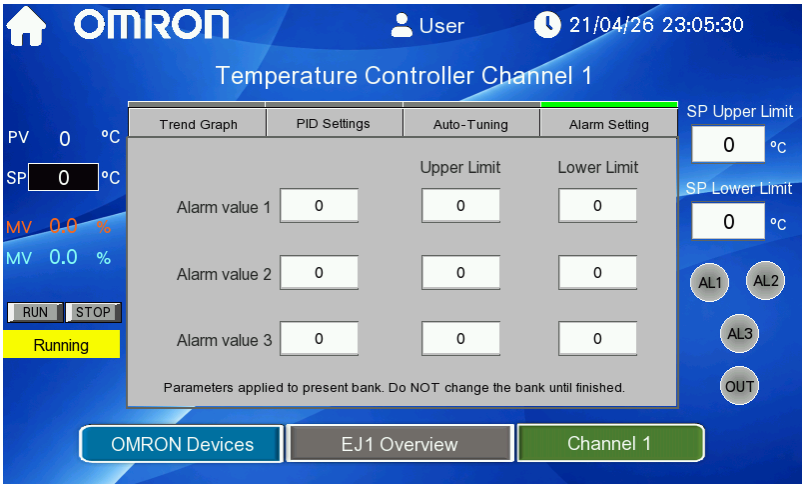
2.24 Temperature Controller - channel 1 Auto-Tuning

Pages:
(325: EJ1 CH1)
(328: EJ1 CH1 (AT))



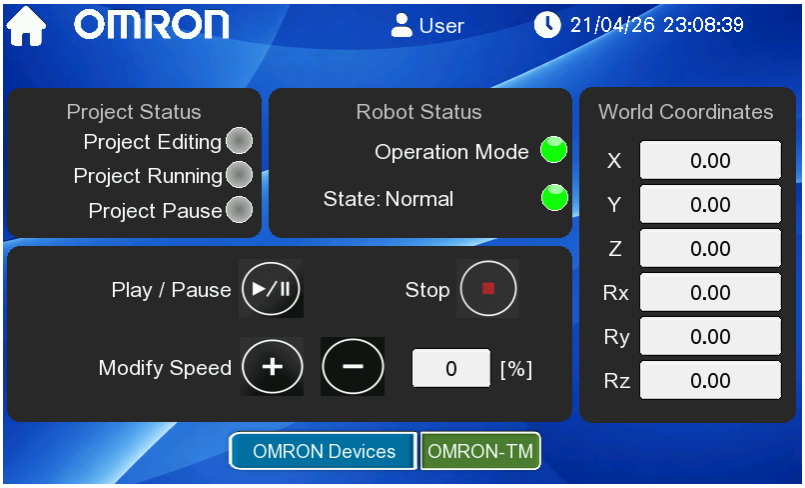
2.25 Temperature Controller - channel 1 Alarm setting

Pages:
(325: EJ1 CH1)
(329: EJ1 CH1 (Alarm))



2.26 Omron - TM

Page:
(330: Omron - TM)

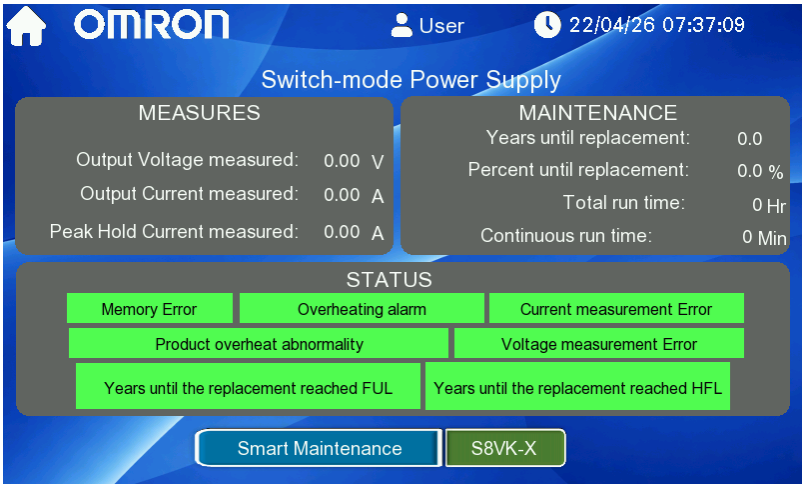


3 Smart Maintenance

Page:
(400: MAIN - SMART)

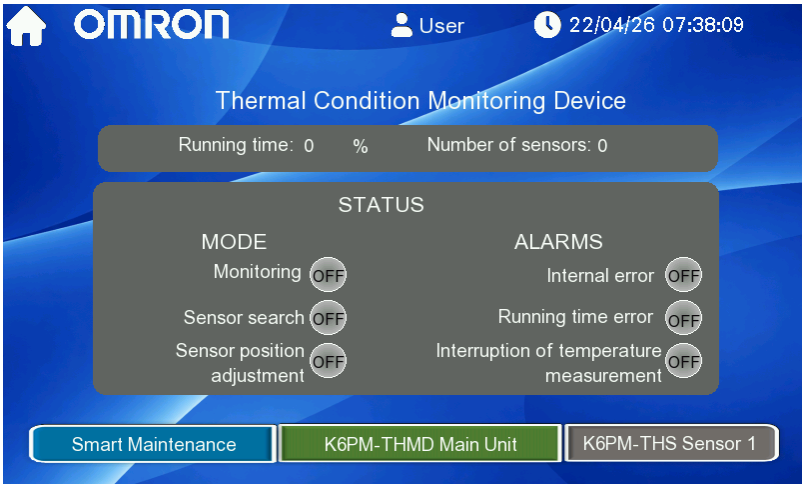
3.1 Switch-mode Power Supply

Page:
(401: S8VK-X)



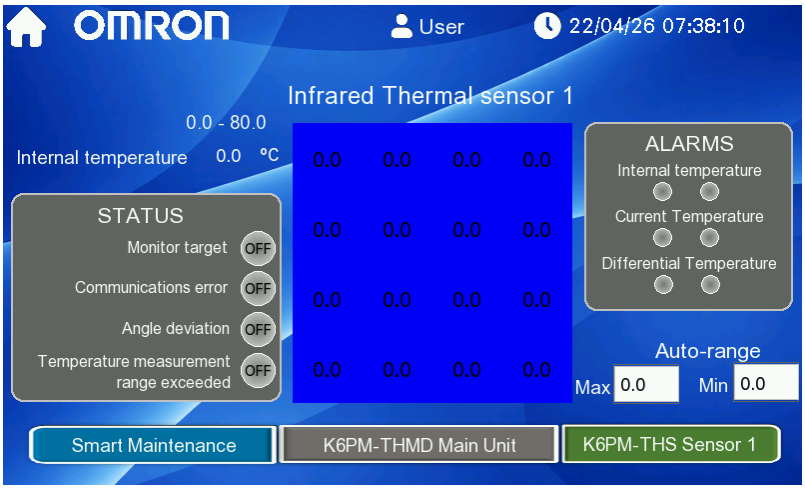
3.2 Thermal Condition Monitoring Device main unit

Page:
(402: K6PM)



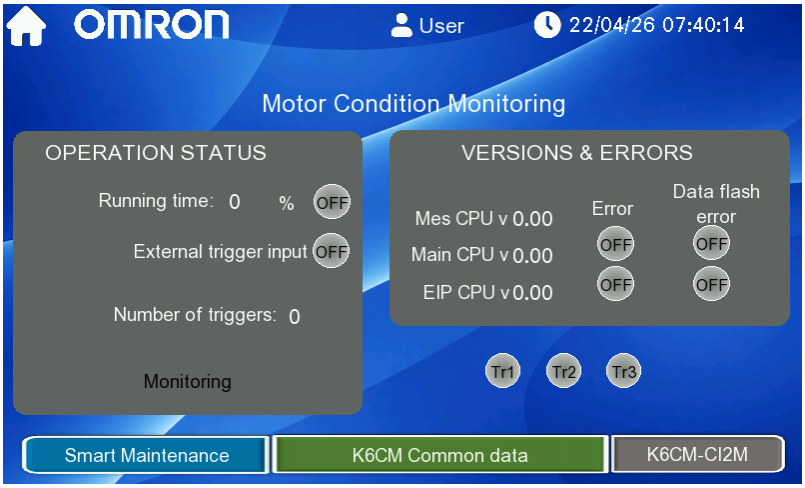
3.3 Thermal Condition Monitoring Device Thermal sensor

Page:
(403: K6PM Sensor)



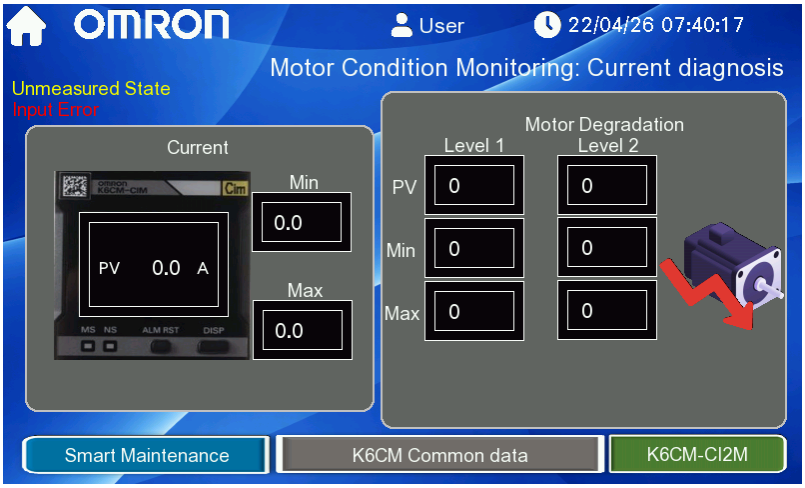
3.4 Motor Condition Monitoring Device

Page:
(404: K6CM)



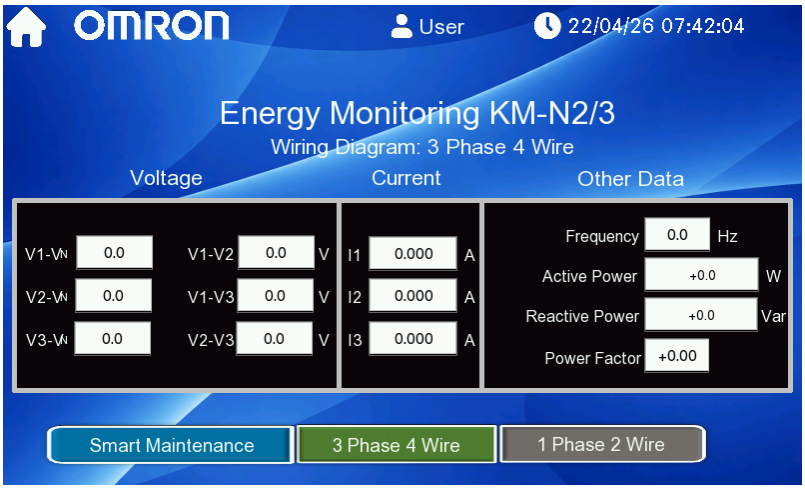
3.5 Motor Condition Monitoring Device Current diagnosis

Page:
(405: K6CM Monitor)



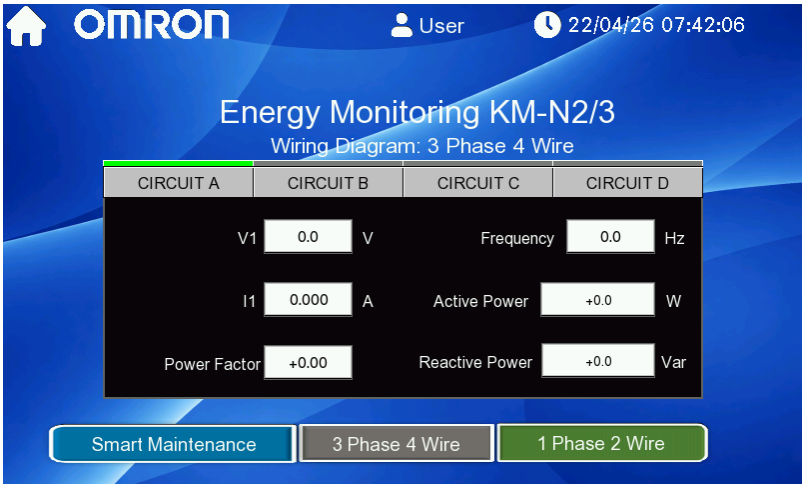
3.6 Energy Monitoring KM-N2/3 - 3 Phase 4Wire

Page:
(406: KMN2/3 3P4W)



