MICROCOM
Simply More

HERMES / NEMOS CONFIGURATION MANUAL

MICROCONF v9 SOFTWARE USER MANUAL

REV 25.01

MICROCONF 9
MICROCOM

Warning

1. This system has been designed to be installed by professionals, not by end users. Please contact our experts for any technical queries you may have.

2. We are continually committed to innovation both in terms of software and hardware. However, errors may result in discrepancies between the product and some of its specifications despite our best efforts to properly document our products. Therefore, please contact us at the following email address should you have any questions or comments: microcom@microcom.es.

3. GSM-based communications are highly reliable. However, we advise against using our device in critical systems unless some form of redundancy has been implemented for the communication network as the service may be interrupted in rare cases.

4. "Life Support": This unit is not designed for use in systems on which human life depends. In other words, in devices where a malfunction could pose a risk to human life.

5. Our liability in relation to the device shall be strictly limited to its repair or replacement in accordance with the terms set forth in the warranty.

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DOCUMENT CONTENT

This manual describes the MicroConf configuration software used for configuring and diagnosing the Microcom Hermes and Nemos range of devices.

Other documents of interest include the commands manual, which describes the commands available for interacting with the devices, and the MicroPLC-II manual, which details the automation capabilities of the Hermes line. These manuals can be found in the downloads section of the Microcom website.

A set of video tutorials on device configuration and other videos of interest are available on our YouTube channel.

VERSIONS AND COMPATIBILITY

The information shown in this document corresponds to the version of the MicroConf configuration software and firmware of the Hermes / Nemos indicated below:

Element	Version
Microconf Software	v.9.2.10
Firmware	v.9.22

INFORMATION TABLES

The following information tables are used throughout the manual:

	Please note: These are used to highlight information of special importance or interest.
	Please note: They are used to describe the conditions, practices or procedures that must be followed for the proper use of hardware or software.
	Example: They are used to show practical examples and therefore help to better understand the text described in the section.

1 - INTRODUCTION

This section describes important concepts related to the Zeus 6 monitoring platform, system functionality, and communication methods used by the devices.

1.1 SYSTEM OVERVIEW

Figure 1-1shows an overview of the system that will help understand its functionality and features.

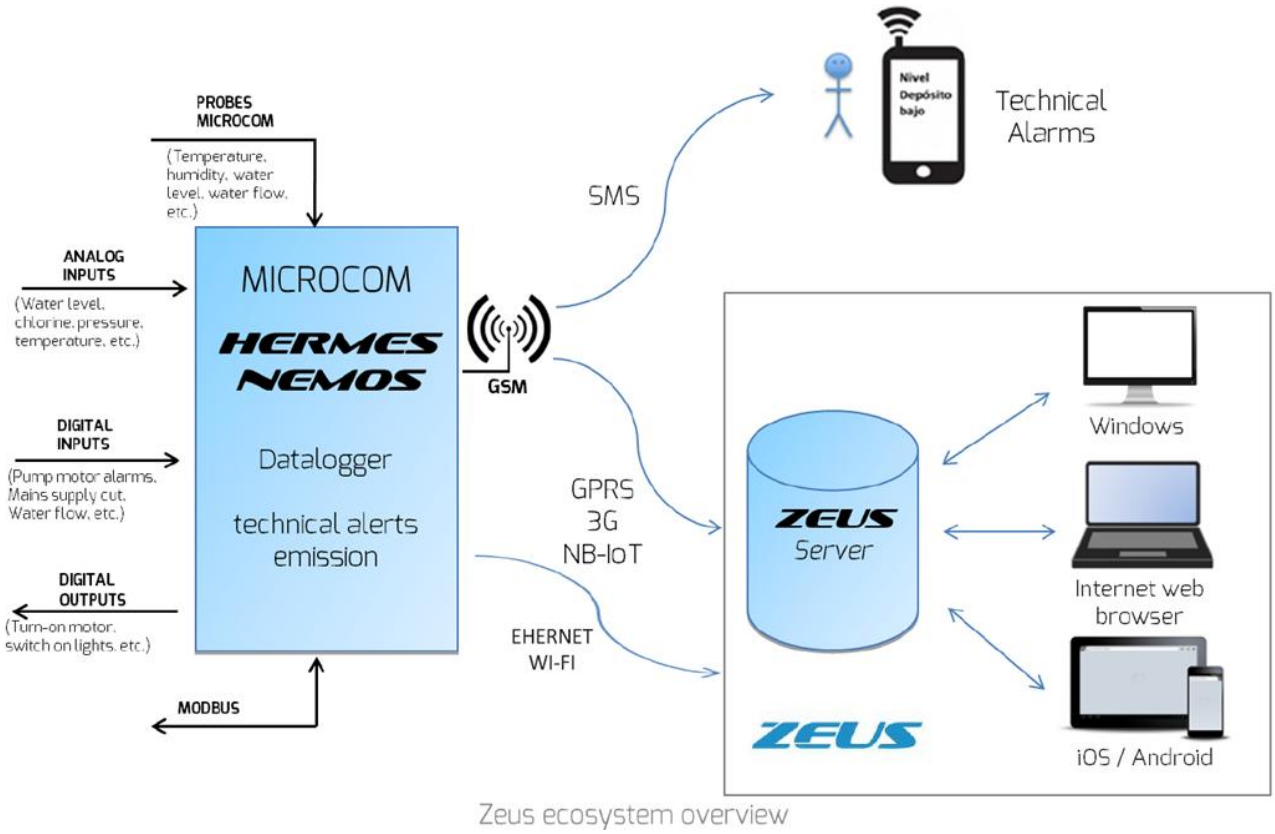


Figure 1-1. System outline

The Hermes or Nemos remote control device interacts with the signals from the installation it is connected to, through its inputs/outputs. The device provides three functionalities with this information:

Technical alarm transmission: Users receive a notification to their mobile phone of any issues detected in the facility.

Alarms can be received via SMS and/or through the free Zeus Mobile app, which is available for iOS android.

Data logger and monitoring via the Internet. The device features internal memory that allows it to register data received through its inputs and a communication system via GSM mobile networks and/or Ethernet/Wi-Fi. This allows the installations to be monitored and managed through the Zeus 6 Platform, which integrates the applications and servers provided by Microcom.

Automation. The Hermes series incorporates a complete programming language for automation systems with pump control modules, inter-station communication, timers, etc. This language is described in the document "MicroPLC-II Manual.pdf".

1.2 ZEUS 6 MONITORING PLATFORM

Software suite developed by Microcom, providing service to the Hermes and Nemos devices.

Includes the following tools and features:

Zeus Server: Software for receiving and storing data from Microcom devices with integrated web server.

Zeus Web: Free online service for monitoring installations using Microcom devices from a web browser.

Zeus Mobile: Mobile applications for iOS android for accessing the Zeus Web service with alarm reception using PUSH technology.

Zeus OPC-UA: OPC server for integrating Zeus server data.

Zeus API REST: API for integration into existing SCADA. REST server for integrating Zeus server data.

Zeus Synoptic Builder: Synoptic editor for Zeus. Allows synoptics to be created to represent the stations.

Microconf configurator: Configuration application for Microcom devices.

Figure 1-2. Zeus 6 digital platform

1.3 ZEUS WEB AND ZEUS MOBILE

Zeus Web and Zeus Mobile are free services for monitoring installations with Microcom devices from a web browser, smartphone, or tablet.

These applications allow the information recorded by the devices to be managed from any device connected to the internet.

Features:

- Viewing of data and graphs.
- Managing and viewing Synoptics / SCADAS.
- Sending orders.
- Alarm management
- User management
- Report generation
- Cloud storage

To see a demo of the system, go to the following web address zeus.microcom.es or install the free Zeus Mobile app (available for iOS android) on a mobile device.

User: demo

Password: demo

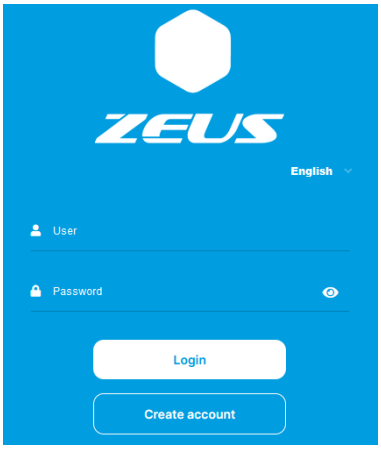


Figure 1-3. Access credentials for the Zeus demo.

Click the following link for further information: Zeusweb information

1.4 COMMUNICATION WITH ZEUS

Microcom devices include an integrated GSM modem available in 2G, 3G, 4G, NB-IoT, and LTE-M technologies. Compatible devices also include Wi-Fi and Ethernet connectivity, providing a redundant communication system.

The following conditions trigger the transmission of data to the server:

The execution of action 79 (connect/refresh data) in Zeus (usually from a timer).

The generation of an alarm configured for notification to Zeus.

The receipt of the TCPCONNECT command (useful for forcing the download of history by sending an SMS, for example).

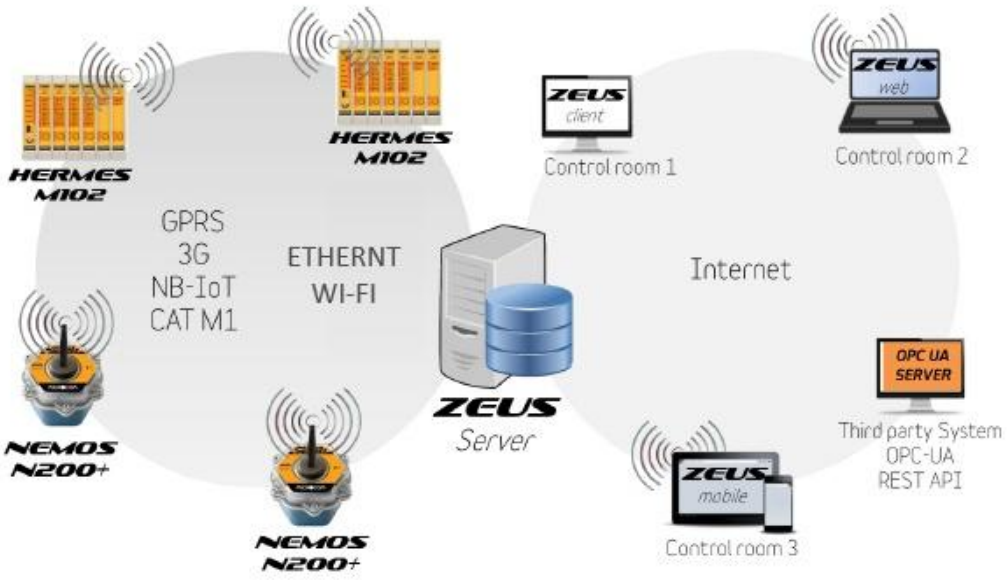


Figure 1-4. Example of the use of mobile networks for remote management.

(Figure 1-4) Several Hermes and Nemos remote control devices transmit the recorded data (tank level, chlorine, temperature, humidity, etc.) to a Zeus server.

The checkpoints connect to the Zeus server to view data and manage stations.

M2M telephone services are recommended for communications. This type of contract offers traffic of between 10 and 15 MB/month, which is generally sufficient at an affordable cost.

Contact Microcom for further information on the most suitable telephone contracts for your user needs.

2 - SOFTWARE INSTALLATION

Software installation requirements:

Microsoft Windows® 10/11 operating system (32 or 64-bit)

Bluetooth 4.0 or higher

2.1 DISCOVER ASSIGNED COM PORT

Communication with the PC takes place via a virtual serial port on Hermes devices. Below is the procedure to discover the COM port Windows has assigned the device.

1. Connect the Microcom device to the PC using the USB cable.
2. Wait a few seconds for the new device to be detected.
3. Locate the communications (COM) port assigned by Windows to the newly connected Microcom device. Proceed as follows:

    a. Open Windows Device Manager.

Home → Type "Device Manager"

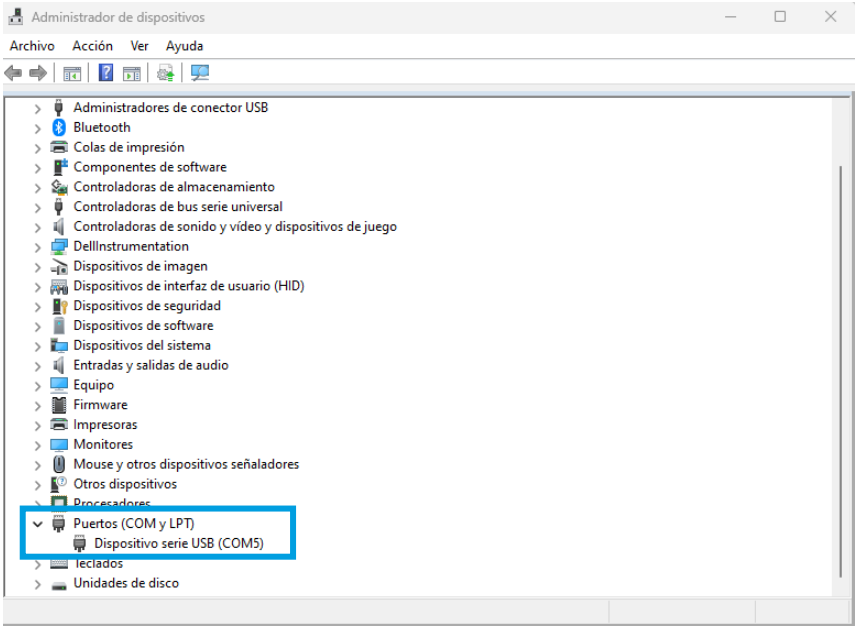


Figure 2-1.Example of a device detected in the Windows Device Manager.

The Manager shows the Microcom device, within the Ports section, as USB serial device with the COM5 assigned communications port.

2.2 INSTALLATION OF THE MICROCONF CONFIGURATION SOFTWARE

Download the software from the following address:

https://www.microcom360.com/en/start-english/.

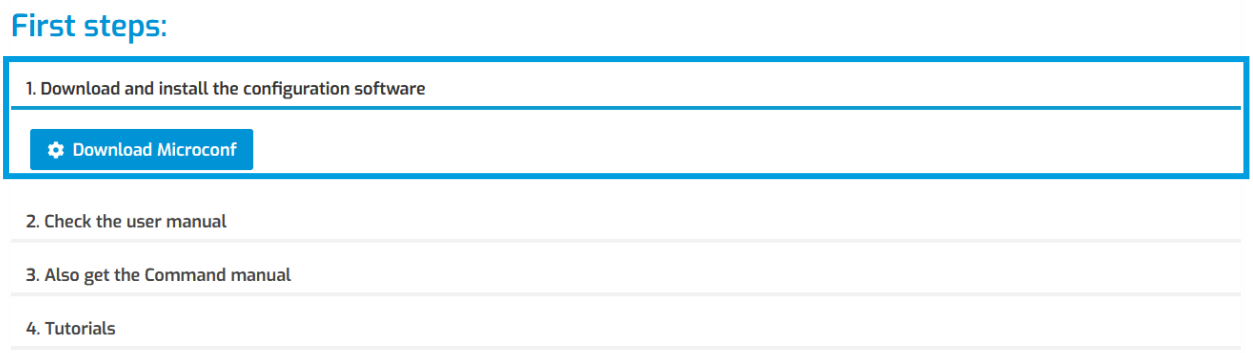


Figure 2-2. Download the MicroConf configuration software.

Run it and follow the on-screen instructions.

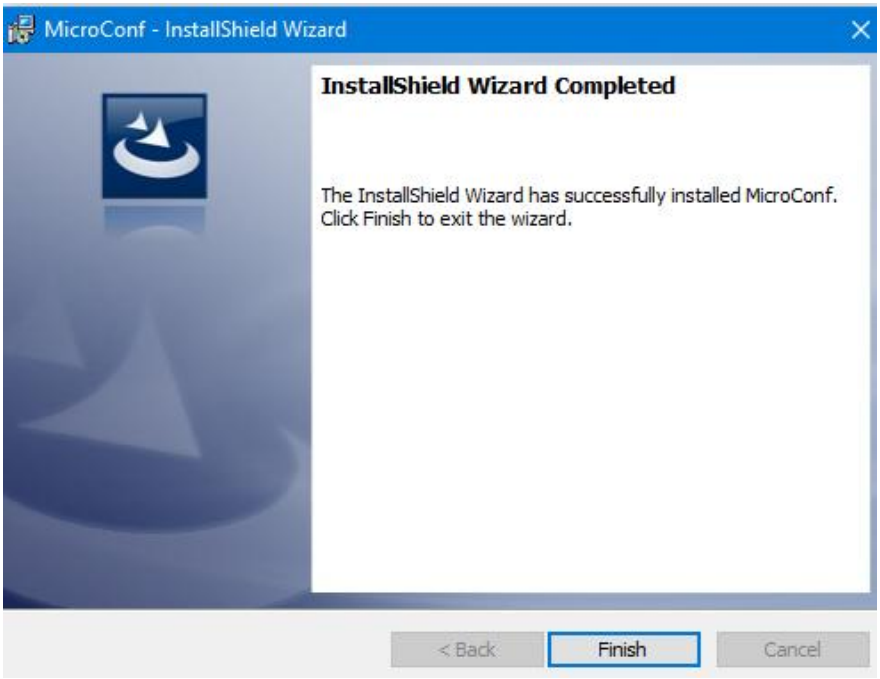


Figure 2-3. Successful installation of MicroConf vX.XX software.

3 - USER INTERFACE

The user interface is divided into three sections:

Upper section: These include buttons for accessing the application menu, retrieving and saving configuration files, and selecting the model and interface language.

Lower section: Displays status data and information about the configuration software.

Middle section: Displays the different forms that comprise the Microcom device configuration.

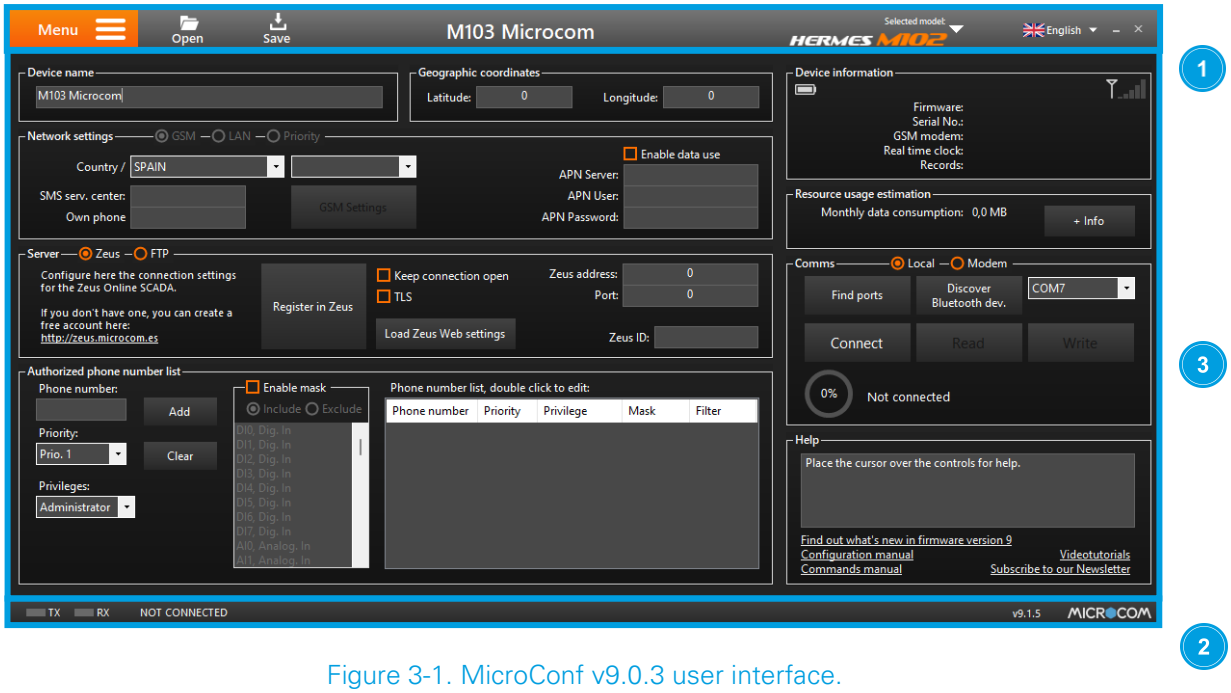


Figure 3-1. MicroConf v9.0.3 user interface.

