



RNXtudio

PC software: Configuration program

USER'S MANUAL

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1. INTRODUCTION

The **RNXtudio software** is a proprietary and free software with gateway configuration and logic editor, allowing precise customization and integration in the system. In addition, NTP server synchronization is available, ensuring accurate event timing across the system.

The RNXtudio software allows for the following functions:

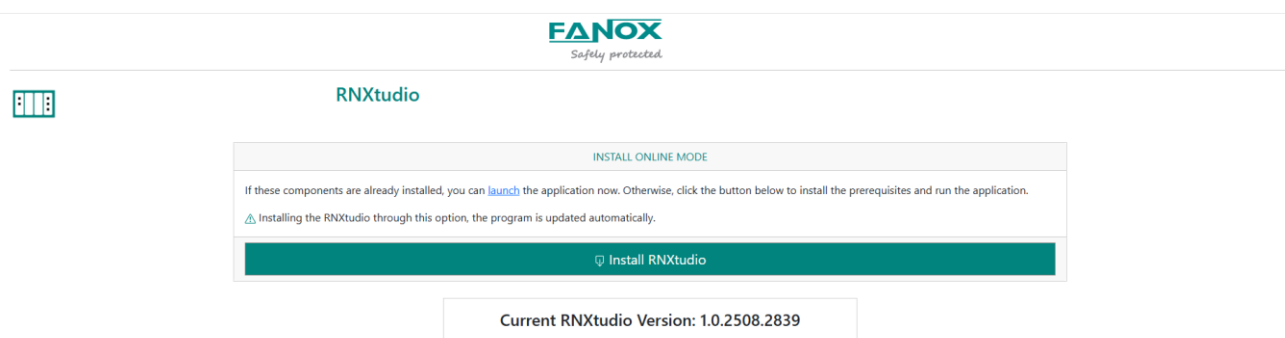
- Installation Management
- Gateways configurations
 - Modbus RTU Master
 - Modbus TCP Master
 - IEC 60870-5-104 Slave
 - IEC 60870-5-101 Slave
 - DNP3 Slave
- Setting configurations
- Logic configuration
- **Exit:** To close the program.

2. INSTALLATION

To install the RNXtudio it is necessary the following link:

<https://fanox.blob.core.windows.net/rnxtudio/publish.htm>

The link will open the next screen, where key “install” must be pressed:



Once it is pressed INSTALL, the RNXtudio will be installed automatically. Following this advice, the update of the software does not require any user's action, this is, if the RNXtudio is run being the laptop connected to Internet, The RNXtudio updates itself when it is started. Besides, the necessary drivers depending on the operative system can be downloaded from this page.

Supported operating system is Windows.

3. DESCRIPTION

3.1. Start Page

While no project is open or created, the toolbar submenus options will remain disabled except NEW, Open and import.

RNXstudio as shown as follows:

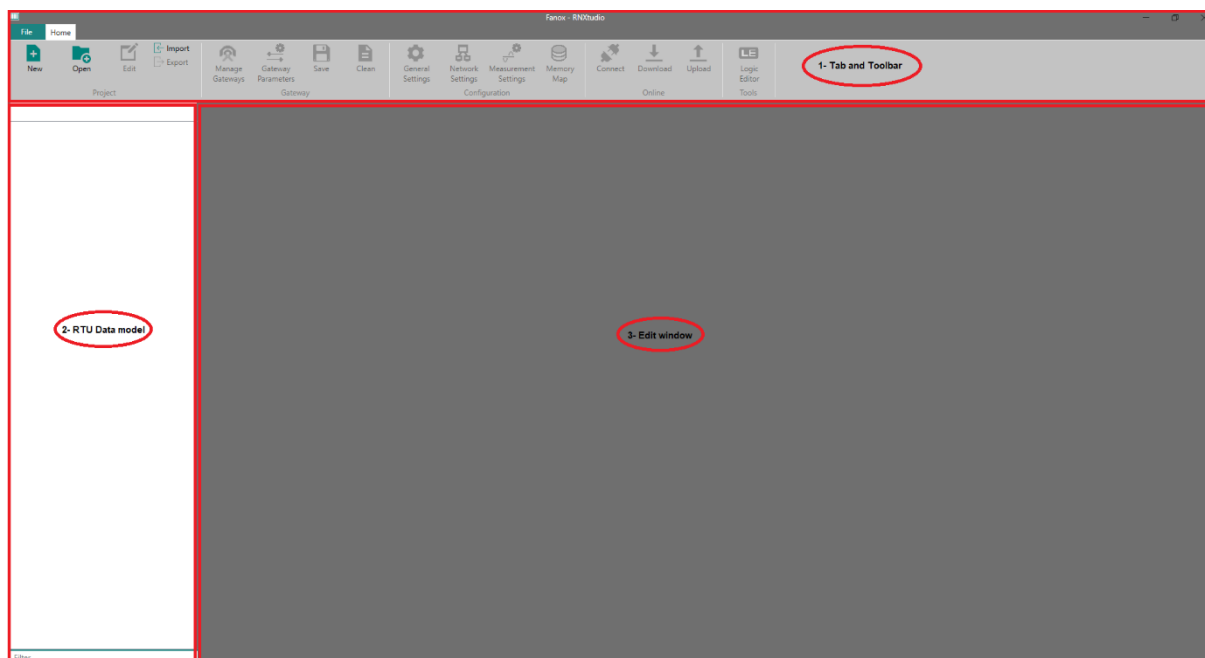


Figure 1: **RNXstudio** Start Page

The main window is divided into 3 areas:

- 1- Tabs and Toolbar.
- 2- Browser tree by the RTU data model.
- 3- Edit window.

3.2. Tabs and Toolbar options

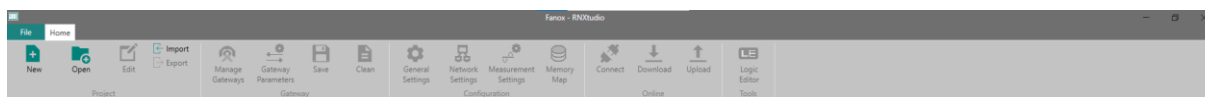


Figure 2: Tabs and Toolbar options

3.2.1. Tabs

3.2.1.1. File Tab

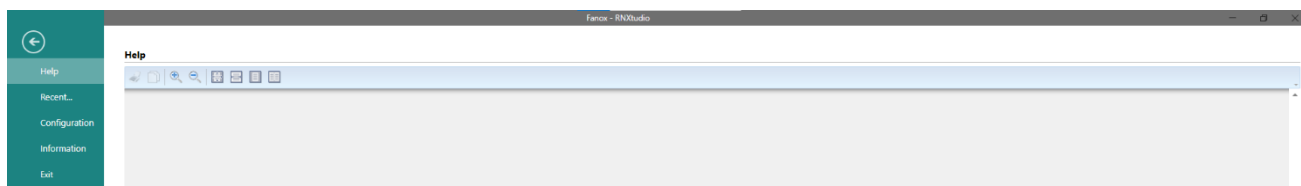


Figure 3: File Tab

The file tab consists of the following menus:

- **Help:** To view help file
- **Recent:** Last project opened
- **Configuration:** Language selection
- **Information:** About RNStudio Version
- **Exit:** To close the program.

3.2.1.2. Home Tab

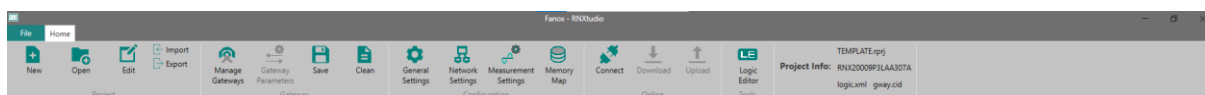


Figure 4: Home Tab

The Home tab consists of the following menus:

- **Project:** Different options for creating and managing project files.
- **Gateway:** Different options to create and manage protocols.
- **Configuration:** Different settings options.
- **Online:** To Download/Upload files.
- **Tools:** Logic Editor tool.

3.2.2. Toolbar options

3.2.2.1. Project Options

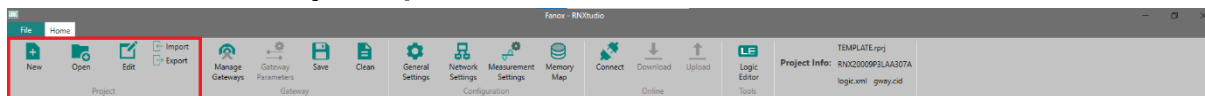


Figure 5: Project Options

The project options menu consists of the following submenus:

- **New:** Allows to create a new Project.
- **Open:** Allows to open a Project.
- **Edit:** Edit project options.
- **Export:** Export a backup of a project.
- **Import:** Import a backup of a project.

3.2.2.1.1. New

It allows to create a new project, when selected, the following screen appears:

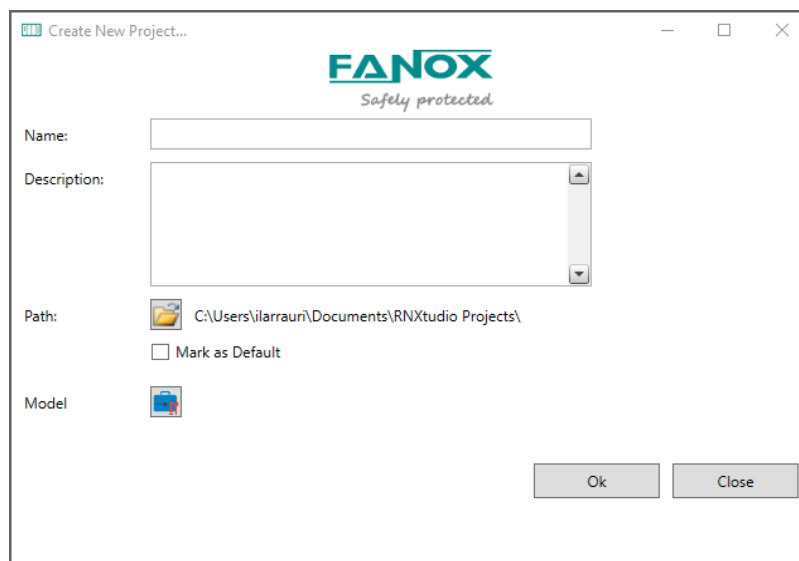


Figure 6: Create New Project

Where:

- **Name:** Project name.
- **Description:** Optional.
- **Path:** Where to save the project files.
- **Model:** Model selection code.

3.2.2.1.2. Open

It allows to open existing project, to open a project, perform the following steps:

- Press Open button.
- On the Open window, select the file to be opened.

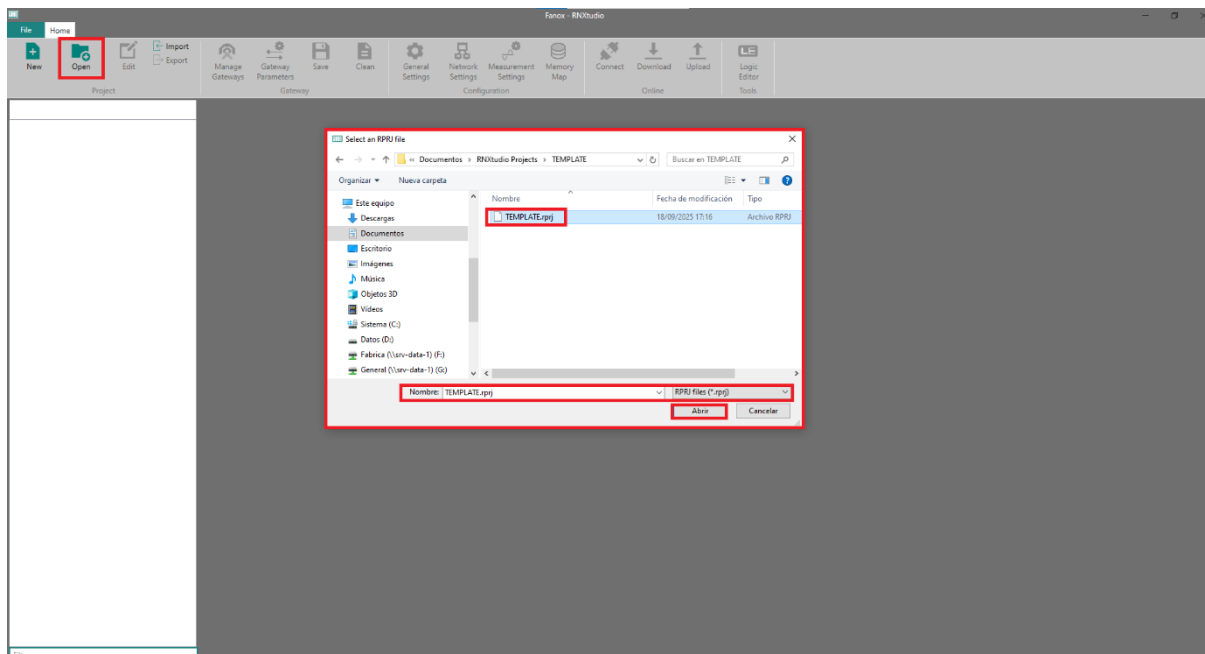


Figure 7: Selecting a Project File

3.2.2.1.3. Edit

It allows to edit an open project, when selected, the following screen appears:

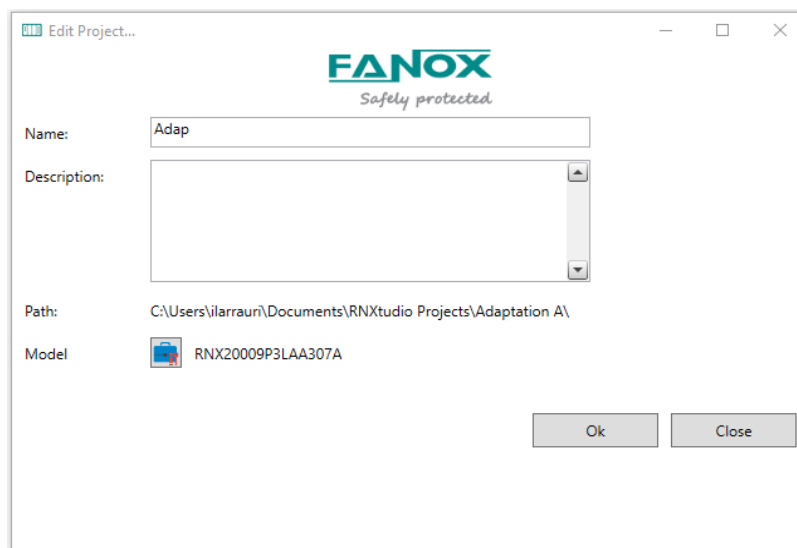


Figure 8: Editing a Project

The following options can be changed:

- Name
- Description
- Model

3.2.2.1.4. Export

It allows to export a back-up of a project, to export a backup, perform the following steps:

- Press Export button.
- On the Open window, select the place to save the backup file to be exported.

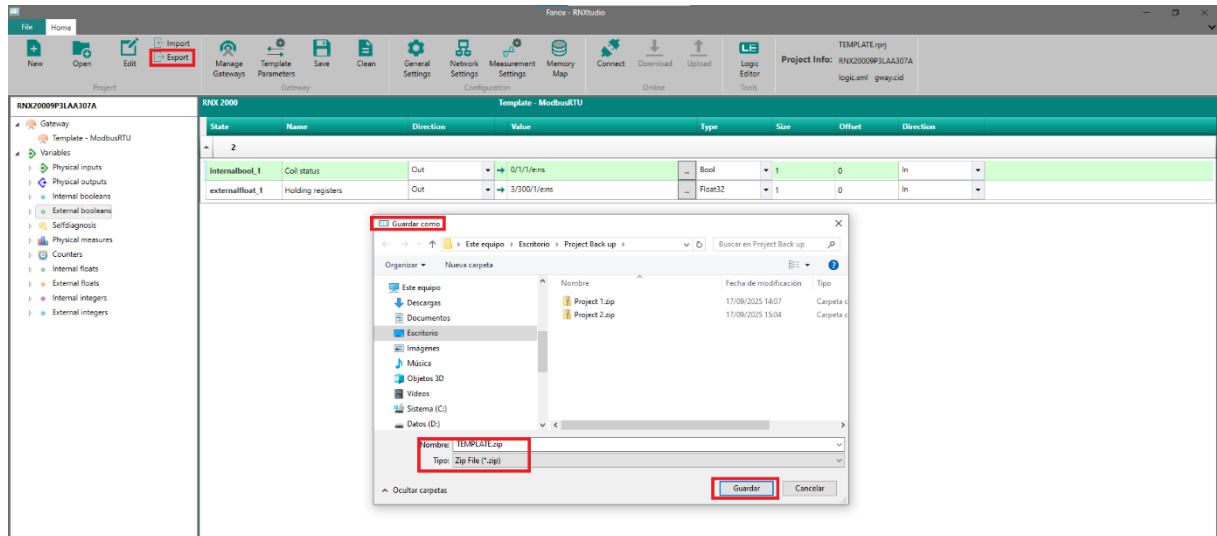


Figure 9: Export a backup of a Project.

3.2.2.1.5. Import

It allows to import a back-up of a project that has been previously exported, to import a backup, perform the following steps:

- Press Import button.
- On the Open window, select the backup file to be imported.

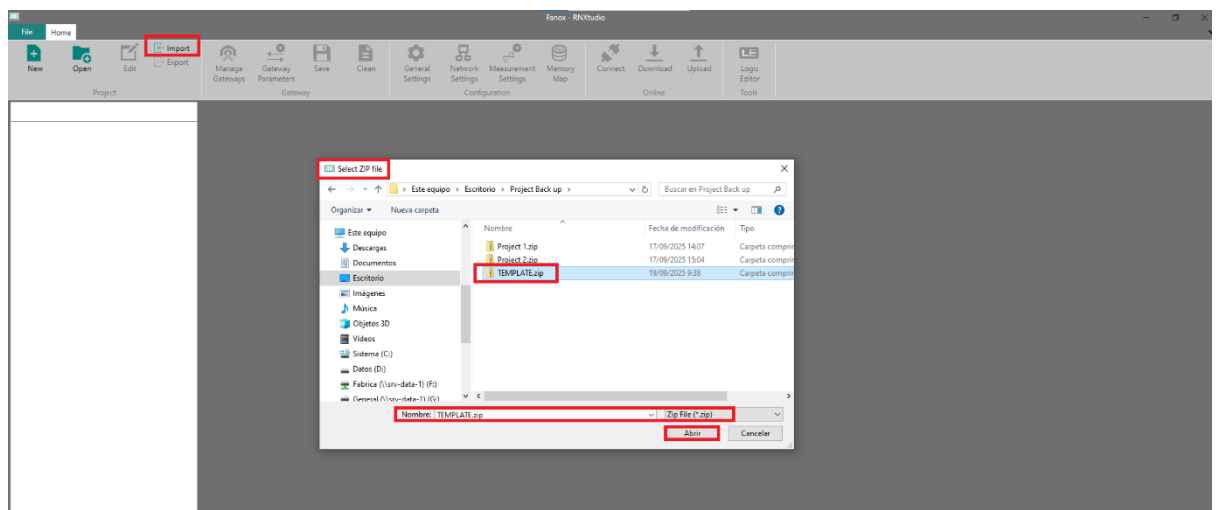


Figure 10: Import a backup of a Project.