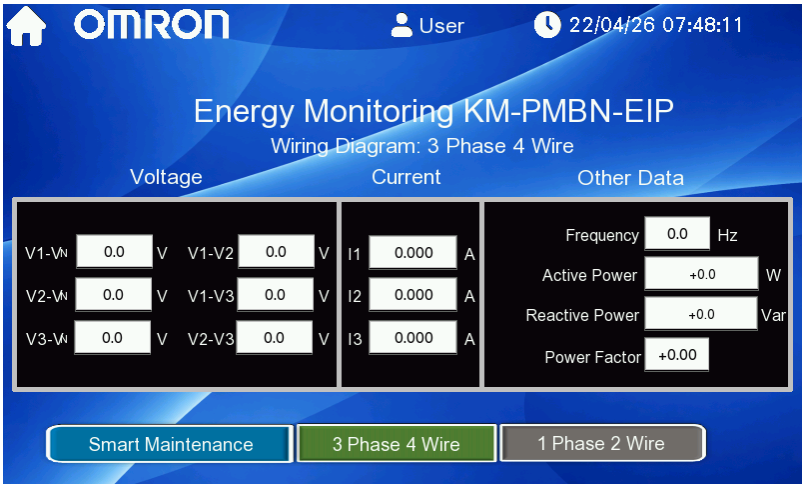
3.7 Energy Monitoring KM-N2/3 - 1 Phase 2 Wire

Pages:
(407: KMN2/3 1P2W)
(408: KMN2/3 1P2W (CA))
(409: KMN2/3 1P2W (CB))
(410:KMN2/3 1P2W (CC))
(411: KMN2/3 1P2W (CD))



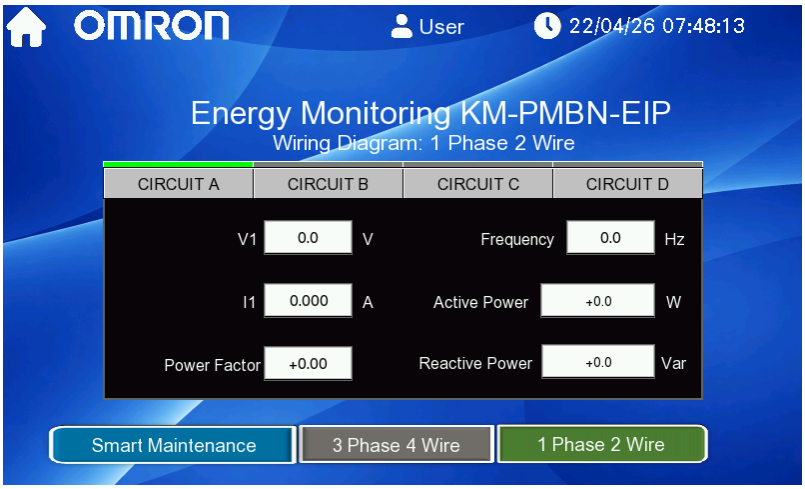
3.8 Energy Monitoring KM-PMBN-EIP - 3 Phase 4 Wire

Page:
(412: KMPN 3P4W)



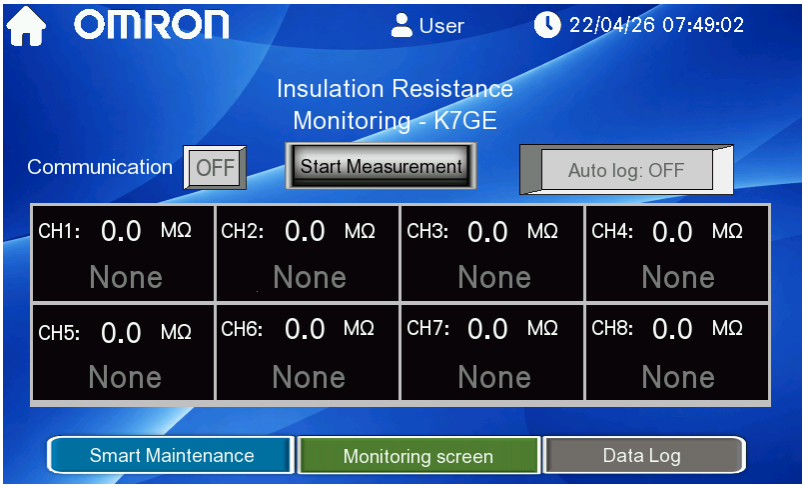
3.9 Energy Monitoring KM-PMBN-EIP - 1 Phase 2 Wire

Pages:
(413: KMPM 1P2W)
(414: KMPM 1P2W (CA))
(415: KMPM 1P2W (CB))
(416: KMPM 1P2W (CC))
(417: KMPM 1P2W (CD))



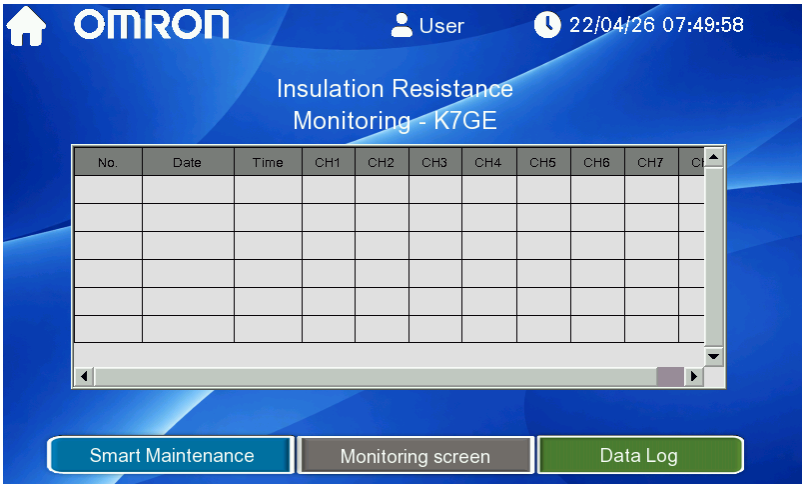
3.10 Insultation Resistance Monitoring - General

Page:
(418: K7GE)



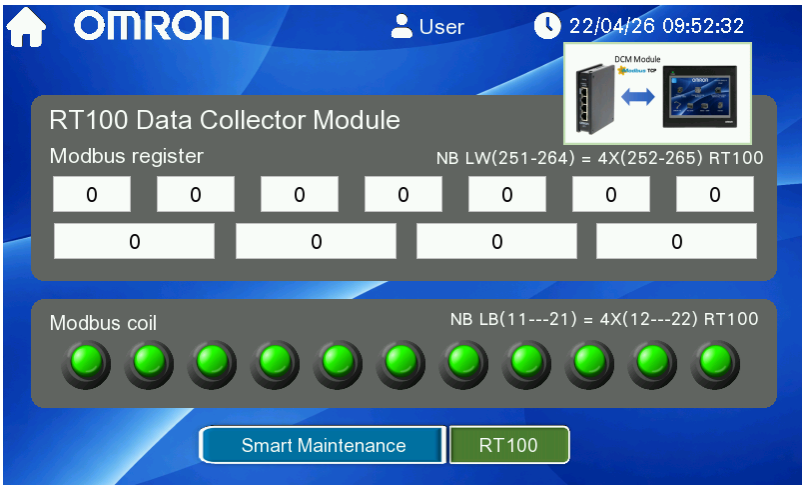
3.11 Insultation Resistance Monitoring - Data Log

Page:
(419: K7GE Datalog)



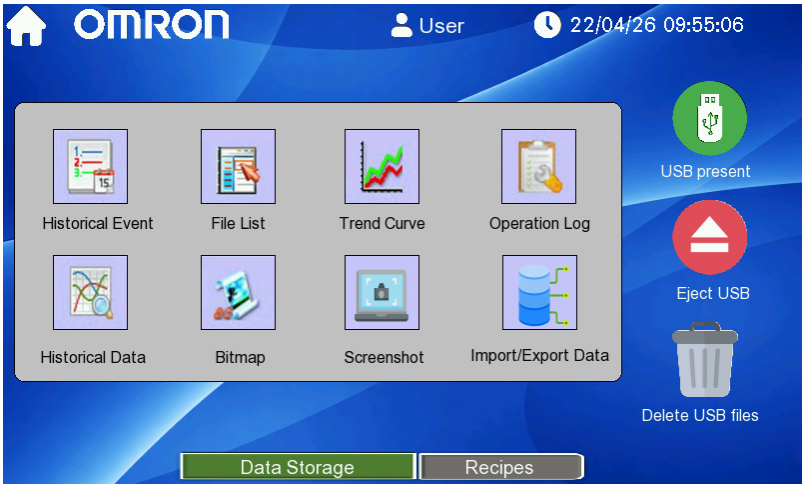
3.12 Remote Maintenance Solution Data Collector Module

Page:
(420: RT100)



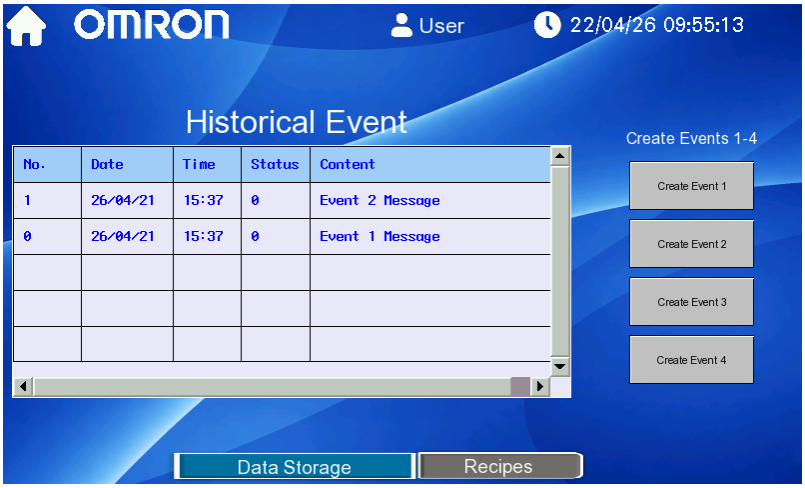
4.1 Data Management: data storage

Page:
(200: MAIN - DATA)



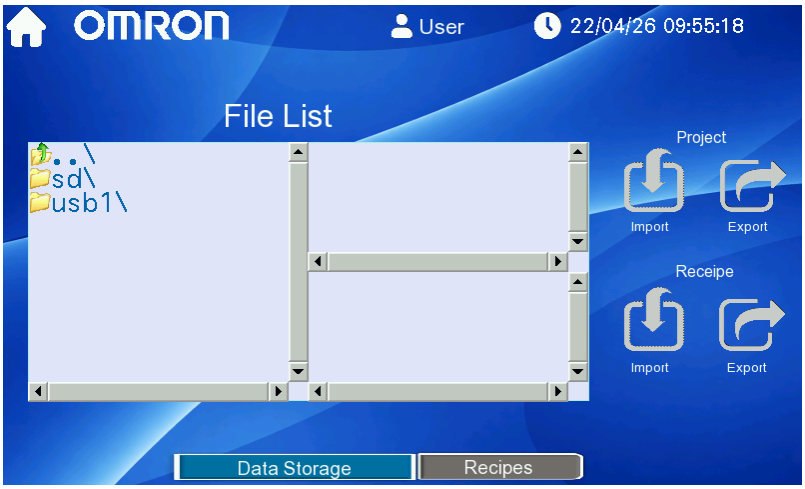
4.1.1 Data Management: data storage - Historical Event

Page:
(201: Historical Event)



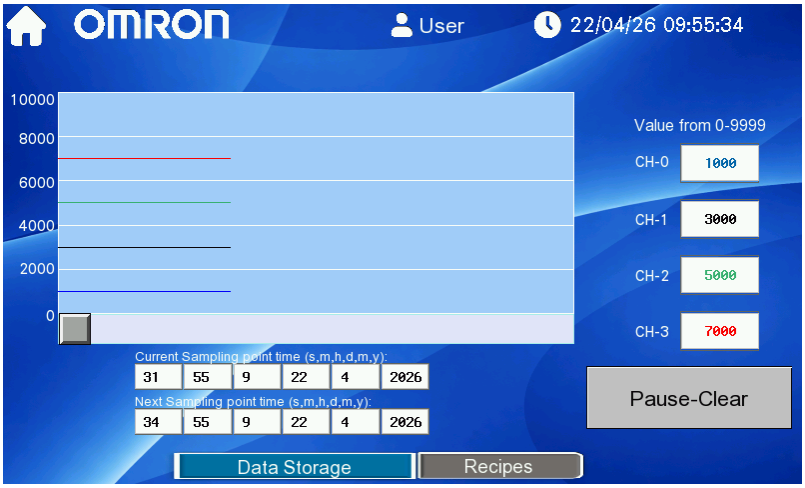
4.1.2 Data Management: data storage - File List