1 Upper section: Contains the following components from left to right:

- Main menu: Allows the different configuration options for the application to be selected.

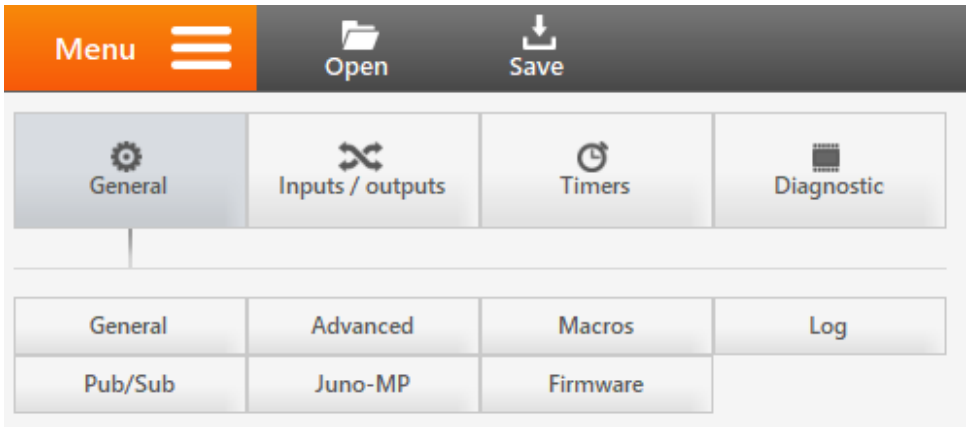


Figure 3-2. Pop-up window. Drop-down menu.

- Open/Save configuration: Allows the configuration settings on the device to be opened and saved onto a disk.

> All configuration settings should be backed up.

- Device name: Name assigned to the device or station.
- Select device: Select the Microcom model you wish to configure. The selection takes place automatically when connecting to a device or when loading a configuration file.

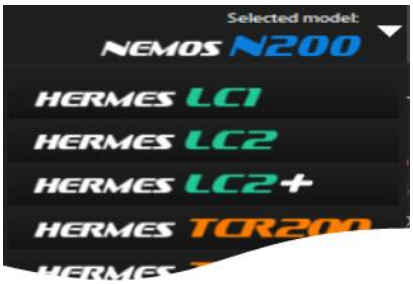


Figure 3-3. List of available devices.

- Select language: Application language selector.

2 Lower section: Contains the following components from left to right:

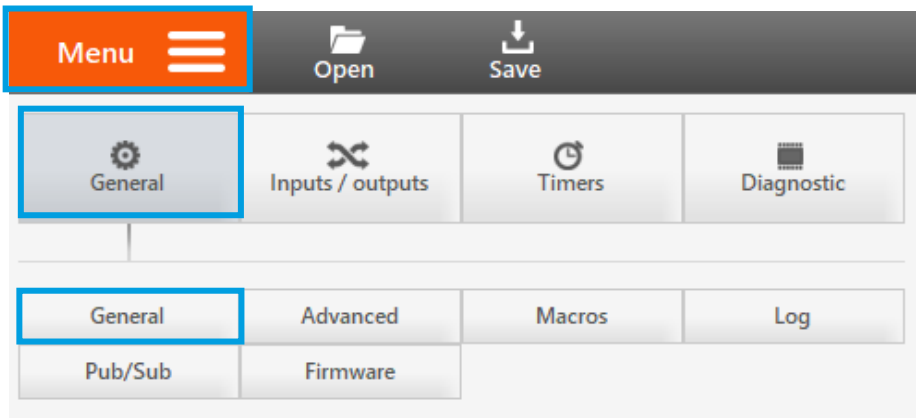
- Communications' status: Indicates whether a device is connected and the usage of the Rx and Tx communication lines. The text "Zeus" will be displayed if the configuration is opened from ZeusWeb.
- Program version: Installed MicroConf version number.

3 Middle section: The configuration of this section depends on the Main Menu option selected.

4 - GENERAL CONFIGURATION

Default screen displayed when the program is opened. Used to configure general settings (name, list of authorised phone numbers, etc.), communication settings, and to display device information.

Access:



Menu → General → General

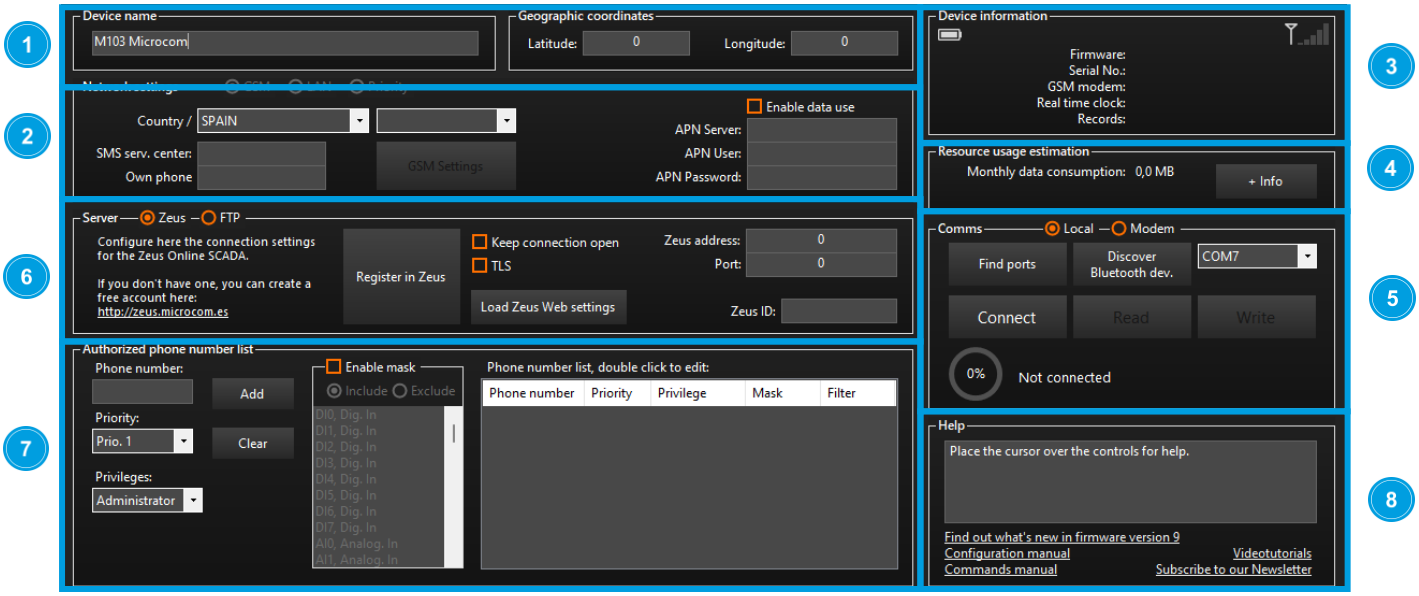


Figure 4-1. "General configuration" screen

Table 4-1. "General configuration" screen

Item	Section
1	Device name and geographic coordinates See Section 4.1
2	Network configuration See Section 4.2

Item	Section
3	Device information See Section 4.3
4	Resources estimation See Section 4.4
5	Communications See Section 4.5
6	Server See Section 4.6
7	List of authorised telephone numbers See Section 4.7
8	Help See Section 4.8

4.1 DEVICE NAME AND GEOGRAPHIC COORDINATES

Fields for assigning a name to the device and its geographic coordinates.

Geographic coordinates must be indicated in decimal degrees.

Figure 4-2. Example of a "Device name and coordinates" configuration.

The device will be displayed in Zeus with the assigned name.

All SMS messages sent will include the device name to allow the sender to easily recognise it.

This field cannot contain more than 50 characters.

Please note: This field only supports alphanumeric characters.

4.2 NETWORK CONFIGURATION

4.2.1 GSM Network

Fields for configuring parameters related to the inserted SIM card and enabling data usage.

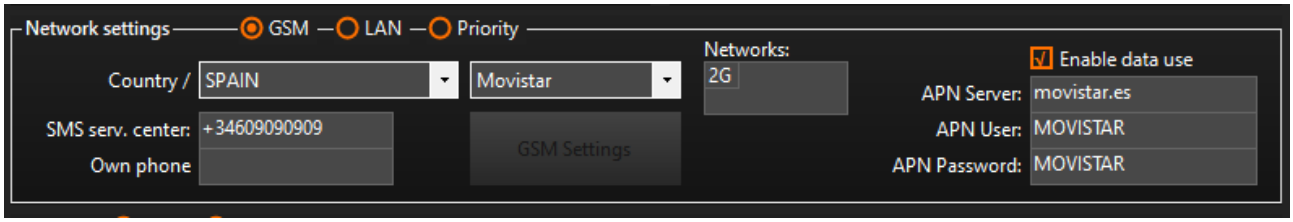
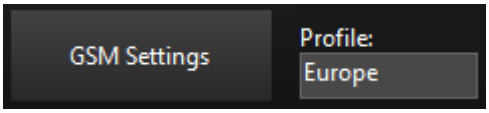


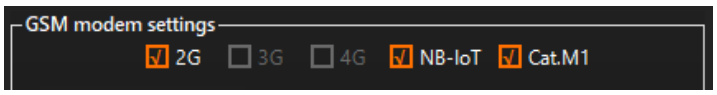
Figure 4-3. Example of "Mobile Network" configuration.

Table 4-2. Mobile Network.

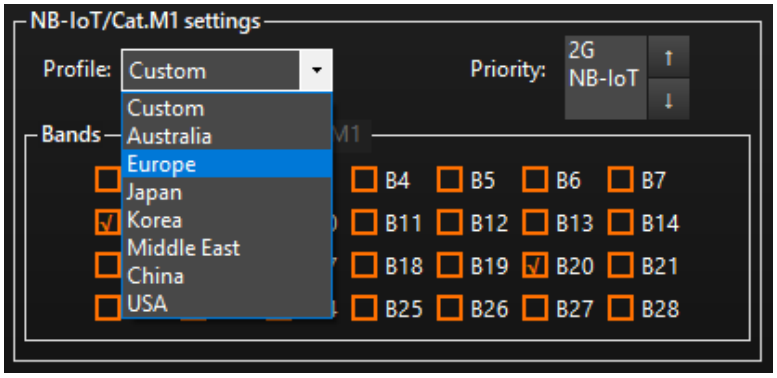
Field	Description
Country and operator	The fields related to the APN and SMS service centre are automatically filled in when you select the country and operator. The fields can be filled in automatically if your operator's information is unavailable.
APN Server APN User Name APN Password	Configuration of phone company details to connect to the internet. ⚠ These details must be correct; otherwise, the device will not be able to communicate with the Zeus server.
SMS Service Centre	Configuration of phone company details to send SMS messages. ⚠ These details must be correct; otherwise, the device will not be able to send SMS messages.
Own phone number	Number of the Installed SIM card. The number must be entered in international format (for example: starting with +34 for Spanish numbers). ⚠ Enter the short number instead of the long one (without the international code at the beginning) for cards with short numbers (corporate contracts).

Field	Description
Enable data usage	Checking this option enables the SIM card's GPRS data connection. This allows the device to use the contract's mobile data communications services.
Networks	Mobile networks supported by the device. WHITE: Supported and enabled mobile networks. BLACK: Supported but disabled mobile networks. 
GSM bands	Allows you to select the bands and technology for accessing the mobile network. A series of profiles are offered for the different geographic areas in which the device can operate to simplify configuration.  This button is enabled if the device supports mobile network configuration. Incorrect configuration may prevent the device from being registered on the network or lead to higher power consumption than necessary.

GSM modem configuration: Enables and disables supported mobile networks.



NB-IOT / Cat.M1 configuration:

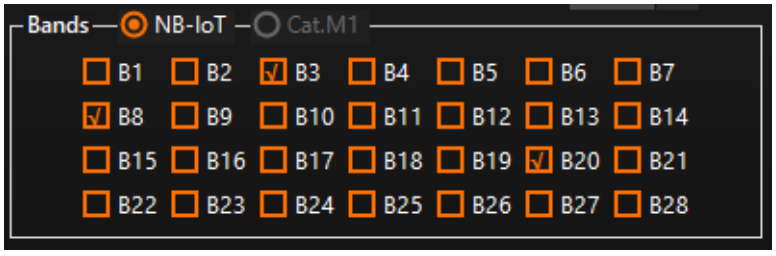


GSM Bands and Profile (cont.)

- Priority: Priority use of the selected networks.
- Profile: NB-IOT/Cat.M1 band profile.

  Preconfigured by geographic region.
- NB-IOT bands/Cat.M1 bands: Manual selection of the bands enabled for NB-IOT and CAT-M1 networks in the geographical area.

  Enabled if the "Custom" profile is selected.



Please check with your mobile network operator about the supported bands prior to configuring a custom profile.

4.2.2 Local area network (Ethernet/Wi-Fi)

The local area network configuration can be configured on compatible devices.

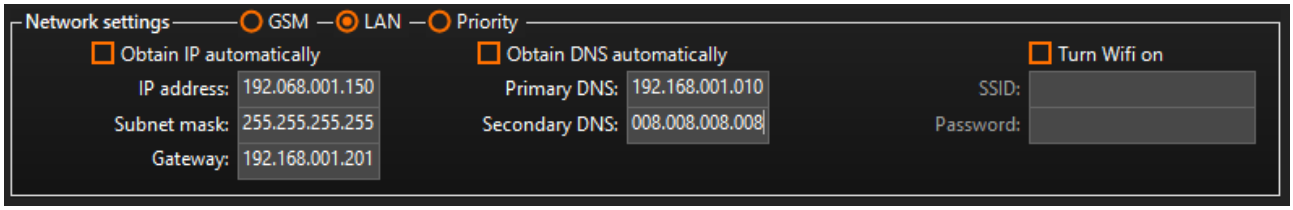


Figure 4-4. Example of "LAN" configuration.

Ethernet will take precedence whenever both Ethernet and Wi-Fi connectivity is available.

Table 4-3. LAN.

Field	Description
Obtain IP address automatically	Enables you to obtain the IP, subnet mask and gateway parameters automatically using DHCP protocol for the Ethernet interface.
Obtain DNS automatically	Enables DNS to be obtained automatically using the DHCP protocol.
Activate Wi-Fi	Activates Wi-Fi radio. The Wi-Fi interface always operates in DHCP mode.
IP address	Manually sets the IP address for the Ethernet interface. The "Obtain IP address automatically" option must be disabled.
Subnet mask	Manually sets the subnet mask for the Ethernet interface. The "Obtain IP address automatically" option must be disabled.
Gateway link	Manually sets the gateway link for the Ethernet interface. The "Obtain IP address automatically" option must be disabled.
Primary DNS	Sets the primary DNS manually. The "Obtain DNS automatically" option must be disabled.
Secondary DNS	Sets the secondary DNS manually. The "Obtain IP address automatically" option must be disabled.
SSID	Name of the Wi-Fi network that the device will be connected to.

Field	Description
Password	Password to access WI-FI.

4.2.3 Network priority

This feature allows you to select how the device accesses the internet on devices with mobile data connectivity and a local area network interface.

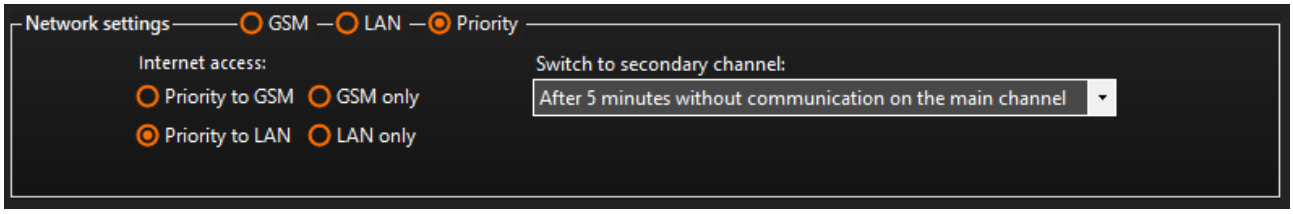


Figure 4-5. Example of "Priority" configuration.

Table 4-4. Priority

Field	Description
Internet access	Internet access priority and channel GSM priority: The device prioritises the mobile network to access the internet. It uses the local area network if this is not working. LAN priority: The device prioritises the local area network to access the internet. It uses the mobile network if this is not working. Only GSM: The device only uses the mobile network to access the internet. Only LAN: The device only uses the local area network to access the internet.
Switchover to secondary channel	The time that the primary network must be down to perform the switchover to the secondary channel.

4.3 DEVICE INFORMATION

A range of important parameters about the device with which communication has been established are displayed after establishing communication with the device.

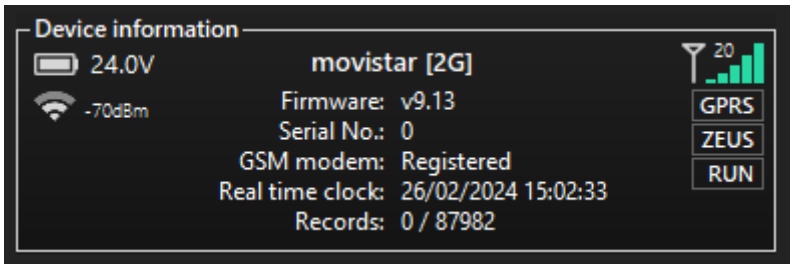
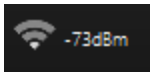
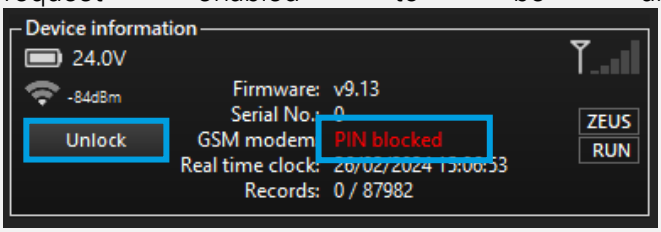
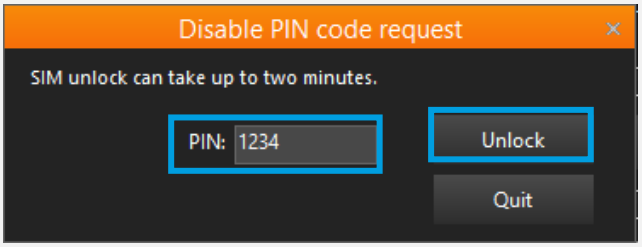


Figure 4-6. Example of "Device Information" configuration.

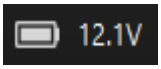
Table 4-5. Device information.

Field	Description
	GSM field strength or coverage.  It is very important for the device to have a strong enough GSM signal to ensure communication. The recommended minimum value is 8, which is displayed above the GSM signal strength bar.
Operator and mobile network	Network operator you are connected to and the network technology used for your internet connection.  Figure 4-6 shows that the network operator the device is connected to is Movistar, and that it has 4G access.
	Wi-Fi signal strength is expressed in dBm.  It is very important for the device to receive a sufficiently strong signal to ensure reliable communication if the installation requires Wi-Fi connectivity. This value should be at least -70 dBm.
RUN / STOP	The operating status of the device that indicates whether the code programmed in the MICROPLC-II is running.  Only if the MICROPLC-II is in use.