3.2.2.2. Gateway

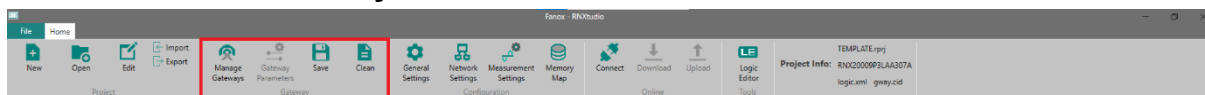


Figure 11: Gateway Options

The Gateway menu consists of the following submenus:

- **Manage Gateways:** To create a new gateway.
- **Parameters:** Parameters of selected protocol.
- **Save:** Save the changes.
- **Clean:** Clears the tables of the selected protocol.

3.2.2.2.1. Manage Gateway

It allows to add different protocols, when selected, the following screen appears:

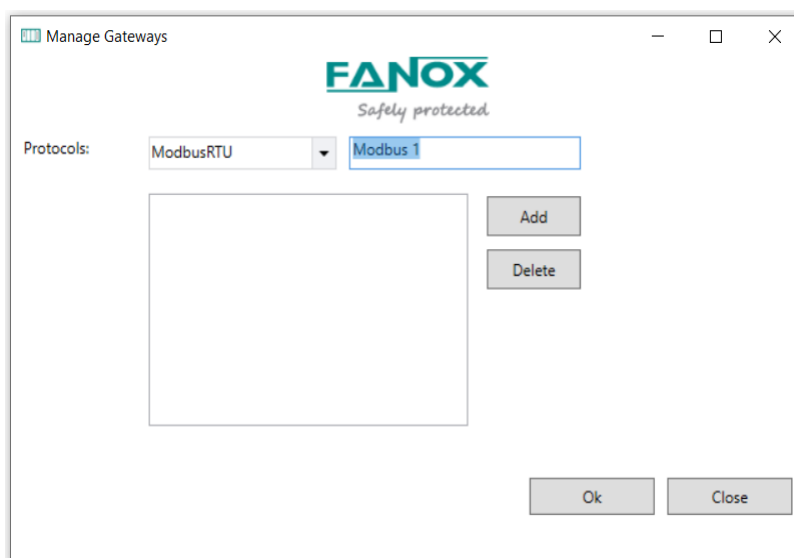


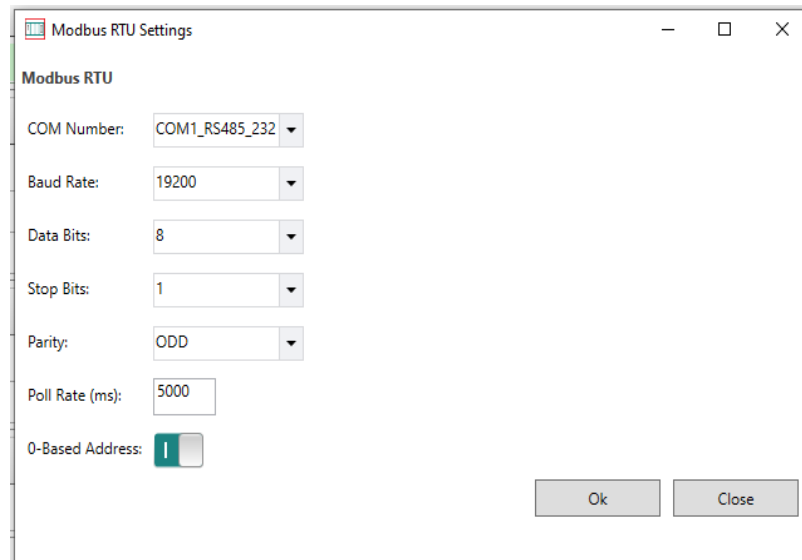
Figure 12: Example of Adding a Protocol

Where:

- **Protocols:** To choose communication protocol. Selectable from a list.
- **Name:** Name of Selected protocol.
- **Add:** To Include in the project.
- **Delete:** To delete created protocol.
- **Ok:** To apply the configuration.

3.2.2.2.2. Protocol Parameters

It allows to change Parameters of selected protocol, when selected, the following screen appears:



The image shows a 'Modbus RTU Settings' dialog box. It contains the following fields and controls:

- COM Number: COM1_RS485_232 (dropdown)
- Baud Rate: 19200 (dropdown)
- Data Bits: 8 (dropdown)
- Stop Bits: 1 (dropdown)
- Parity: ODD (dropdown)
- Poll Rate (ms): 5000 (text input)
- 0-Based Address: ☒ (checkbox)
- Buttons: Ok, Close

Figure 13: Example of Modbus parameters.

3.2.2.2.3. Save

It saves the signal database configuration.

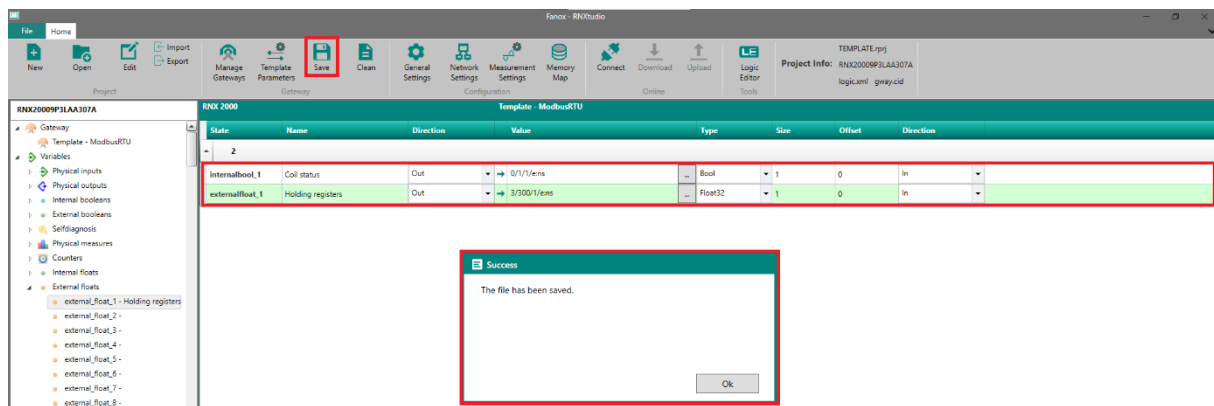


Figure 14: Save database configuration.

3.2.2.2.4. Clean

It deletes the edit window.

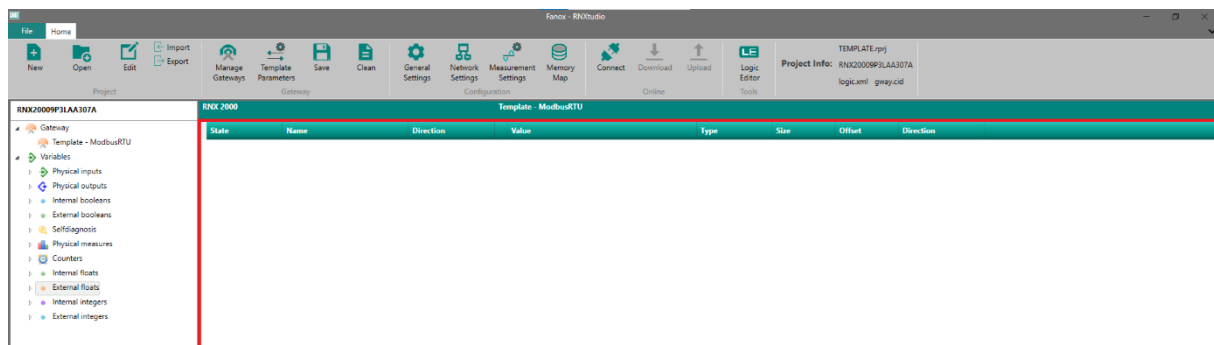


Figure 15: Clean database configuration.

3.2.2.3. Configuración

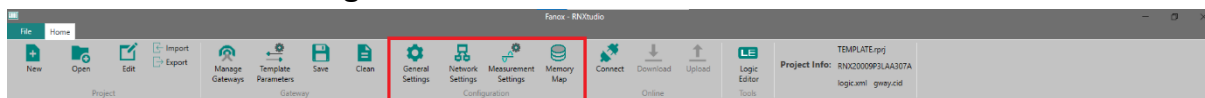


Figure 16: Configuration Options

The Gateway menu consists of the following submenus:

- **General Settings:** To configure Time settings.
- **Network Settings:** To configure parameters of Ethernet ports.
- **Measurement Settings:** To configure measurement settings.
- **Memory Map:** To configure names of variables.

3.2.2.3.1. General Settings

It allows to configure different settings like identifier, time zones, etc. When selected, the following screen appears:

Figure 17: General Settings

It is divided into two parts.

- **Interface**
 - **Language:** Configuration language.
 - **Identifier:** Alias name of RTU.
 - **Time zone:** Current time zone
- **SNTP Server**
 - **Address 1:** Ip address of the main NTP server.
 - **Address 2:** Ip address of the secondary NTP server.
 - **Time no synchronization (m):** Synchronization alarm.
 - **SNTP polling time (m):** Time interval between synchronization request to NTP servers.
 - **SNTP waiting time (s):** Waiting time for the response to a unicast synchronization request.
 - **Numbers of retries SNTP:** Number of retries in case there is no response from the NTP server to a request

3.2.2.3.1. Network Settings

It allows to configure the network settings of the different ethernet ports, when selected, the following screen appears:

Figure 18: Network Settings

Where:

- **Enable DHCP:** Dynamic Host Configuration Protocol.
- **IP Address:** IP address of selected Ethernet port.
- **Subnet Mask:** Network mask of selected Ethernet port.
- **Default Gateway:** Gateway of selected Ethernet port.
- **DNS 1:** Domain Name System 1.
- **DNS 2:** Domain Name System 2.

3.2.2.3.2. Measurements Settings

It allows to configure the different settings of measurements. When selected, the following screen appears:

Figure 19: Measurement Settings

It is divided into four parts.

- **Measurement**

Figure 20: Measurement

Where:

- **Frequency:** Frequency value.
- **Current Sensor 1 Primary:** Current Sensor 1 ratio.
- **Current Sensor 2 Primary:** Current Sensor 2 ratio.
- **Current Sensor 3 Primary:** Current Sensor 3 ratio.
- **Voltage Sensor Primary:** Voltage Sensor ratio.

Values:

Description	Minimum	Maximum	Step	Unit
Frequency	50	60	50/60	Hz
Current Sensor 1	1	1600	0.1	A
Current Sensor 2	1	1600	0.1	A
Current Sensor 3	1	1600	0.1	A
Voltage Sensor	0.001	69	0.001	kV

- **Ratio Corrections Factors**

Measurement Settings

Measurements **Ratio Correction Factors** Angle Correction Factors Input Settings

I1-A RCF 1 I3-A RCF 1

I1-B RCF 1 I3-B RCF 1

I1-C RCF 1 I3-C RCF 1

I2-A RCF 1 V3-A RCF 1

I2-B RCF 1 V3-B RCF 1

I2-C RCF 1 V3-C RCF 1

Ok Close

Figure 21: Ratio Correction Factors

Where:

- **I1-A RCF:** First Current Set Phase A Ratio Correction Factor.
- **I1-B RCF:** First Current Set Phase B Ratio Correction Factor.
- **I1-C RCF:** First Current Set Phase C Ratio Correction Factor.
- **I2-A RCF:** Second Current Set Phase A Ratio Correction Factor.
- **I2-B RCF:** Second Current Set Phase B Ratio Correction Factor.
- **I2-C RCF:** Second Current Set Phase C Ratio Correction Factor.
- **I3-A RCF:** Third Current Set Phase A Ratio Correction Factor.
- **I3-B RCF:** Third Current Set Phase B Ratio Correction Factor.
- **I3-C RCF:** Third Current Set Phase C Ratio Correction Factor.
- **V3-A RCF:** Voltage Phase A Ratio Correction Factor.
- **V3-B RCF:** Voltage Phase B Ratio Correction Factor.
- **V3-C RCF:** Voltage Phase C Ratio Correction Factor.

Values:

Description	Minimum	Maximum	Default	Description	Minimum	Maximum	Default
I1-A RCF	0.5	2	1	I3-A RCF	0.5	2	1
I1-B RCF	0.5	2	1	I3-B RCF	0.5	2	1
I1-C RCF	0.5	2	1	I3-C RCF	0.5	2	1
I2-A RCF	0.5	2	1	V3-A RCF	0.5	2	1
I2-B RCF	0.5	2	1	V3-B RCF	0.5	2	1
I2-C RCF	0.5	2	1	V3-C RCF	0.5	2	1

- **Angle Corrections Factors**

Figure 22: Angle Correction Factors

Where:

- **I1-A ACF:** First Current Set Phase A Angle Correction Factor.
- **I1-B ACF:** First Current Set Phase B Angle Correction Factor.
- **I1-C ACF:** First Current Set Phase C Angle Correction Factor.
- **I2-A ACF:** Second Current Set Phase A Angle Correction Factor.
- **I2-B ACF:** Second Current Set Phase B Angle Correction Factor.
- **I2-C ACF:** Second Current Set Phase C Angle Correction Factor.
- **I3-A ACF:** Third Current Set Phase A Angle Correction Factor.
- **I3-B ACF:** Third Current Set Phase B Angle Correction Factor.
- **I3-C ACF:** Third Current Set Phase C Angle Correction Factor.
- **V3-A ACF:** Voltage Phase A Angle Correction Factor.
- **V3-B ACF:** Voltage Phase B Angle Correction Factor.
- **V3-C ACF:** Voltage Phase C Angle Correction Factor.

Values:

Description	Minimum	Maximum	Default	Description	Minimum	Maximum	Default
I1-A ACF	0	359.9	0	I3-A ACF	0	359.9	0
I1-B ACF	0	359.9	0	I3-B ACF	0	359.9	0
I1-C ACF	0	359.9	0	I3-C ACF	0	359.9	0
I2-A ACF	0	359.9	0	V3-A ACF	0	359.9	0
I2-B ACF	0	359.9	0	V3-B ACF	0	359.9	0
I2-C ACF	0	359.9	0	V3-C ACF	0	359.9	0

- **Input Setting**

The screenshot shows a 'Measurement Settings' dialog box with four tabs: 'Measurements', 'Ratio Correction Factors', 'Angle Correction Factors', and 'Input Settings'. The 'Input Settings' tab is active. It contains a 'Debounce Time' field with a value of '5' and a unit of 'ms'. At the bottom right, there are 'Ok' and 'Close' buttons.

Figure 23: Angle Correction Factors

Where:

- **Debounce time:** Time to consider an input stable.

Values:

Description	Minimum	Maximum	Step	Unit	Default
Debounce time	5	255	1	ms	5

3.2.2.3.3. Memory Map

It allows to configure the names to the different variables. When selected, the following screen appears:

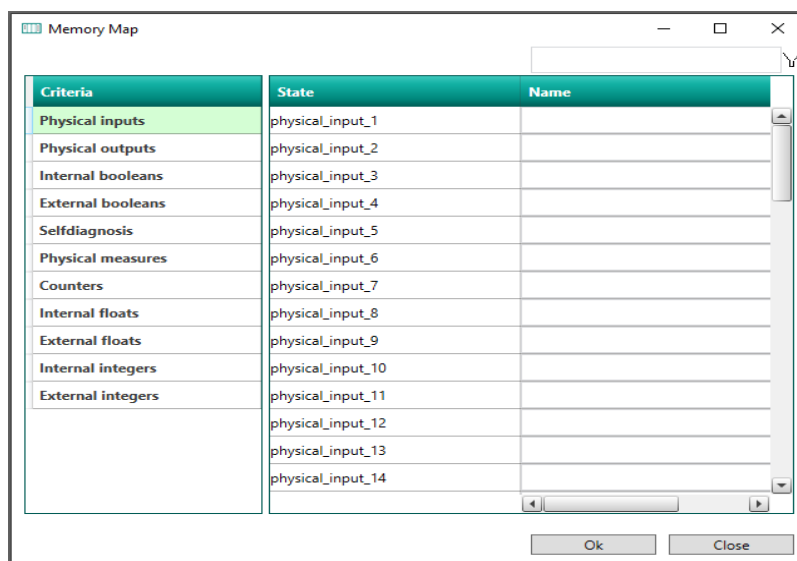


Figure 24: Memory Map

To configure, perform the following steps:

- Select the signal type (Criteria).
- Set the name.
- Press ok to save it.

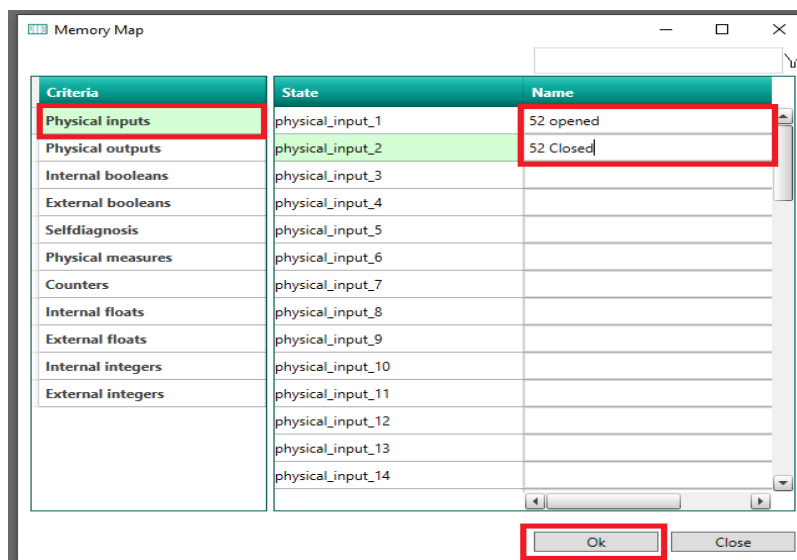


Figure 25: Configuring a name

Once configured, the text will be reflected in the variable:

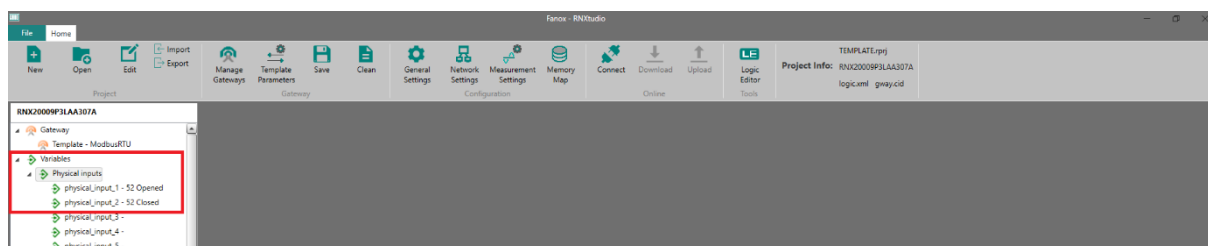


Figure 26: Checking configured name

3.2.2.4. Online

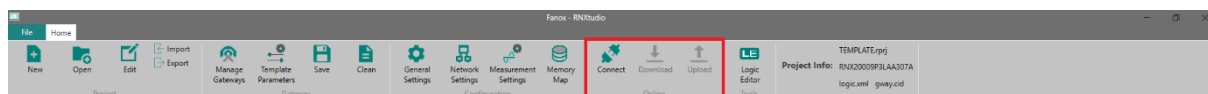


Figure 27: Online options

The online menu consists of the following submenus:

- **Connect:** To connect to the RTU.
- **Download:** To download files from RTU.
- **Upload:** To upload files to RTU.