Page:
(202: File List)



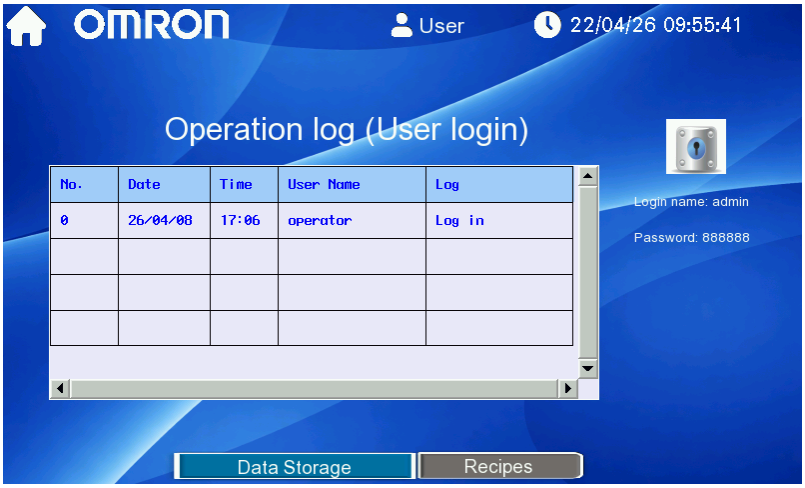
4.1.3 Data Management: data storage - Trend Curve

Page:
(203: Trend Curve)



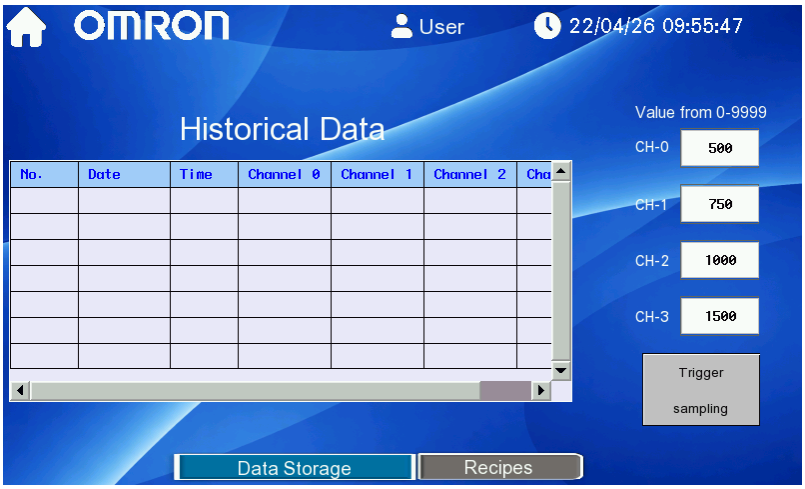
4.1.4 Data Management: data storage - Operation Log

Page:
(204: Operation Log)



4.1.5 Data Management: data storage - Historical Data

Page:
(205: Historical Data)

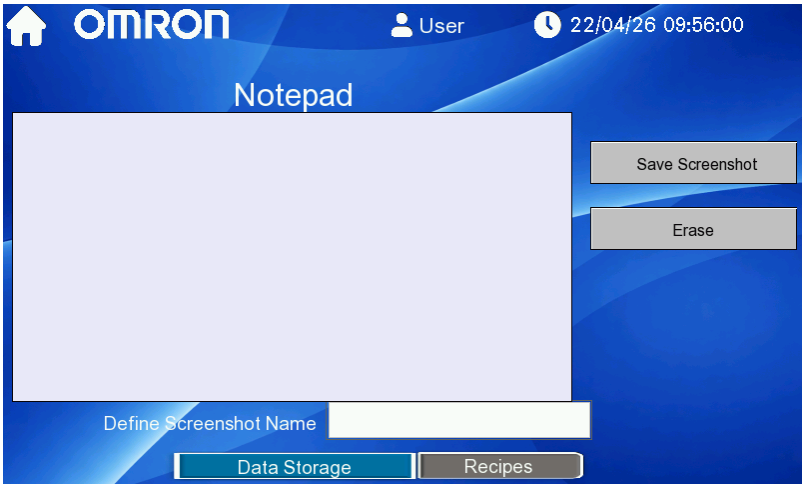


4.1.6 Data Management: data storage - Bitmap

Page:
(206: Bitmap)

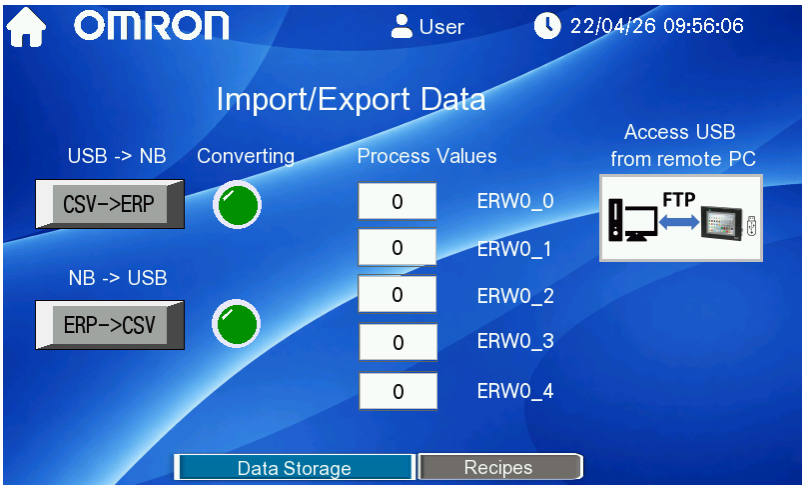
4.1.7 Data Management: data storage - Screenshot

Page:
(207: Screenshot)



4.1.8 Data Management: data storage - Import/Export DATA

Page:
(208: ImportExport Data)

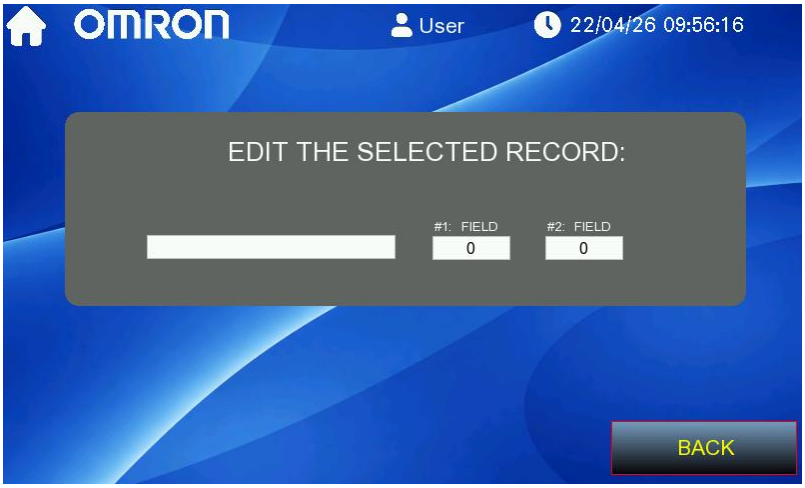


4.2 Data Management: Recipes

Page:
(209: Recipes)

4.2.1 Data Management: Edit Selected Record

Page:
(210: Recipes - Edit)

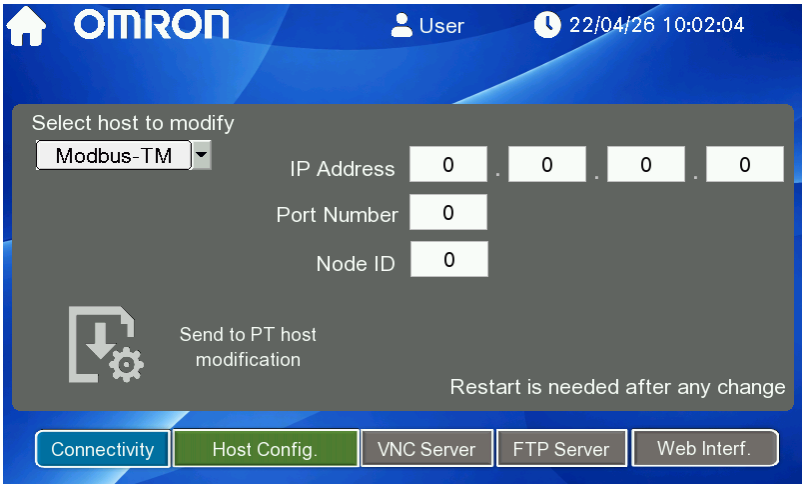


5 Connectivity

Page:
(500: MAIN - CONNECT)

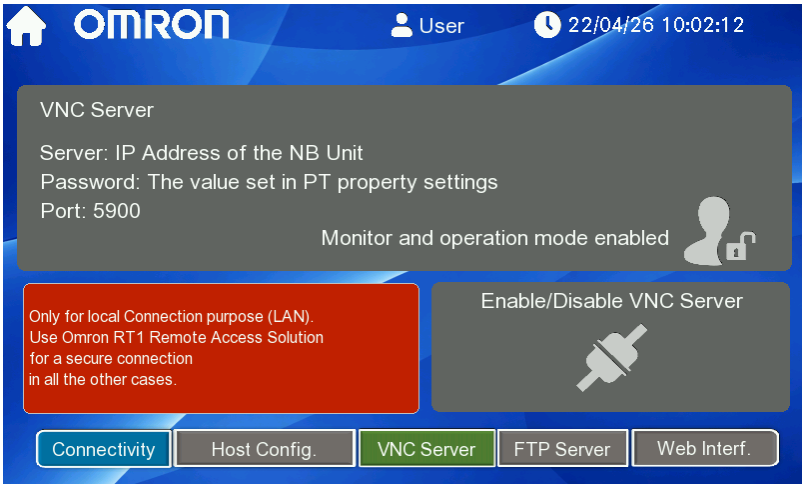
5.1 Host Configuration

Page:
(501: NetworkConfig)



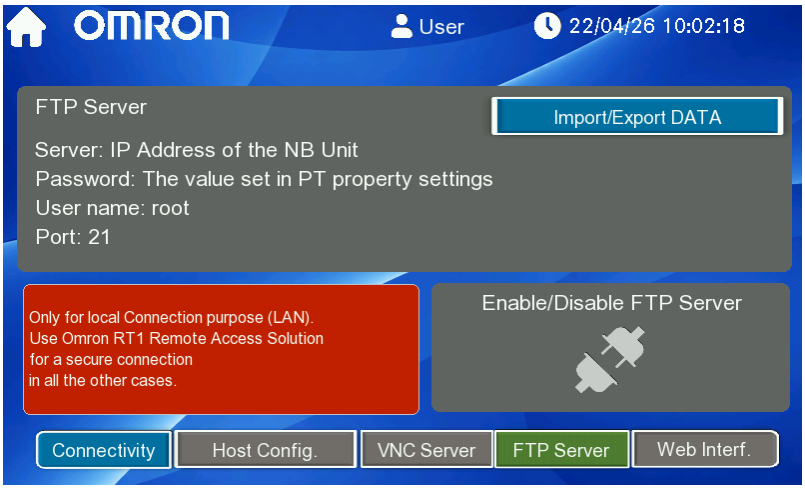
5.2 VNC Server

Page:
(502: VNC)



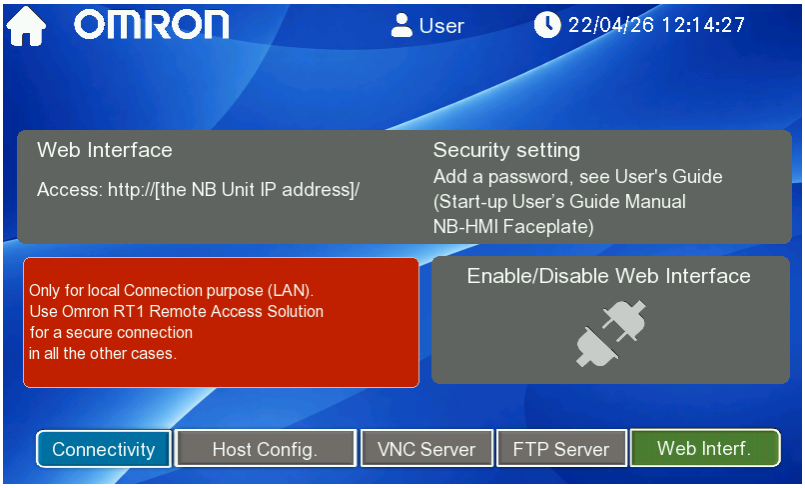
5.3 FTP Server

Page:
(503: FTP)



5.4 Web Interface

Page:
(504: 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.*1
5. Adjust PT Brightness.