Field	Description
	RUN: Device in RUN mode. STOP: Device in STOP mode. Further information in Section 16.3
Firmware	Firmware version installed on the device.
Serial number	Device serial number.
Stored logs	Number of history logs stored. This is displayed as AAAAA/BBBBB, where A is the number of logs currently stored, and B is the maximum number of logs the device can store (history depth). A can be greater than B, which indicates that the history log has gone full circle and the most recent logs are replacing the oldest ones.
Modem status	Information related to the modem status. List of messages:

Field	Description
	Registered: Device connected to the GSM network. Not registered: No GSM signal detected. Check that there is network coverage in the area and that the GSM antenna is properly connected SIM card not inserted: No SIM card detected: Invalid SIM: Unspecified SIM card error. Wrong PIN: SIM card protected by PIN code. PIN blocked: .....SIM card locked. PIN code required to unlock. PUK locked: SIM card locked. Enter the PUK code to unlock the device. Hardware error: A hardware malfunction has occurred. Please contact our technical support service. The software allows any inserted SIM card with PIN code request enabled to be unlocked.  
Internal Time	The device's internal time. The time zone and daylight-saving time settings of the computer used to configure the device are loaded by default. Go into the advanced settings menu see Section 18.5 to set a certain time zone.
Power supply voltage	Hermes devices: This displays the power supply voltage for devices powered by direct current.

Field	Description



On device powered at 230 VAC, the voltage of the internal backup battery will be displayed or, failing that, a battery with an X in red will be displayed, indicating that the battery has not been connected or does not support charging.

Nemos devices:

Displays the power supply voltage and a colour code.

- 

GREEN: Battery in good condition.
- 

ORANGE: *Battery life less than 3 months.
- 

RED: *Battery life less than 1 month.
- 
GREY and X: Battery dead. Device operation suspended until it is replaced.

* Nemos:

The battery life estimates shown above are based on the following configuration: Flow and pressure logs every 5 minutes and transmitted every 24 hours.

The battery status is assessed every 24 hours. This data will not be updated until 12 a.m. the following day whenever the batteries are replaced.

4.4 RESOURCE USAGE ESTIMATION

The resource usage estimator is a very useful tool for understanding the impact of the current configuration, both in terms of energy consumption (Nemos) and the required monthly data traffic.

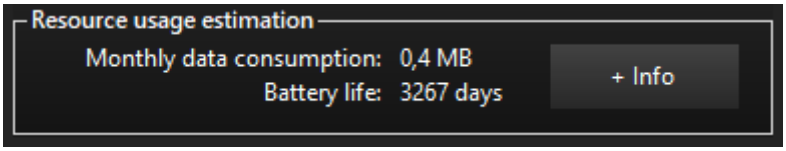


Figure 4-7. Example of "Resource usage estimation" configuration.

Table 4-6. Resource usage estimation.

Field	Description
Monthly data usage	Estimated monthly mobile data traffic. Useful information for choosing a SIM card plan.
Battery life	Estimated battery life. Calculation based on the assumption that the batteries are at a 100% capacity.
	Applies only to Nemos devices. The battery life estimate shown is for the standard battery pack. Click the "+Info" button to see the estimate for the dual battery pack.
"+ Info"	This provides additional information about resource usage, including communication and energy usage distribution, as well as battery life with the dual battery pack.

The data shown is based on a simulation, and actual consumption may vary. Use this information at your own risk.

4.5 COMMUNICATIONS

4.5.1 "Local" communications

Establishes local communications with the device.

Connection can take place via USB cable or Bluetooth depending on the model.

Establish local communication via USB:

1. Connect the Microcom device to the PC using the USB cable.
2. Click on the "Local" selector.
3. Press the Search for Ports" button.
4. Click on the drop-down list and select the communication port in use. See Section 2.2. if in doubt.
5. Press the "Connect" button.

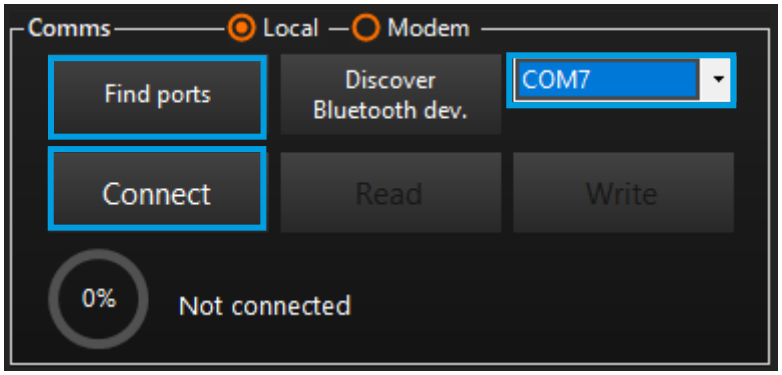


Figure 4-8. "Local Communication via USB" screen

Establish local communication via Bluetooth

1. Enable Bluetooth communication on the device. Place the activation magnet near the mark until the GSM LED flashes red twice.
2. Click on the "Local" selector.
3. Press the "Search for Bluetooth devices" button.
4. Click on the drop-down list and select the serial number or device name.
5. Press the "Connect" button and enter the access password.

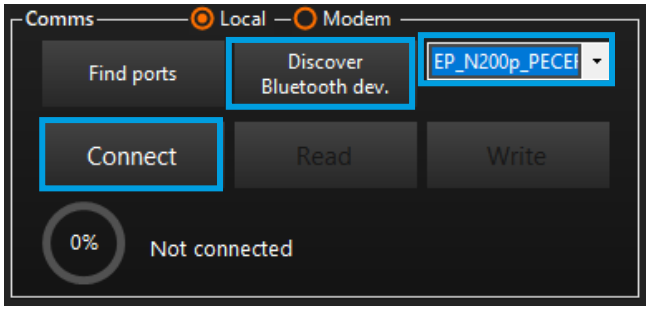


Figure 4-9. "Local Communications via Bluetooth" screen

Default password: 1234.

4.5.2 "Modem" connections

This feature allows you to connect to a device using remote communication via GSM. This connection takes place using a CSD (Circuit Switched Data) call and therefore must be supported by your phone service provider.

The PC requires a GSM modem. The serial parameter configuration of the GSM MODEM is **9600 baud 8N1**.

This communication technology is being phased out by phone service providers.

Microcom devices manufactured since 2022 are not compatible with this type of communication.

An alternative communication method is via the Zeus server.

Establish a local connection with the device via GSM.

1. Click on the "Modem" selector.
2. Click the "Search for ports" button.
3. Enter the phone number of the destination device, including the country code.
4. Click on the drop-down list and select the communication port to which the radio modem device is connected. See Section 2.2. if in doubt.
5. Press the "Connect" button and enter the access password.

Default password: 1234.

6. If the device connects successfully, the "Device Information" area will be automatically filled in, and the connected model will be displayed in the top bar.

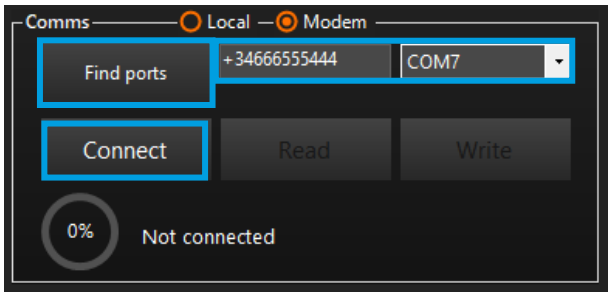


Figure 4-10. Example of "GSM". configuration.

4.5.3 Reading/Writing of the device configuration

The "Read" and "Write" buttons will become enabled after establishing communication with the device locally or via modem These allow the configuration loaded on the Microcom device to be read and a new configuration to be written.

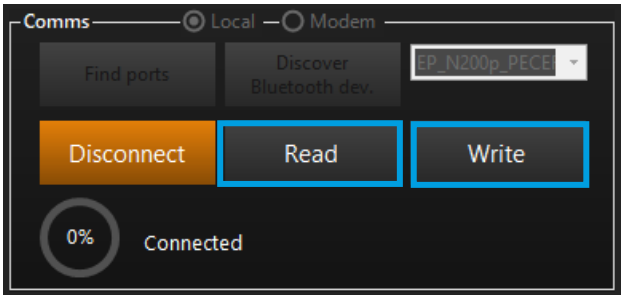


Figure 4-11. Example of "GSM". configuration.

You should back up your device configuration data to your computer as follows:

1. Press the "Read" button.
2. Click the "Save" button to store a copy of the configuration file.

4.6 SERVER

4.6.1 Zeus server

Configures the connection parameters between the Hermes/Nemos device and a Zeus server.

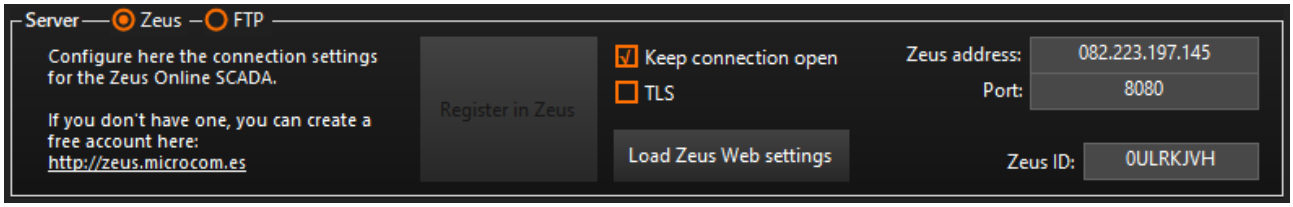
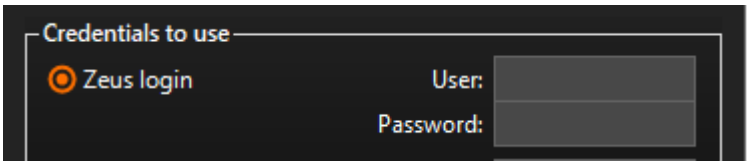
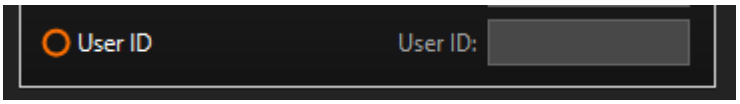


Figure 4-12. Example of "GPRS connection" configuration

Table 4-7. Example of "GPRS connection" configuration

Field	Description
Zeus address and Port	IP address (or DNS name) and port number of the machine where the Zeus server is installed. The IP address must consist of four groups of three numbers separated by a full stop. • Correct: 082.223.197.145. • Incorrect: 82.223.197.145.
Zeus ID	ID provided by the Zeus server following completion of the registration process for the Hermes or Nemos device.
Permanent connection	The device maintains a constant connection with the server, which optimises data usage during short data update cycles (less than 30 minutes), allows commands to be sent to the device, and enables real-time connectivity at any time. It is recommended to enable this feature on Hermes models, but not on Nemos models (battery-powered), as it prevents the device from entering low-power mode.
TLS	Enables the use of the transport layer that allows and guarantees the exchange of data in a secure and private environment between two devices over the internet. This would be between the device and the Zeus server in this case.

Field	Description
Loading data Zeus Web	The "Zeus Address" and "Port" fields are automatically filled in to allow the device to connect to the Zeus server provided by Microcom free of charge.
Registration in Zeus	This allows you to register your Microcom device on the Zeus server and link it to a user account. Visit the following page to create a free account: zeus.microcom.es The "Register in Zeus" button will be disabled If the device has a valid ID. Credentials. Select one of the two options: Zeus Login: Use the same username and password to log in to ZeusWeb or ZeusMobile.  User ID: This is the user ID generated by the Zeus server whenever a new account is created.  You can find the user ID in the Zeus administration menu. Clicking on the button  The option to register using a USER ID allows the device to be configured without having to disclose the Zeus username and password, which can be particularly useful in situations where a third party is responsible for setting up the Microcom device.

4.6.2 FTP server

This allows the settings for downloading the history via FTP to be configured.

Downloading history to an FTP server consumes more power and mobile data than downloading to a Zeus server and should only be enabled if absolutely necessary.

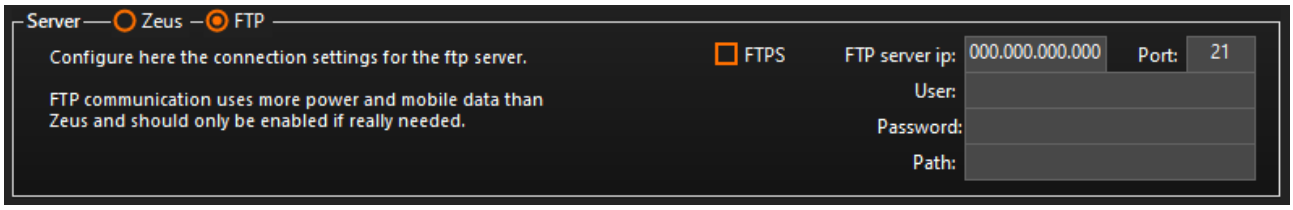


Figure 4-13. Example of "FTP Server" configuration.

Table 4-8. FTP server

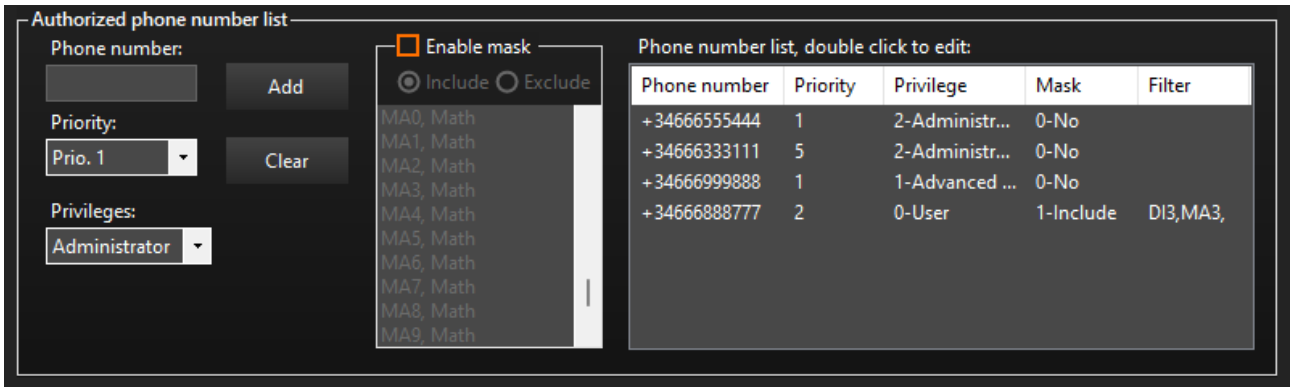
Field	Description
FTP server IP address and port	IP address and port number where the server is located. The IP address must consist of four groups of three numbers separated by a full stop. • Correct: 217.076.130.082 • Incorrect: 217.76.130.82
User	User account for accessing your server.
Password	Password for accessing your server.
Path	Path for storing files. The path must start with "/".
FTPS	This enables the implicit FTPS protocol for FTP communications.

The action "89 - Download history via FTP" performs the data transfer to the FTP server. See Section 14.2 to configure a timer to perform this action.

4.7 AUTHORISED PHONE NUMBERS LIST

Microcom devices only process SMS messages received from phones that appear on the list of authorised phone numbers. Any SMS message whose sender is not included in this list will be automatically discarded.

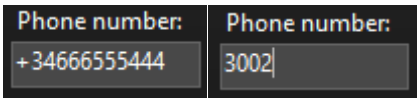
The list is composed of a maximum of 20 configurable telephone numbers. The numbers included in the authorised phone number list can also be categorised by priority, privileges, and mask.



Do not leave the authorised phone number list empty. The system will respond to any caller if the list is empty.

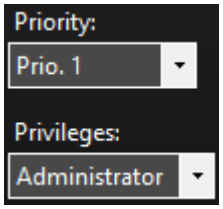
To add a new number to the list:

1. Enter the phone number in international format in the phone number field (+34 for Spanish numbers). If the number you are adding has a short code (such as a company extension), enter the short code instead of the full number.

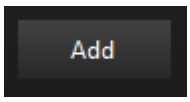


Short phone numbers should be entered without the international prefix.

2. Select the privilege type and priority level from the drop-down menus.



3. Click the "Add" button.



To delete a phone number, select it from the list and click the "Delete" button.

To change the voice call notification default behaviour, see and SMS see Section 18.2

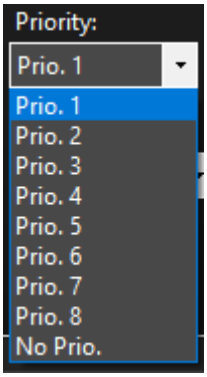
Figure 4-14. List of authorised phone numbers.

4.7.1 Classification by priority

There are two types of authorised phone numbers:

Priority: Phone numbers to which alarm messages or any other messages automatically generated by the system will be sent.

Non-priority: Phone numbers that will not receive alerts from the device.



Prio. (1-8): Each priority number has a corresponding priority level ranging from 1 (highest priority) to 8 (lowest priority).

This number determines the order in which messages or voice calls will be sent when an alarm is generated.

No Prio. (Priority 0): The device will not send any alarms to the programmed phone number but will allow all authorised functions to be performed at its privilege level.

4.7.2 Privilege level

Assign a privilege level to each phone number listed. The privilege level determines the level of control you have over the device.

Table 4-9. Authorised phone privileges

Type	Privileges
Administrator	Configuration changes. Output activation. Status query.

Type	Privileges
Advanced user	Output activation. Device status query.
User	Device status query.

The privilege level does not affect alarm notifications. All priority numbers receive alarms regardless of their privilege level.

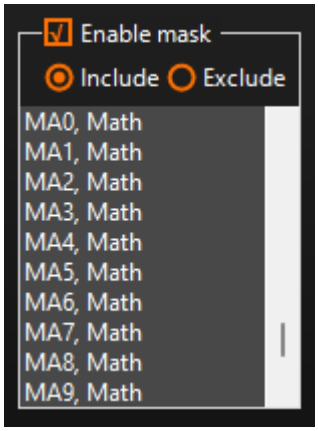
4.7.3 Input mask

Priority phone numbers can be associated with an input mask. This allows a priority phone number to be configured that will only receive alerts for the inputs specified in the mask.

Mask options:

Include: Only alerts from the selected inputs will be sent to this number.

Exclude: Alarms will be sent for all inputs except those selected.



This feature allows notifications to be sent to different phone numbers, depending on the type of alert that has been activated.

4.8 HELP

Screen displaying help text that changes depending on the element the cursor is positioned over.

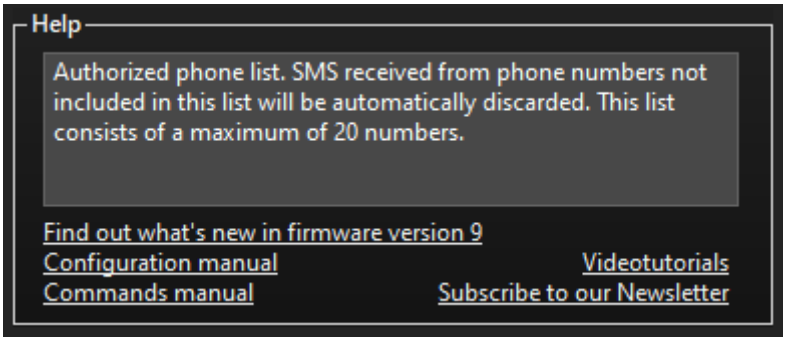


Figure 4-15. "Help" screen

Table 4-10. Help

Field	Description
Discover the new features in firmware version 9	This displays a document in PDF format, listing the new features included in firmware version 9.
Configuration manual	Download the configuration software manual in PDF format.
Command manual	Download the command manual in PDF format.
Video tutorials	Visit the Microcom YouTube channel. An internet connection is required.
Subscribe to our newsletter	Visit this page to subscribe to our newsletter and receive the latest news and information about Microcom's products and services via email.

5 - ALARM CONFIGURATION

Microcom devices feature a wide variety of inputs that can generate alarm alerts:

Digital inputs.

Analogue inputs.