3.2.2.4.1. Connect to RTU

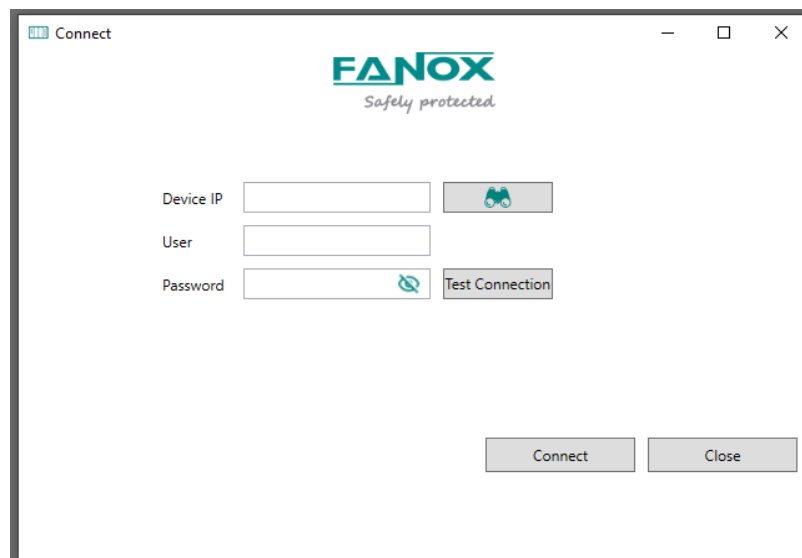


Figure 28: Connect options

Where:

- **Device IP:** IP of the RTU.
- **User:** Super Admin 1
- **Password:** Fanox/5555

The user can be modified from website: Security → User Management.

3.2.2.4.1.1. Discover Device



Figure 29: Device Discovery button

Where

- **Discover Device:** Auto detection of RTU in the network.

It allows for RTU to be auto-detected over the ethernet. When selected, the following screen appears:

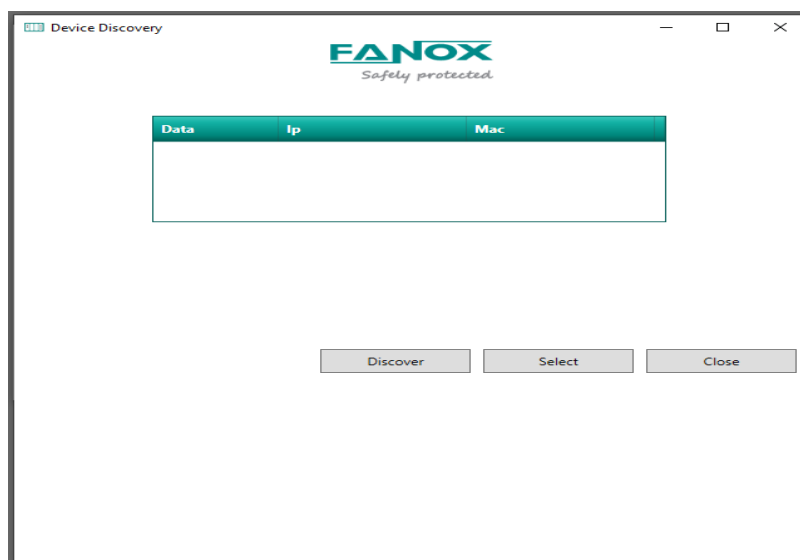


Figure 30: Device Discovery

Where:

- **Discover:** To start searching.
- **Select:** To select the detected IP address
- **Close:** To close window.

To device discovery, perform the following steps:

- Select device discover button.
- Press in Discover button to start searching the IP address on the network.
- A list of the different RTU detected is displayed.
- Select the IP address detected and Press in Select Button.

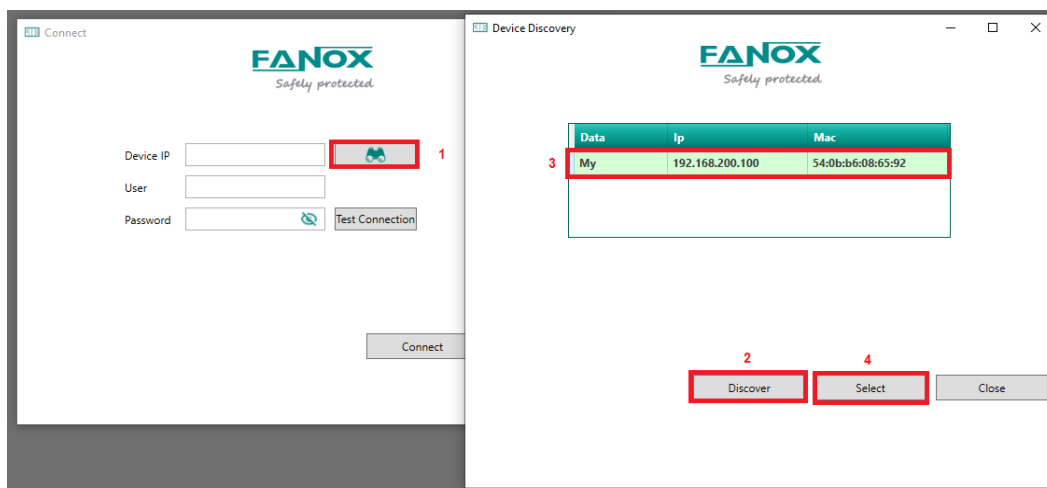


Figure 31: Example of Device Discovery

The IP address of the RTU will automatically be selected:

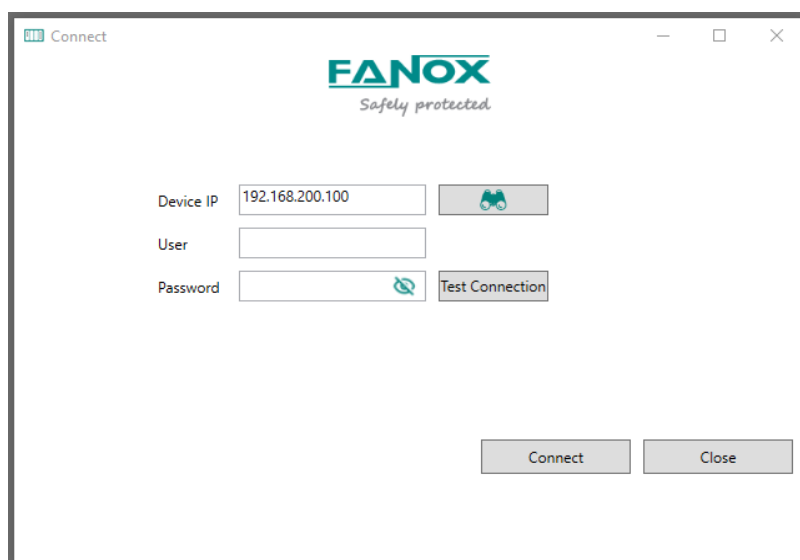


Figure 31: Auto detected IP address

To connect with RTU:

- Set the User.
- Set the password.

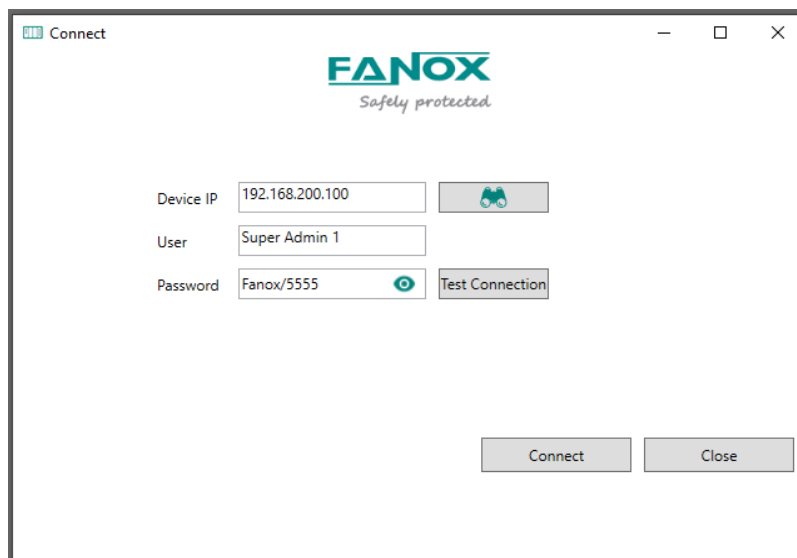


Figure 32: Logging to RTU

Once the connection established, download and Upload button are enabled.

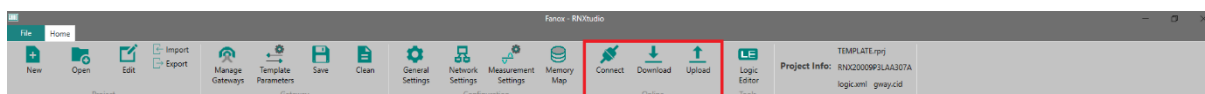


Figure 33: Established Connection

3.2.2.4.2. File management

The RTU handles different files:

- **Program Logic:** Logic Configuration file.
- **Gateway File:** Gateway configuration file.
- **General Setting:** Alias and Time configuration file.
- **Network Setting:** Ethernet configuration file.
- **Measurements Settings:** Measurement configuration file.

It can download or upload all files at once or one at time.

3.2.2.4.2.1. Download Files

It allows to download files from RTU. When selected, the following screen appears:

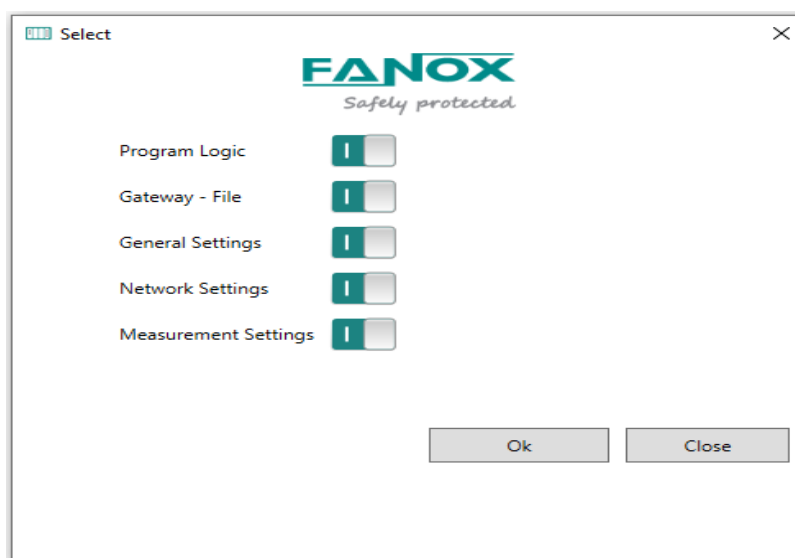


Figure 34: Download Files Selection

It can be send all files or select them from the list.

To upload the files, perform the following steps:

- Connect to RTU.
- Press in download button.
- Select the files to be send.
- Press in Ok Button.

Once the files have been downloaded, the following window is displayed:

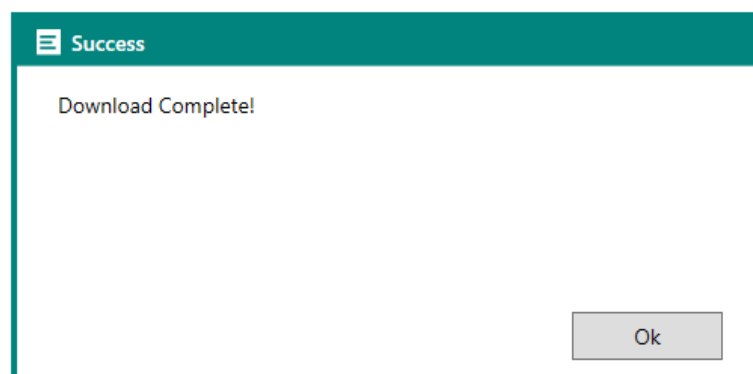


Figure 35: Download complete

3.2.2.4.2.2. Upload Files

It allows to Upload files to RTU. When selected, the following screen appears:

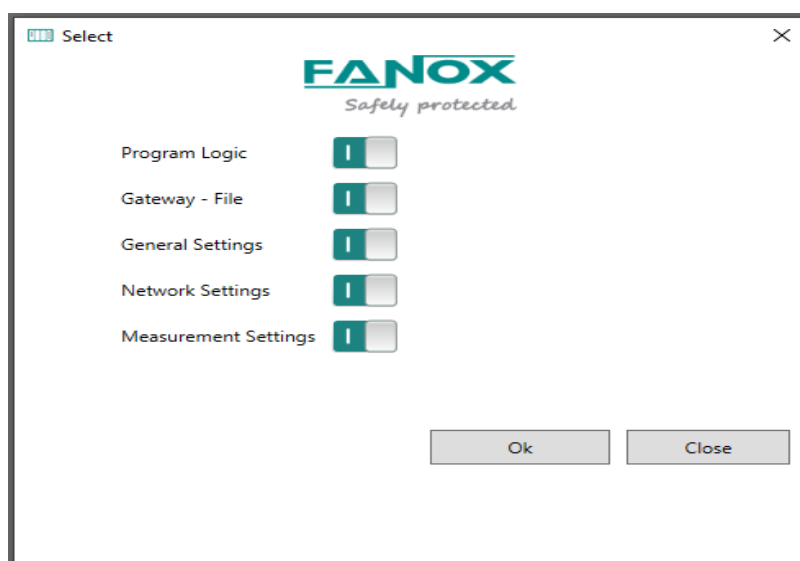


Figure 36: Upload Files Selection

It can be send all files or select them from the list.

To upload the files, perform the following steps:

- Connect to RTU.
- Press in upload button.
- Select the files to be send.
- Press in Ok Button.
- Press Yes in Warning window

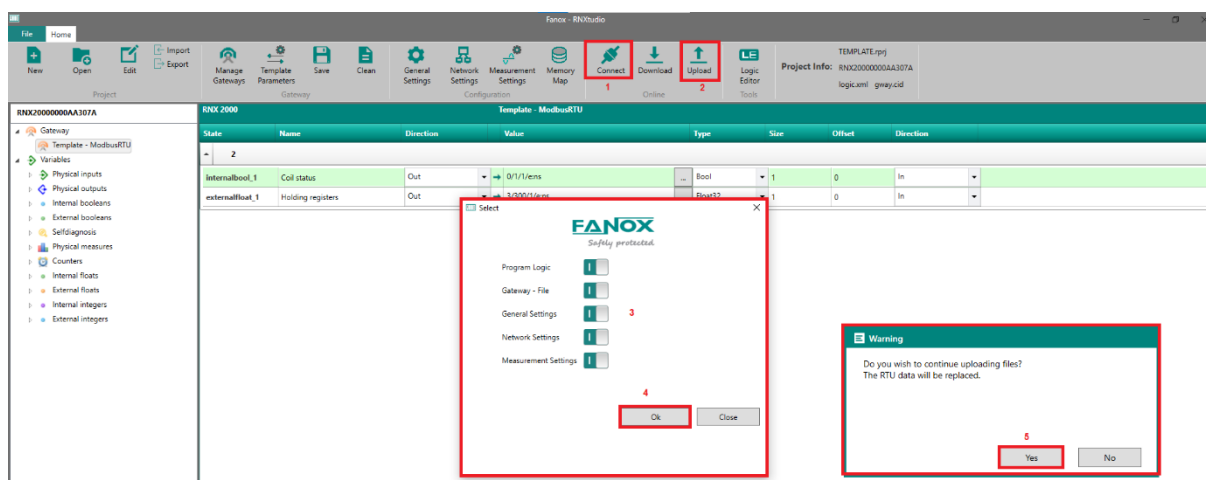


Figure 37: Example of Upload Files

Once the files have been sent, the following window is displayed:

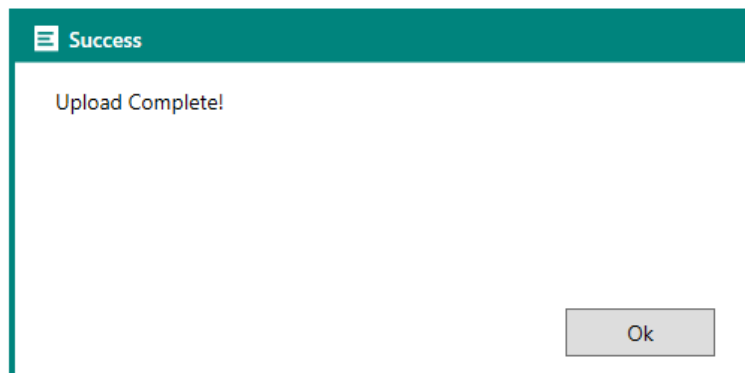


Figure 38: Upload complete

3.2.2.5. Logic Editor

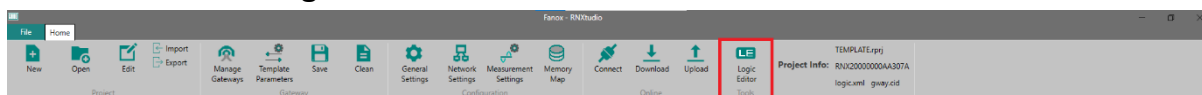


Figure 39: Logic Editor Option

The logic editor for RTU allows for automatisms or logics to be programmed.

The logic configuration program is described in an independent document: **LGGE (Logic Gate Graphic Editor)**.

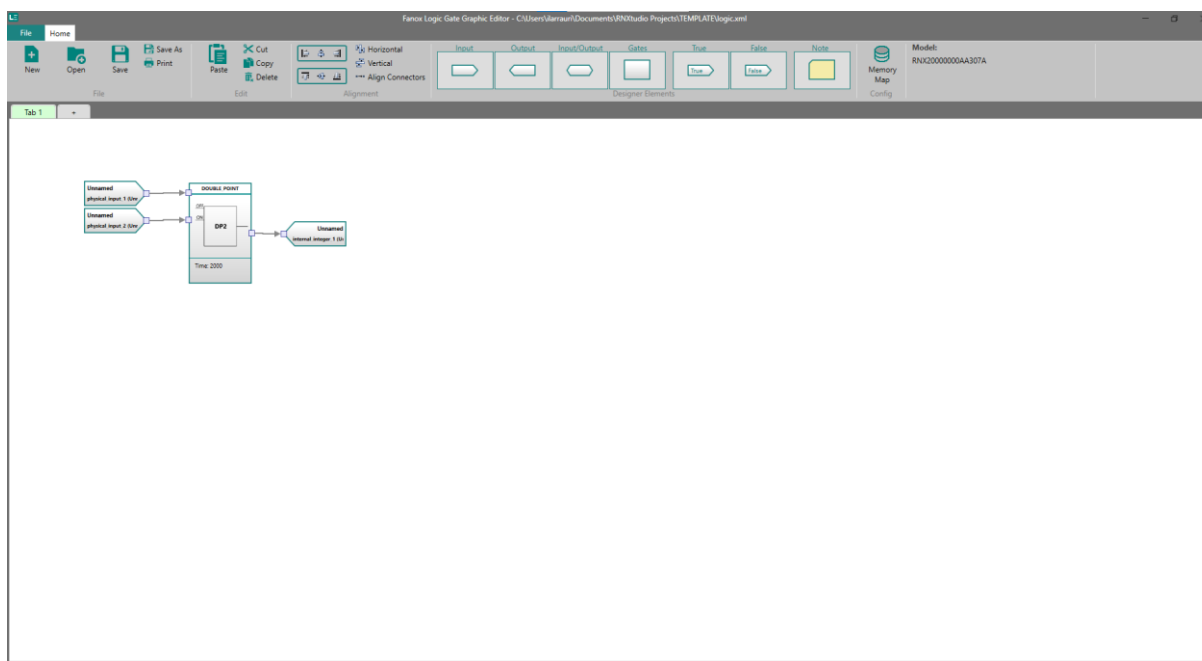


Figure 40: Logic Editor

4. PROTOCOLS CONFIGURATION

4.1. MODBUS MASTER

The Modbus master protocol allows communication with control and/or protection and measuring devices.