All these System Memory Addresses are described in the *V106-E1-28 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.

*1: The are 12 languages available in the project. They can be selected from the dropdown menu:

1. English
2. Spanish
3. French
4. Italian
5. German
6. Dutch
7. Portuguese
8. Polish
9. Japanese
10. Chinese
11. Turkish
12. Romanian

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 (username and password). Then, you can check the permission levels enabled for that user using the buttons and indicators located on the right side of the screen. These operations will be stored in the Operation Log.

   The permissions created are:

   Administrator (No. 3).
   Engineer (No. 2).
   Quality (No. 1).
   Operator (No. 0).

   The different users defined for this project are the following:

   Administrator:
   Username: admin
   Password: 888888
   Logout Time: 10 minutes.
   Permission: No. 0-3.

   Engineer:
   Username: engineer
   Password: 888888
   Logout Time: 10 minutes.
   Permission: No. 0-2.

   Quality
   Username: quality
   Password: 888888

Logout Time: 10 minutes.
Permission: No. 0-1.

Operator:

Username: operator
Password: 888888
Logout Time: 10 minutes.
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:
   Add: adds a user to the PT running program.
   Delete: deletes a user of the PT running program.
   Save: saves the running program users in the PT internal memory.
   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:
   Level 1: 111111
   Level 2: 222222
   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.

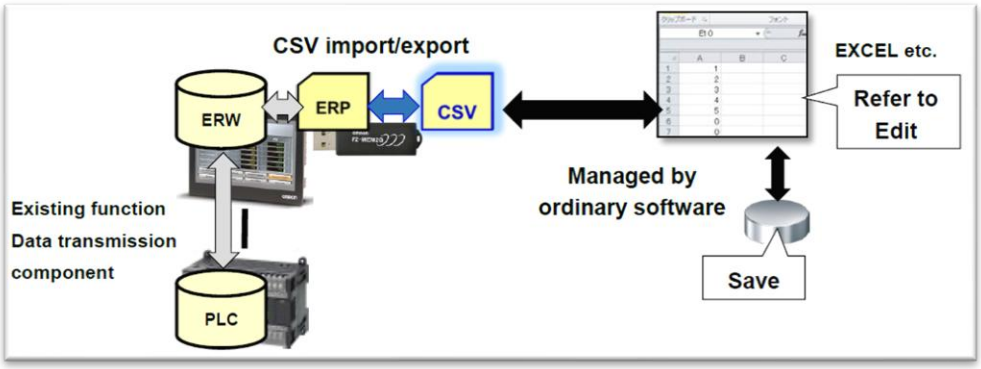


Figure 3: CSV Import/Export DATA

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.

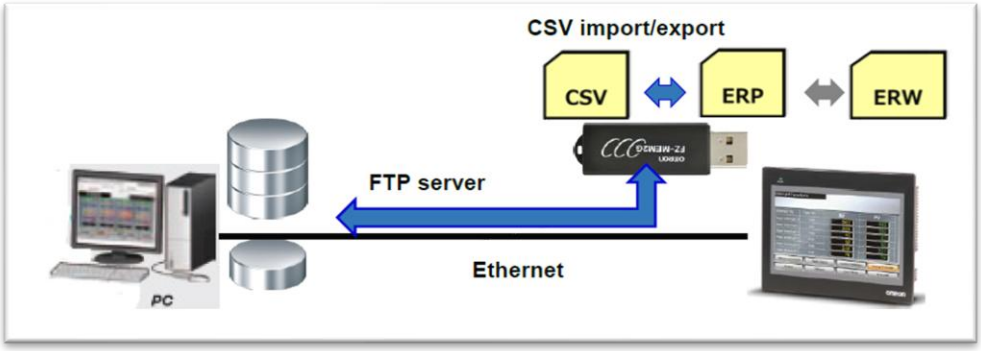


Figure 4: FTP + CSV Import/Export DATA

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. 20260331.csv – 31st March 2026).
- 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: 2026-03-31,14;24;46;701.bmp.
  - User defined screenshot name: test2026-03-31,14;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 'initial.c'. The size of the recipe area used for searching the records will depend on the total number indicated (maximum 32,000 total channels).

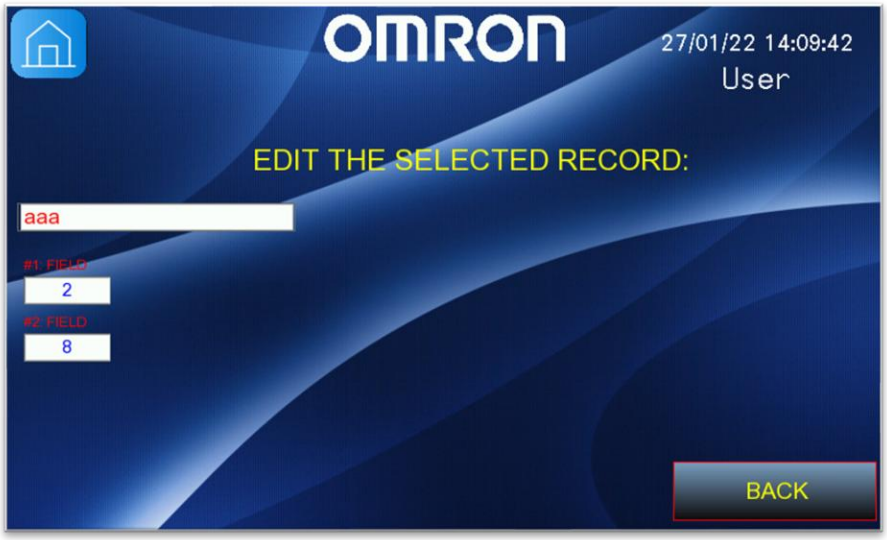
The demo includes a recipe management page (page 35, called 'Recipes1') and a page for modifying the selected record (page 36, 'Recipes2').

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 'initial.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

The following 6 different OMRON devices have been included in this template project:

1. CP2 controller: FINS/UDP communication.
2. NX1P2 controller: FINS/UDP communication.
3. Safety controller-G9SP: RS232 Serial communication.
4. Inverters: MX2, RX2, M1-STD and M1-ECT: all with Modbus/RTU Extend RS485 Serial communication, except M1-ECT which communicates in EtherCAT through the NX1P2.
5. Temperature Controller E5_C: Modbus/RTU Extend RS485 Serial communication.
6. Temperature Controller EJ1: Modbus/RTU Extend RS485 Serial communication.
7. Omron-TM Robot: Modbus/TCP communication.

6.4.1. CP2-PLC:

It has been included all the Digital I/Os to match the same status from the real PLC. 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.

6.4.2. NX1P2-Controller:

It has been included all the built-in digital I/Os to match the same status from the real controller. Also, system information is displayed, such as Battery Error flag, Built-in ECAT Error, ECAT Cycle Time Error and Built-in EIP Error.

6.4.3. Safety-G9SP:

Inside this section, you can access three screens to interface all models of G9SP:

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. Error Log: the last 10 errors registered are displayed, with their Unit Conduction time in minutes and the error description. To show the data, the refresh button must be pressed to execute a macro that processes EL addresses.
4. Operation Log: the last 10 operations registered are displayed, with their Unit Conduction time in minutes and the operation description. To show the data, the refresh button must be pressed to execute a macro that processes OL addresses.
5. Transmission data: Here are gathered all the different bits of information that can be configured to be transferred between PT and G9SP.

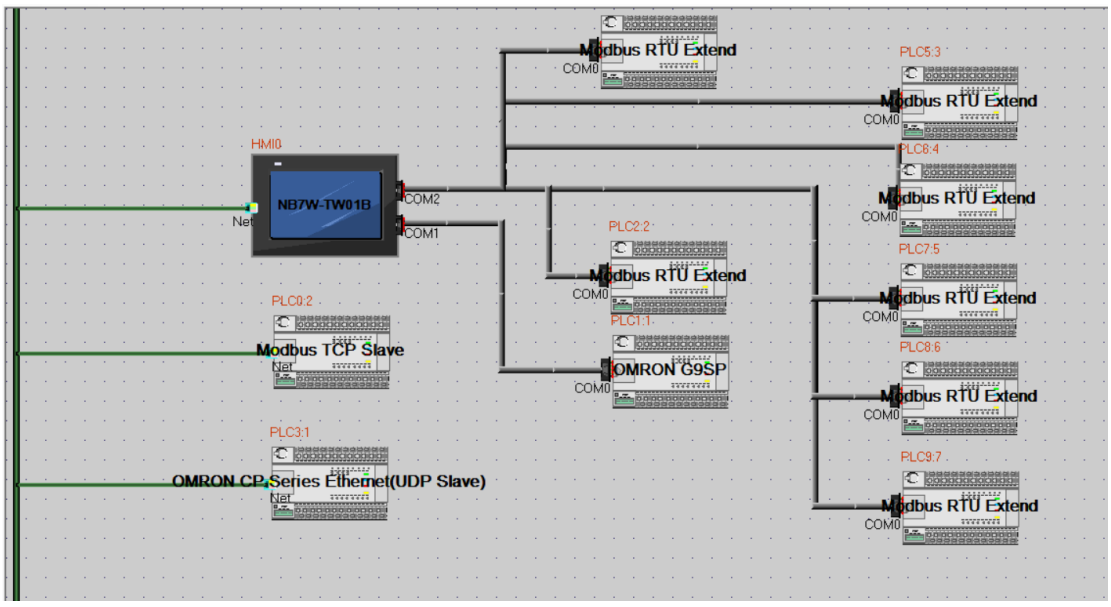
6.4.4. Inverter:

There are 4 screens that communicates NB-HMI with Inverters M1-STD, M1-ECT, MX2 and RX2. All of them using Modbus/RTU Extend protocol, except M1-ECT which communicates with the NB through the NX1P2 (M1-ECT through EtherCAT to NX1P2, through FINS/UDP to NB). Several information is displayed such as the Current Fault with it's 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 (for M1 start command is inherit in forward and reverse commands).

- **Note:** For further information refer to each inverter user's manual.

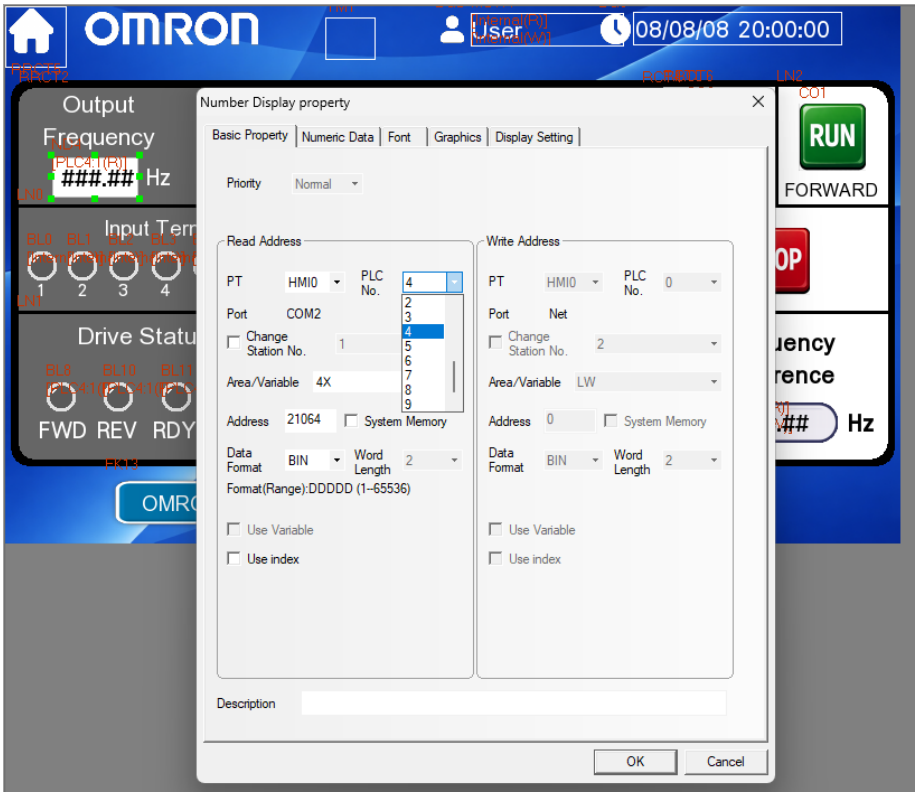
The three inverters points to the same PLC number (4) with slave number 1. In case the user has in its application more than one inverter, follow these steps:

1. Add to COM2 a new "Modbus RTU Extend" driver in hardware overview of NB-Designer:

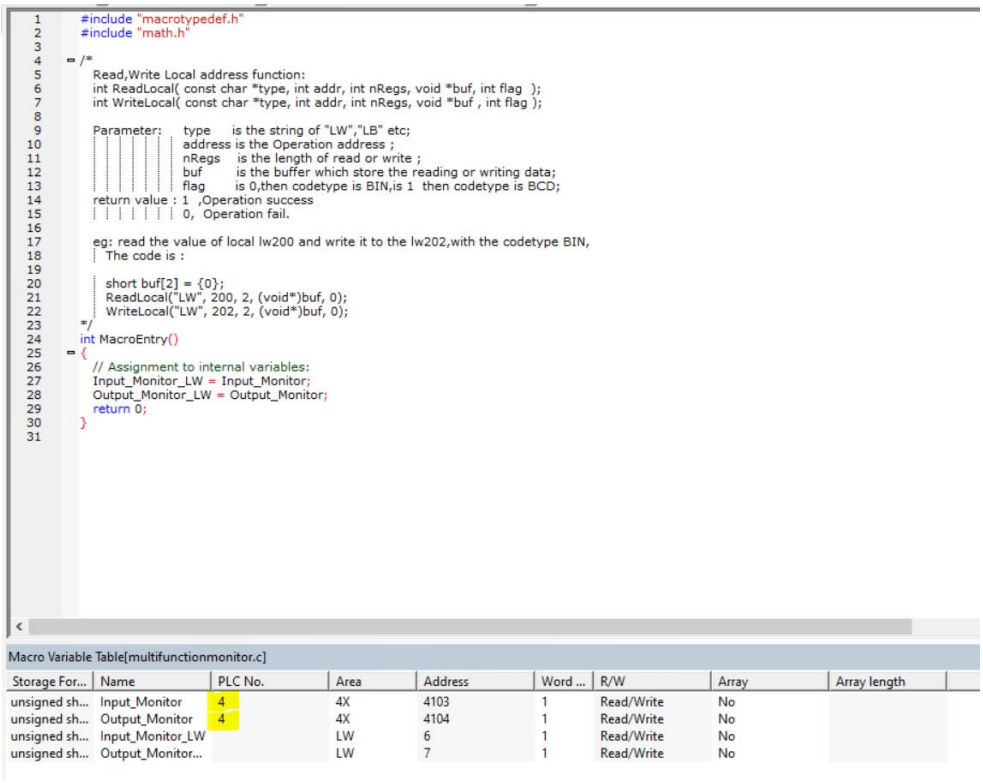


2. Copy and paste the new inverter screen from one of the inverter types of the template (M1, RX2 or MX2).

3. Change the addresses to the corresponding PLC number:



4. Create a new multifunction macro for the new PLC number corresponding to the added inverter. Copy the macro code from multifunctionmonitor.c if the added inverter is a MX2, from multifunctionmonitorrx2.c if it is a RX2, or copy the Data Transmission (from Timer object) object in M1. Then, change the PLC number inside the new macro code:



```
#include "macrotypedef.h"
#include "math.h"

/*
   Read,Write Local address function:
   int ReadLocal( const char *type, int addr, int nRegs, void *buf, int flag  );
   int WriteLocal( const char *type, int addr, int nRegs, void *buf , int flag );

   Parameter:    type     is the string of "LW","LB" etc;
                 address  is the Operation address ;
                 nRegs    is the length of read or write ;
                 buf      is the buffer which store the reading or writing data;
                 flag     is 0,then codetype is BIN,is 1  then codetype is BCD;
   return value : 1  ,Operation success
                  0,  Operation fail.

   eg: read the value of local lw200 and write it to the lw202,with the codetype BIN,
    The code is :

    short buf[2] = {0};
    ReadLocal("LW", 200, 2, (void*)buf, 0);
    WriteLocal("LW", 202, 2, (void*)buf, 0);
*/
int MacroEntry()
{
   // Assignment to internal variables:
   Input_Monitor_LW = Input_Monitor;
   Output_Monitor_LW = Output_Monitor;
   return 0;
}
```

Macro Variable Table[multifunctionmonitor.c]

Storage For...	Name	PLC No.	Area	Address	Word ...	R/W	Array	Array length
unsigned sh...	Input_Monitor	4	4X	4103	1	Read/Write	No	
unsigned sh...	Output_Monitor	4	4X	4104	1	Read/Write	No	
unsigned sh...	Input_Monitor_LW		LW	6	1	Read/Write	No	
unsigned sh...	Output_Monitor...		LW	7	1	Read/Write	No	

For the M1-ECT inverter, the attached Sysmac Studio template project is needed (NB-Faceplate-v5). In program NX1P2andM1ECT, the variables mapping between FINS addresses and PDO ECAT is done (PDO ECAT comms has only been used for operation and frequency). All the other data is read/write through EtherCAT SDOs in program M1readSDO (which uses the defined FBs in the project).

6.4.5. Temperature Controller E5_C:

The Temperature Controller E5_C (tested with E5CC and E5DC) 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 PV, MV and other status information; run, stop and execute the AT; change the Set Point, and open a trend graph for each temperature controller unit (template created just for unit 1).
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.
3. Parameters Backup and restore: here the user can select to work with E5_C parameters in RAM mode or with the non-volatile memory. The following subpages are defined:
    a. Current parameters: read of parameters from E5_C. Buttons to save to a USB in a csv file or to NB flash memory (FRW).
    b. Parameters in USB: when clicking the button “RestoreFromUSB”, shows the parameters values stored in the csv of the USB.
    c. Parameters in Flash: when clicking the button “RestoreFromNBflash”, shows the parameters values stored in the flash memory (FRW) of the NB.
    d. Parameters to modify: page to modify the parameters in E5_C. Initial settings (at left

side of the black line) can be changed by chaging the value in the Number Input object and clicking the “WriteToE5_CRAM” button. The operation settings (rigth side of black line) can be changed just by modifying the value in the number input object. And this is how the buttons works:

i. WriteToE5_CRAM: performs the following steps to write the parameters to E5_C RAM memory. It sends the following commands via Modbus RTU communications using macros. The command and related information must be written to Modbus register 0000 (4x_1 in NB-HMI configuration).
   1. Communications Writing to ON: “e5_cparamwritecommswrite.c”.
   2. Move to Setup Area 1 and write parameters: “e5_cparamwritesetarea1.c”.
   3. Software Reset: “e5_cparamwritesoftreset.c”.

   Sequential (LB address activates following macro) execution of different macros is used due to how NB macros works when writing to variables.

ii. Save Parameters in E5_C non-volatile memory: writing a 1280 to 4X_1 executes a command in E5_C to save the parameters from RAM memory to EEPROM.

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

6.4.6. Temperature Controller EJ1:

The Temperature Controller EJ1 communicates with the NB-HMI via Modbus/RTU Extend protocol. The Temperature Controller input is of type Thermocouple. This device has two subscreens:

4. EJ1 Overview: the four channels of the EJ1 are represented in this page, where important data can be visualized and the user can run or stop the channel, activate the autotuning at 100% and change the set point. The top part of each channel representation turns red when an error is present.
5. Channel 1: there are several parameters for setting and visualization such us: RUN and STOP TC, PV, MV, Run Mode, Control Output, alarms status, Set Point, set point limits setting, Trend Graph, PID setting, Auto-Tuning and alarm settings.

➢ **Note:** For further information refer to H142-E1-09 EJ1 Modular Temperature Controllers User’s Manual.

6.4.7. 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 (for hw3.x and hw5.0). 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).
For the TM Robot configuration, check the TM manuals.

6.5. Smart Maintenance

This main section is composed of 7 devices that monitor data and serves as devices for applying smart maintenance solutions:

1. Switch-mode Power Supply S8VK-X: Modbus/TCP communication.
2. Thermal Condition Monitoring K6PM-TH: Modbus/TCP communication.
3. Motor Condition Monitoring K6CM-CI2M: Modbus/TCP communication.
4. Energy Monitoring KM-N2 / 3: Modbus/RTU Extend RS485 Serial communication.
5. Energy Monitoring KM-PMBN-EIP: Modbus/TCP communication.
6. Insulation Resistance Monitoring K7GE: Modbus/RTU Extend RS485 Serial communication.
7. Remote maintenance solution RT100 Data Collector Module: Modbus/TCP communication.

6.5.1. Switch-mode Power Supply S8VK-X

A template page for S8VK-X monitoring data is included in the Smart Maintenance section. The communication is via Modbus/TCP and in the same way as K6PM-TH, it is important to not change in NB Faceplate project the station number (Unit ID of S8VK-X) set to 255 (FF) for the S8VK-X Modbus/TCP driver as stated in the S8VK-X manual T213-E1-06.

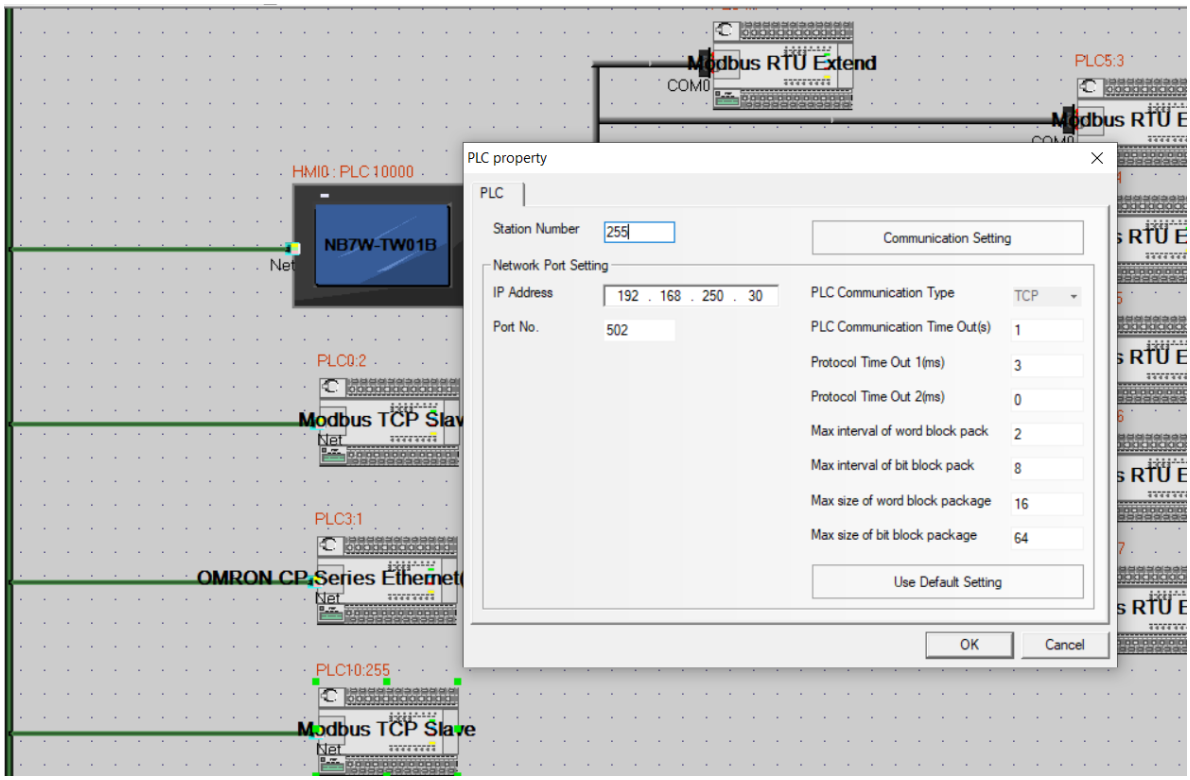
The page includes 3 main areas with the following information:

1. Measures: Output Voltage Measured, Output Current Measured and Peak Hold Current Measured.
2. Maintenance: Years until replacement, Percentage until replacement, Total run time and Continuous run time.
3. Status: Memory error, Product overheat abnormality, Current measurement error, Voltage measurement error, Overheating alarm, Years until the replacement reached FUL and Years until the replacement reached HLF.

For the DWORD data (Total run time and Continuous run time), it is necessary to perform a Word Swapping due to the difference in the Endianness. This simple code is included as a Macro function (byteswappings8vk-x.c) executed cyclically (500ms).

6.5.2. Thermal Condition Monitoring K6PM-TH

This section is composed of two subscreens, one for the main unit K6PM-THMD-EIP and the other one for the infrared thermal sensor K6PM-THS.
The connection with the NB-HMI is done via Modbus/TCP, where the NB is the master and the K6PM-THMD is the slave. It is important not to change in NB Faceplate project the station number (Unit ID of K6PM) set to 255 (FF) for the K6PM-THMD-EIP Modbus/TCP driver as stated in the K6PM-TH manual H231-E1-04.



Description of each subscreen:

1. Main unit: some important data of the main unit is displayed, as for example the running time, number of connected sensors, mode and alarms.