Flowmeters.

MODBUS.

etc.

The alarm configuration form structure is similar for all available input types.

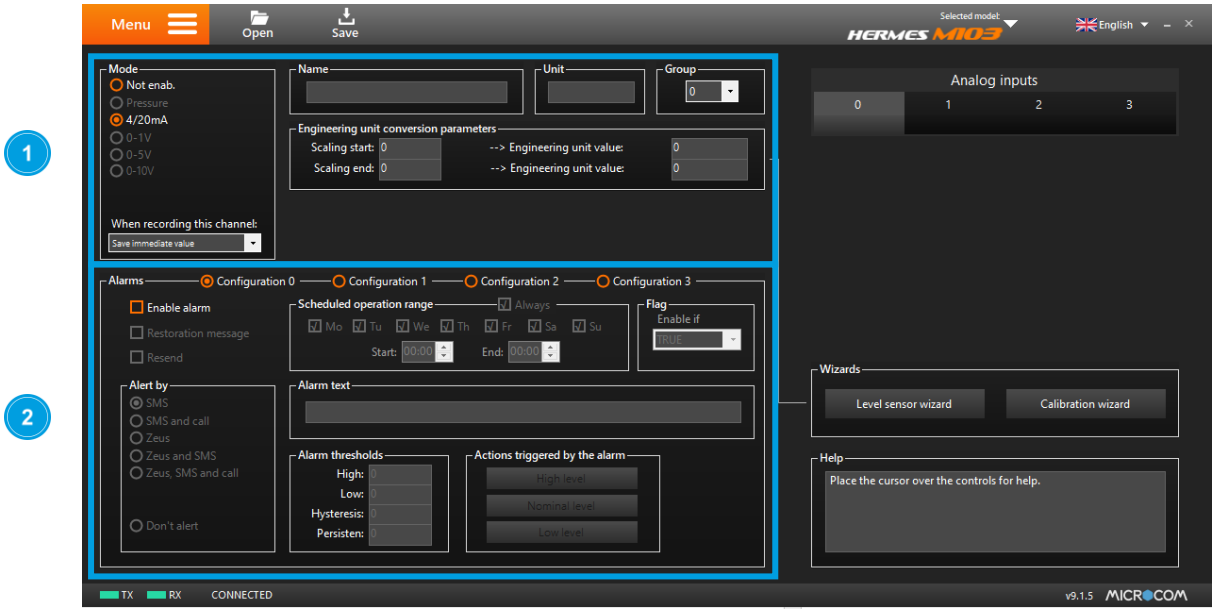


Figure 5-1. "Alarm configuration" screen.

Table 5-1. Alarm configuration.

Item	Section
1	Section specific to each input type.
2	Common section for all input types, with only minor variations between digital and analogue inputs. The conditions for generating alarms and the notification methods are configured here.

5.1 COMMON CONFIGURATION OPTIONS

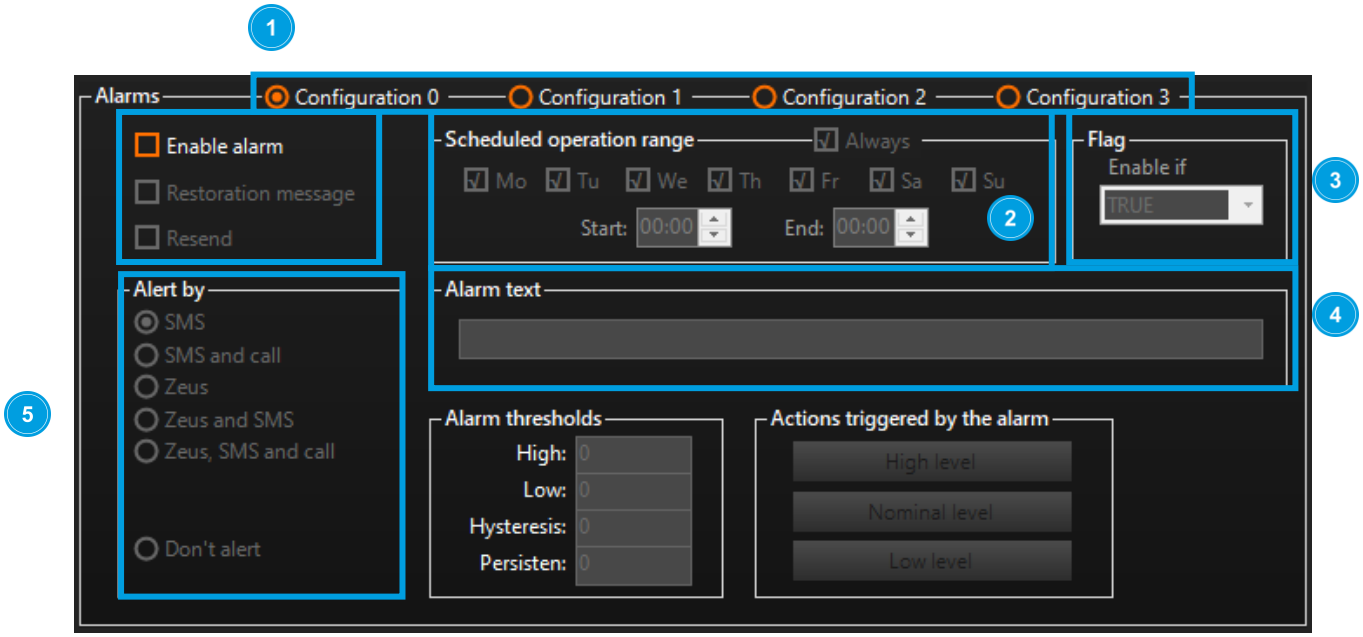


Figure 5-2. "General configuration" screen

Table 5-2. General configuration

Item	Section	Item	Section
1	Alarm configuration selection. See Section 5.1.1.		
2	Scheduled operation range See Section 5.1.2.		
3	Flag (Enable if). See Section 5.1.3.		
4	Alarm text. See Section 5.1.4.		
5	Notify by. See Section 5.1.5.		

5.1.1 Alarm configuration selection

These devices allow for up to four different alarm configurations on the same signal, for certain channels.

This enables the transmission of different alarm texts based on different exceeded ranges or the option of having different alarm ranges for different time periods.

Figure 5-3. "Alarm configuration" selection details

Table 5-3. "Alarm configuration" selection details

Field	Description
Enable alarm	Enable alarm for selected configuration.
Reset message	Enables the sending of the alarm reset message. This message is sent when the signal returns to its normal values after an alarm has been triggered. The message contains the "Alarm text" and is preceded by the "Reset text". The default reset text is "RESET". See Section 18.2 to find out how to modify it.
Resend	The alarm will be resent for as long as the alarm continues. The time interval between resends and the maximum number of times the resends are defined in Section 18.3.

5.1.2 Scheduled operation range

This allows the time period during which the alarm will be enabled to be selected.

Table 5-4. Scheduled operation range

Field	Description
Always	The alarm will be activated 24/7.
Select start time, end time, and days of the week	The activation time can be manually entered by unchecking the "Always" option.

5.1.3 Flag (Enable if)

This setting enables the alarm based on the status of a system flag.

If the corresponding flag is set to the value indicated in the dropdown Fx=TRUE (1, enabled) or Fx=FALSE (0, disabled), the timer will be active.

See Section 12 to find out further details of how the flags work.

5.1.4 Alarm text

The text entered in this box will be sent whenever the alarm goes off. This text will include the signal value, the range (High, Low, Nominal), the device name, and the date and time.

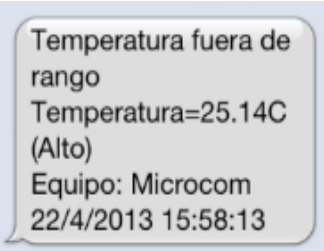


Figure 5-4. Example of an SMS message sent due to a temperature out-of-range alarm.

5.1.5 Alert by

Select the method through which the alarm will be sent:

Table 5-5. Notification by

Field	Description
SMS	Alarm notification will be sent as an SMS message to the priority numbers.
SMS and call	Alarm notification will be sent by SMS message and via a call. Particularly interesting option to ensure that the most critical alarms are delivered to the user. Procedure: 1. The device calls the phone number with the highest priority from the authorised contact list. (Highest priority is 1, lowest is 8). 2. The user must answer the call; otherwise, the next highest priority number will be called. 3. Users will hear a dual-tone signal or beep when they pick up. Depending on the settings, the user may need to press the # key. 4. As soon as the user hangs up, they will receive an SMS message with the alarm text. For more information about this alarm notification option: See Section 18.1.

Field	Description
Zeus	The alarm will be sent via TCP/IP to the Zeus server. The ZeusWeb and ZeusMobile applications will then notify the user about the alarm.
Zeus and SMS	The alarm will be sent via SMS and to the Zeus server.
Zeus, SMS and call	The alarm will be sent by SMS, the Zeus server, and a call.
No notification sent	No notification about the alarm will be sent. Useful whenever you only want to perform an action when the alarm goes off.

5.2 ANALOGUE INPUT CONFIGURATION OPTIONS

Specific settings for analogue inputs.

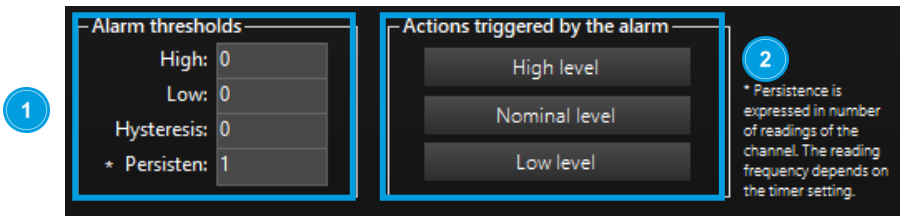


Figure 5-5. Details of the "Analogue input parameters" configuration.

Table 5-6. Analogue input parameters.

Item	Field	Description
1	High	High value limit. The value above which the alarm goes off.
1	Low	Low value limit. The value below which the alarm goes off.
1	Hysteresis (dead band)	Hysteresis is a region around a logical threshold where changes in the input signal have no effect on the output signal. Example of use: If a high-temperature alarm is set to activate at 45°C, with a hysteresis value of 2, the alarm will go off at 45°C and reset whenever the temperature drops below 43°C (high value limit – hysteresis).
1	Persistence	The amount of time the signal must be out of range before the alarm goes off. (Maximum: 65535 seconds/cycles).

Item	Field	Description
		Hermes devices: Values expressed in seconds. Nemos devices: Values expressed in reading cycles.
2	Actions to be performed by the alarm	This enables a series of actions to automatically take place whenever the value of an analogue signal exceeds the high-level limit, falls below the low-level limit or returns to its nominal state. See Section 23.

5.3 DIGITAL INPUT CONFIGURATION OPTIONS

Specific settings for digital inputs.

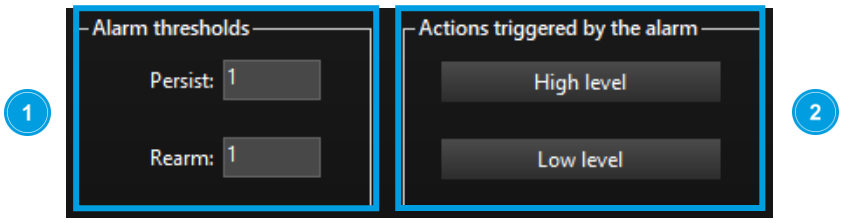


Figure 5-6. Details of the "Digital input parameters" configuration.

Table 5-7. Digital input parameters.

Item	Field	Description
1	Persistence	The amount of time the digital signal must remain active before the alarm goes off. Maximum persistence: 65,535 seconds. This value is expressed in seconds, unless otherwise specified.
1	Reset	Time required for the alarm to reset (become active again) after it has gone off. Maximum reset time: 65,535 seconds. This value is expressed in seconds, unless otherwise specified.
2	Actions to be performed by the alarm	This enables a series of actions to automatically take place whenever a digital signal goes off (high value) or returns to its normal state (low value). See Section 23.

5.4 CONFIGURATION EXAMPLE

We wish to configure an out-of-range SMS alarm for an analogue level probe with a 4-20 mA output and a full-scale range of 5 meters.

The alarm activation conditions are as follows:

Detected level ..... greater than 4.2 meters

Detected level ..... less than 0.8 meters

Hysteresis..... 0.2 meters

persistence 300 seconds

Configuration: Complete this configuration by filling in the fields as shown in Figure 5-7.

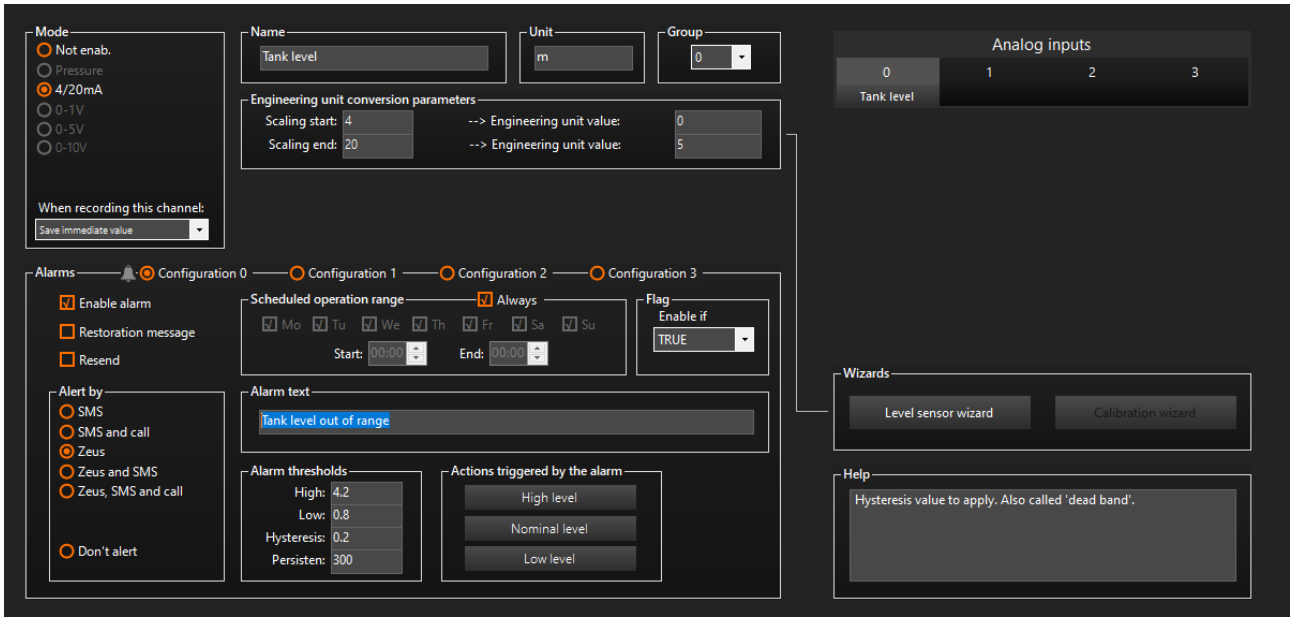


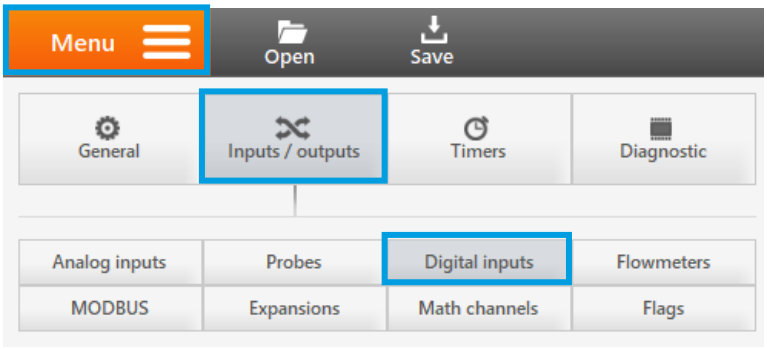
Figure 5-7. Example of "Analogue input alarm" configuration

6 - DIGITAL INPUTS

This feature allows the device's digital inputs to be enabled and configured.

The configuration options include selecting the contact type (NO, NC), alarms, and related actions.

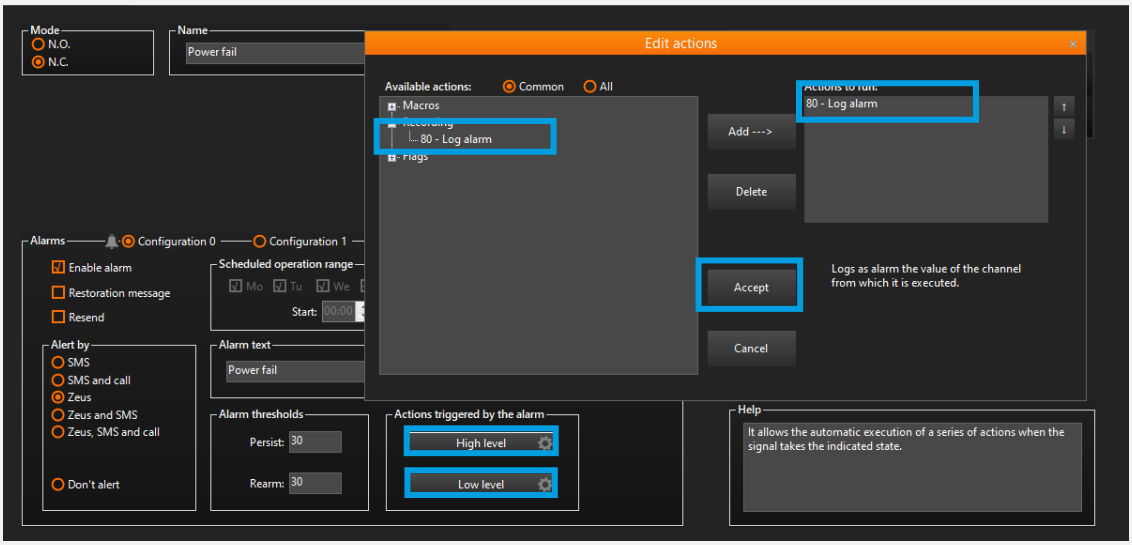
Access:



Menu → Inputs and outputs → Digital Inputs

Hermes

The digital inputs are automatically read every second. However, registration takes place on demand. To register the digital input data, action "80 - Register Alarm" should be configured for both high and low levels and periodic logging should also take place every hour.



Nemos

The digital input sampling is always active, even when the Nemos device is in sleep mode. This ensures that as soon as an alarm goes off, the Nemos device will automatically wake up and the alarm will be reported.

Hermes LC2/LC2+/TCR210

It has an internal battery that allows it to operate even when there is no mains power. This allows it to send an alarm notification in case of a power failure. The power failure signal is internally connected to digital input 8.

6.1 FIELD DESCRIPTION

Settings related to the different sections of this screen.

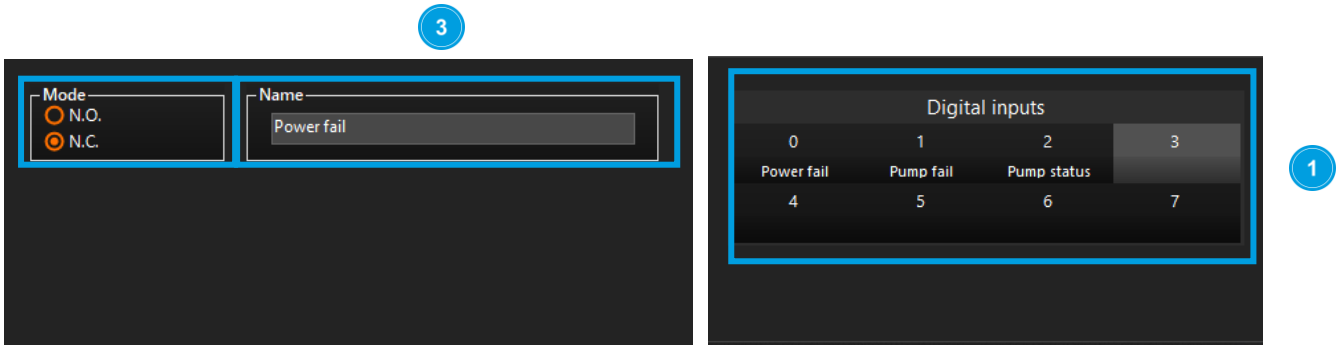


Figure 6-1. Details of the "Digital input configuration" interface".