The RTU has two types of communication:

- Modbus RTU master: Serial communication.
- Modbus TCP client: TCP/IP network.

The protocol allows the database to update with digital signals, measurements, and commands.

4.1.1. Implemented Functions

The Modbus master functions that may be used for requesting and writing data in the slave devices are the following:

- FC1 (0x01) Read Coils
- FC2 (0x02) Read Discrete Inputs
- FC3 (0x03) Read Holding Registers
- FC4 (0x04) Read Input Registers
- FC5 (0x05) Write Single Coil
- FC6 (0x06) Write Single Holding Register
- FC15 (0x0F) Write Multiple Coils
- FC16 (0x10) Write Multiple Holding Registers

4.1.2. Modbus RTU Gateway

4.1.2.1. Creating a Modbus RTU Gateway

To create a Modbus RTU, perform the following steps:

- Select Manage Gateways from Gateway menu.
- Select ModbusRTU from the list.
- Set a Name.
- Press in ADD button to include in the project.
- Press Ok button to save.

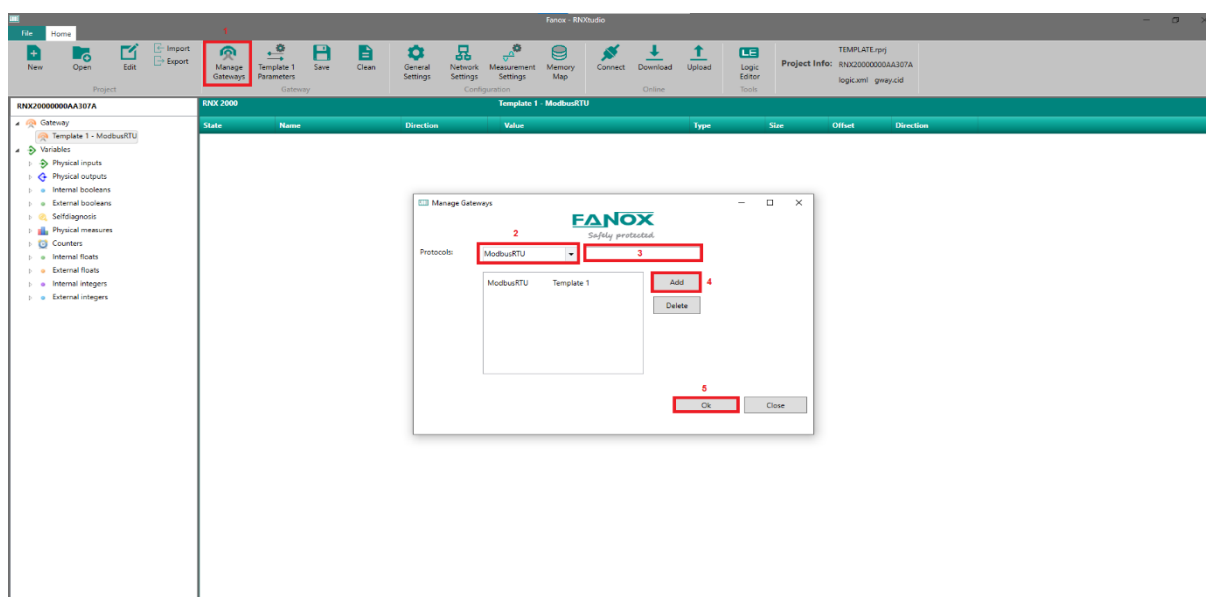


Figure 41: Creating a Modbus RTU

4.1.2.2. Configure a Modbus RTU Setting

To configure a Modbus RTU setting, perform the following steps:

- Select the gateway.
- Select Gateways parameters from Gateway menu.
- Configure the settings.
- Press Ok button to save.

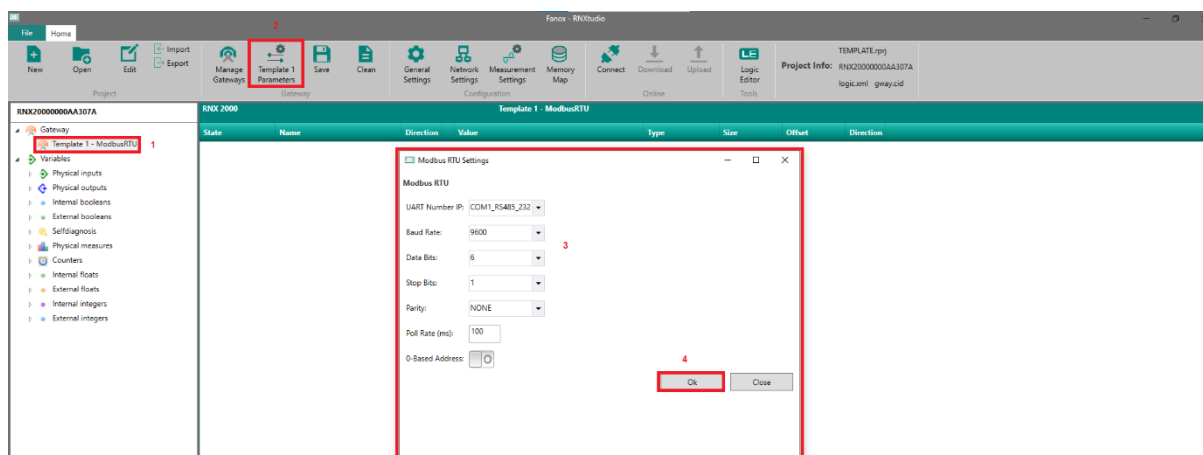


Figure 42: Configuring a Modbus RTU Settings

Where:

- **COM Number:** It allows set the communication channel.
 - COM1_RS485_232
 - COM2_RS485
- **Baud Rate:** It allows to select the serial transmission speed.
 - 9600 Baud
 - 19200 Baud
 - 38400 Baud
 - 57600 Baud
 - 115200 Baud
- **Data Bits:** Number of data bits.
 - 6
 - 7
 - 8
- **Stop Bits:** Number of stop bits.
 - 1
 - 2
- **Parity:** It allows to select the type of the parity to be used in the transmission.
 - None
 - Even
 - Odd
- **Poll Rate (ms):** Time intervals between requests.
- **0-Based Address:** Zero based addressing.
 - not selected Base 0
 - Selected Base 1

4.1.2.3. Configure a Modbus RTU Database

To configure a Modbus RTU database, perform the following steps:

- Select a signal from RTU data model (External variables).
- Drag and drop to edit window.
- Edit signal and configure.
- Press Ok button to include.

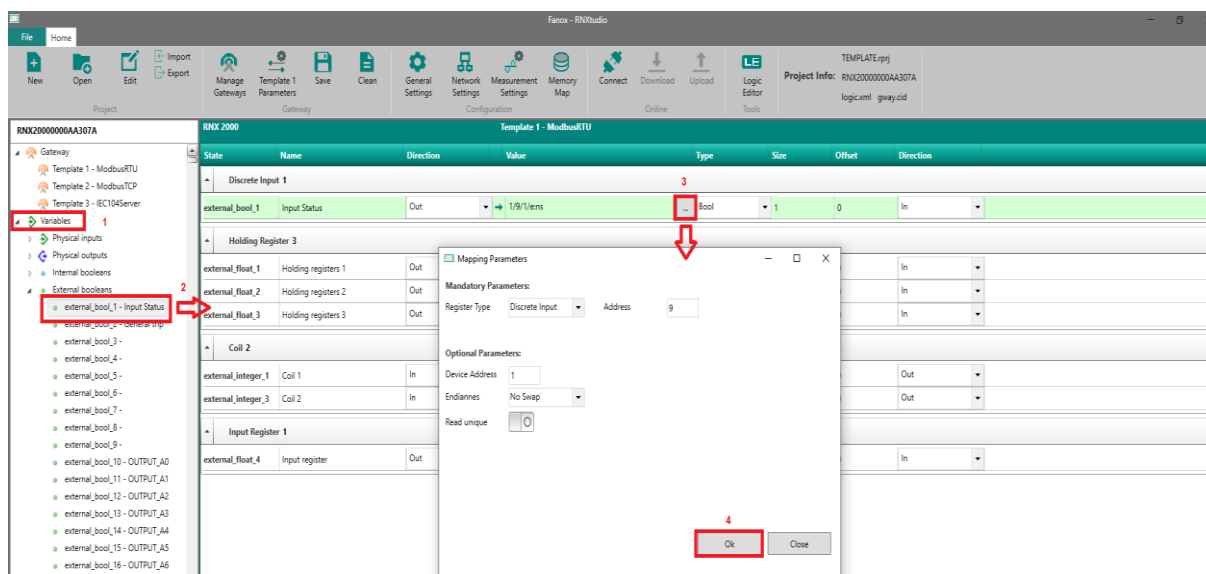


Figure 43: Configuring a Modbus RTU Database

The signals are divided into different columns.

Template 1 - ModbusRTU							
State	Name	Direction	Value	Type	Size	Offset	Direction
1							
externalbool_1	Coil status	Out	0/1/1/ens	Bool	1	0	In

Figure 44: Database Structure

Where:

- **State:** Name of variable used.
- **Name:** Description of the signal, it can be edit.
- **Direction:** where the signal comes from.
- **Value:** Modbus attribute.
 - **Register Type:** Object type, selectable from a list:
 - Coil
 - Discrete input
 - Input register
 - Holding register
 - **Address:** Modbus Address of signal.
 - **Device Address:** Address of Slave device.
 - **Endiannes:** It indicates the order in which the slave sends data, selectable from a list:
 - No Swap
 - Byte Swap (bs).
 - Word Swap (ws).
 - Byte Word Swap (bw).

Endianness Types	Value (HEX)
Default	0x1234 5678
bs	0x3412 7856
bw	0x7856 3412
ws	0x5678 1234

Figure 46: Examples of Endianness types

- **Function:** It is enabled with Coil and Holding register types. It indicated function to use.
 - None (Read).
 - Single (Write).
 - Coils (0x05).
 - Holding Register (0x06).
 - Multiple (Write).
 - Coils (0x0F).
 - Holding Register (0x10).
- **Read unique:** To read configured registers.

The screenshot shows a 'Mapping Parameters' dialog box. Under 'Mandatory Parameters', 'Register Type' is set to 'Holding Register' and 'Address' is '1000'. Under 'Optional Parameters', 'Device Address' is '1', 'Endianness' is 'No Swap', 'Function' is 'None', and the 'Read unique' checkbox is unchecked. 'Ok' and 'Close' buttons are at the bottom right.

Figure 47: Examples of Modbus Attributes.

- **Type:** Data format types
 - Bool
 - Float 32
 - Int8
 - Int16
 - Int32
 - UInt8
 - UInt16
 - UInt32
 - Codedenum
 - Enumerated
 - String
- **Size:** Number of registers.
- **Offset:** Number of Bit
- **Direction:** where the signal goes.

4.1.2.4. Example of a Modbus RTU configuration

4.1.2.4.1. Input Status

- Signal to be integrated.
- Input Status (1)
 - Signal type: Discrete input
 - Modbus Address: 9
 - Device Address: 1
 - Endiannes: No swap
 - Fuction: NA

RNX 2000		Template 1 - ModbusRTU						
State	Name	Direction	Value	Type	Size	Offset	Direction	
Discrete Input 1								
external_bool_1	Input Status 1	Out	1/9/1/ens	Bool	1	0	In	

Figure 47: Example of Input Status configuration

For each Input status point, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 1/9/1/e:ns
 - 1 = Discrete input
 - 9 = Signal Modbus address
 - 1 = Device Address
 - e = Endiannes
- **Type:** Bool
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.2.4.2. Holding register

- Signal to be integrated
- Holding Registers (4)
 - Modbus Address: 1000
 - Device Address: 1
 - Endiannes: No swap
 - Fuction: None

RNX 2000		Template 1 - Modbus RTU Master									
State	Name	Direction	Value	Type	Size	Offset	Direction				
▼	Discrete Input 1										
▲	Holding Register 3										
external_float_1	Holding registers 1	Out	▼	4/1000/1/e:ns	▼	UInt16	▼	1	0	In	▼

Figure 48: Example of Holding register configuration

For each holding register, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 4/1000/1/e:ns
 - 4 = Holding register
 - 1000 = Signal Modbus address
 - 1 = Device Address
 - e = Endiannes

- **Type:** UInt16
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.2.4.3. Coils status

- Signal to be integrated
 - Coil Status (0)
 - Modbus Address: 2
 - Device Address: 1
 - Endiannes: No swap
 - Fuction: Single
 - Fun:5

Template 1 - Modbus RTU Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
Discrete Input 1									
Holding Register 3									
Coil 2									
external_integer_1	Coil 1	In	0/2/1/ens/fun:5	Bool	1	0	Out		

Figure 49: Example of Holding register configuration

For each Coils Status, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 0/2/1/e:ns/fun:5
 - 0 = Coils
 - 2 = Signal Modbus address
 - 1 = Device Address
 - e = Endiannes
 - fun: 5 = Fuction type
- **Type:** Bool
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.2.4.4. Input register

- Signal to be integrated
 - input Registers (3)
 - Modbus Address: 6000
 - Device Address: 1
 - Endiannes: No swap
 - Fuction: NA

Template 1 - Modbus RTU Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
Discrete Input 1									
Holding Register 3									
Coil 2									
Input Register 1									
external_float_4	Input registers 1	Out	3/6000/1/ens	UInt16	1	0	In		

Figure 50: Example of Input register configuration

For each Coils Status, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 0/2/1/e:ns/fun:5
 - 0 = Coils
 - 2 = Signal Modbus address
 - 1 = Device Address
 - e = Endiannes
 - fun: 5 = Function type
- **Type:** UInt16
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

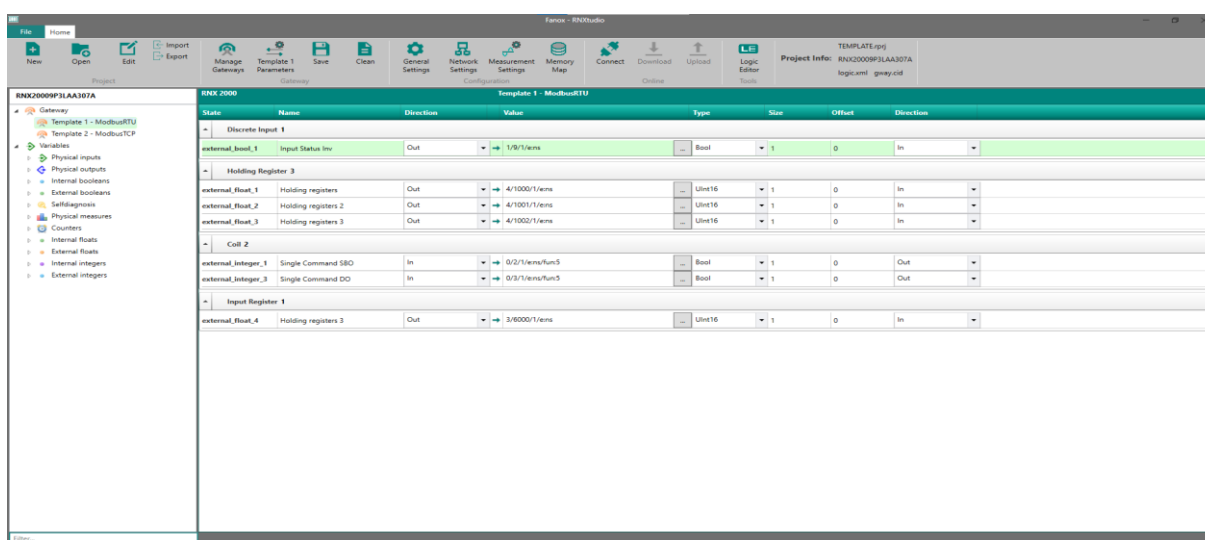


Figure 51: Examples of Modbus RTU Database configuration

4.1.3. Modbus TCP Gateway

4.1.3.1. Creating a Modbus TCP Gateway

To create a Modbus TCP, perform the following steps:

- Select Manage Gateways from Gateway menu.
- Select ModbusTCP from the list.
- Set a Name.
- Press in ADD button to include in the project.
- Press Ok button to save.

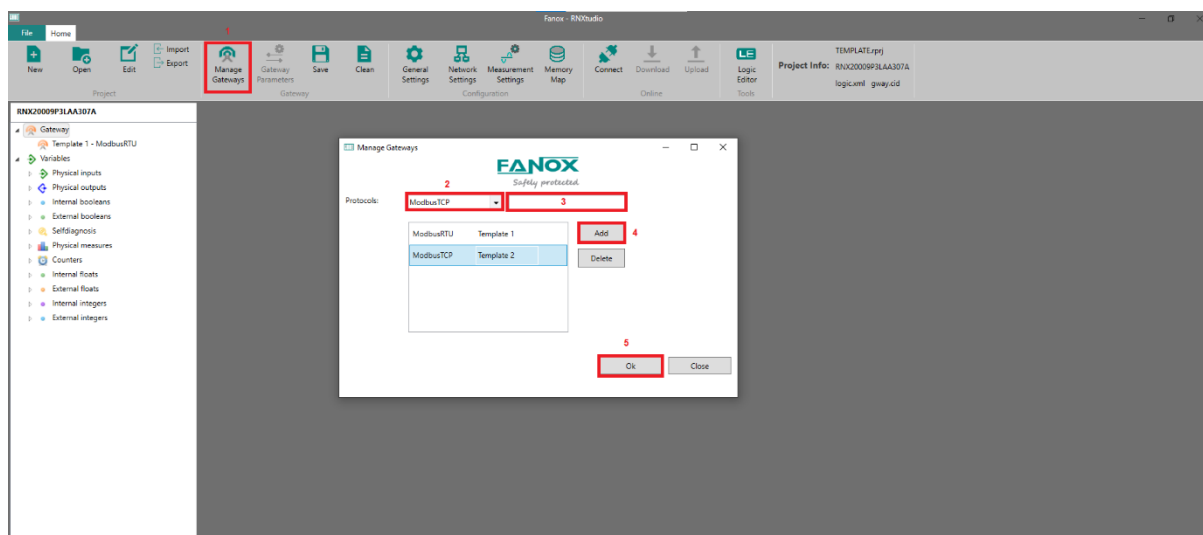


Figure 52: Creating a Modbus RTU

4.1.3.2. Configure a Modbus TCP Setting

To configure a Modbus TCP setting, perform the following steps:

- Select the gateway.
- Select Gateways parameters from Gateway menu.
- Configure the settings.
- Press Ok button to save.