2. Infrared thermal sensor: at the center of the page, the temperature of the 16 segments is displayed and represented also with colors. An auto-range functionality is included to represent the temperature by the colors, by setting a minimum and maximum temperature. At right side, some alarms are displayed by shown when first and second thresholds are reached. Finally, at left side, the sensor internal temperature and and some status information is represented.

6.5.3. **Motor Condition Monitoring K6CM-CI2M**

This section interfaces via Modbus/TCP the Motor Condition Monitoring Device, specifically the Comprehensive Current Diagnosis type K6CM-CI2M. It is composed of two subscreens, one for the K6CM common data and the other one for the Comprehensive Current Diagnosis type K6CM-CI2M. The connection with the NB-HMI is done via Modbus/TCP, where the NB is the master and the K6CM-CI2M is the slave. In the same way as for the K6PM, it is important not to change in NB Faceplate project the station number (Unit ID of K6CM-CI2M) set to 255 (FF) for the K6CM-CI2M Modbus/TCP driver as stated in the K6CM manual N219-E1-14.

Description of each subscreen:

1. K6CM Common Data: some of the data common to all the types of K6CM is displayed in the page, as for example the operation status, device versions, errors and transistors output state.

2. K6CM-CI2M monitoring data: there are two main areas in this screen, current data and motor degratation data. For each monitoring data of the current or motor degradation sections, there is a yellow square surrounding the number display representing “Unmeasured state” and a red square representing “Input Error”. The Individual Alarm Result Warning and Critical states are represented with yellow and red rectangles respectively at the bottom of each seaction (current, degradation lv1 and lv2).

6.5.4. Energy Monitoring KM-N2/3

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.

6.5.5. Energy Monitoring KM-PMBN-EIP

Another device communicating via Modbus/TCP is KM-PMBN-EIP energy monitoring. 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 TCP Slave” drivers in NB Ethernet with their corresponding Modbus addresses (configured in KM-PMBN-EIP 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-PMBN-EIP Users Manual.

6.5.6. Insulation Resistance Monitoring K7GE

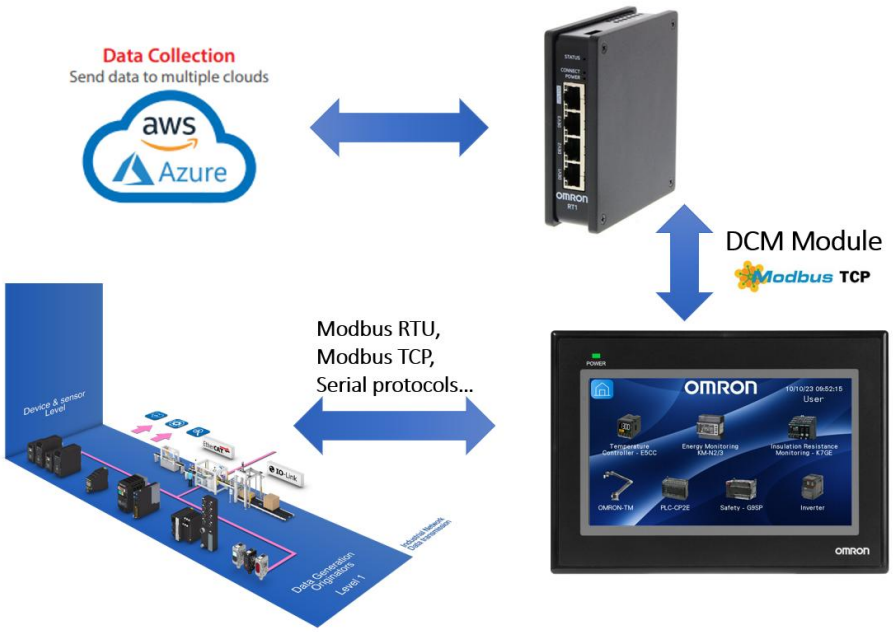
K7GE Insulation Resistance Monitoring is also interfaced in the COM2 of NB-HMI and again using the Modbus/RTU Extend driver. The screens are prepared to measure up to 8 channels. Furthermore, it is used a macro to control the measurement and to display or not the screen objects depending on the number 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.

6.5.7. RT100 Remote Solution DCM

The remote access solution RT100 includes the DCM functionality that can obtain data from devices via Modbus/TCP. In this case, the NB will be the slave and the RT100 the master. To configure the NB as a Modbus/TCP slave check the V108-E1-19 manual and to configure the RT100 DCM check the RT100 / Secomea documentation. The NB screen (420: RT100) for the RT100 includes a series of addresses for Modbus registers and coils, this is just an example of addresses that can be read, but it will depend on the configuration of the RT100 DCM.



6.6. 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.

Here a summary of all the devices and the bit communication control associated:

PLC Nº in NB	Device	Port	Control bit
1	OMRON **G9SP**	COM1	LW.B 9605.2
2	Modbus RTU Extend (for **E5_C**)	COM2	LW.B 9605.1
4	Modbus RTU Extend (for **MX2**, **RX2**, **M1 STD**)		
5	Modbus RTU Extend (for **KM-N2 (3P4W and CA)**)		
6	Modbus RTU Extend (for **KM-N2 (CB)**)		
7	Modbus RTU Extend (for **KM-N2 (CC)**)		
8	Modbus RTU Extend (for **KM-N2 (CD)**)		
9	Modbus RTU Extend (for **K7GE**)		
12	Modbus RTU Extend (for **EJ1**)		
0	Modbus TCP Slave (for **Omron TM**)	Ethernet	LW.B 9605.3
3	OMRON **CP Series** Ethernet (UDP Slave)		LW.B 9605.4
10	Modbus TCP Slave (for **K6PM-TH**)		LW.B 9605.5
11	Modbus TCP Slave (for **K6CM-CI2M**)		LW.B 9605.6
13	Modbus TCP Slave (for **S8VK-X**)		LW.B 9605.7
14	OMRON **NX Series** Ethernet (UDP Slave)		LW.B 9605.8
15	Modbus TCP Slave (for **KM-PM (3P4W and CA)**)		LW.B 9605.9
16	Modbus TCP Slave (for **KM-PM (CD)**)		LW.B 9605.10
17	Modbus TCP Slave (for **KM-PM (CD)**)		LW.B 9605.11
18	Modbus TCP Slave (for **KM-PM (CD)**)		LW.B 9605.12

Four other screens can be access from this one:

1. Host configuration: When accessing to the *Host configuration* screen (501:NetworkConfig), 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).

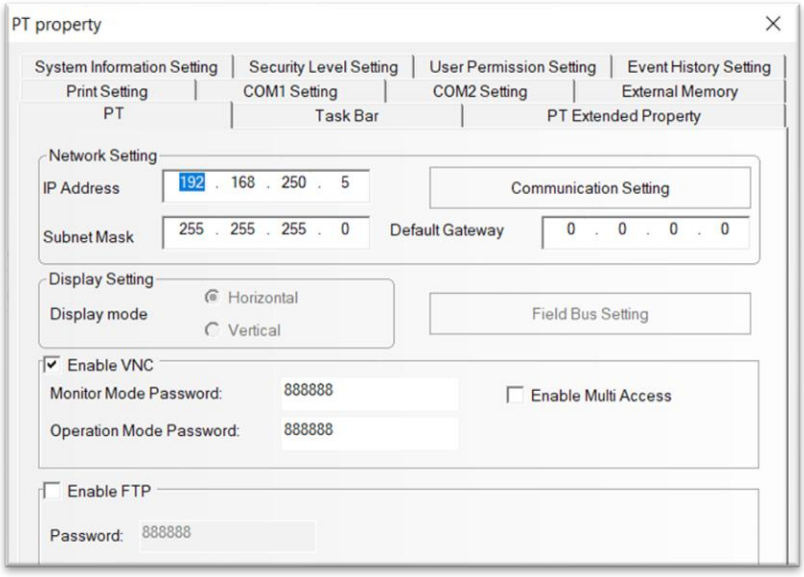
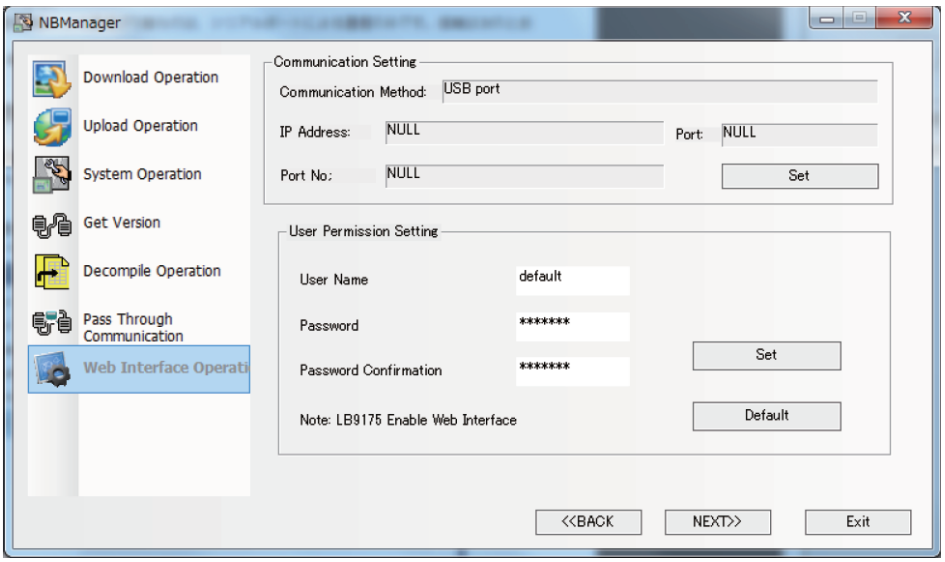


Figure 7: PT properties.

You can combine the FTP functionality with Import/Export Data to exchange data between the NB and a remote PC (see chapter 6.3.1). In rigth 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 1 2 3	Create Events
4	Trigger Historical Data Sampling
5	Trend Curve
6 7	ERW<->CSV
8-10	K7GE
11 to 21	RT100
22-25	E5_C Param. Backup Restore
23-99	Free Memory
100	Direct Screen (User Login)
101 102 103	Test User Permission
104 105 106	Test Security Level
107 108 109 110 111-999	Free Memory
1000	Start_Mode (Recipe Management)
1001	U_Case (Recipe Management)
1002 1003 1004 1005 1006 1007 1008 1009 1010	Reserved (Recipe Management)
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 1	Event History
2 3 4 5	Historical Data
6 7	Multi-function Input Monitor Multi-function Output Monitor
8 9 10 11	Trend Curve
12 13 14	Trend Curve Scrollbar
15 16 17 18 19 20	Trend Curve (Actual Sampling Point Time)
21 22 23 24 25 26	Trend Curve (Next Sampling Point Time)
27 28	Operation Log
29-37	Temperature Controller
38-77	E5_C Param. Backup Restore
78-199	Free Memory
200 201 202 203 204 205 206 207 208 209 210 211	Byte Swapping
212-213	KMN2/3
214-229	K6PM
230-233	KMPM
234-249	Free Memory
250	Alarm
251-264	RT100
265-549	Free Memory
550	Reserved Alarms Events
551-552	Event History
553	Event
554-571	K7GE
572-575	S8VK-X
576-581	EJ1
582-999	Free Memory
1000 1100	Recipe Management
1101-1999	Free Memory
2000 2001 2002 2003 2004 2005	User Storage
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	
FRW0-14	E5_C Param. Backup Restore

7.4. ERW0 and ERW1 Memory Address

The only memory addresses used, are:

ERW0	
ERW0_0	ERW<->CSV
ERW0_1	
ERW0_2	
ERW0_3	
ERW0_4	

ERW1	
0-14	E5_C Param. Backup Restore

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.

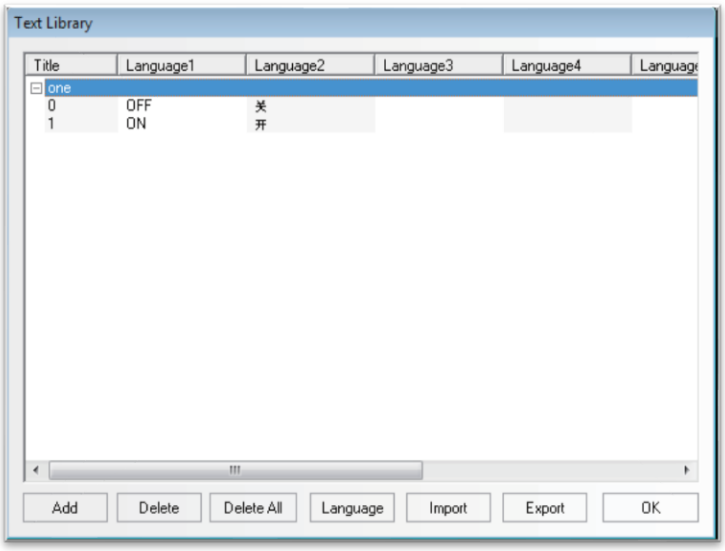


Figure 3: Text Library example.