Table 6-1. "Digital input configuration" interface.

Item	Field	Description
1	Digital input selection	This allows you to select the digital input to be configured. The number of available inputs depends on the connected device.
2	Mode	Digital input operating mode. N.O. Normally open N.C. Normally closed.
3	Name	Sets the name for the digital signal.

Common alarm configuration options are shown in the lower left-hand side. See Section 5 for further information.

6.2 EXAMPLE OF USE

We wish to configure an alarm SMS whenever a digital input is activated indicating a network failure. The alarm SMS will be sent if the output remains active for more than 5 minutes (persistence: 300 seconds).

The alarm activation conditions are as follows:

Digital input..... Activated.

Persistence ..... 300 seconds.

Configuration: Complete this configuration by filling in the fields as shown in Figure 6-2.

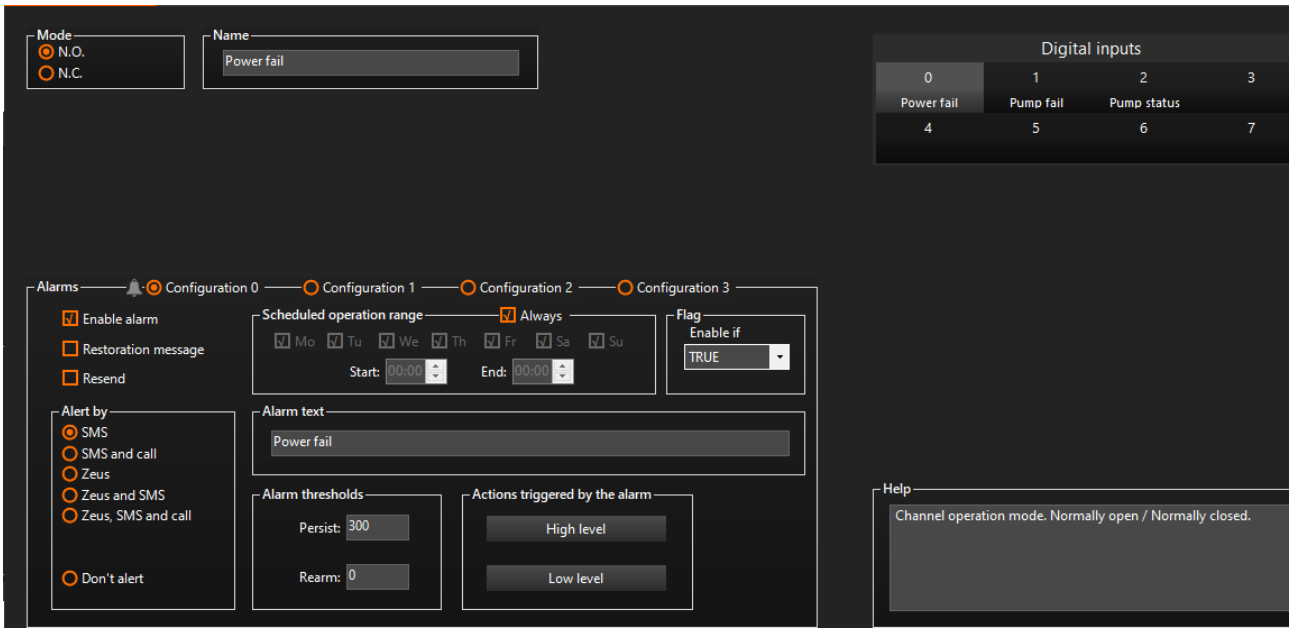
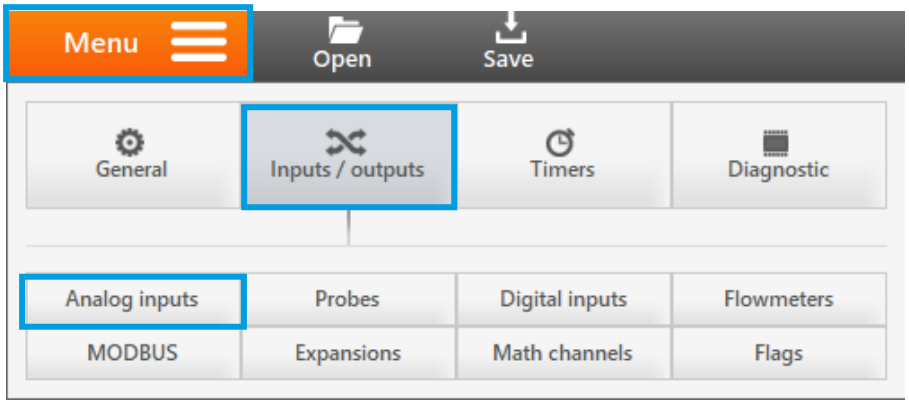


Figure 6-2. Example of "Digital input alarm" configuration

7 - ANALOGUE INPUTS

This allows the device's analogue inputs to be set to register data, define the conversion parameters to engineering units, and specify the conditions under which alarm notifications should be sent.

Access:



Menu → Inputs and outputs → Analogue inputs

Hermes

The analogue inputs are automatically read every second. A timer must be programmed to register these readings.

Nemos (battery-powered)

For energy-saving reasons in the Nemos, the analogue inputs are read only on demand. This means that a timer must be programmed to perform these actions at the desired frequency:

"Read analogue input group X" or "Register analogue input group X".

These actions cause the Nemos to exit sleep mode, power on the sensor, register the value, and then return to sleep mode.

7.1 FIELD DESCRIPTION

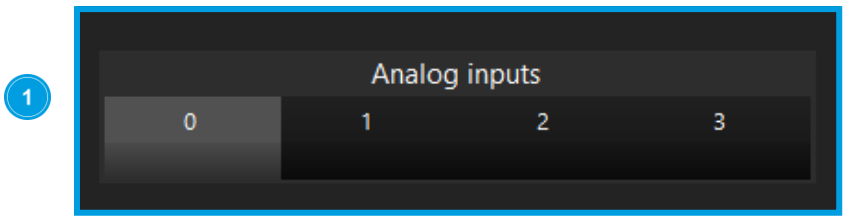


Figure 7-1. Details of the analogue input selection configuration interface.

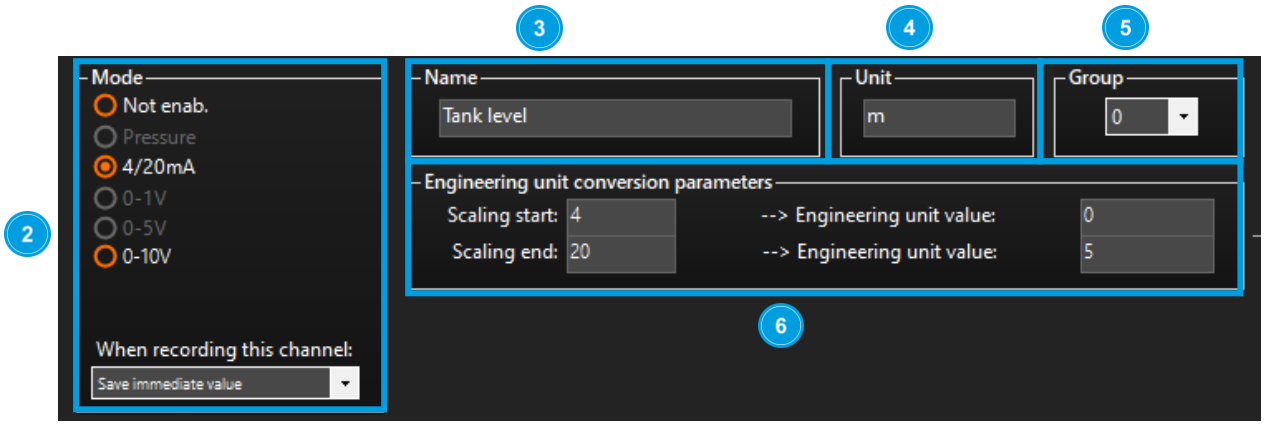


Figure 7-2. Details of the "Analogue input configuration" interface.

Table 7-1. "Digital input configuration" interface.

Item	Field	Description
1	Analogue input selection	Selection of the analogue input to be configured.

Item	Field	Description
2	Mode	Enables the selected analogue input and configures the operating mode. Not enabled: Analogue input not enabled. Pressure (only for Nemos models with integrated pressure sensor): Configures the analogue input to work with the built-in pressure sensors. 4/20 mA / 0-1 V / 0-5 V / 0-10 V: Configures the analogue input to read sensors with different analogue signal interfaces. The signal value to be logged based on the following configurations: Save immediate value: Logs the measured value directly. Save average: Logs the average value of the instantaneous readings taken during the registration period. Save average, mín. max: Logs the minimum and maximum average value of the instantaneous readings taken during the registration period. The position of the jumpers associated with the analogue input must be changed for the Nemos LP, Hermes TCR200, and Hermes M120 models. The jumper configuration will be shown on this configuration screen and in the device manual. 
3	Name	Sets the name for the analogue signal.
4	Unit	The unit in which the analogue signal is expressed.
5	Group	Indicates which group this input belongs to. All inputs within a group are logged simultaneously. Configure a periodic timer if you want to register this signal. See section 14.2

Item	Field	Description
6	Engineering unit conversion parameters	Defines the conversion parameters to map the analogue electrical signal to the corresponding engineering unit. The device performs a linear interpolation of the measured value between these two points. Start scale/ Full scale: Analogue input value (volts or milliamperes). Equivalent value in engineering units: Value of the physical quantity corresponding to the configured start and full scale.

7.2 GROUP CONFIGURATION FOR NEMOS DEVICES

Defines the power supply characteristics for analogue probes connected to devices in the Nemos range (N200, N200+, LP, LP+, and N100+).

Each group comprises one or more probes that will be powered simultaneously, specifying the output from which they will be powered, the excitation voltage, and the activation period prior to measurement (probe warm-up time).

This additional panel is located on the right-hand side of the interface.

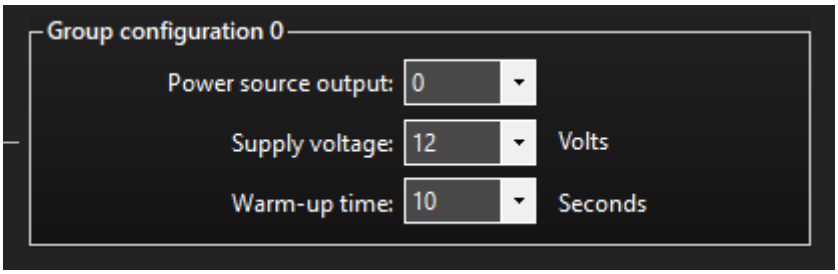


Figure 7-3. Details for "Group configuration".

Table 7-2. Details for "Group configuration".

Field	Description
Output power from	Sets the output port that will power the probe or sensors.

Field	Description
Power voltage	Voltage at which the probes will be powered: 0V: The Nemos will not provide power. This option is intended for cases where the probe is powered by a separate source to the Nemos. 5 – 24V: The Nemos will provide the indicated voltage. V_EXT (only for Nemos N200+ with external power input): The Nemos provides the power voltage it receives via its external power input without any conversion taking place.
Warm-up time	Time (in seconds) that the probe is powered on before taking a measurement.

7.3 INTEGRATED PRESSURE SENSOR CONFIGURATION IN NEMOS

Nemos devices can optionally be equipped with one or two integrated pressure sensors with a high sampling frequency, enabling the detection of pressure transients.

These sensors are internally connected as follows:

N110: Analogue input 0.

N110+: Analogue input 2.

N200+: Analogue inputs 2 and 3 of the device.

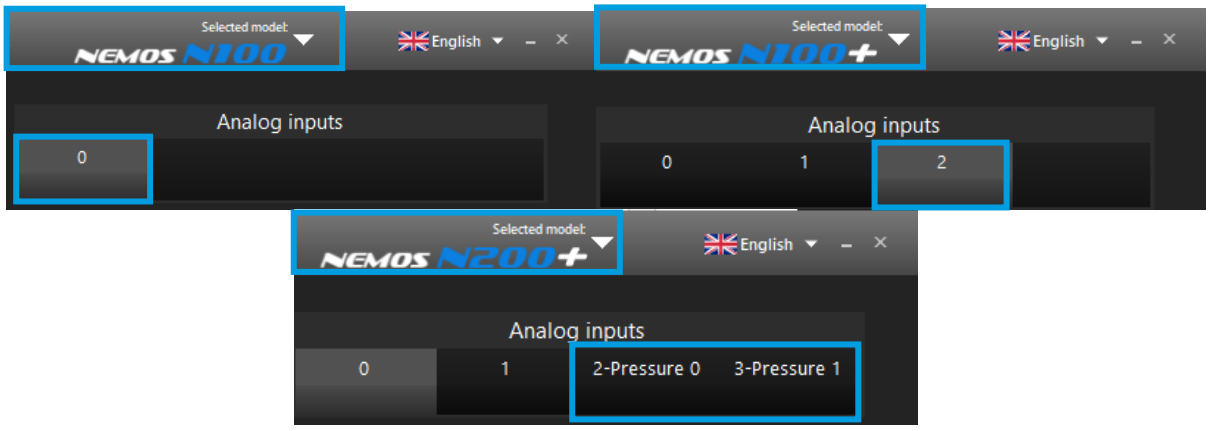


Figure 7-4. Internal connection of the N100, N100+ and N200+ sensors.

These sensors can be calibrated for any applications that so require it. See Section 18.10.

7.3.1 Field description

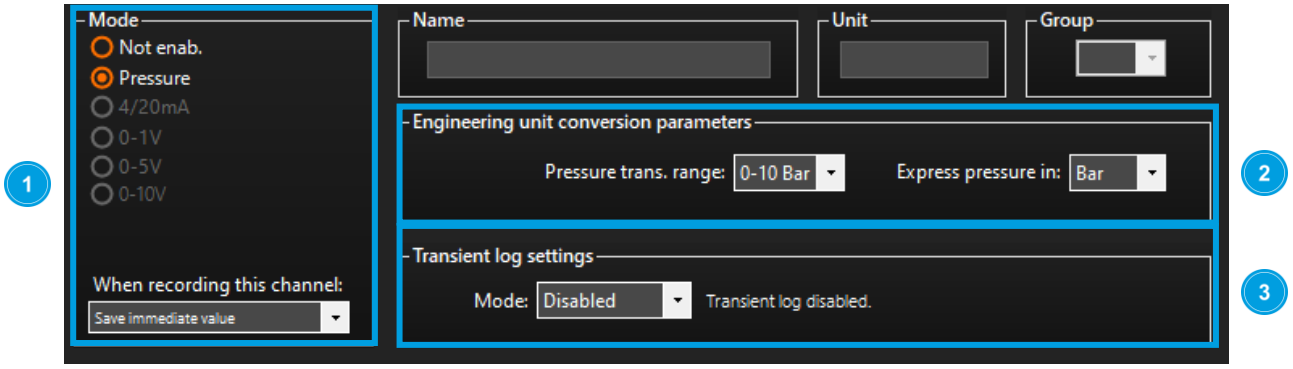


Figure 7-5. Details of the pressure probe configuration interface.

Table 7-3. Pressure probe configuration interface.

Item	Field	Description
1	Mode	Enables the selected pressure probe.
2	Engineering unit conversion parameters	Full-scale range of the pressure probe and the output unit. These parameters can be 1, 10 or 20 bars (depending on the model selected). The available output units are Bar, mH2O, kPa and PSI.
3	Transient register	The transient registration only affects the behaviour of pressure probe number 0 in the case of the Nemos N200+.

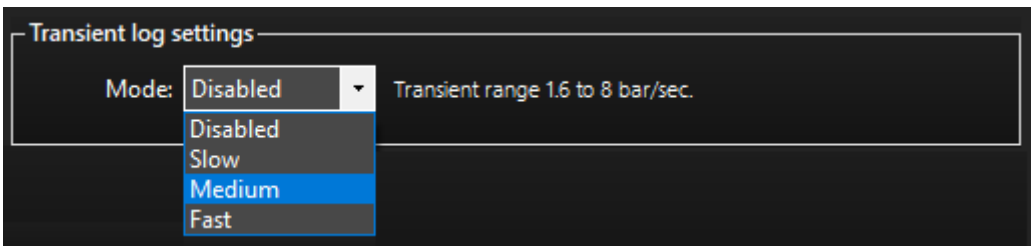


Table 7-4. Transient log

Field	Description
Deactivated.	Inhibited. Low power consumption. Pressure is measured every second. Statistics for maximum, minimum, and average values can be generated for each registration period. There Is a negligible impact on battery life.
Slow	Range between 0.4 and 2 bar/s. Recommended for large diameter pipes. By default, the pressure is measured 8 times per second until a pressure change between two readings is detected that indicates the start of a transient. After detecting a pressure transient, the device automatically switches to measuring the pressure 128 times per second.
Medium	Range between 1.6 and 8 bar/s. Recommended for most facilities. By default, the pressure is measured 16 times per second until a pressure change between two readings is detected that indicates the start of a transient. After detecting a pressure transient, the device automatically switches to measuring the pressure 128 times per second.

Field	Description
	Range between 6.4 and 32 bar/s.
	Recommended for small diameter pipes.
Quick	By default, the pressure is measured 32 times per second until a pressure change between two readings is detected that indicates the start of a transient. After detecting a pressure transient, the device automatically switches to measuring the pressure 128 times per second.