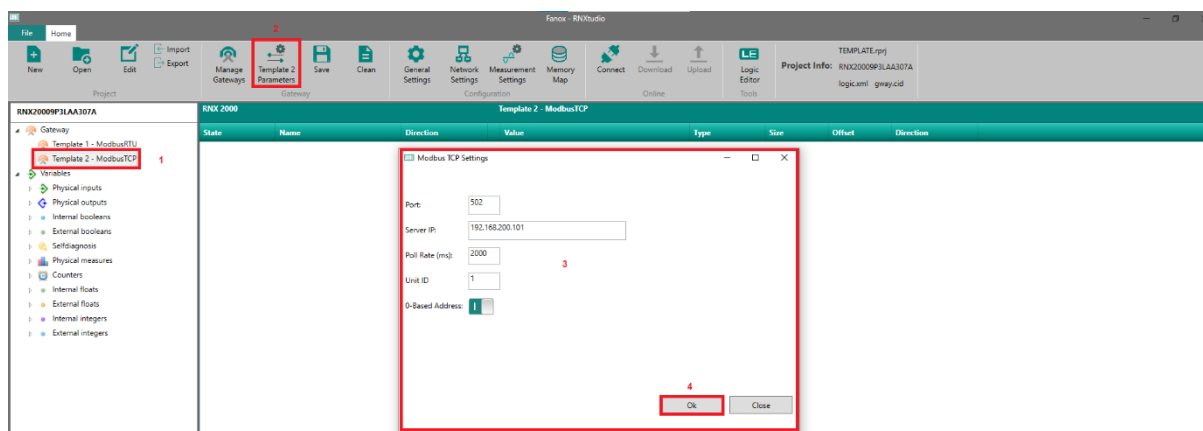


Figure 53: Configuring a Modbus TCP Settings

Where:

- **Port:** Modbus TCP/IP port, by default 502.
- **Server IP:** IP address of Modbus Slave.
- **Poll Rate (ms):** Time intervals between requests.
- **0-Based Address:** Zero based addressing.
 - not selected Base 0
 - Selected Base 1

4.1.3.3. Configure a Modbus TCP Database

To configure a Modbus TCP database, perform the following steps:

- Select a signal from RTU data model (External variables).
- Drag and drop to edit window.
- Edit signal and configure.
- Press Ok button to include.

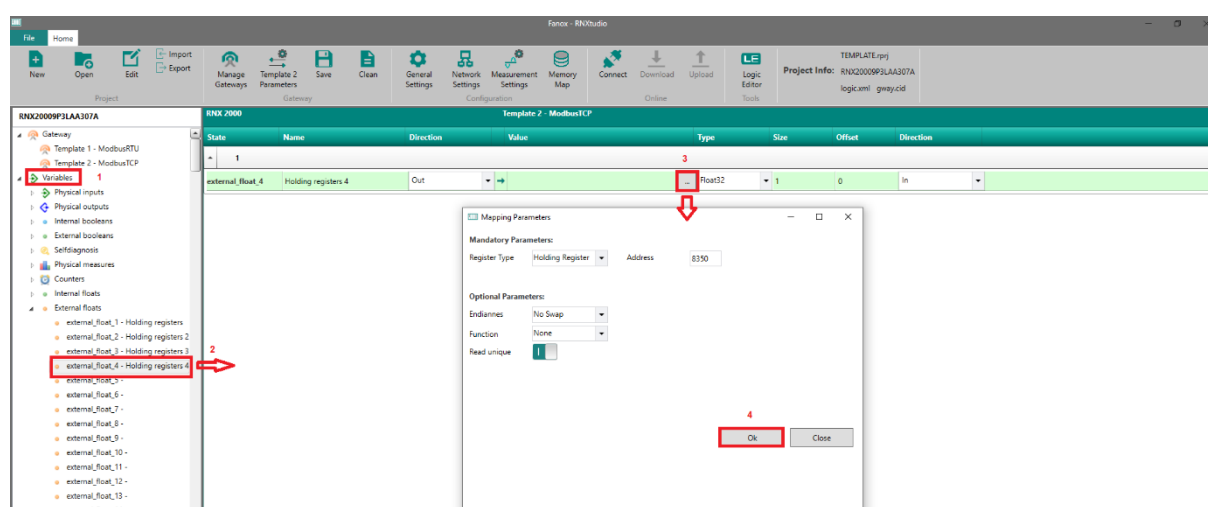


Figure 54: Configuring a Modbus TCP Database

4.1.3.4. Example of a Modbus TCP configuration

4.1.3.4.1. Input Status

- Signal to be integrated.
- Input Status (1)
 - Modbus Address: 9
 - Endiannes: No swap
 - Fuction: NA

Template 2 - Modbus TCP Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
Discrete Input 1									
external_bool_1	Input Status 1	Out	1/9/ens	Bool	1	0	In		

Figure 55: Example of Input Status configuration

For each Input status point, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 1/9/1/e:ns
 - 1 = Discrete input
 - 9 = Signal Modbus address
 - e = Endiannes
- **Type:**
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.3.4.2. Holding register

- Signal to be integrated.
- Holding Registers (4)
 - Modbus Address: 1000
 - Endiannes: No swap
 - Fuction: None

Template 2 - Modbus TCP Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
Discrete Input 1									
Holding Register 3									
external_float_1	Holding registers 1	Out	4/1000/ens	Uint16	1	0	In		

Figure 56: Example of Holding register configuration

For each holding register, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 4/1000/1/e:ns
 - 4 = Holding register
 - 1000 = Signal Modbus address
 - e = Endiannes
- **Type:**
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.3.4.3. Coils status

- Signal to be integrated
 - Coil Status (0)
 - Modbus Address: 2
 - Endiannes: No swap
 - Fuction: Single
 - Fun:5

Template 2 - Modbus TCP Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
▼	Discrete Input 1								
▼	Holding Register 3								
▲	Coil 2								
external_integer_1	Coil 1	In	0/2/e:ns/fun:5	Bool	1	0	Out		

Figure 57: Example of Holding register configuration

For each Coils Status, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 0/2/1/e:ns/fun:5
 - 0 = Coils
 - 2 = Signal Modbus address
 - e = Endiannes
 - fun: 5 = Function type
- **Type:**
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

4.1.3.4.4. Input register

- Signal to be integrated
 - input Registers (3)
 - Modbus Address: 6000
 - Endiannes: No swap
 - Fuction: NA

Template 2 - Modbus TCP Master									
State	Name	Direction	Value	Type	Size	Offset	Direction		
▼	Discrete Input 1								
▼	Holding Register 3								
▼	Coil 2								
▲	Input Register 1								
external_float_4	Input registers 1	Out	3/6000/e:ns	Uint16	1	0	In		

Figure 58: Example of Input register configuration

For each Coils Status, following fields must be configured:

- **State:** Data from RTU model.
- **Name:** Description of the signal.
- **Direction:** From where
- **Value:** 0/2/1/e:ns/fun:5
 - 0 = Coils
 - 2 = Signal Modbus address
 - 1 = Device Address
 - e = Endiannes
 - fun: 5 = Function type

- **Type:**
- **Size:** N° of register
- **Offset:** Bit to be read
- **Direction:** To where

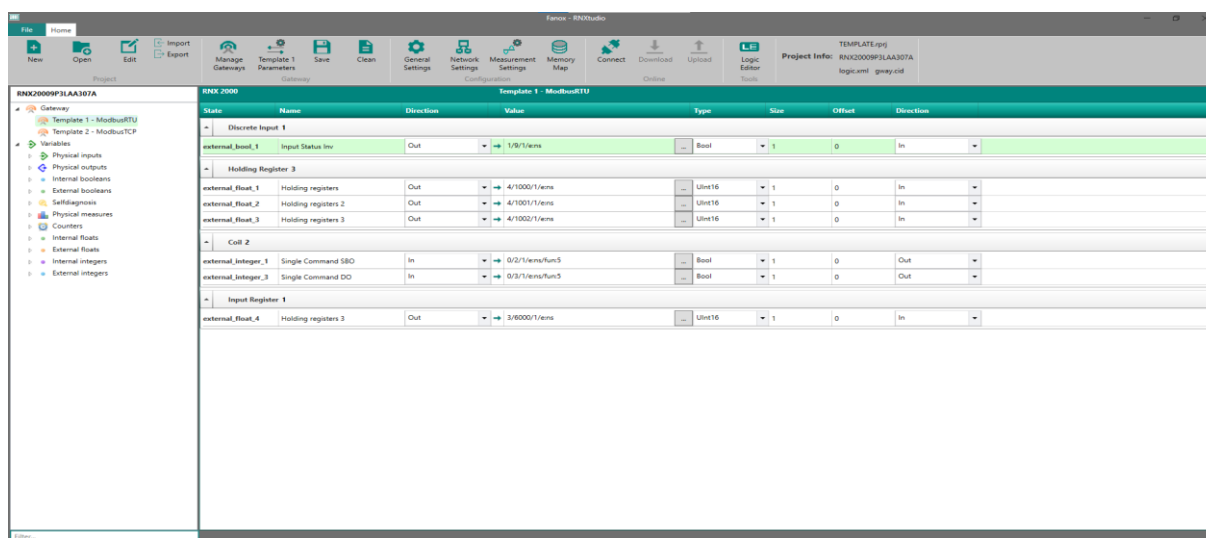


Figure 59: Examples of Modbus TCP Database configuration

4.2. IEC 60870-5-104

IEC60870-5-104 telecontrol protocol is based in a client/server model referring the controlling station as the client and the controlled station as the server. Is the controlling station which establishes each transport connection with all IEC60870-5- 104 servers in the network.

The transport interface (User to TCP interface) is a stream-oriented interface which does not define any start or stop mechanism for the ASDUs of IEC 60870-5-101. In order to detect the start and the end of the ASDUs, each APCI includes the following delimiting elements: a start character, the specification of the length of the ASDU, plus the control field. Either a complete APDU (or, for control purposes, only the APCI fields) may be transferred.

4.2.1. IEC104 Server Gateway

4.2.1.1. Creating an IEC104 Server Gateway

To create an IEC104 Server, perform the following steps:

- Select Manage Gateways from Gateway menu.
- Select IEC104Server from the list.
- Set a Name.
- Press in ADD button to include in the project.
- Press Ok button to save.

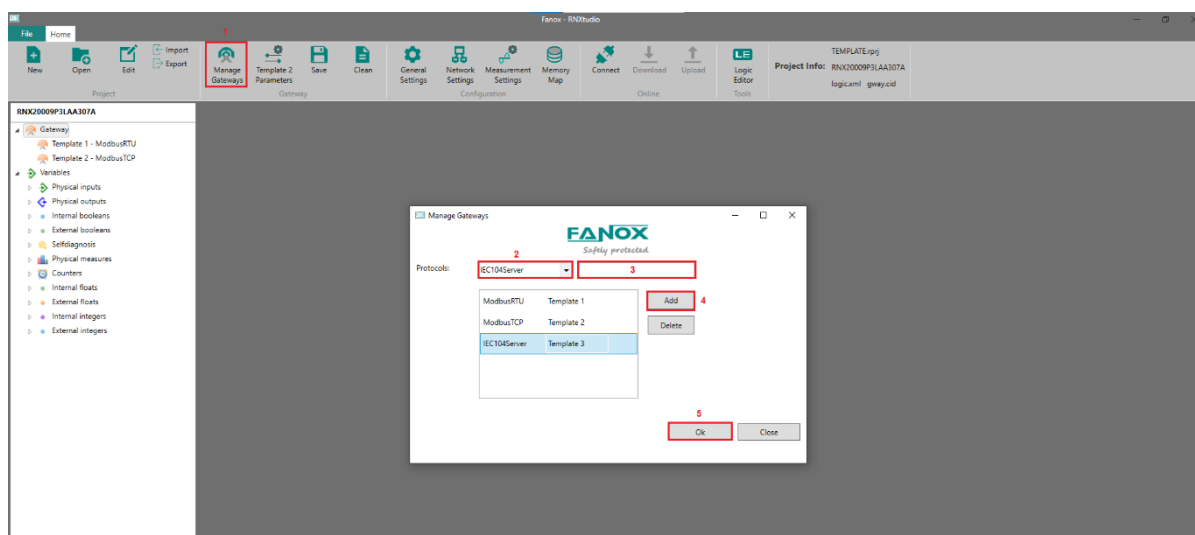


Figure 60: Creating an IEC104Server

4.2.1.2. Configure an IEC104 Server Setting

To configure a IEC104 Server setting, perform the following steps:

- Select the gateway.
- Select Gateways parameters from Gateway menu.
- Configure the settings.
- Press Ok button to save.

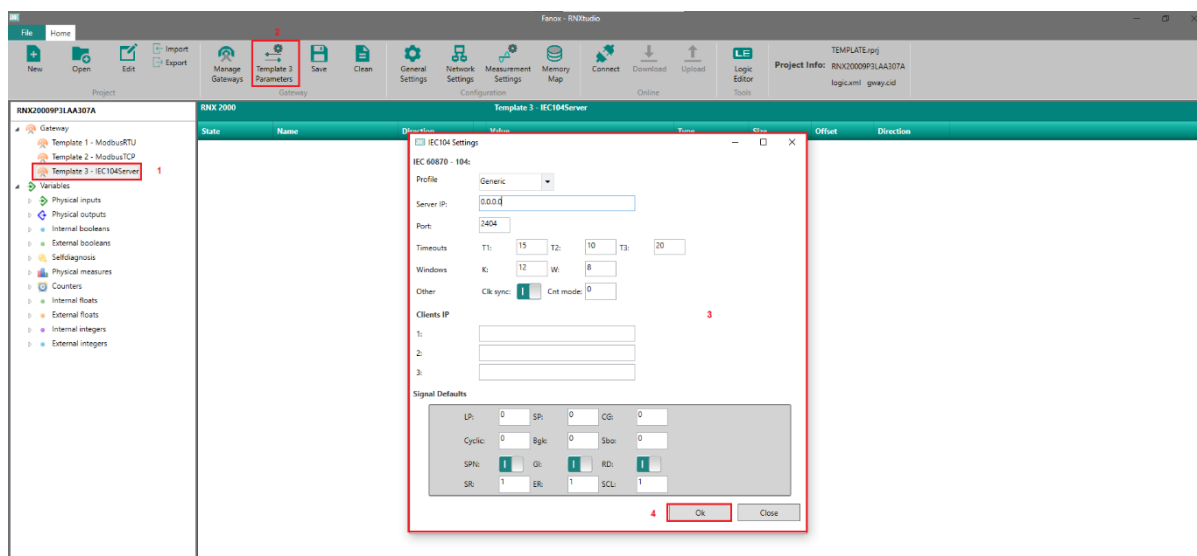


Figure 61: Configuring a IEC104 Server Settings

Where:

- **Profile:** Selectable from a list:
 - Generic: Generic Profile.
 - EVN: EVN Profile.
- **Server IP:** IP address of RTU.
- **Port:** IEC 104 port, by default 2404.
- **Timeouts:**
 - T1: Time-out of send or test APDUs.
 - T2: Time-out for acknowledges in case of no data messages $t2 < t1$.
 - T3: Time-out for sending test frames in case of a long idle state.
- **Window:**
 - k: Maximum difference receive sequence number to send state variable.
 - w: Lasted acknowledge after receiving w I format APDUs.
- **Other:**
 - Clk sync: Synchro enabled by IEC 61850-5-104
 - Cnt Mode: Counter mode.
 - Mode A = Value 0
 - Mode B = Value 1
 - Mode C = Value 2
 - Mode D = Value 3
- **Clients IP:** Allowed IP to connect as a client.
- **Default signals:** Applies to entire database

LP	Lond pulse duration	SP	Short pulse Duration	CG	Counter group
Cyclic	Cyclic data transmission time	Sbo	Select Before operate time		
SPN	Spontaneous	GI	General interrogation	RD	Read procedure Time

SR	Start range for normalized value	ER	End range for normalized value	SCL	Scale factor
-----------	----------------------------------	-----------	--------------------------------	------------	--------------

4.2.1.3. Configure an IEC 104 Server Database

To configure an IEC104 Server database, perform the following steps:

- Select a signal from RTU data model.
- Drag and drop to edit window.
- Edit signal and configure.
- Press Ok button to include.

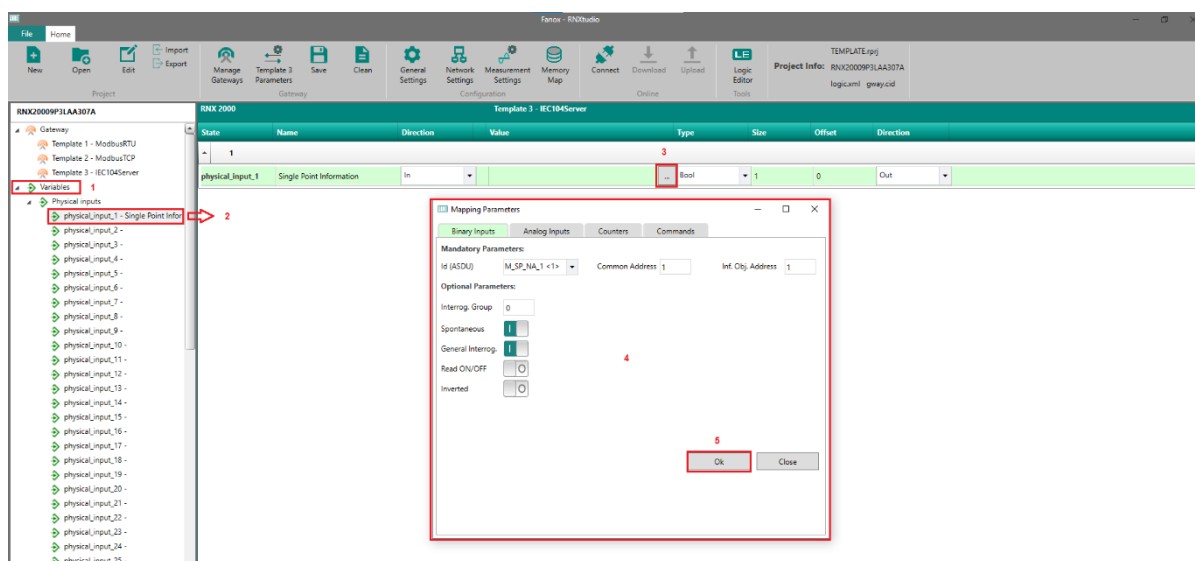


Figure 62: Configuring an IEC104 Server Database

The signals are divided into different columns.

State	Name	Direction	Value	Type	Size	Offset	Direction
Binary Inputs							
physical_input_1	Single Point Information	In	id:1/ca:1/oa:1/g:0/spm:1/gi:1/rd:0/mv:0	Bool	1	0	Out

Figure 63: Database Structure

Where:

- **State:** Name of variable used.
- **Name:** Description of the signal, it can be edit.
- **Direction:** where the signal comes from.
- **Value:** IEC 104 attribute, four type of signals:
 - **Binary Inputs:**
 - Mandatory Parameters
 - Id (ASDU)
 - M_SP_NA_1 <1> (Single point information).
 - M_DP_NA_1 <3> (Double point information).
 - M_SP_TB_1 <30> (Single point inf. with time tag).
 - M_DP_TB_1 <31> (Double point inf. with time tag).
 - Common Address
 - IOA: Information Object Address

- Optional Parameters
 - Interrog. Group
 - Spontaneous
 - General interrogation
 - Read ON/OFF
 - Inverted

The screenshot shows a 'Mapping Parameters' window with four tabs: Binary Inputs, Analog Inputs, Counters, and Commands. The 'Binary Inputs' tab is active. It contains two sections: 'Mandatory Parameters' and 'Optional Parameters'. In the mandatory section, 'Id (ASDU)' is a dropdown menu showing 'M_SP_NA_1 <1>', 'Common Address' is a text box with '1', and 'Inf. Obj. Address' is a text box with '1'. The optional section has five items: 'Interrog. Group' with a text box containing '0', 'Spontaneous' with a checked checkbox, 'General Interrog.' with a checked checkbox, 'Read ON/OFF' with an unchecked checkbox, and 'Inverted' with an unchecked checkbox. At the bottom right are 'Ok' and 'Close' buttons.

Figure 64: Examples of Binary Inputs Attributes.