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).

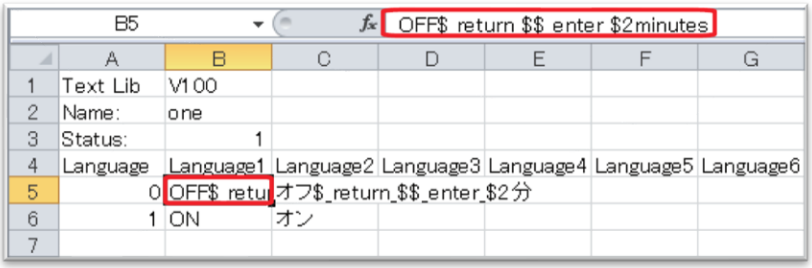
Text Lib	V100							
Name:	Test							
Status:	1							
Language	Language1	Language2	Language3	Language4	Language5	Language6	Language7	Language8
0	Hello	Hola	Salut	Ciao				

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 with the same format.

- **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:



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 'initial.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:

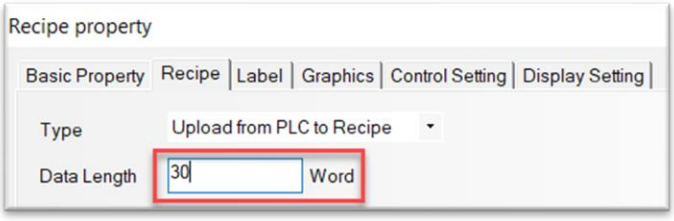
Access the macro ‘initial.c’ and modify lines 48 and 49 as indicated below:

```
//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:

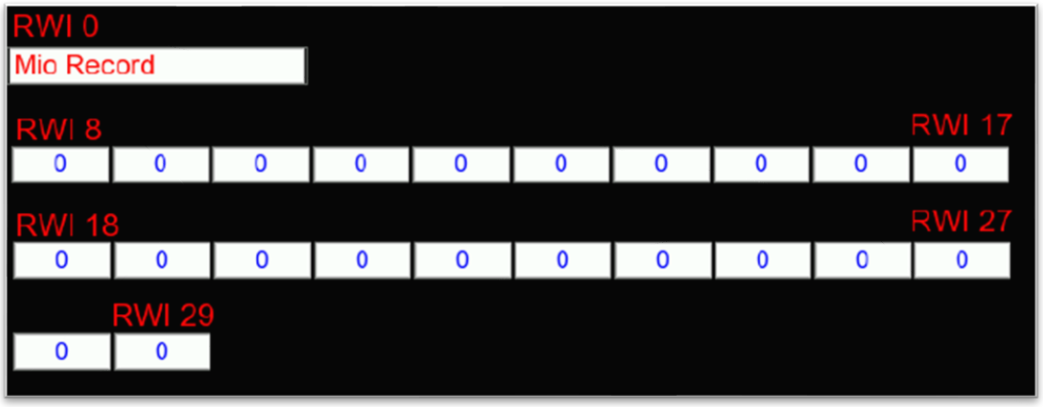
If the length of the description field of each record is different from the 10 words provided by default, it is necessary to indicate the new length in each of the text components present in the recipe management page (also, the one present in the record editing page).

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:

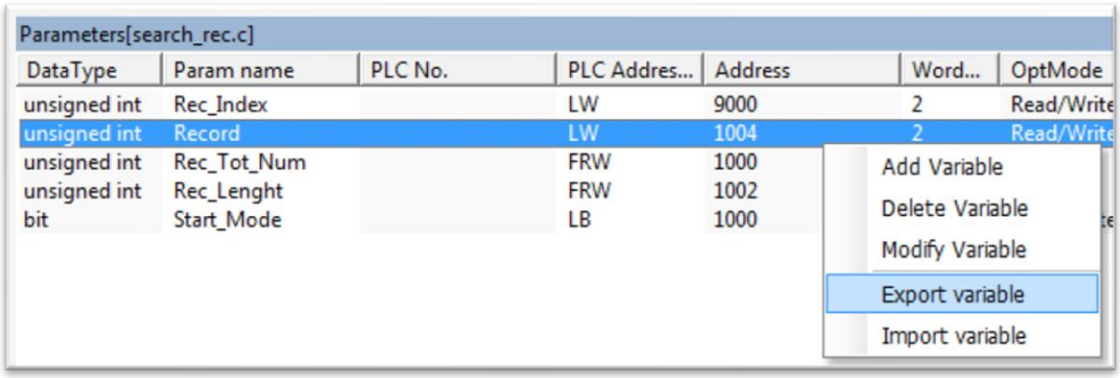
The default page for editing the selected record (page number 36, called 'Recipes2') includes a description field (of 10 words) and two numeric fields (of one word each). It is therefore necessary to configure the record editing page according to the new structure of the table. For this example, considering 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 8.3 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 ':



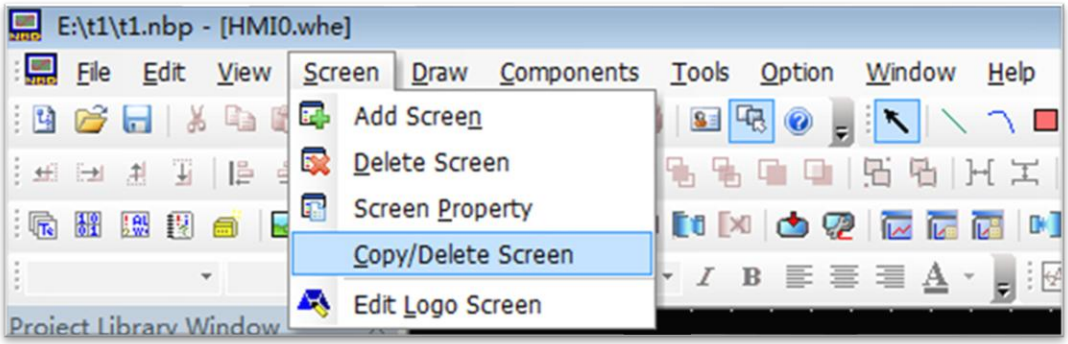
An import file will be generated, which can be imported in the macro of another project following the same procedure and selecting 'Import Variable'. For the reuse of all the other macros applies what has already been indicated for the search macro.

8.3. Copy and Paste functionality

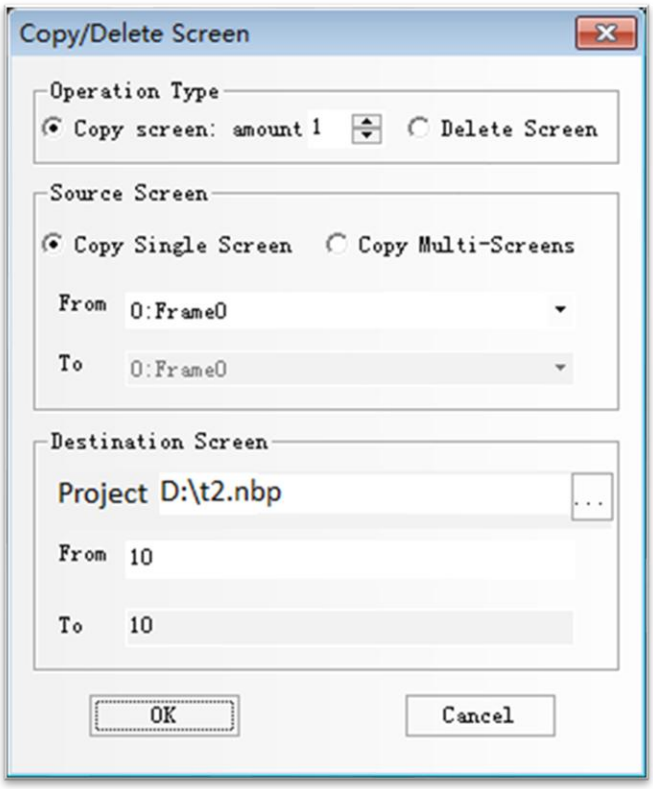
Copy and paste operation between projects can be carried out following the next steps:

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.

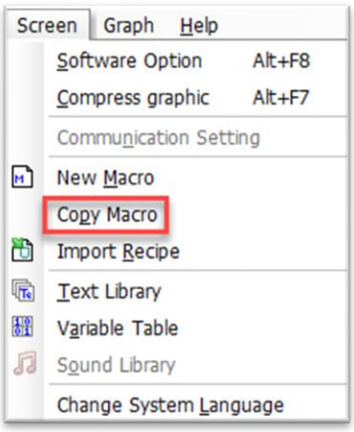


- **Note:** If there are any conflicts such as macro name or memory area addresses, the corresponding pop-ups will be displayed to perform the desired operation. For further information, refer to manual "*PRACTICES GUIDE NEW FUNCTIONALITIES FOR NB-DESIGNER V1.51*".

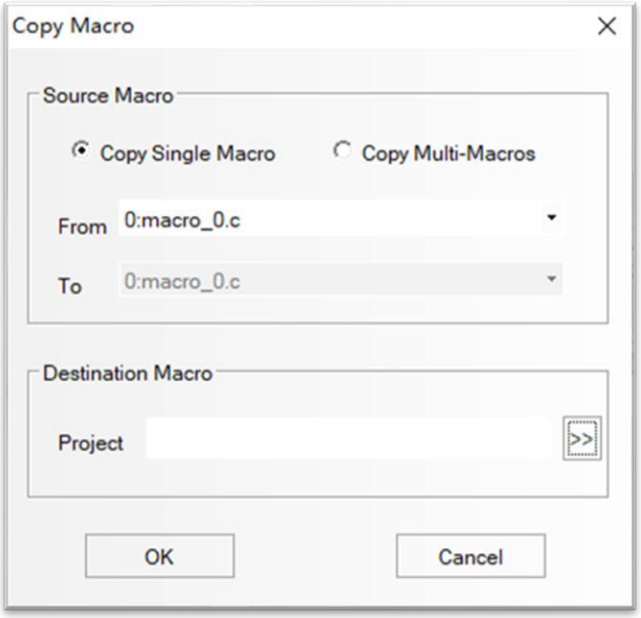
8.3.1. Macro copy and paste

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:

I. 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.



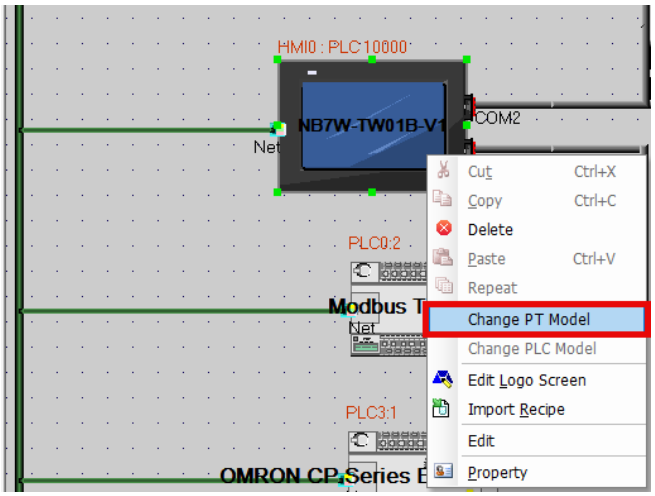
- **Note:** Because of name confliction, Macros can't be copied within source project. If destination project is not selected, warning message will pop up: "Please select destination project". Otherwise, Macros are copied to end of macro list in destination project. For further information, refer to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

8.4. PT Model Conversion

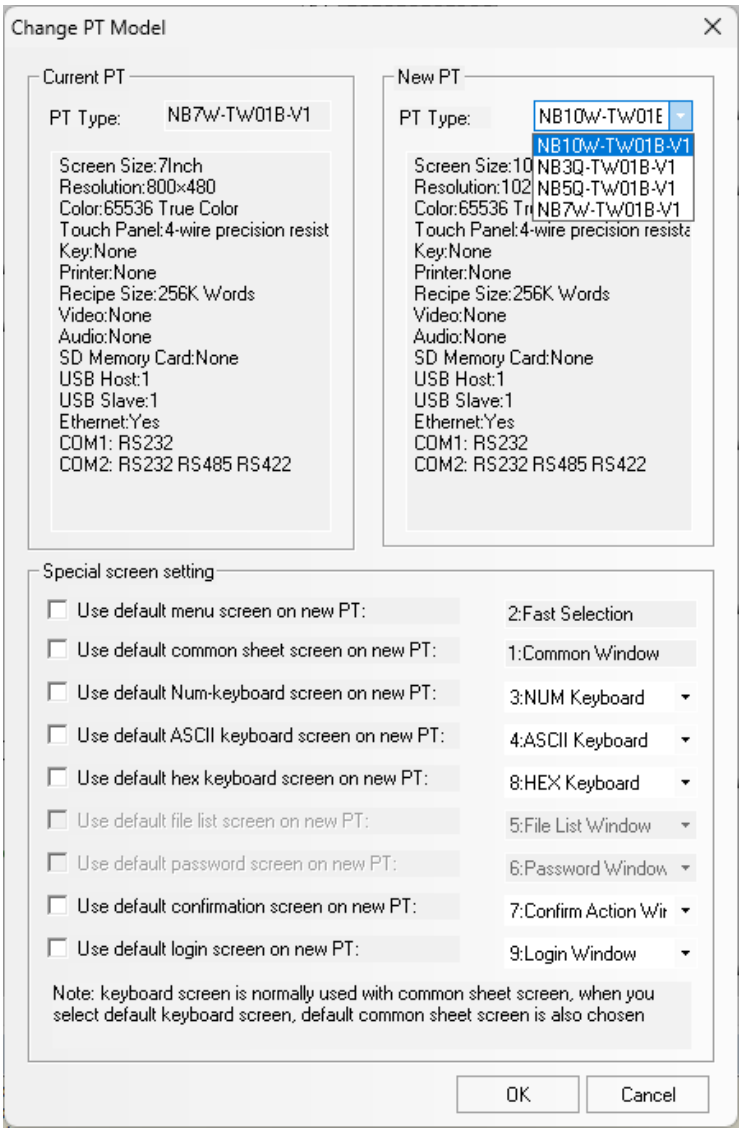
NB Faceplate v5 was developed for the NB7-V1 PT model. If the project needs to be used on another NB series HMI, such as NB10-V1, a model conversion must be performed in NB-Designer.

To convert the project, follow these steps:

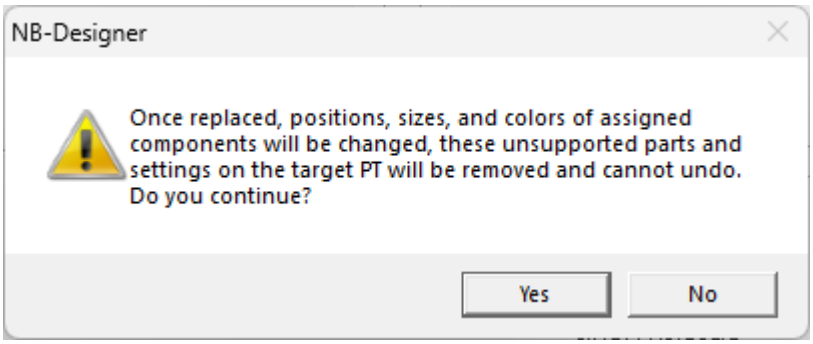
1. Right-click the HMI icon and select **Change PT Model** from the menu.



2. Select the **NB10-V1** device model and click **OK**



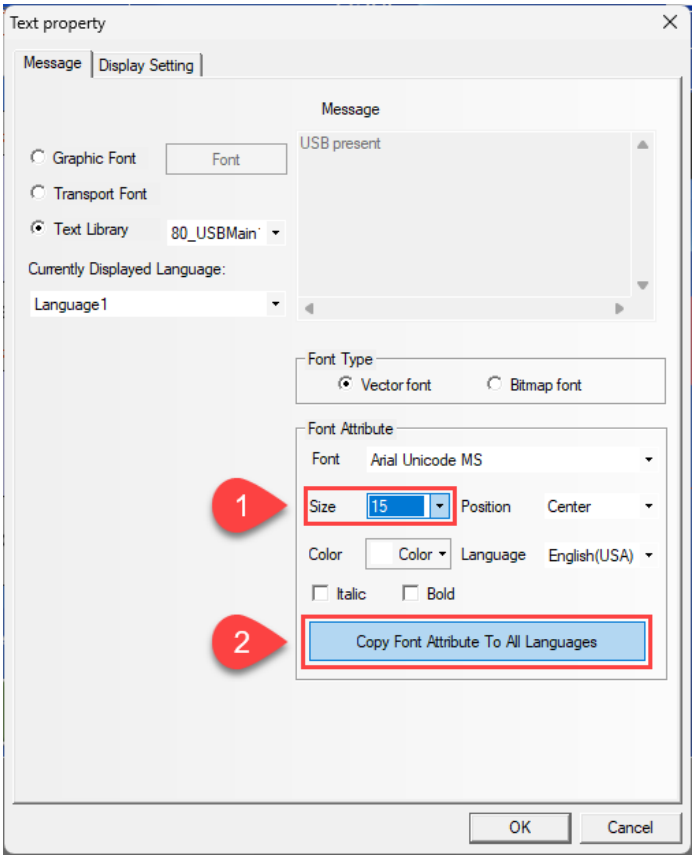
3. A warning message will be displayed. Select **Yes**.



Object positions and graphical components are scaled automatically according to the resolution change. However, special attention must be paid to the following point:

- Text objects may require **manual font size adjustments**, since font scaling is not automatically adapted during the conversion process.