7.4 LEVEL SENSOR WIZARD

A wizard that helps with the configuration of non-contact level sensors:

Access:

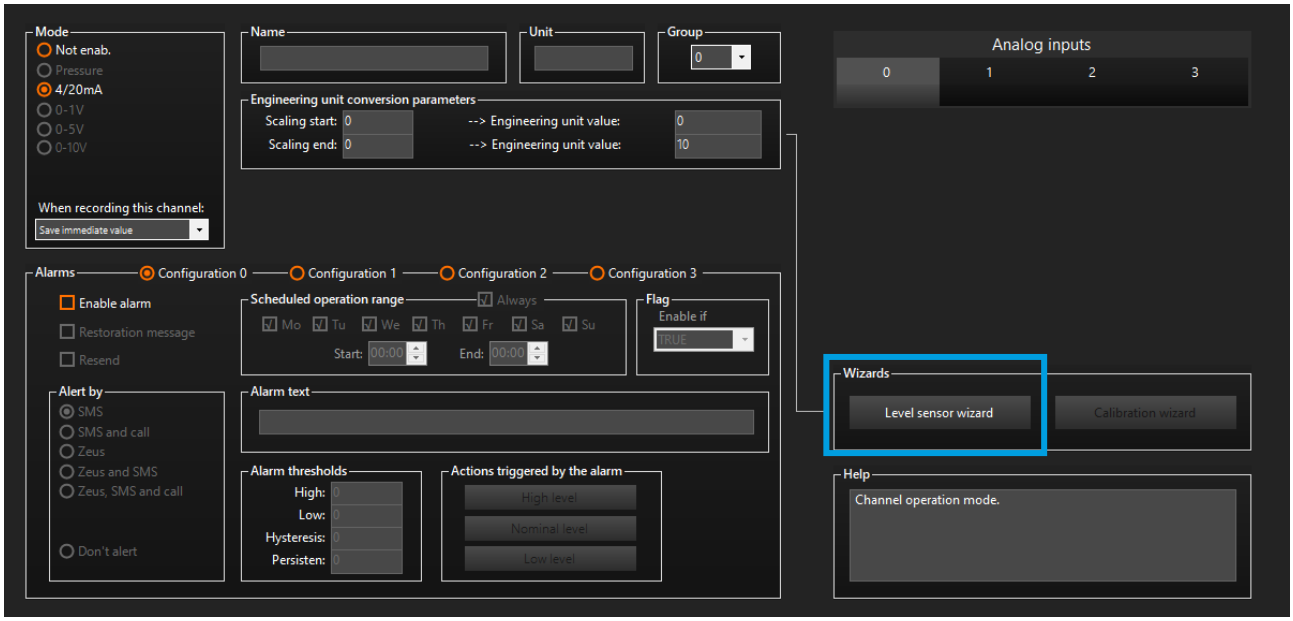
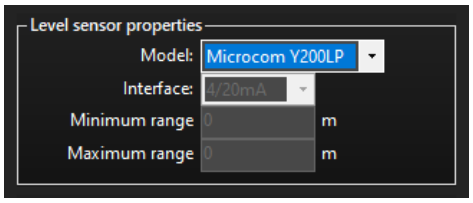
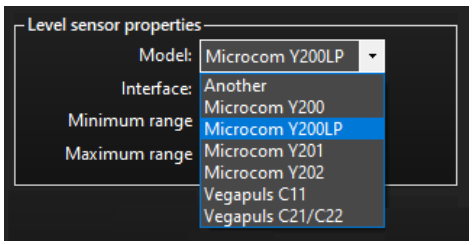
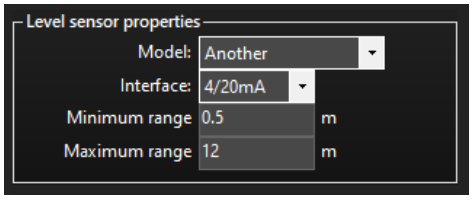
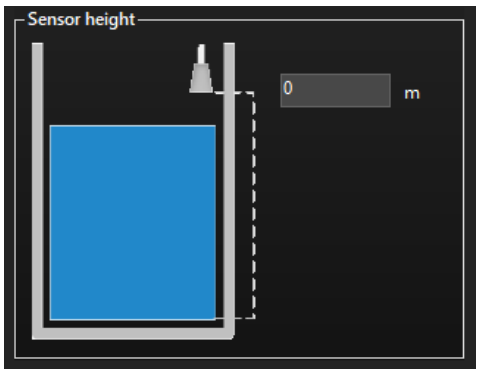


Figure 7-6. Level probe wizard.

7.4.1 Field description

Table 7-5. Level probe wizard.

Field	Description
Probe characteristics   	Parameters that depend on the connected sensor. Model: Connected probe model selection. Select "Other" if your probe is not listed and manually enter the minimum and maximum range parameters. Interface: Sensor output signal: ▪ 0-10 V. ▪ 4/20 mA current loop. Minimum range: Minimum measurement range in meters (band or dead zone). Maximum range: Maximum measurement range in meters.
Probe height 	Distance, in meters, between the reference plane of the probe and the bottom of the tank.
	Click "OK" to apply the changes. The "engineering unit conversion parameters" will be filled in automatically.

7.5 EXAMPLE OF USE

An out-of-range SMS alarm needs to be configured for an analogue level probe that offers a 4-20 mA output and a full-scale range of 5 meters.

The alarm activation conditions are as follows:

Detected level ..... greater than 4.2 meters.

Detected level ..... less than 0.8 meters.

Hysteresis..... 0.2 meters.

Persistence ..... 300 seconds.

Configuration: Complete this configuration by filling in the fields as shown in Figure 7-7.

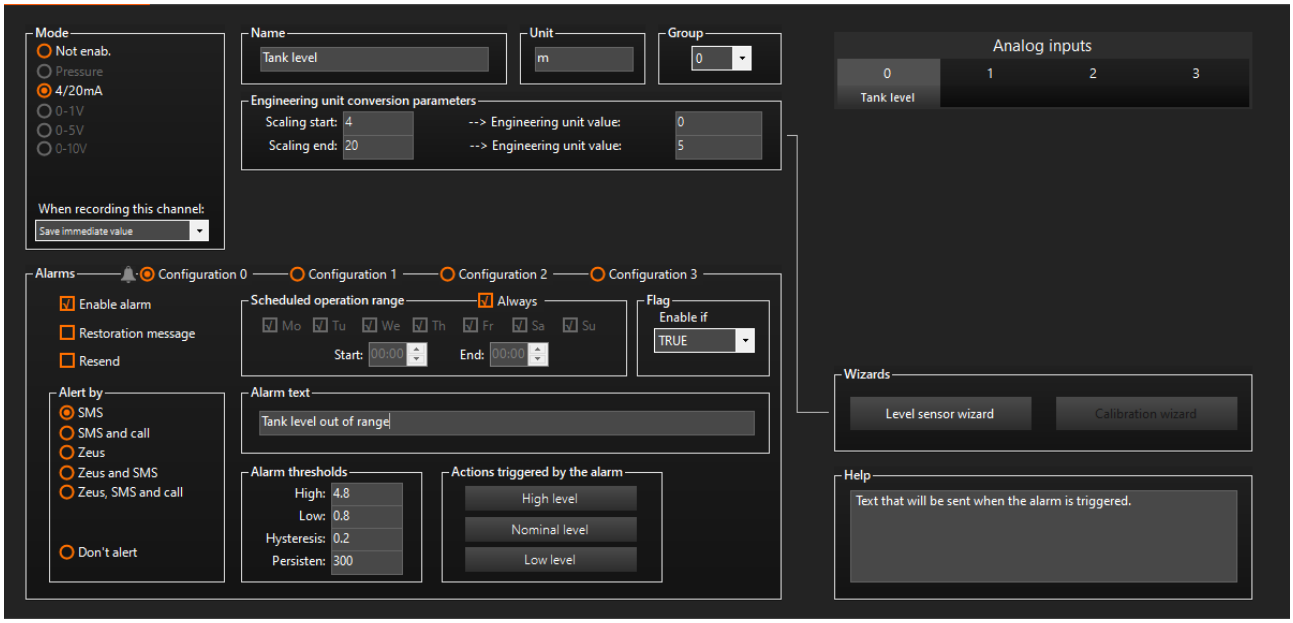


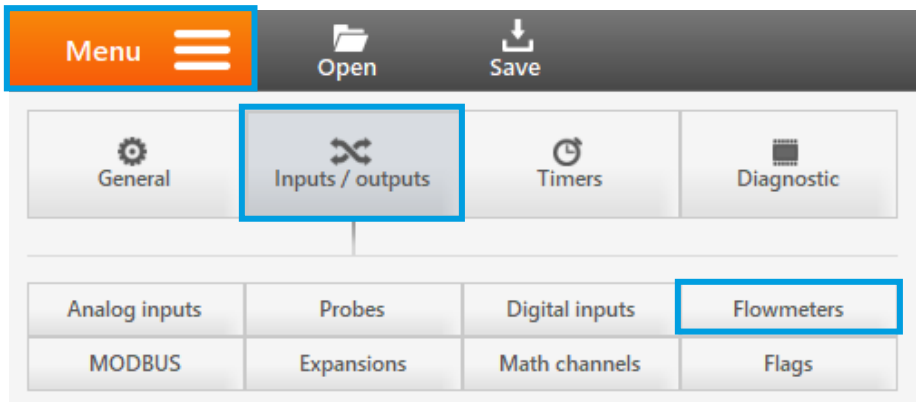
Figure 7-7. Example of configuration for analogue input alarm

8 - FLOWMETERS

Each digital input has an associated flowmeter function, which allows the direct conversion of a pulse signal from a flowmeter into an engineering unit flow.

Its configuration is described below.

Access:



Menu → Inputs and outputs → Flowmeters

8.1 FIELD DESCRIPTION

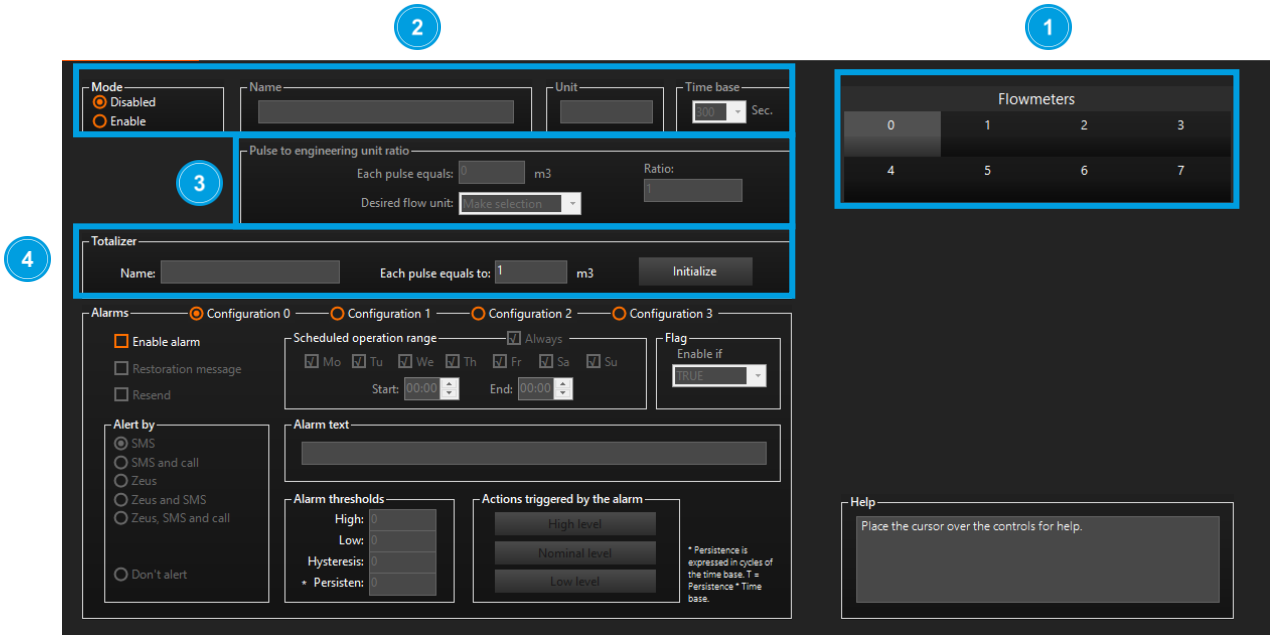


Figure 8-1. Flowmeters.

Table 8-1. Analogue input parameters.

Item	Field	Description
1	Flowmeter input selection	This is the digital input to which the flowmeter is connected.

Mode: Enables/disables the flowmeter function in the corresponding digital input.

Name: Flowmeter name.

Unit: Unit in which flow rate is expressed.

Time frame: Time period, in seconds, during which the received pulses are counted to calculate the flow rate (typical time base values range from 300 to 900 seconds).

2 Configuration

A cyclic counter must be used to register the flowmeter data, stating the same time period configured in the "Time Base" section.

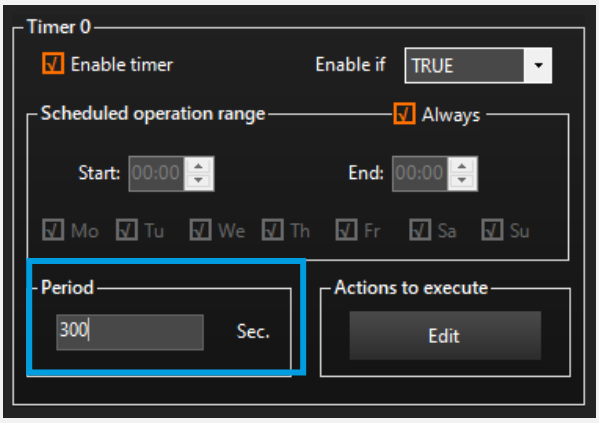


Figure 8-2. Cyclic timer configuration details.

Item	Field	Description
3	Pulse – engineering unit equivalence	Flowmeter technical specifications. Allows the pulse/time ratio to be set to the desired engineering unit.

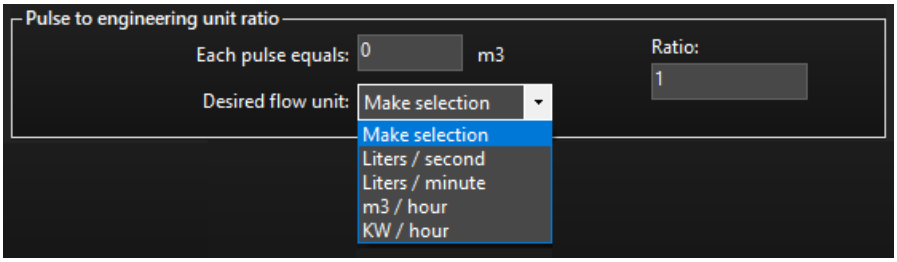


Figure 8-3. Pulse equivalence configuration details.

Each pulse equals: This indicates the number of cubic meters (m^3) that the flowmeter logs for each pulse.

The flow rate should be expressed in: Unit of measurement in which the information will be received

Coefficient: Shows the relationship between the flow rate measured per pulse and the unit of measurement in which the flow rate will be expressed.

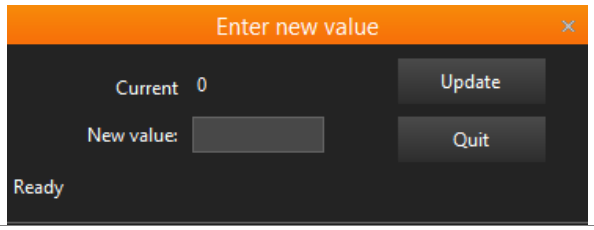
This text box is automatically filled in.

4	Totaliser	Totaliser counter associated with the flowmeter.

Name: Assigns a name to the input that reflects the intended use of the flowmeter.

One pulse is equivalent to: Indicates the number of cubic meters (m^3) that the flowmeter logs in each pulse.

Initialise: Initialises the totaliser to the desired value.



Item	Field	Description

Figure 8-4. Pop-up screen to initialise the totaliser.

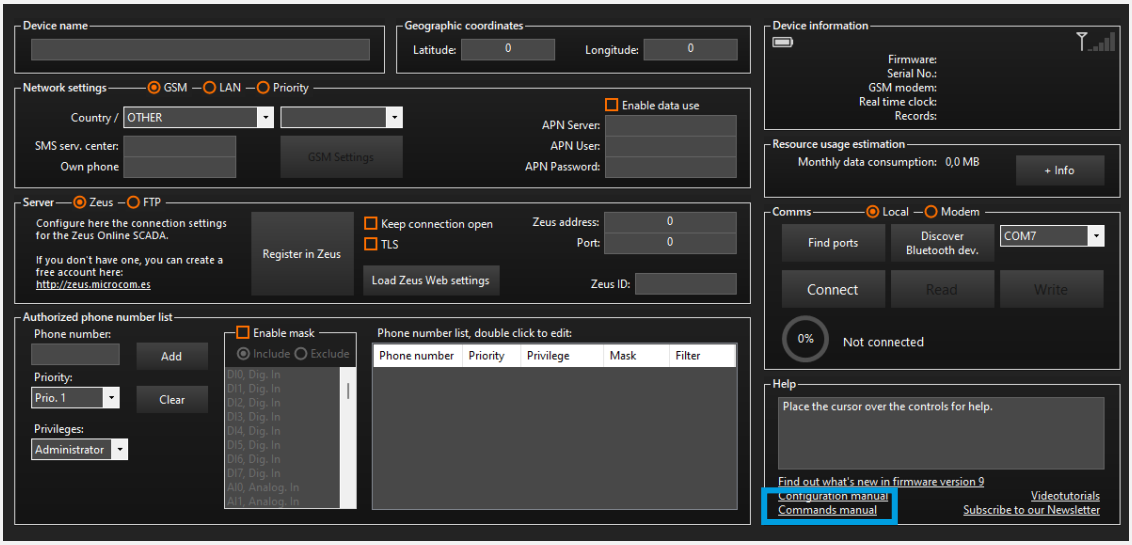
It is necessary to be connected to the device via USB or Bluetooth to initialize the totaliser value.

The totaliser value can be initialized by SMS or by Zeus Web using the following command:

CNTx = yyyyyy

Where x is the totaliser number and yyyyy is the number of cubic metres logged at that time.

You can consult the command manual at www.microcom360.com. or in the configuration software general menu.



8.2 EXAMPLE OF USE

An SMS alert needs to be configured whenever a high nighttime flow rate is detected. We wish to use a flowmeter with a pulse output, with a pulse weight of 10 litres and we wish to determine the flow rate in l/s.

The alarm activation conditions are as follows:

Scheduled operation range ..... from 1 am to 6 am.

High flow alarm..... > 10 l/s.

Low flow alarm ..... < 2 l/s.

Hysteresis.....1 l/s.

Persistence.....1 reading cycle

Configuration: Complete this configuration by filling in the fields as shown in the image below.

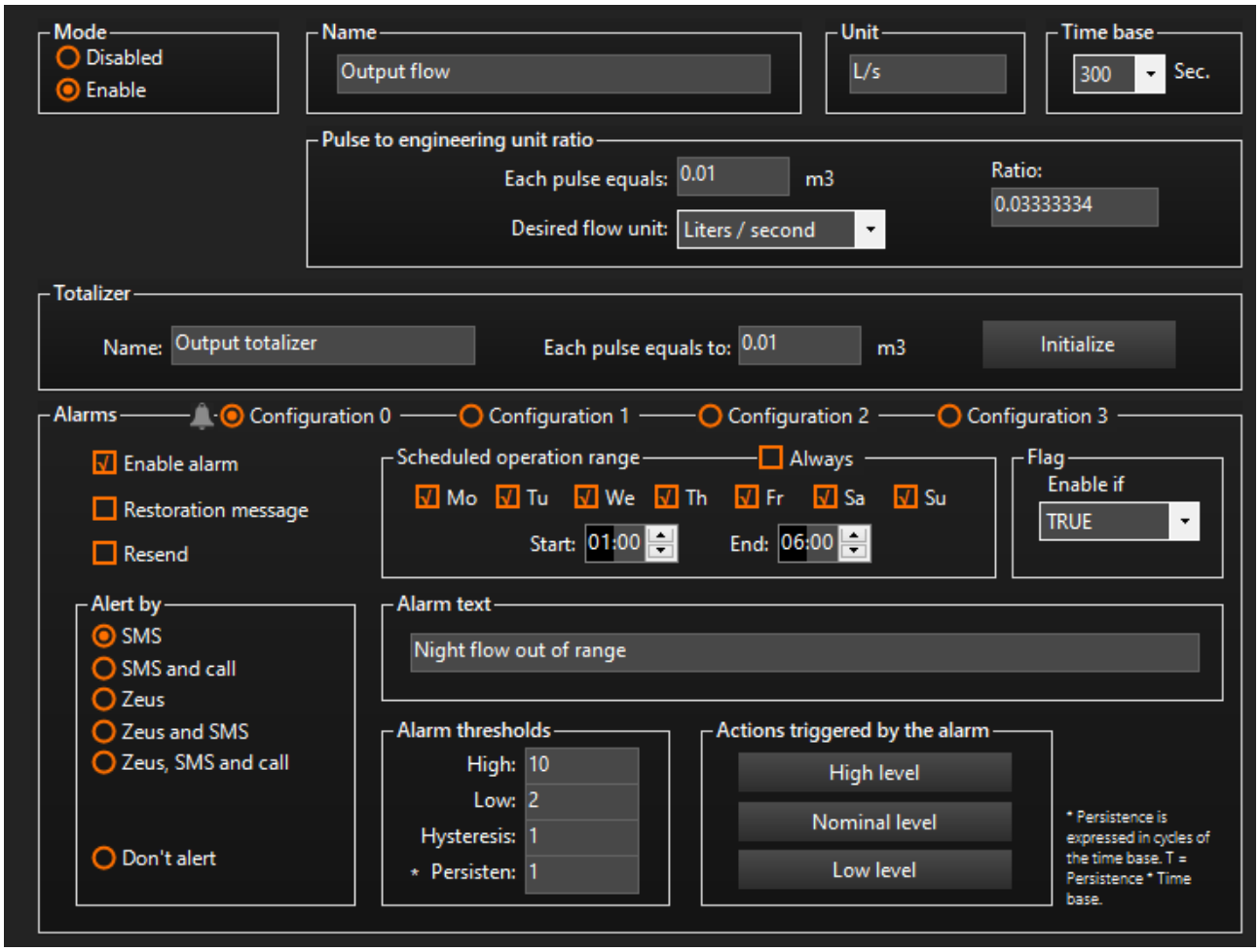


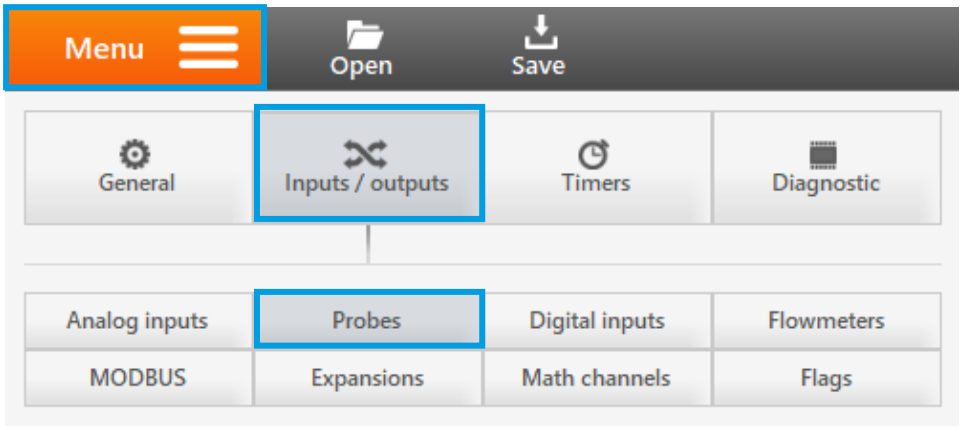
Figure 8-5. Example of configuration "Flow metre alarm".