- **Analog Inputs:**
 - Mandatory Parameters
 - Id (ASDU)
 - M_ST_NA_1 <5> (Step position information).
 - M_ME_NA_1 <9> (Normalized value).
 - M_ME_NB_1 <11> (Scaled value).
 - M_ME_NC_1 <13> (Short Floating point).
 - M_ST_TB_1 <32> (Step position information with time).
 - M_ME_TD_1 <34> (Normalized value with time).
 - M_ME_TE_1 <35> (Scaled value with time).
 - M_ME_TF_1 <36> (Short Floating point with time).
 - Common Address
 - IOA: Information Object Address
 - Optional Parameters
 - Cyclic time
 - Range Init (Enables with the following types: 9/34)
 - Range End (Enables with the following types: 9/34)
 - Scaled
 - Interrog. Group
 - Spontaneous
 - General interrogation
 - Read ON/OFF
 - Deadband

Mapping Parameters

Binary Inputs Analog Inputs Counters Commands

Mandatory Parameters:

Id (ASDU) M_ME_NC_1 <13> Common Address 1 Inf. Obj. Address 1

Optional Parameters:

Cyclic Time 0 seg Scaled 1.00

Interrog. Group 0

Spontaneous I

General Interrog. I

Read ON/OFF O

Deadband 0

Ok Close

Figure 65: Examples of Analog Inputs Attributes.

- **Counters:**
 - **Mandatory Parameters**
 - Id (ASDU)
 - M_IT_NA_1 <15> (Integrated total).
 - M_IT_TB_1 <37> (Integrated total with time).
 - Common Address
 - IOA: Information Object Address
 - **Optional Parameters**
 - Freeze
 - Counter Group

Mapping Parameters

Binary Inputs Analog Inputs Counters Commands

Mandatory Parameters:

Id (ASDU) M_IT_NA_1 <15> Common Address 1 Inf. Obj. Address 300

Optional Parameters:

Freeze 5 seg

Counter Group 0

Ok Close

Figure 66: Examples of Counter Attributes.

- **Commands:**
 - **Mandatory Parameters**
 - Id (ASDU)
 - C_SC_NA_1 <45> (Single command).
 - C_DC_NA_1 <46> (Double command).
 - C_RC_NA_1 <47> (Regulating step command).
 - C_SE_NA_1 <48> (Set point command, normalized value).
 - C_SE_NB_1 <49> (Set point command, scaled value).
 - C_SE_NC_1 <50> (Set point command, short floating-point number).
 - Common Address
 - IOA: Information Object Address
 - **Optional Parameters**
 - SBO
 - Long Pulse
 - Short Pulse
 - Inverted (Enables with the following types: 45/46/47)

The screenshot shows a software window titled 'Mapping Parameters' with four tabs: 'Binary Inputs', 'Analog Inputs', 'Counters', and 'Commands'. The 'Commands' tab is active. Under 'Mandatory Parameters', there are three fields: 'Id (ASDU)' with a dropdown menu showing 'C_DC_NA_1 <46>', 'Common Address' with a text box containing '1', and 'Inf. Obj. Address' with a text box containing '400'. Under 'Optional Parameters', there are four fields: 'SBO' with a text box containing '15', 'Long Pulse' with a text box containing '5', 'Short Pulse' with a text box containing '2', and 'Inverted' with a radio button that is currently unchecked. At the bottom right, there are 'Ok' and 'Close' buttons.

Figure 67: Examples of Command Attributes.

- **Type:** Data format types
 - Bool
 - Float 32
 - Int8
 - Int16
 - Int32
 - UInt8
 - UInt16
 - UInt32
 - Codedenum
 - Enumerated
 - String
- **Size:** Number of registers.
- **Offset:** Number of Bit
- **Direction:** where the signal goes.

4.2.1.4. Example of an IEC 104 Server configuration

Database to be configured:

- Signal to be integrated.
- Binary Inputs
 - Single point:
 - Type identification: <1>: = Single point information.
 - Common Address: 1
 - IOA (Information Object Address): 1
 - COT (Cause of transmission):
 - Spontaneous
 - General interrogation
 - Double point:
 - Type identification: <3>: = Double point information.
 - Common Address: 1
 - IOA (Information Object Address): 100
 - COT (Cause of transmission):
 - Spontaneous
 - General interrogation
- Analog Inputs
 - Type identification: <13>: = measured value, short floating point number
 - Common Address: 1
 - IOA (Information Object Address): 200
 - COT (Cause of transmission):
 - Periodic,Cyclic:60 Seg
 - General interrogation
- Counters
 - Type identification: <15>: = integrated totals
 - Common Address: 1
 - IOA (Information Object Address): 300
 - Freeze: 10 Seg
 - Counter Group: 0 (General Request).
- Commands
 - Type identification: <46>: = Double commands
 - Common Address: 1
 - IOA (Information Object Address): 400
 - SBO:15
 - Long Pulse: 5 Seg
 - Short Pulse: 2 Seg

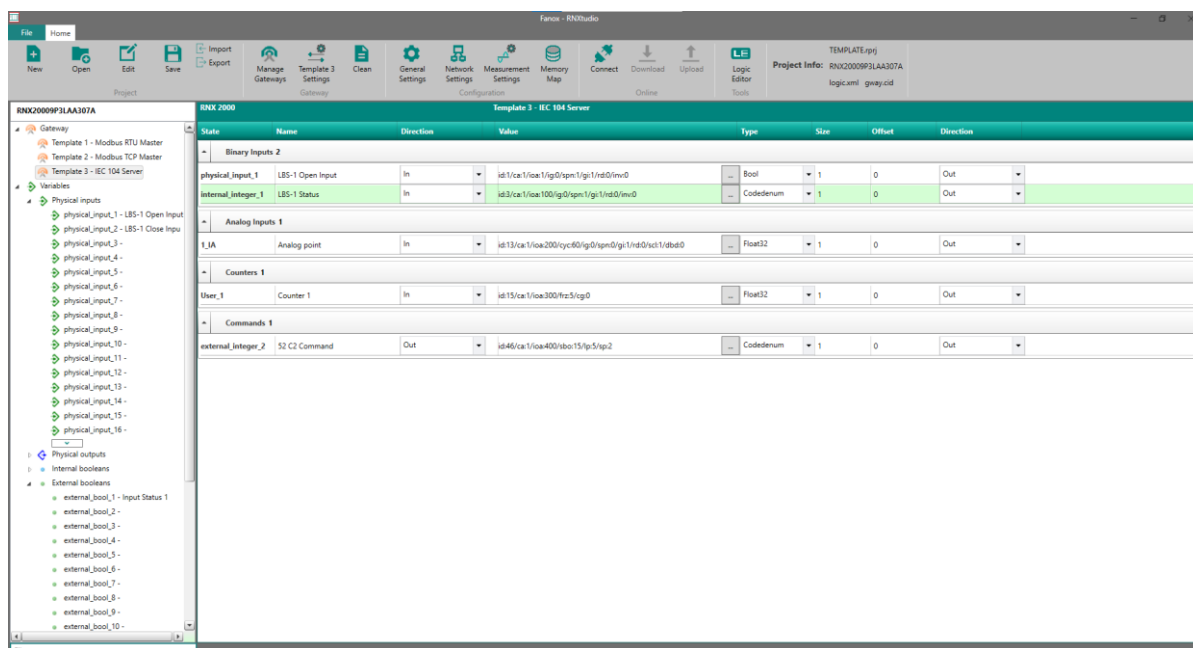


Figure 68: Examples of IEC 104 Server Configuration

5. WEB BROWSER

5.1. Introduction

This document describes the capacity of the web server.

It consists of the following functional features:

- Equipment monitoring.
- Data logging
- Setup
- Security
- Test Menu
- FW Update

5.2. Web server connection

To access the application, open a browser and write the IP address of the device to which you want to connect in the address bar.

E.g.: <https://192.168.200.100> connected to ETH Local. A login page will appear to start the session.

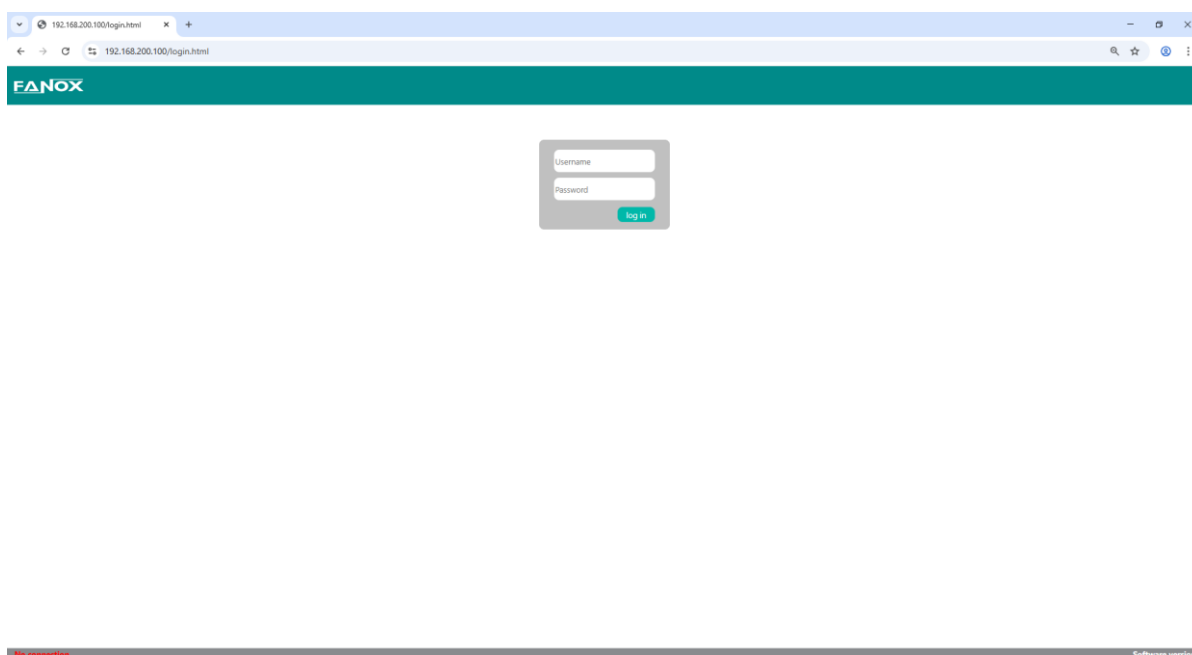


Figure 69: Web Server log in page

The login screen will appear where you will have to enter your username and password.

Authentication is necessary to have access to web.

- User: Super Admin 1
- Password: Fanox/5555

The User and password can be modified from web server.

5.3. Web server options

Web server options consists of the following menus.

- **Monitoring:** It allows to visualize different data.
- **Data logging:** It allows to visualize events and system log.
- **Setup:** It allows to change the settings of RTU.
- **Security:** It allows to change Users and Roles configuration.
- **Test Menu:** It allows to simulate the signals.
- **FW Update:** It allows to send firmware update.

5.3.1. Monitoring

The monitoring options menu consists of the following submenus:

- **Device info:** It provides us with information about equipment.
- **States:** It allows to be monitoring the real state of:
 - Physical Inputs
 - Physical Outputs
 - Internal Booleans
 - External Booleans
 - Internal floats
 - External floats
 - Internal integers
 - External integers
 - Protections
 - Selfdiagnosis
- **Measurements:** It allows to monitoring measurements
- **Counters:** It allows to change the values of counters.

5.3.1.1. Device info

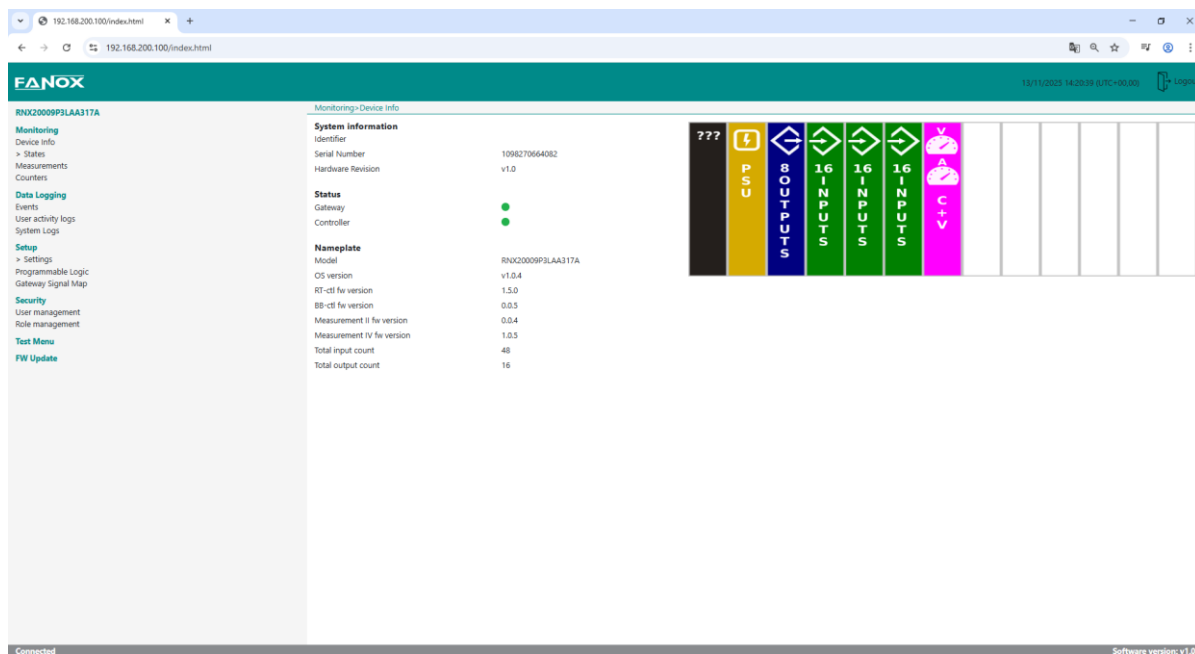


Figure 70: Device info page

5.3.1.2. States

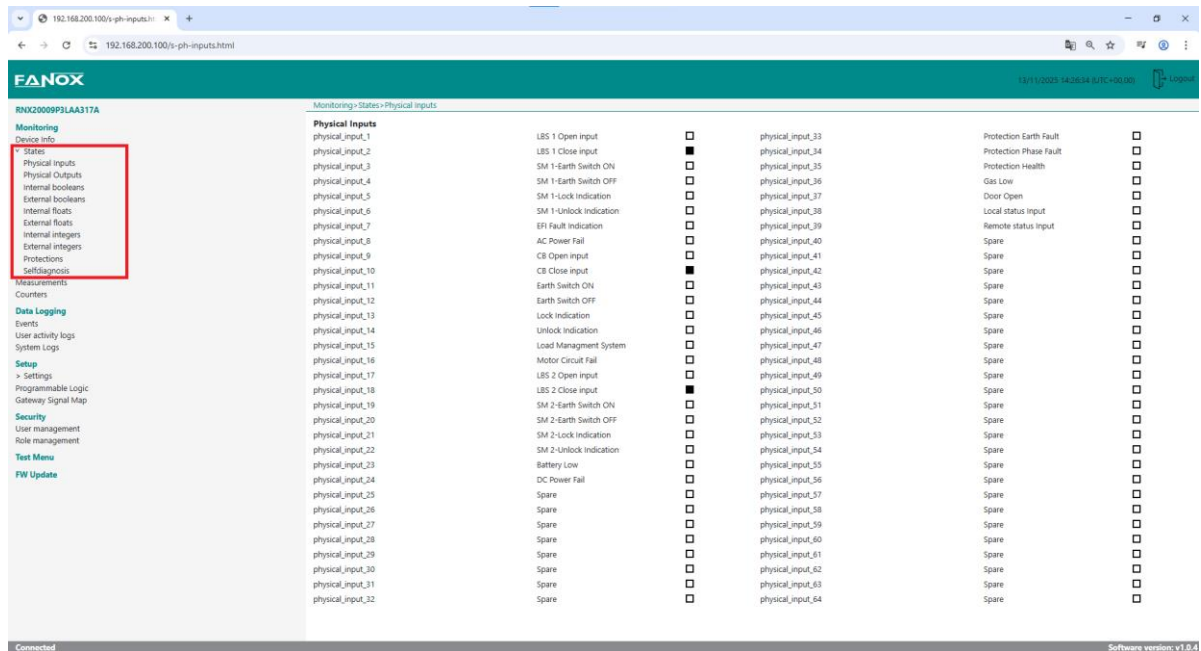


Figure 71: States page

5.3.1.3. Measurements

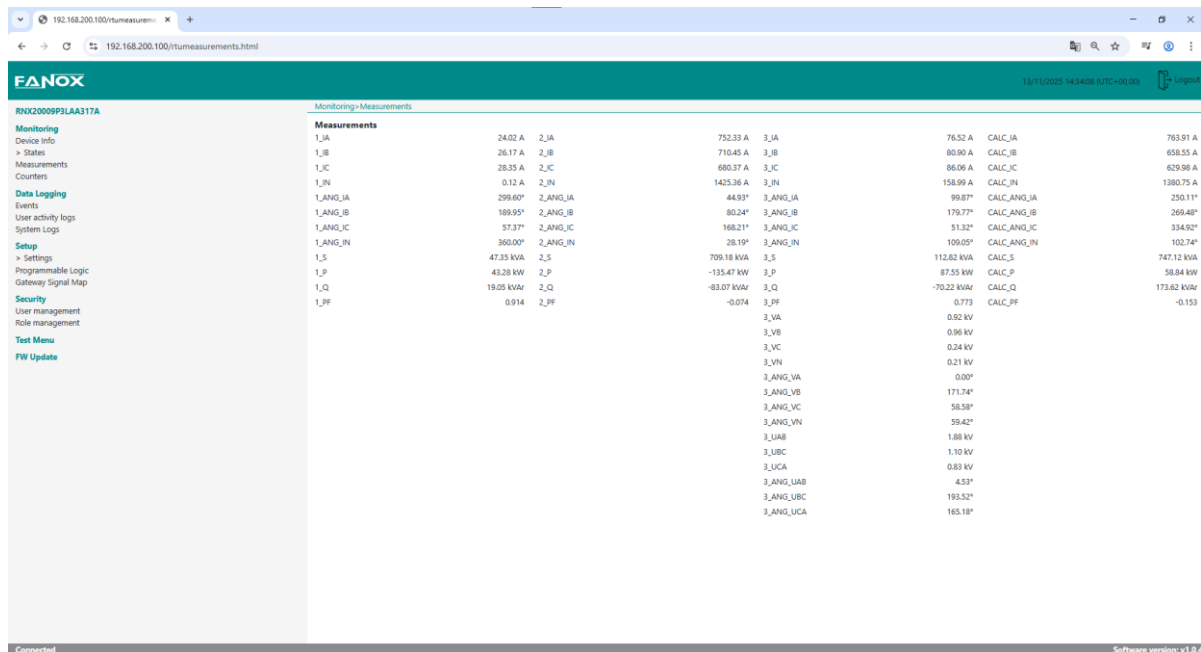


Figure 72: Measurements page

5.3.1.4. Counters

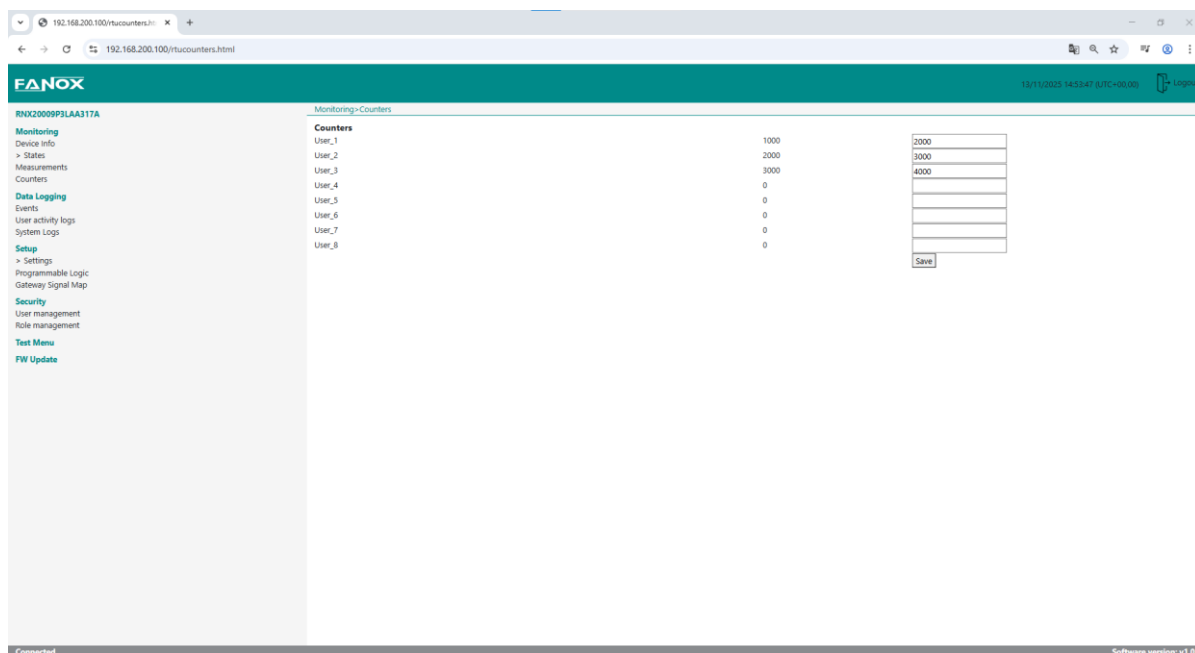


Figure 73: Counters page

5.3.2. Data Logging

The data logging menu consists of the following submenus:

- Events: System variable events
- User activity logs: User Events
- System logs: System event logs

5.3.2.1. Events

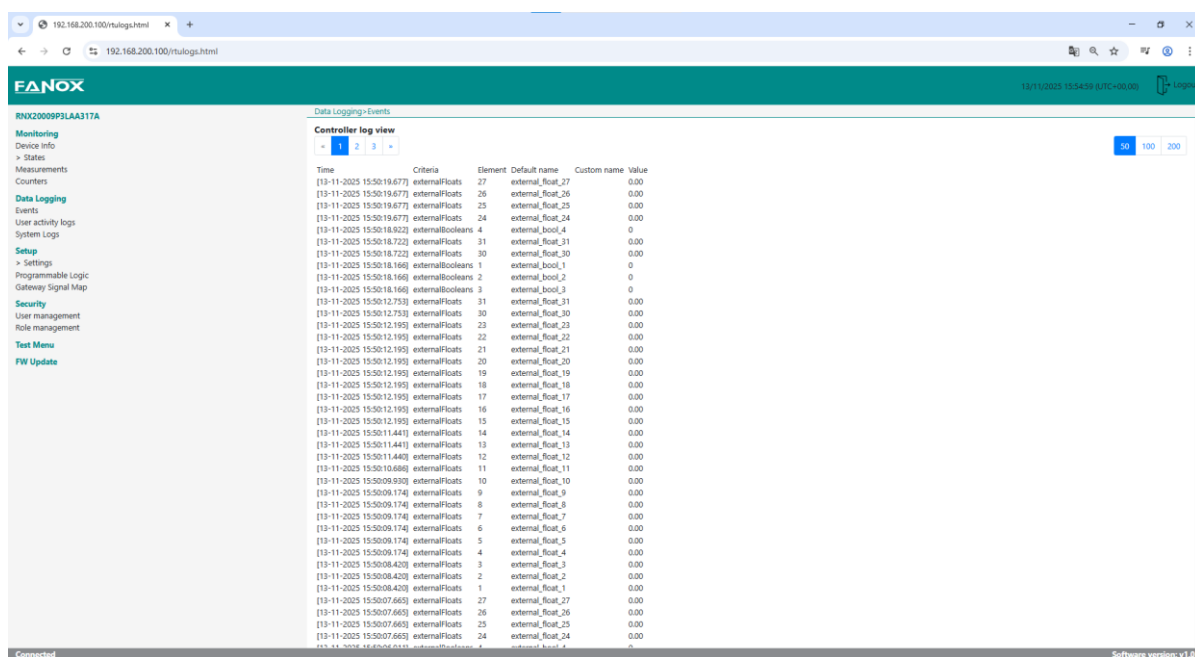


Figure 74: Events page

5.3.2.1. User activity logs

The screenshot shows the 'User log view' section of the FANOX web interface. The interface includes a sidebar with navigation options like Monitoring, Data Logging, Setup, Security, and Test Menu. The main content area displays a table of user activity logs. The table has columns for Time, Level, User, and Message. The logs show various events such as 'User logged in', 'User logged out', and 'About to check role map_gway permission'.

Time	Level	User	Message
2025.11.13 14:47:06.430	INFO		Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:47:06.362	INFO		Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:35:22.453	INFO	Super Admin 1	Counter value change, item: User_3, old_value: 0.0, new_value: 2000
2025.11.13 14:35:22.453	INFO	Super Admin 1	Counter value change, item: User_2, old_value: 0.0, new_value: 2000
2025.11.13 14:35:22.453	INFO	Super Admin 1	Counter value change, item: User_1, old_value: 0.0, new_value: 1000
2025.11.13 14:25:36.890	INFO	Super Admin 1	Simulation start request: physiological
2025.11.13 14:25:07.000	INFO		Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:25:06.962	INFO		Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:24:34.512	INFO		About to check role map_gway permission
2025.11.13 14:24:28.463	INFO		Go to URL: /index.html
2025.11.13 14:24:28.463	INFO	Super Admin 1	User logged in, login: Super Admin 1
2025.11.13 14:24:16.361	INFO	Super Admin 1	User logged out
2025.11.13 14:24:16.360	INFO		User logged in externally = False
2025.11.13 14:23:54.623	INFO		About to check role map_gway permission
2025.11.13 14:23:40.914	DEBUG		trying to start gateway which is already running
2025.11.13 14:23:40.913	DEBUG		trying to start gateway which is already running
2025.11.13 14:23:31.023	INFO		About to check role map_gway permission
2025.11.13 14:23:25.308	DEBUG		trying to start gateway which is already running
2025.11.13 14:23:25.308	DEBUG		trying to start gateway which is already running
2025.11.13 14:23:10.291	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:55.262	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:55.261	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:40.253	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:40.252	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:24.349	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:24.338	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:08.893	DEBUG		trying to start gateway which is already running
2025.11.13 14:22:08.890	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:53.408	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:53.407	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:37.870	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:37.868	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:37.858	DEBUG		trying to start gateway which is already running
2025.11.13 14:21:37.858	DEBUG		trying to start gateway which is already running

Figure 75: User activity logs page

5.3.2.1. System logs

The screenshot shows the 'System log view' section of the FANOX web interface. The interface includes a sidebar with navigation options like Monitoring, Data Logging, Setup, Security, and Test Menu. The main content area displays a table of system logs. The table has columns for Time, Level, Appname, User, and Message. The logs show various events such as 'Time synchronization lost', 'Client sim/type/mc with parameters: 9600/8/3/1', and 'Created internal signal: INTL_DEV_BOOT_TYPE'.

Time	Level	Appname	User	Message
2025.11.13 15:22:22.449	INFO	gateway	-	Time synchronization lost
2025.11.13 14:47:06.430	INFO	AppSvc	None	Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:47:06.362	INFO	AppSvc	None	Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:35:22.453	INFO	AppSvc	1	Counter value change, item: User_3, old_value: 0.0, new_value: 2000
2025.11.13 14:35:22.453	INFO	AppSvc	1	Counter value change, item: User_2, old_value: 0.0, new_value: 2000
2025.11.13 14:35:22.453	INFO	AppSvc	1	Counter value change, item: User_1, old_value: 0.0, new_value: 1000
2025.11.13 14:25:36.890	INFO	gateway	-	CSharedMem singleton object deleted
2025.11.13 14:25:36.888	INFO	gateway	-	Simulation start request: physiological
2025.11.13 14:25:36.883	INFO	gateway	-	CSharedMem object: rtush / 602 / 1
2025.11.13 14:25:36.883	INFO	gateway	-	Mapped shared memory 'rtush' boot/6528/int240/unit1/float672
2025.11.13 14:25:07.000	INFO	AppSvc	None	Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:25:06.962	INFO	AppSvc	None	Test menu shm cfg: rtush/6528/1/240/672
2025.11.13 14:24:37.273	INFO	gateway	-	IEC-60870-5 - Starting server
2025.11.13 14:24:37.243	INFO	gateway	-	Configured uart (/dev/ttyMC0) with parameters: 9600/8/3/1
2025.11.13 14:24:37.243	INFO	gateway	-	Client sim/type/mc, S48911 started
2025.11.13 14:24:37.243	INFO	gateway	-	Created Signal with ID: 1 mapping topic to register: RMLU_Temperature --> 4/2/1
2025.11.13 14:24:37.243	INFO	gateway	-	Created Signal with ID: mapping topic to register: RMLU_Temperature --> 4/1/1
2025.11.13 14:24:37.243	INFO	gateway	-	Created internal signal: INTL_DEV_BOOT_TYPE, dir: 0, offset: 164, dtype: 6
2025.11.13 14:24:37.243	INFO	gateway	-	Created internal signal: INTL_DEV_SYNC_SYNC, dir: 0, offset: 163, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_TEMP_VALUE, dir: 0, offset: 162, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_TEMP_ALARM, dir: 0, offset: 161, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_ERROR, dir: 0, offset: 160, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_ERROR, dir: 1, offset: 146, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_CONN_STATE, dir: 1, offset: 130, dtype: 6
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_CONN_STATE, dir: 1, offset: 6498, dtype: 0
2025.11.13 14:24:37.239	ERROR	gateway	-	Internal signal not handled: INTL_DEV_GPIOD_LOCK_UNLOCK
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_IND_LED_LX, dir: 0, offset: 6407, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_IND_LED_ERROR, dir: 0, offset: 6406, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_IND_LED_STATUS, dir: 0, offset: 6405, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_IND_LED, dir: 0, offset: 6404, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_SYNC_RESET, dir: 1, offset: 6403, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_STATE, dir: 0, offset: 6400, dtype: 0
2025.11.13 14:24:37.239	INFO	gateway	-	Created internal signal: INTL_DEV_LX_HW, dir: 0, offset: 5830, dtype: 0
2025.11.13 14:24:37.239	ERROR	gateway	-	Internal signal not handled: INTL_DEV_SYNC_MANUAL
2025.11.13 14:24:37.239	ERROR	gateway	-	Internal signal not handled: INTL_DEV_SYNC_PROTOCOL
2025.11.13 14:24:37.239	ERROR	gateway	-	Internal signal not handled: INTL_DEV_SYNC_SNP

Figure 76: System logs page

5.3.3. Setup

The setup options menu consists of the following submenus:

- Settings:
 - General: It allows to configure time zone and synchronization settings.
 - Measurements
 - Settings Measurements: It allows to configure measurements settings (Ratios, correct factors...).
 - Settings inputs: Debounce time.
- Serial ports: Serial port settings, cannot be configured.
- Ethernet ports: Ethernet port setting configuration
- Programmable Logic: It allows the followings:
 - Start: To start the application.
 - Stop: To stop the application.
 - Restart: To restart the application.
 - Send: To send logics configuration file.
 - Get: To download the logics configuration file.
- Gateway Signal Map: It allows the followings:
 - Start All: To start the gateway application.
 - Stop All: To stop the gateway application.
 - Send: To send gateway configuration file.
 - Get: To download gateway configuration file.
-

5.3.3.1. Settings

5.3.3.1.1. General

The screenshot displays the 'General' settings page for an RTU. The interface includes a sidebar on the left with various menu items. The main content area is divided into several sections:

- Interface:** Includes fields for Language (set to English), Identifier, and Timezone (set to UTC). There is a 'Save' button below these fields.
- SNTP:** Includes fields for Address 1, Address 2, Time no synchronization (m) (set to 60), SNTP Polling time (m) (set to 15), SNTP Waiting time (s) (set to 30), and SNTP Retries number (set to 3). There is a 'Save' button below these fields.
- Current time:** Includes a 'Set time' button and a 'Sync time with the browser' checkbox.

Figure 77: General Settings page

5.3.3.1.2. Settings Measurements

Settings Measurements

Frequency	60 Hz
Current Sensor 1 Primary	100
Current Sensor 2 Primary	100
Current Sensor 3 Primary	100
Voltage Sensor Primary	10

RatioCorrectionFactors

I1-A RCF	1
I1-B RCF	1.1
I1-C RCF	1.2
I2-A RCF	1.3
I2-B RCF	1.4
I2-C RCF	1.5
I3-A RCF	1.6
I3-B RCF	1.7
I3-C RCF	1.8
V3-A RCF	1.9
V3-B RCF	2.0
V3-C RCF	0.5

AngleCorrectionFactors

I1-A ACF	359.9	deg
I1-B ACF	0	deg
I1-C ACF	0	deg
I2-A ACF	100	deg
I2-B ACF	0	deg
I2-C ACF	0	deg
I3-A ACF	200	deg
I3-B ACF	0	deg
I3-C ACF	0	deg
V3-A ACF	300	deg
V3-B ACF	0	deg
V3-C ACF	0	deg

Deadbands

I1-Phase Deadband	0.05	ms
-------------------	------	----

Figure 78: Settings Measurements page 1_2

Deadbands

I1-Phase Deadband	0.03	ms
I1-Neutral Deadband	0.3	ms
S1-Deadband	0.5	V/VmIn
P1-Deadband	0.5	V/VmIn
Q1-Deadband	0.5	V/VmIn
PF1-Deadband	0.5	PF
I2-Phase Deadband	0.5	ms
I2-Neutral Deadband	0.5	ms
S2-Deadband	0.5	V/VmIn
P2-Deadband	0.5	V/VmIn
Q2-Deadband	0.5	V/VmIn
PF2-Deadband	0.5	PF
I3-Phase Deadband	0.3	ms
I3-Neutral Deadband	0.3	ms
S3-Deadband	0.5	V/VmIn
P3-Deadband	0.5	V/VmIn
Q3-Deadband	0.5	V/VmIn
PF3-Deadband	0.5	PF
V3-Phase Deadband	0.5	V/Vm
V3-Neutral Deadband	0.5	V/Vm

[Save](#)

Figure 79: Settings Measurements page 2_2

5.3.3.1.3. Settings Inputs

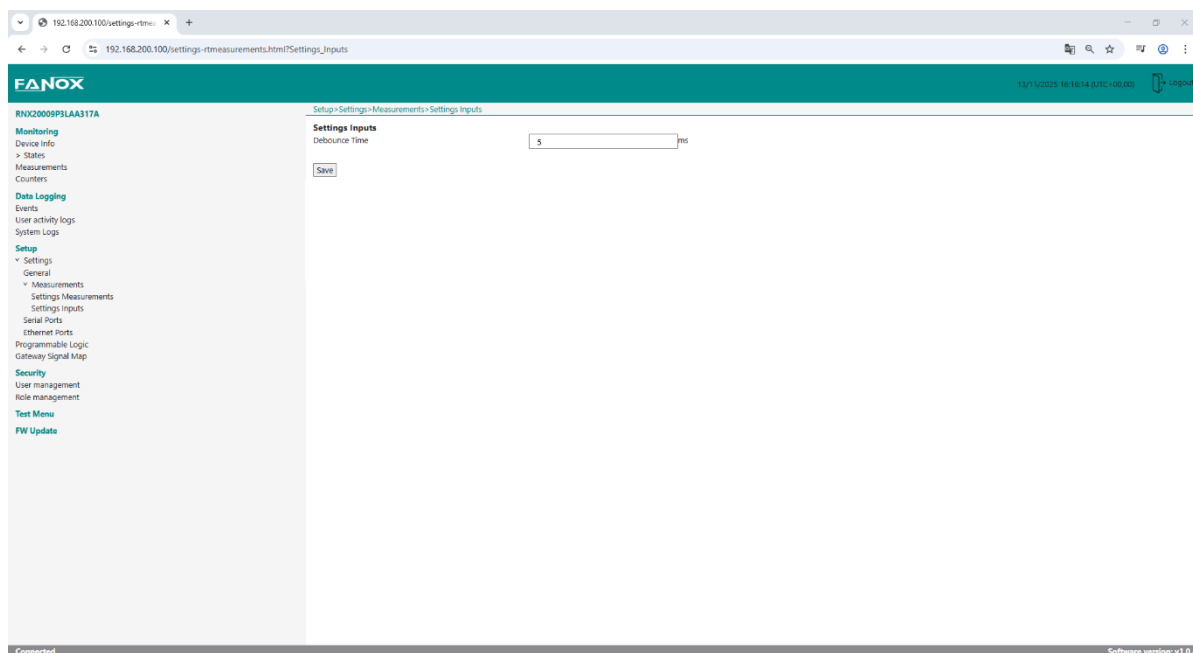


Figure 80: Settings Inputs page

5.3.3.1.4. Serial Ports

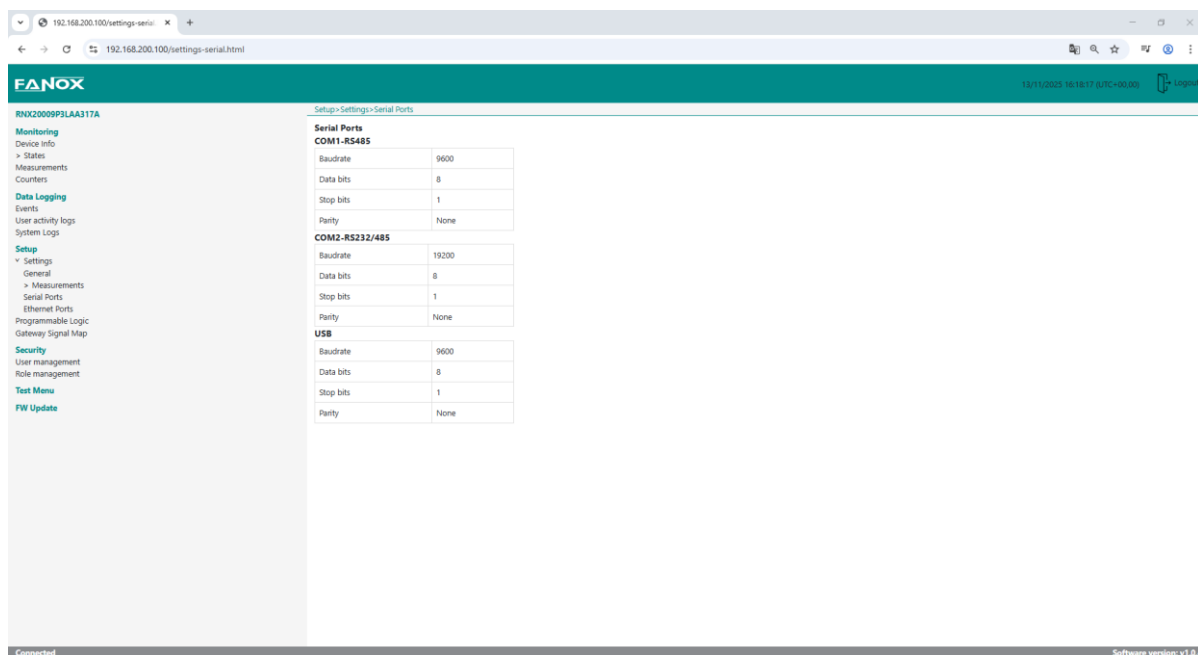


Figure 81: Serial Ports page

5.3.3.1.5. Ethernet Ports

The screenshot shows the FANOX web interface for device RNX20009P3LAA317A. The left sidebar contains navigation links for Monitoring, Data Logging, Setup, Security, Test Menu, and FW Update. The main content area is titled 'Setup - Settings - Ethernet Ports' and displays four configuration sections:

- ETH Local:** Includes fields for IP Address (192.168.200.100), Subnet Mask (255.255.255.0), Default Gateway, DNS 1, and DNS 2. An 'Enable DHCP' checkbox is present.
- ETH LAN:** Includes fields for IP Address (192.168.201.100), Subnet Mask (255.255.255.0), Default Gateway, DNS 1, and DNS 2. An 'Enable DHCP' checkbox is present.
- ETH WAN 1:** Includes fields for IP Address (192.168.202.100), Subnet Mask (255.255.255.0), Default Gateway, DNS 1, and DNS 2. An 'Enable DHCP' checkbox is present.
- ETH WAN 2:** This section is currently empty.