To adjust the font size of the objects, and since the project supports multiple languages, it is recommended to first change the font according to the new resolution and then copy the font attributes to all languages from the Object Property, as shown in the following example for a Text object.



The suggested font size adjustment according to the screen resolution is:

From	Resolution	To	Resolution	Font adjustment	Example
NB7-V1	800 × 480	NB10-V1	1024 × 600	Around +25%	12 → 15
NB10-V1	1024 × 600	NB7-V1	800 × 480	Around -25%	15 → 12

In addition, if the project is converted to NB3-V1 or NB5-V1 models, the impact on the graphical layout will be significantly higher. These models have a much lower screen resolution (320 × 240), which can strongly affect the original screen design. As a result:

- Many objects may overlap or require repositioning.
- Text readability may be affected.
- Screens may require extensive manual redesign.

For this reason, when converting from NB7-V1 to NB3-V1 or NB5-V1, it is recommended to carefully review all screens and manually adjust the layout to ensure proper usability and display.

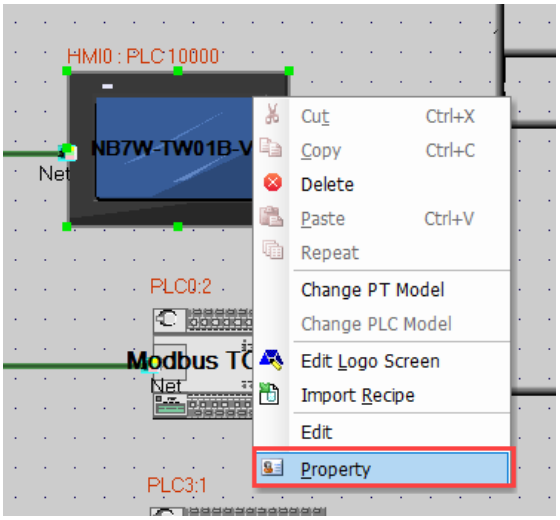
8.4.1. Image optimization

If the resolution increases after the NB model conversion, images may become blurry and appear different from how they look in NB-Designer once the project is transferred to the NB HMI.

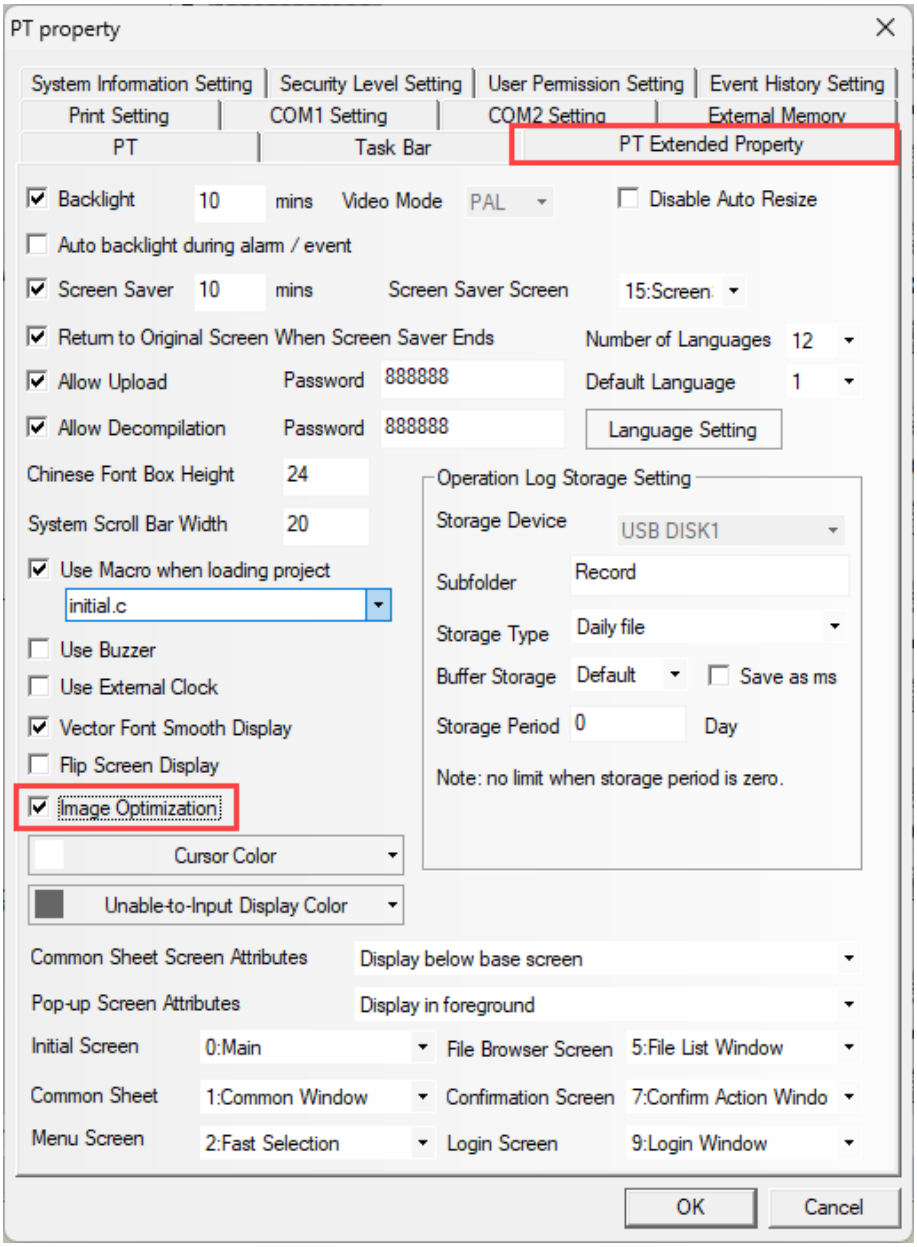
To improve this effect, a new Image Optimization function was added in NB-Designer version 1.67. It is important to note that this function does not need to be enabled before performing the PT model conversion. It can be activated afterwards, and the blurry image effect will still be improved.

Image optimization is disabled by default, and image processing remains consistent with the existing behavior unless this option is enabled. To enable the image optimization feature, follow these steps:

1. Right-click the HMI icon and select **PT Property** from the menu.



2. Then check the checkbox “**Image Optimization**” in the **PT Extended Property**.



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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- Harro Bosch
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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:

Above icons created by Pixel perfect - Flaticon
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Edit icons created by Freepik - Flaticon
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Screenshot icons created by surang - Flaticon
Usb drive icons created by iconmas - Flaticon
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Eject icons created by Alfredo Hernandez - Flaticon
Eject icons created by Creative Stall Premium - Flaticon
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Www icons created by Smashicons - Flaticon
Ftp icons created by Flat Icons - Flaticon
Connection icons created by srip - Flaticon
Gear icons created by Prosymbols - Flaticon
Configuration icons created by Tempo_doloe - Flaticon
Monitoring icons created by Afian Rochmah Afif - Flaticon
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Home icon created by Freepik - Flaticon
Page tree icon created by chehuna - Flaticon
Question icon created by Freepik - Flaticon
Time icon created by ilham Fitrotul Hayat - Flaticon
Calendar icon created by Freepik - Flaticon

11. Revision History

Revision Code	Date	Author(s)	Revised Content
01	April 2020	Antonio Núñez	Original production
02	July 2021	Àngel Matilla	Version 2 update
03	October 2022	Àngel Matilla	Version 3 update
04	September 2023	Àngel Matilla	Version 3.1 update
05	March 2025	Àngel Matilla	Version 4 update
06	April 2026	Àngel Matilla Marc Richart	Version 5 update