9 - DIGITAL PROBES

Certain Microcom devices feature a 1-Wire interface, the digital communication interface used to connect Microcom digital probes.

This interface allows these probes to be configured.

Access:



Menu → Inputs and outputs → Probes

Table 9-1. List of digital probes developed by Microcom.

Name	Description
STDV01	Digital temperature probe.
STDV02	Combined temperature and humidity probe.
Y100	Ultrasonic level probe.

Probe readings:

- Takes place automatically every 10 seconds on Hermes devices.
- Performed on demand on Nemos devices. It is therefore necessary to programme a timer to perform these actions ("Read probe X" or "Register probe X"). These actions cause the Nemos device to exit sleep mode, power on the sensor, register the value, and then return to sleep mode.

9.1 FIELD DESCRIPTION

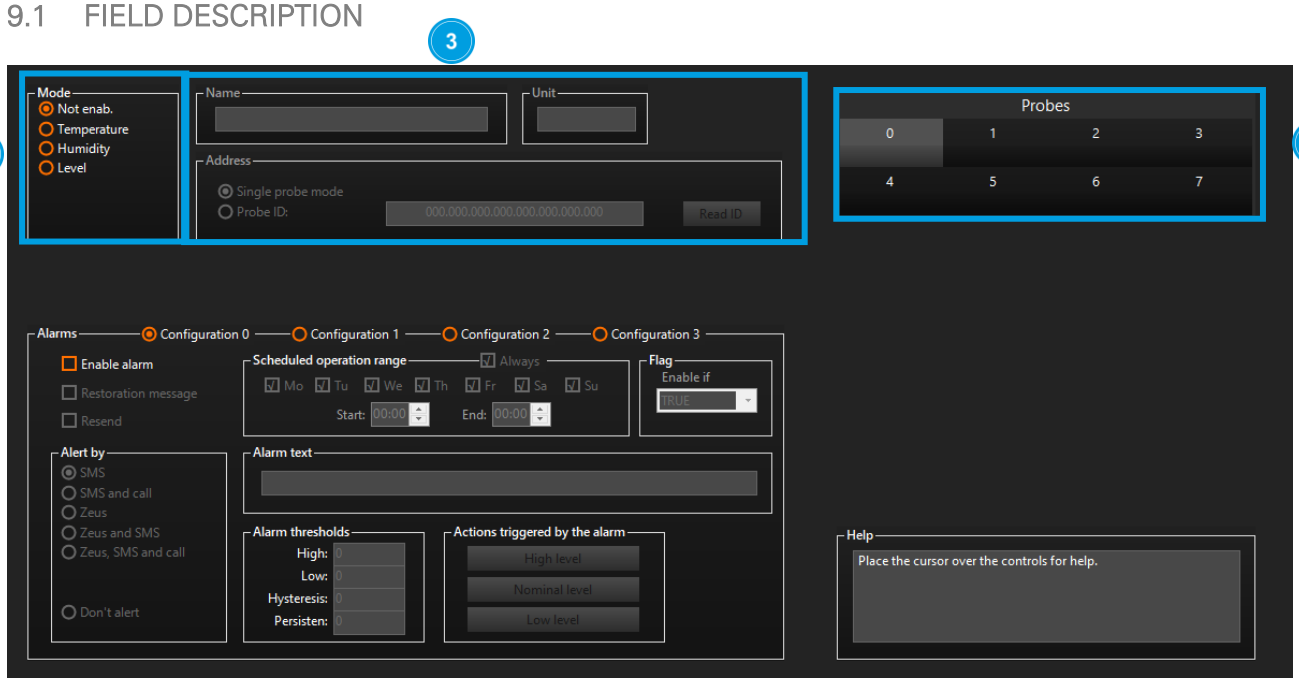


Figure 9-1. Digital probes

Table 9-2. Digital probe parameters.

Item	Field	Description
1	Probe channel selection	Probe channel to be configured.
2	Mode	Not enabled: Channel not enabled. Temperature: Allows the connected probe type to be enabled and selected. Compatible with STDV01 / STDV02 probes. Moisture: Allows the connected probe type to be enabled and selected. Compatible with STDV02 probes. Level: Compatible with Microcom Y105 / Y110 probes.

Item	Field	Description
3	Configuration	Name: Sets the name for the probe. Unit: The unit in which the measured quantity is expressed. Address: Probe address ▪ The *Single Probe Mode* can be selected if there is only one probe on the bus. ▪ You should select the *Probe ID* option and obtain the ID of each probe as shown below If there is more than one probe.

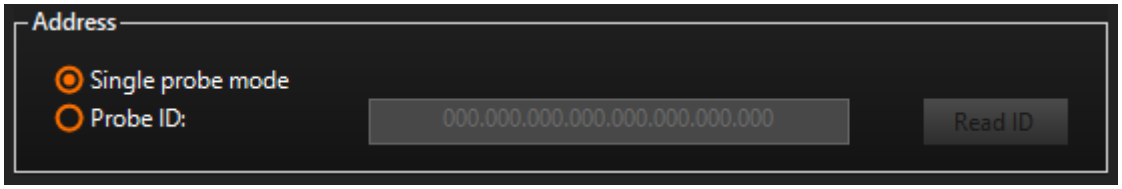
9.2 CONFIGURATION EXAMPLE - TWO TEMPERATURE PROBES

When more than one probe is connected, each of them needs to be addressed by their unique identifier

Procedure to obtain the ID of two temperature probes (one called Interior Temp. and the other one called Exterior Temp.):

1. Connect the first probe to be configured (e.g., the Interior temp. probe).

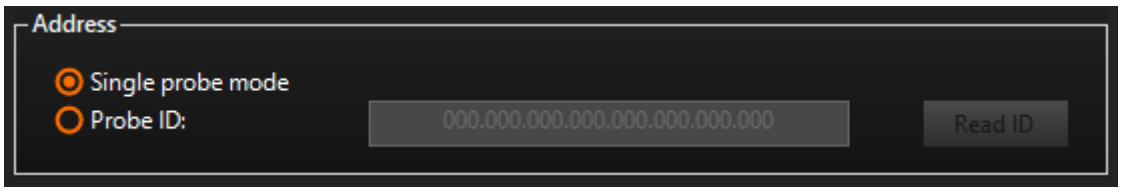
2. Select the Probe ID option and click on the "Read ID" button.



3. Accept the reminder message. By doing so, the ID of the connected probe is loaded into the form.

4. Disconnect the first probe and connect the other (Exterior Temp.).

5. Select the Probe ID option and click on the "Read ID" button.



6. Accept the reminder message. By doing so, the ID of the connected probe is loaded into the form.

7. The two probes can now be connected in tandem.

This procedure must be repeated for each of the probes to be configured.

9.3 EXAMPLE OF USE

An SMS alarm needs to be set for an out-of-range temperature. A Microcom STDV01 temperature probe will be used.

The alarm activation conditions are as follows:

Temperature above.....25 °C.

Temperature below.....18 °C.

Hysteresis.....1 °C

Persistence ..... 60 seconds.

Configuration: Complete this configuration by filling in the fields as shown in the image below.

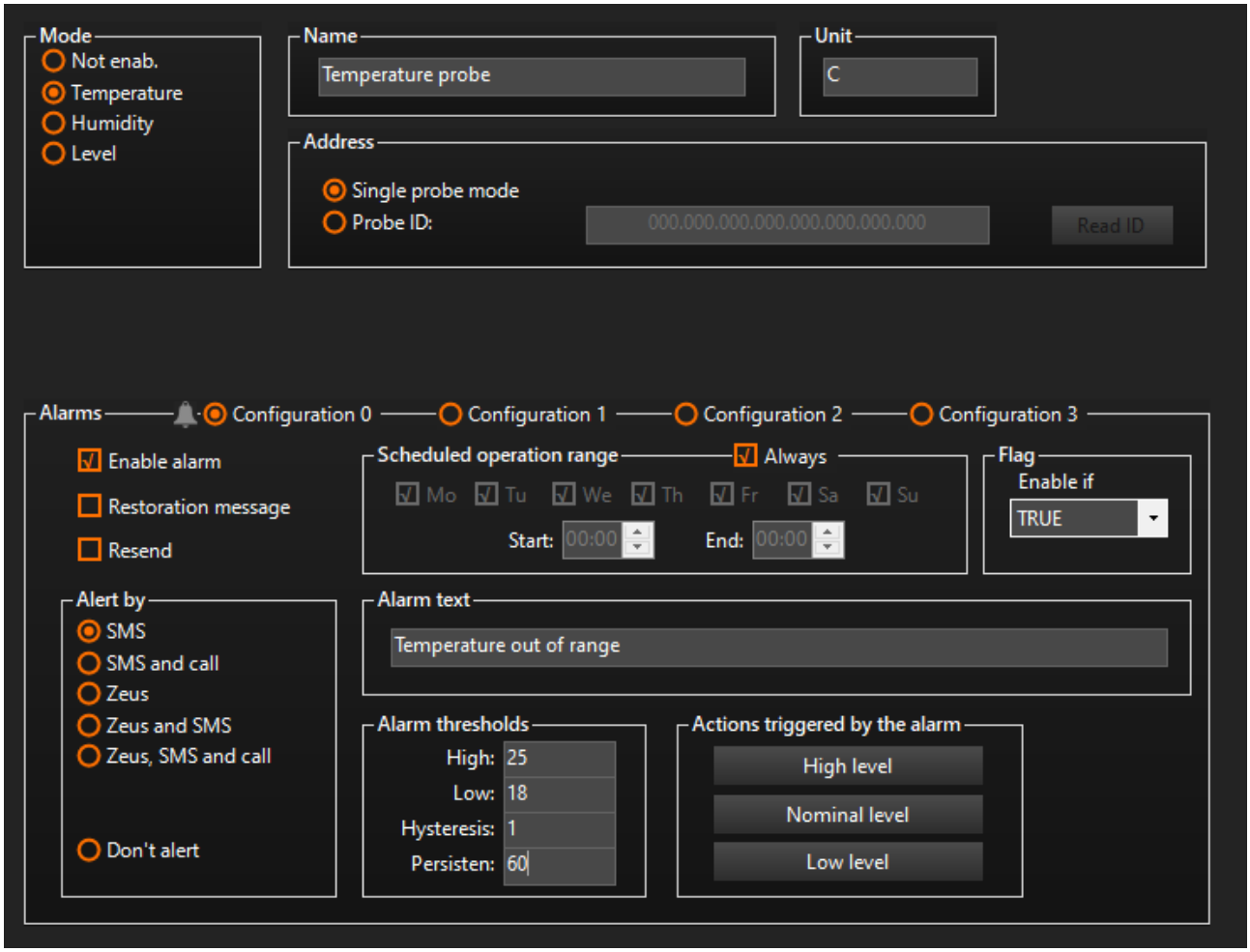


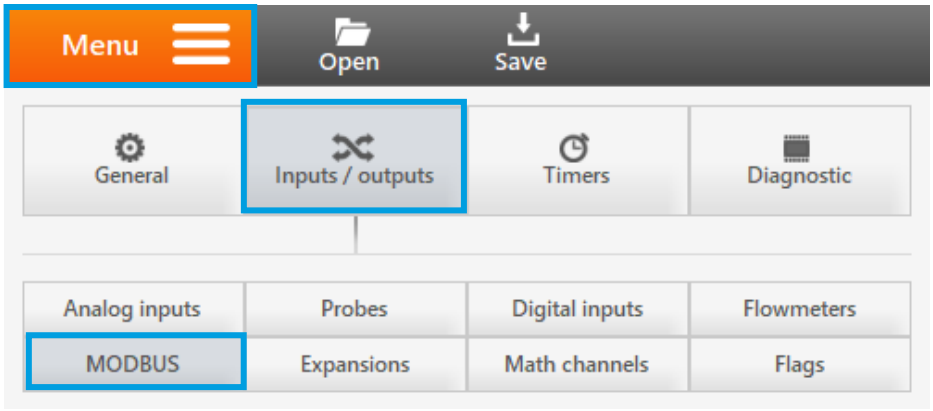
Figure 9-2. Example of configuration "One alarm per probe".

10 - MODBUS

Certain Microcom devices have a MODBUS interface, both in their RTU and TCP mode.

This interface allows you to configure the use of the MODBUS port and its operation mode as master or slave (slave mode only available in Hermes).

Access:



Menu → Inputs and outputs → MODBUS

10.1 INTRODUCTION TO MODBUS COMMUNICATIONS

MODBUS RTU:

This communications protocol is based on the master/slave architecture.

Each device from the MODBUS network has a unique address. The master module normally sends orders or commands to the rest of the connected slave modules, which respond to it.

The basic MODBUS commands allow you to control an RTU or slave device to modify the value of any of its logs or request the content of these logs.

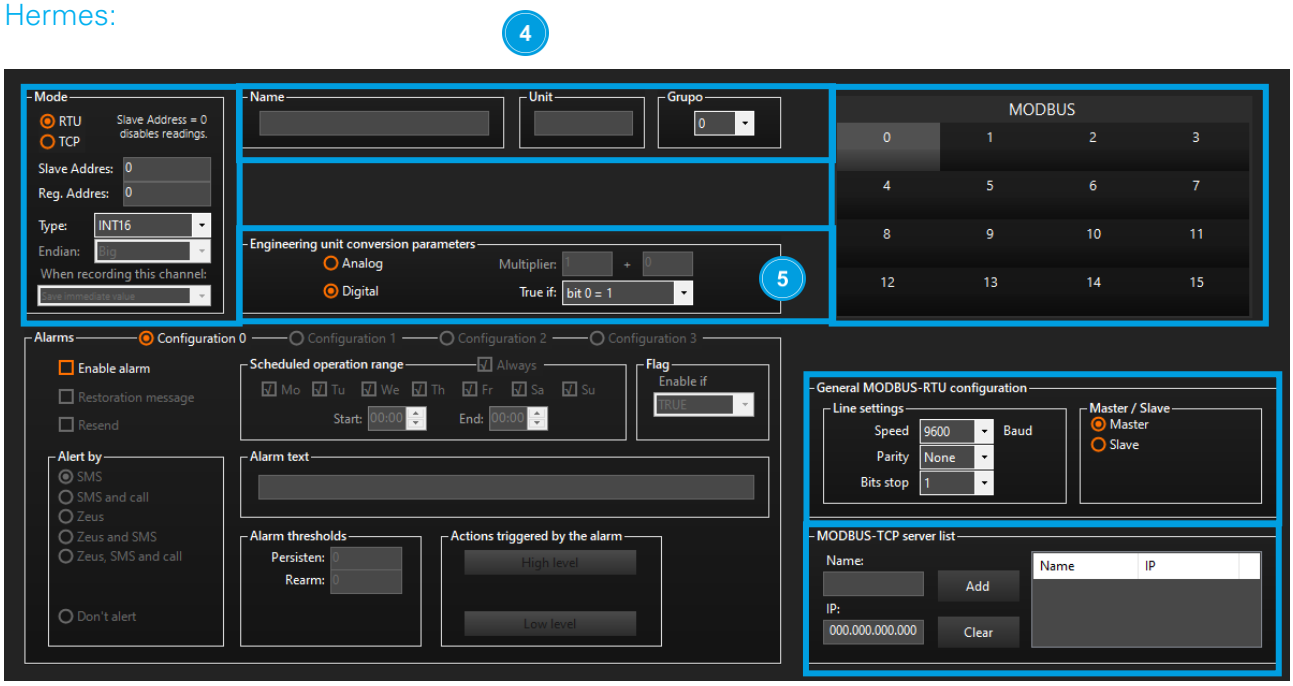
Figure 10-1. MODBUS communications diagram

MODBUS-TCP:

This is a variant of the MODBUS range that covers the use of MODBUS messaging in an "Intranet" or "Internet" environment using the TCP protocols

10.2 DESCRIPTION OF MODBUS RTU AND TCP FIELDS

Hermes:



Nemos:

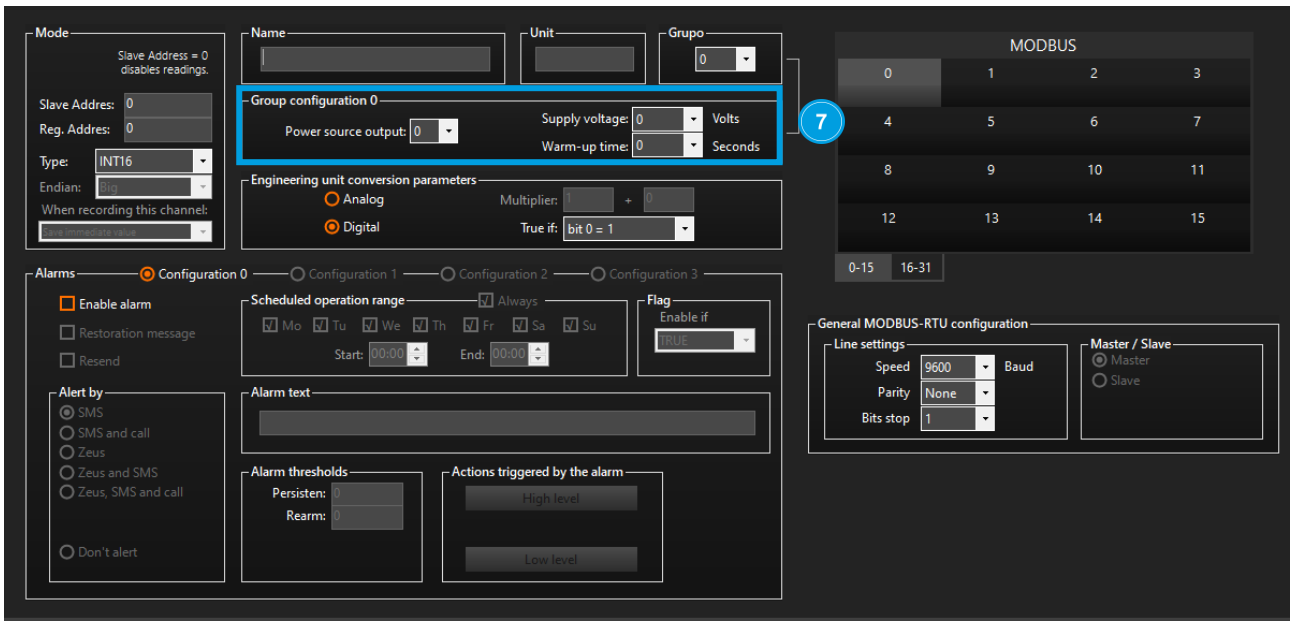


Figure 10-2. "Alarm by MODBUS channel" configuration details

Table 10-1. Alarm by MODBUS channel configuration

Item	Field	Description
1	MODBUS channel selection	Selects the MODBUS channel to be configured.
2	General MODBUS configuration.	Sets the serial parameters of the MODBUS interface Speed, Parity, Bits stop, Master or slave If set to slave, enter the "Slave Address" assigned to the slave device.