The status bar at the bottom indicates 'Connected' and 'Software version: v1.0.4'.

Figure 82: Ethernet Ports page 1_2

This screenshot shows the continuation of the Ethernet Ports configuration page. It displays the configuration for **ETH WAN 2**, which includes fields for IP Address (192.168.203.100), Subnet Mask (255.255.255.0), Default Gateway, DNS 1, and DNS 2. An 'Enable DHCP' checkbox is present. Below this section, there is an 'Enable SSH' checkbox (which is checked) and a 'Save and apply' button.

The status bar at the bottom indicates 'Connected' and 'Software version: v1.0.4'.

Figure 83: Ethernet Ports page 2_2

5.3.3.2. Programable Logic

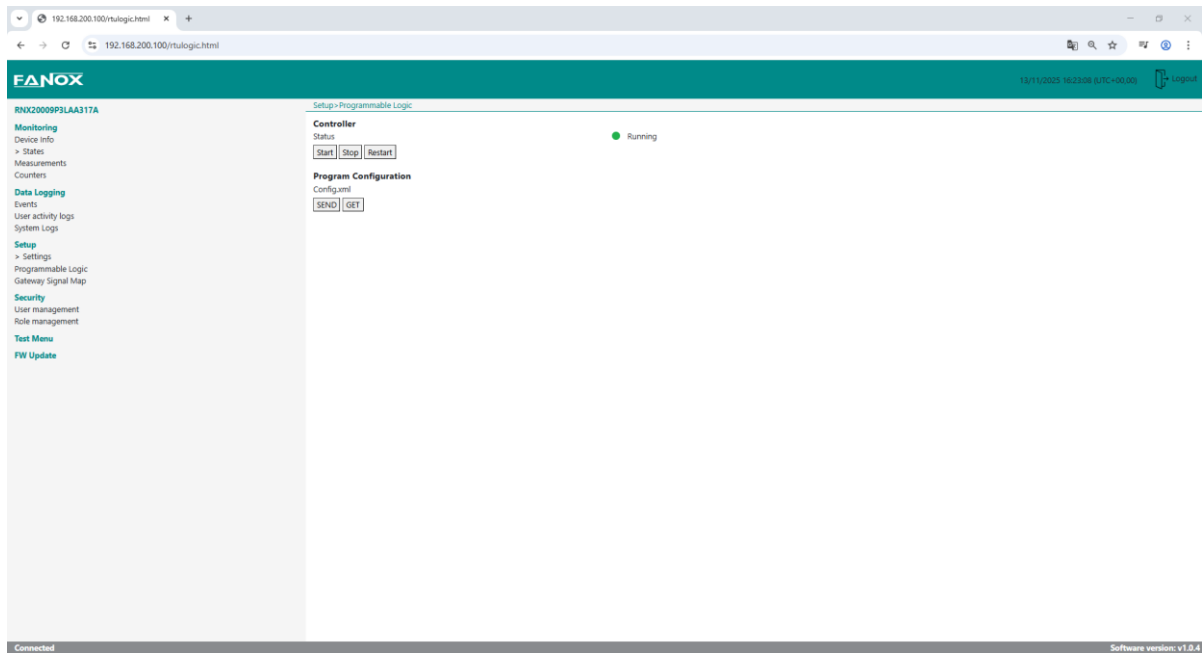


Figure 84: Programable Logic page

5.3.3.3. Gateway Signal Map

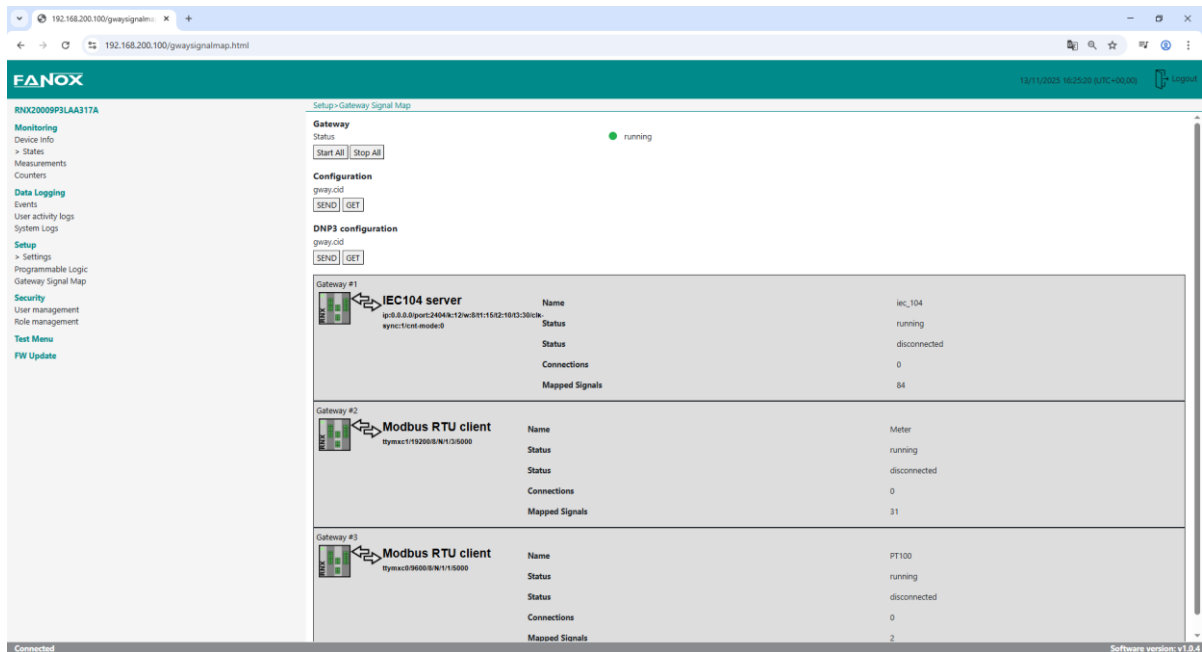


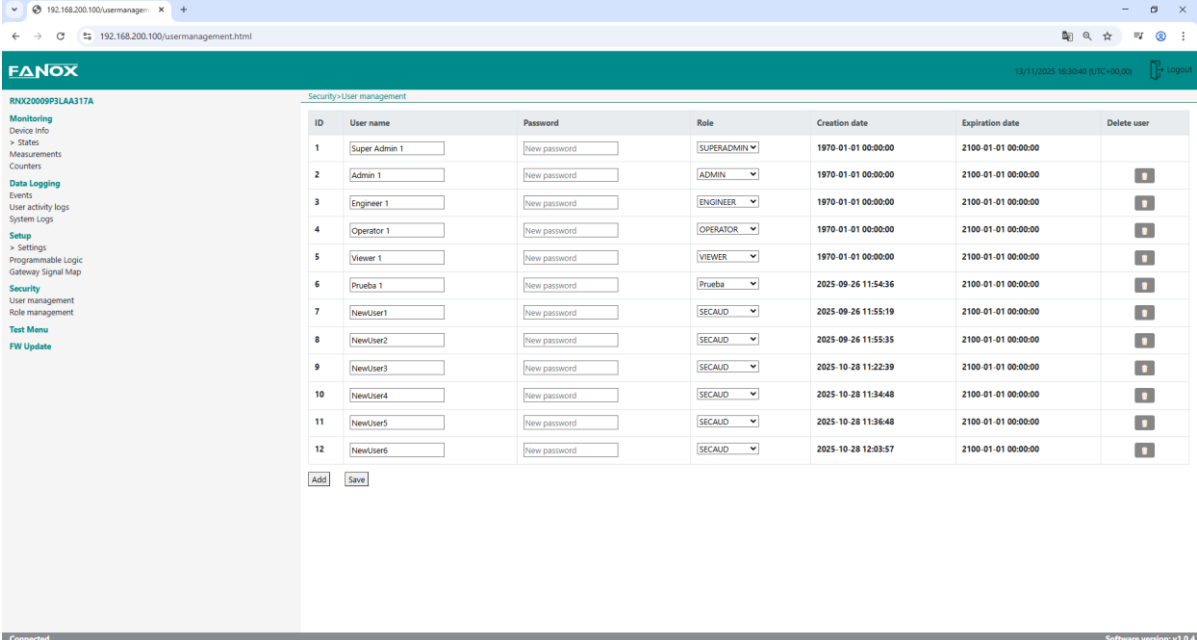
Figure 85: Gateway Signal Map page

5.3.4. Security

The security menu consists of the following submenus:

- **User Management:** It allows to configure the Users.
- **Role Management:** It allows to configure the Roles of the users.

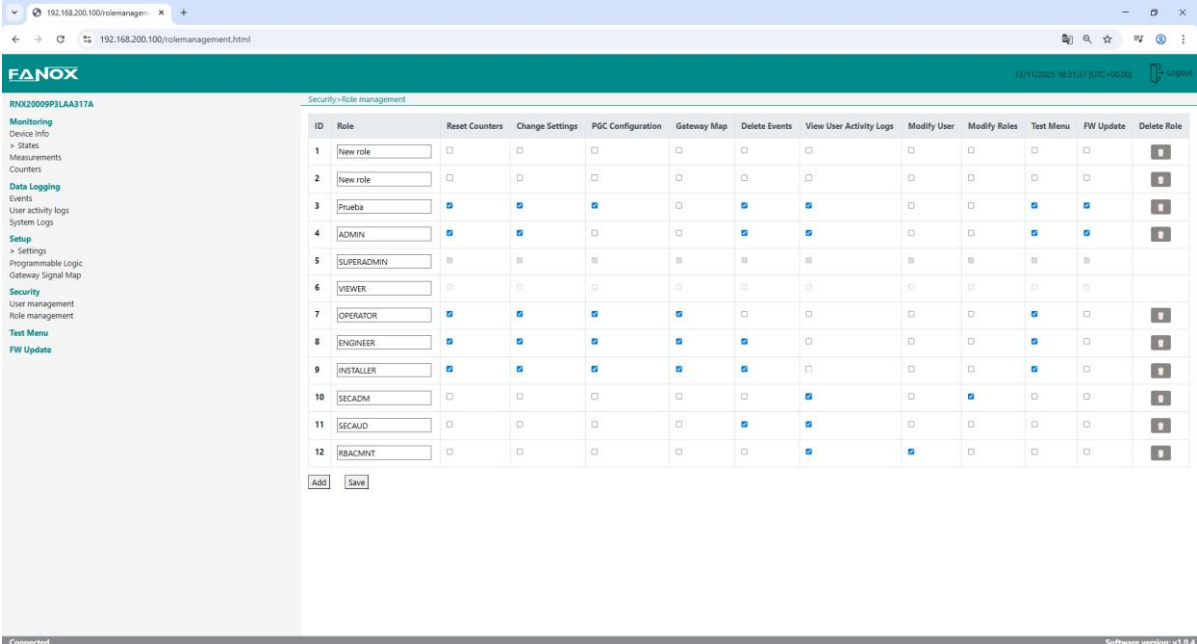
5.3.4.1. User Management



ID	User name	Password	Role	Creation date	Expiration date	Delete user
1	Super Admin 1	New password	SUPERADMIN	1970-01-01 00:00:00	2100-01-01 00:00:00	
2	Admin 1	New password	ADMIN	1970-01-01 00:00:00	2100-01-01 00:00:00	
3	Engineer 1	New password	ENGINEER	1970-01-01 00:00:00	2100-01-01 00:00:00	
4	Operator 1	New password	OPERATOR	1970-01-01 00:00:00	2100-01-01 00:00:00	
5	Viewer 1	New password	VIEWER	1970-01-01 00:00:00	2100-01-01 00:00:00	
6	Prueba 1	New password	Prueba	2025-09-26 11:54:36	2100-01-01 00:00:00	
7	NewUser1	New password	SECAUD	2025-09-26 11:55:19	2100-01-01 00:00:00	
8	NewUser2	New password	SECAUD	2025-09-26 11:55:35	2100-01-01 00:00:00	
9	NewUser3	New password	SECAUD	2025-10-28 11:22:39	2100-01-01 00:00:00	
10	NewUser4	New password	SECAUD	2025-10-28 11:34:48	2100-01-01 00:00:00	
11	NewUser5	New password	SECAUD	2025-10-28 11:36:48	2100-01-01 00:00:00	
12	NewUser6	New password	SECAUD	2025-10-28 12:03:57	2100-01-01 00:00:00	

Figure 86: User Management page

5.3.4.2. Role Management



ID	Role	Reset Counters	Change Settings	PGC Configuration	Gateway Map	Delete Events	View User Activity Logs	Modify User	Modify Roles	Test Menu	FW Update	Delete Role
1	New role	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
2	New role	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
3	Prueba	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	
4	ADMIN	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	
5	SUPERADMIN	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	
6	VIEWER	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
7	OPERATOR	☒	☒	☒	☒	☐	☐	☐	☐	☒	☐	
8	ENGINEER	☒	☒	☒	☒	☒	☐	☐	☐	☒	☐	
9	INSTALLER	☒	☒	☒	☒	☒	☐	☐	☐	☒	☐	
10	SECADM	☐	☐	☐	☐	☐	☒	☐	☒	☐	☐	
11	SECAUD	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	
12	KBACMNT	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	

Figure 87: Role Management page

5.3.5. Test Menu

It allows simulation of all available RTU variables.

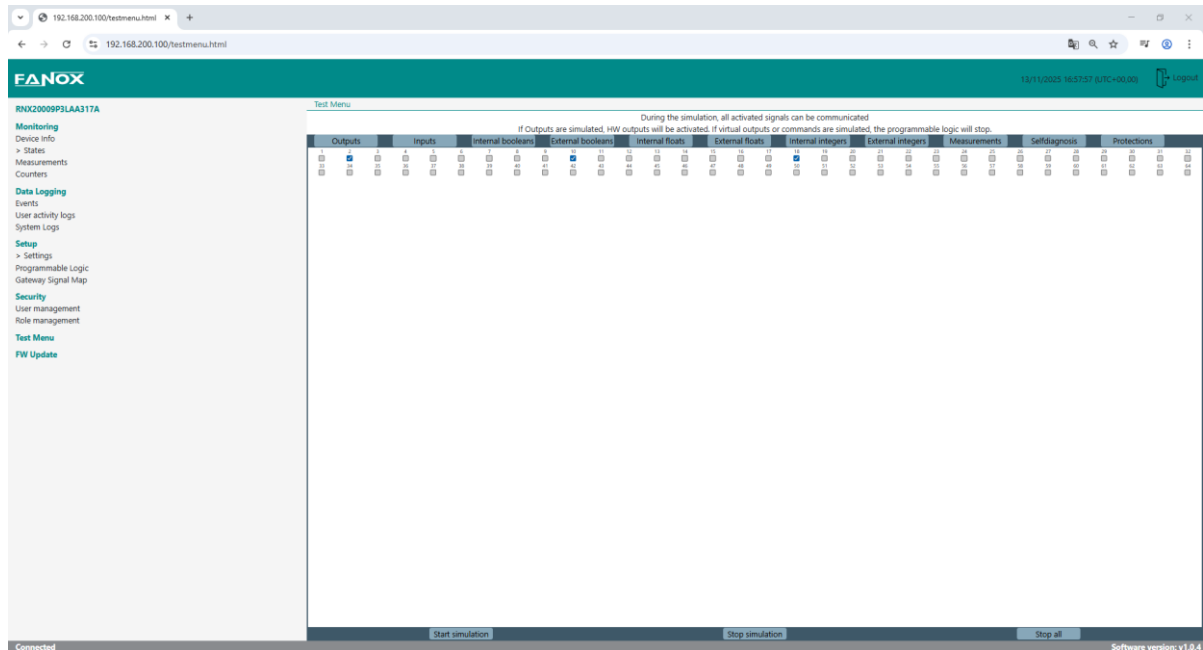


Figure 88: Test Menu page

5.3.6. Firmware Update

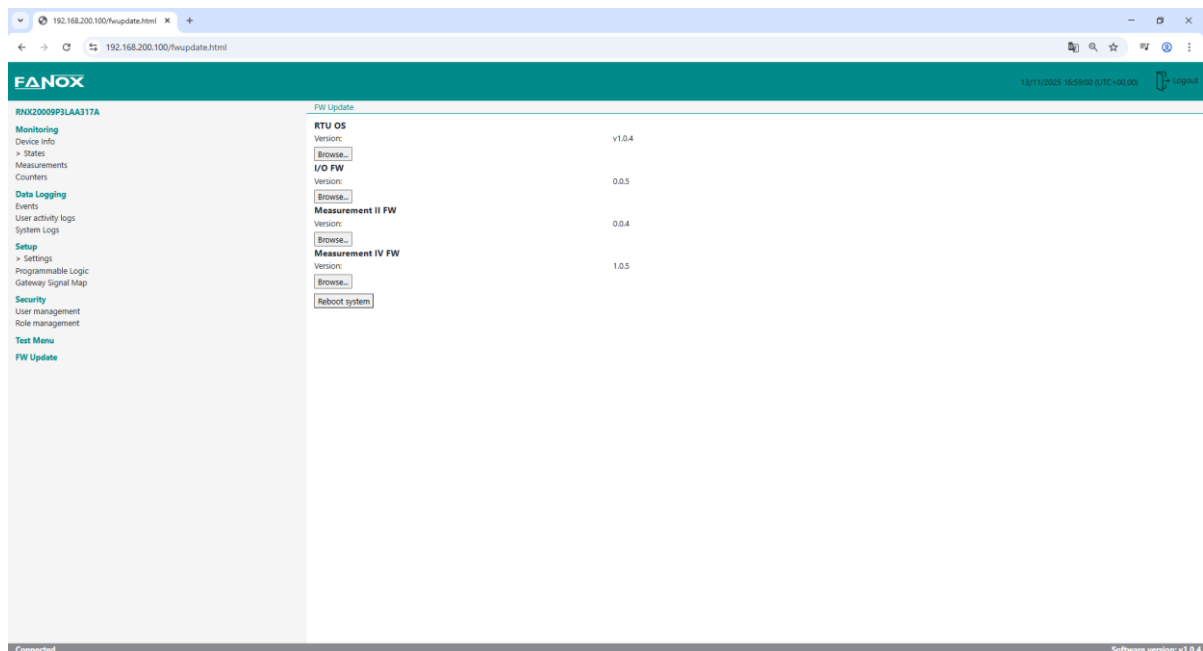


Figure 89: Firmware update page



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