Figure 10-3. Details of the MODBUS configurations screen

Master mode: The device takes the reading of the configured MODBUS registers. Once the reading has taken place, the value is checked to see if it is within the nominal range, and if not, the corresponding alarm is sent

Slave mode: The device waits for the bus master device to read and write in its input logs. These values will be compared with the configured setpoint parameters. The corresponding alarm will be sent if these are exceeded.

The MODBUS module reading period is one second on Hermes devices and on demand on Nemos devices when the corresponding MODBUS channel reading/registration actions take place.

Enabled if the device is configured as a master.

MODBUS RTU/TCP selection (Client/Server) according to model.

TCP SERVER: Enable the channel in server mode.

3 Mode

Slave Address: (Only available in MODBUS-TCP) MODBUS device address with which you wish to interact.

0 is equivalent to disabling it.

Server: (Only available in MODBUS-TCP) Selection of the server with which you want to communicate. The server declaration is shown in point 6.

Reg. Address: Address of the MODBUS register with which you want to interact. Address (Reg. Address).

Type: Select data type. Available options:

Name	Description	Scope
INT16	Signed 16-bit integer (1 word)	-32768 ... +32.767
UINT16	Unsigned 16-bit integer (1 word)	0 ... 65.535
INT32	Signed 32-bit integer (2 words)	-2147483648 ... +2.147.483.647
UINT32	Unsigned 32-bit integer (2 words)	0 ... 4.294.967.295
Float	Number with floating point. 32-bit value (2 words)	-3,4028E+38 ... +3,4028E+38
Double	Number with floating point. 64-bit value (4 words)	-1.7E+308 ... 1.7E+308
MAG8000 TotalType	Configuration for Siemens MAG8000	Volume logged in totaliser
MAG8000 Date	Configuration for Siemens MAG8000	Date of latest sample

3 Mode (cont.)

Endian: Select the order of the tall word "BIG" and short word "LITTLE" in the supported types.

When registering this channel: In compatible models, the value of the signal to be logged can be adjusted based on the following three configurations:

- Save immediate value: Logs the measured value directly.
- Save average: Logs the average value of the instantaneous readings taken during the registration period.
- Save average, mín. max: Logs the minimum and maximum average value of the instantaneous readings taken during the registration period.

4 Configuration

Name: MODBUS channel name.

Unit: The unit in which the measured quantity is expressed.

Group: Group to which the MODBUS channel is assigned. All entries in a group are read or logged at once.

Set a cyclic timer if you want to register this group on a periodic basis. See Section 14.2

5 Engineering unit conversion parameters

Conversion parameters to engineering unit of the MODBUS variable. There are two modes of operation

Analogue: The MODBUS variable is treated as an analogue value.

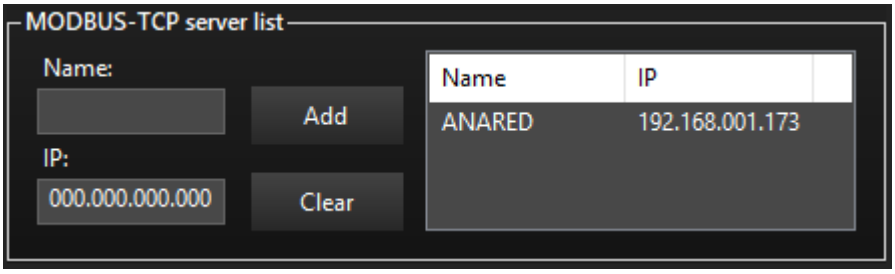
The MODBUS register can be converted to the engineering unit using the multiplier and the associated constant.

The value of the channel will be equal to the value of the register obtained by MODBUS multiplied by the "Multiplier" and added to the optional constant.

Digital: The MODBUS variable is treated as a digital value.

The mask allows you to define the position of the bit of interest.

- When selecting = 1: If the selected bit is at 1 the channel value will be 1.
- When selecting = 0: If the selected bit is at 0 the channel value will be 0.



Allows up to a maximum of 14 MODBUS-TCP servers to be declared.

Enter the name and IP and click on the "Add" button.

6 The "Delete" button allows servers to be deleted from the list

TCP server

This section is only available on models compatible with MODBUS-TCP.

The IP address must consist of four groups of three numbers separated by a full stop.

- Correct: 192.168.001.173
- Incorrect: 192.168.1.173

7 Group configuration

Defines the power characteristics of the MODBUS probes connected to the Nemos range of devices (N200+ and LP+).

Each group comprises one or more probes that will be powered simultaneously, specifying the output from which they will be powered, the excitation voltage, and the activation period prior to measurement (probe warm-up time).

10.3 EXAMPLE OF USE

An SMS alarm must be set for out-of-range voltage in a phase of the supply network. A network analyser will be used that provides the voltage in a 16-bit word expressed in 1/10 volt.

The alarm activation conditions are as follows:

Phase voltage ..... greater than 250 volts.

Phase voltage ..... less than 210 volts.

Type..... INT16.

Multiplier..... 0.1.

Configuration: Complete this configuration by filling in the fields as shown in Figure 10-4.

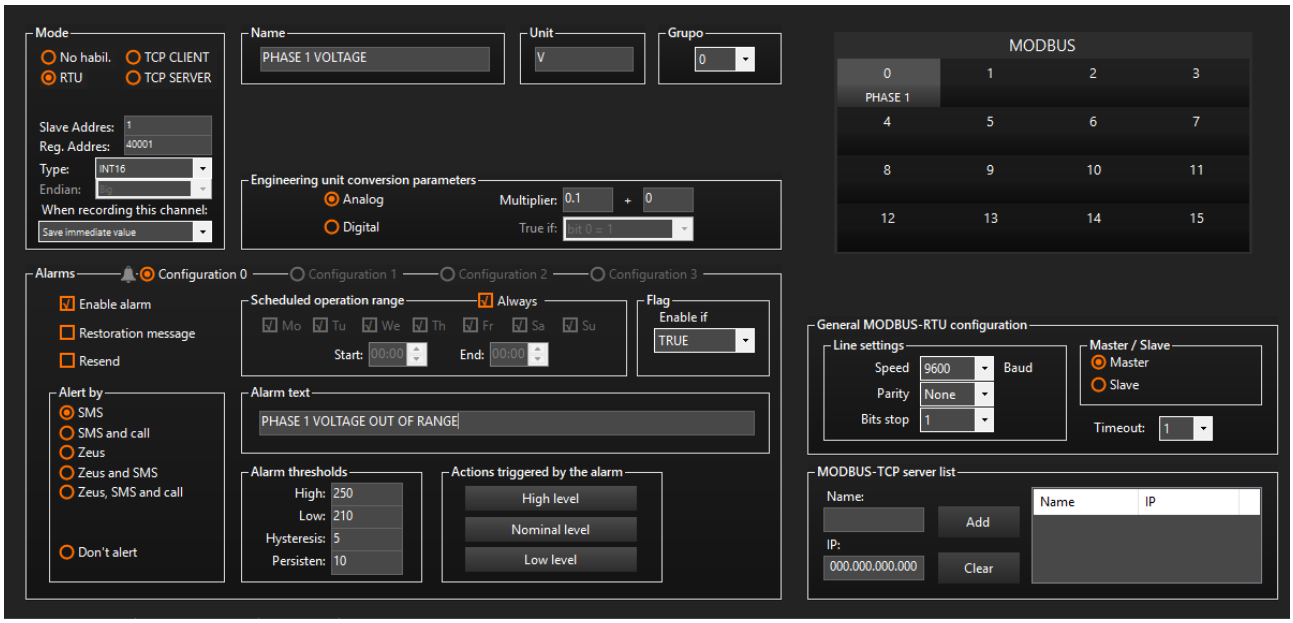
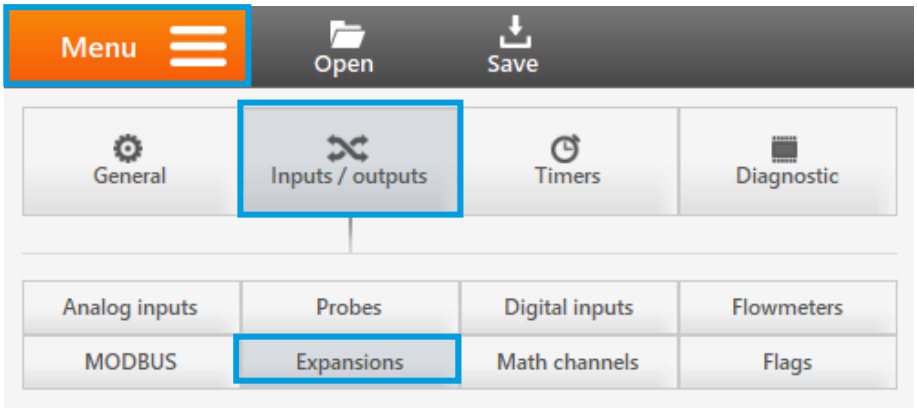


Figure 10-4. Example of "One alarm per MODBUS channel" configuration.

11 - EXPANSIONS

This interface allows you to configure the expansion modules of the Hermes M100 series.

Access:



Menu → Inputs and outputs → Expansions

The following expansion modules are available:

Table 11-1. Input modules.

Model	Description
Hermes M110	Module 8 digital inputs.
Hermes M120	Module with 4 analogue inputs (0-10 V or 4/20 mA).
Hermes M121	4-input module for PT100 probe.
Hermes M130	Module with 6 analogue outputs
Hermes M140	Module with 4 analogue outputs (4/20 mA).

11.1 GENERAL INFORMATION

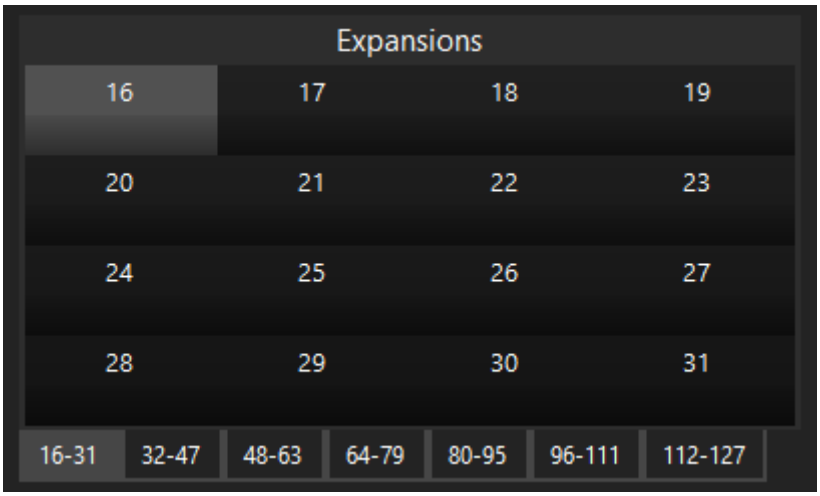


Figure 11-1. Details of the selection of the expansion to be configured.

Table 11-2. Expansion channel selector

Field	Description
Expansions channel selection to be used	Selects the channel in which the expansion module data will be registered.

NOTE Hermes M102/M103

Hermes M102 and M103 devices are compatible with expansion modules and any device with a MODBUS interface simultaneously.

In this case, you can choose the number of channels available to the expansion modules and the MODBUS interface.

Sixteen channels are assigned by default for MODBUS devices and 112 for expansion modules. See Section 18.

Figure 11-2. Details of the expansion configuration selection.

Table 11-3. Expansion screen fields.

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Mode</td><td>Enables the use of the expansion module and configures its operation mode.

Each expansion channel can be configured in different modes:

<table>
<tr><th>Mode</th><th>Reading</th><th>Writing</th><th>Compatibility</th></tr>
<tr><td>Digital Input</td><td>Logical value</td><td>-</td><td>Hermes M110</td></tr>
<tr><td>Flowmeter</td><td>Pulses per time unit</td><td>-</td><td>Hermes M110</td></tr>
<tr><td>Counter</td><td>Totaliser counter</td><td>-</td><td>Hermes M110</td></tr>
<tr><td>Analogue input</td><td>Analogue value</td><td>-</td><td>Hermes M120</td></tr>
<tr><td>Digital output</td><td>-</td><td>Logical value</td><td>Hermes M130</td></tr>
<tr><td>PT100 probe</td><td>Analogue value</td><td></td><td>Hermes M121</td></tr>
<tr><td>Analogue output</td><td>-</td><td>Analogue value</td><td>Hermes M140</td></tr>
</table></td></tr>
<tr><td>Address</td><td>Address of the expansion module (selected with the dial) that this channel belongs to.

 
</td></tr>
<tr><td>Input/output:</td><td>Input/output number of the expansion module you wish to assign to the channel.</td></tr>
<tr><td>Group</td><td>Expansion channel group to which this channel is associated.

Must be referenced to register this channel in the history.</td></tr>
</table>

11.2 CONFIGURATION - DIGITAL INPUT MODE EXPANSION

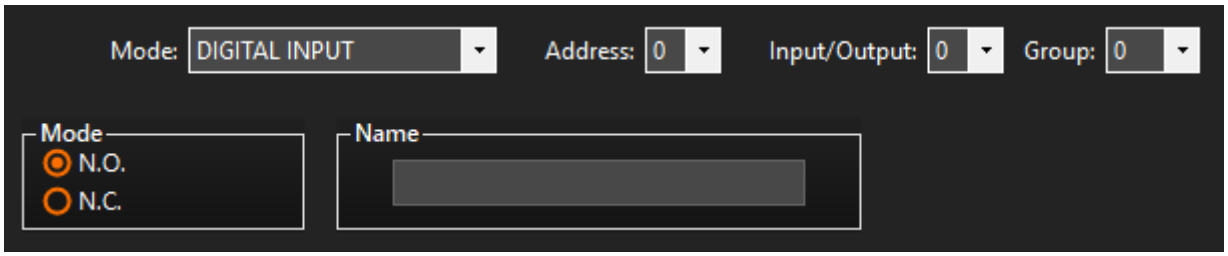


Figure 11-3. Details of "Digital input mode expansions" configuration.

Table 11-4. "Digital input mode expansions" configuration interface

Field	Description
Mode	Digital input operating mode. N.O. Normally open N.C. Normally closed.
Name	Digital signal name.

11.3 DIGITAL INPUT MODE EXPANSION - EXAMPLE OF USE

A SMS alarm needs to be configured whenever a digital input is activated that indicates a network failure. The digital input is located at input number 7 of the module with address 4.

The alarm activation conditions are as follows:

Digital input..... activated.

Persistence ..... 300 seconds.

Configuration: Complete this configuration by filling in the fields as shown in Figure 11-4.

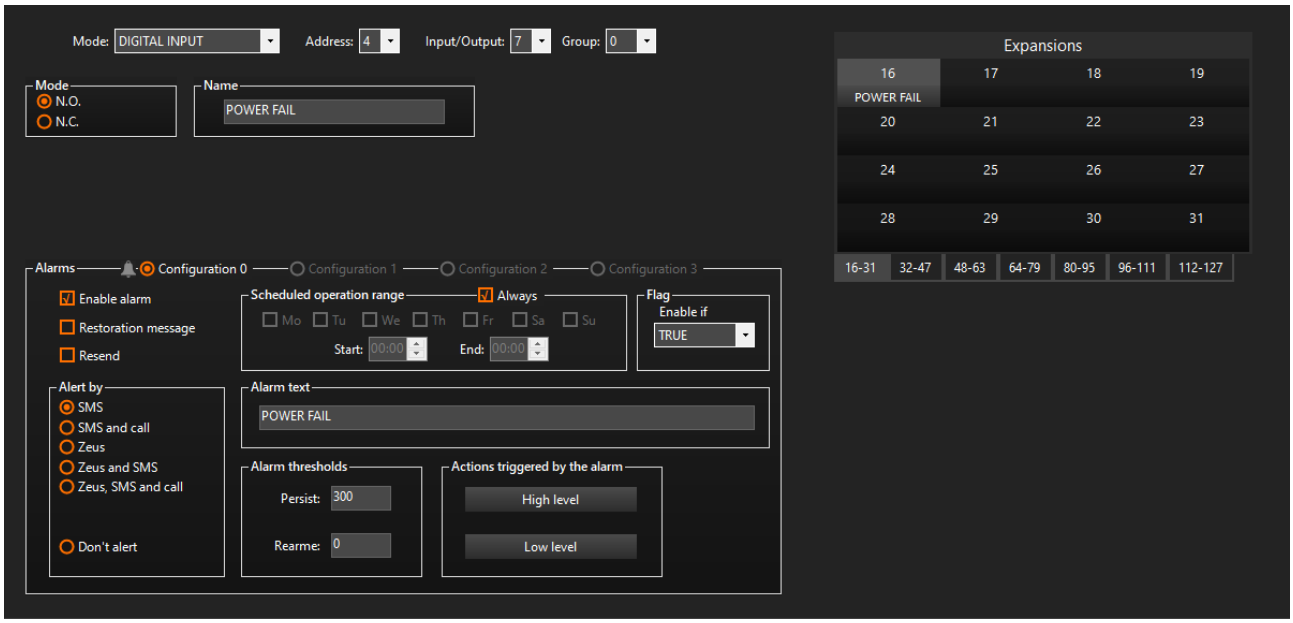


Figure 11-4. Example of "One alarm per expansion channel" configuration

11.4 CONFIGURATION - FLOWMETER MODE EXPANSION

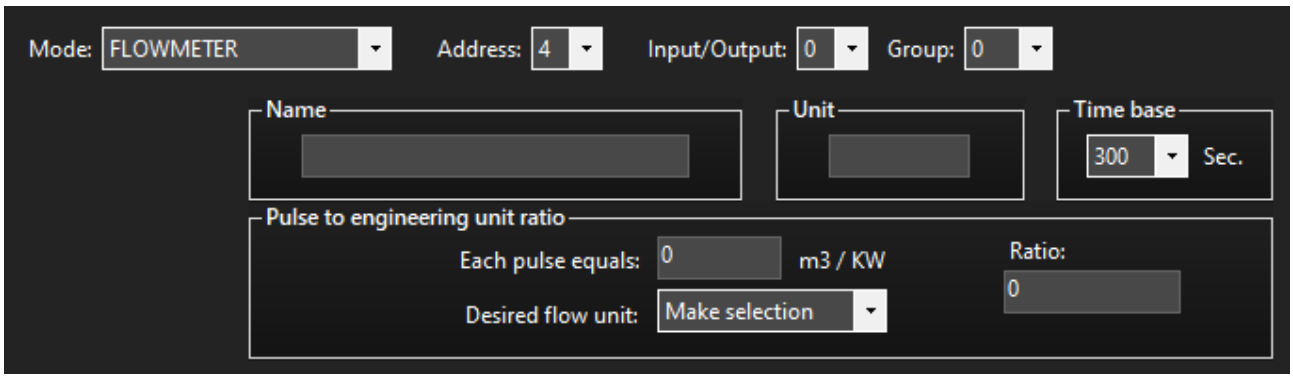
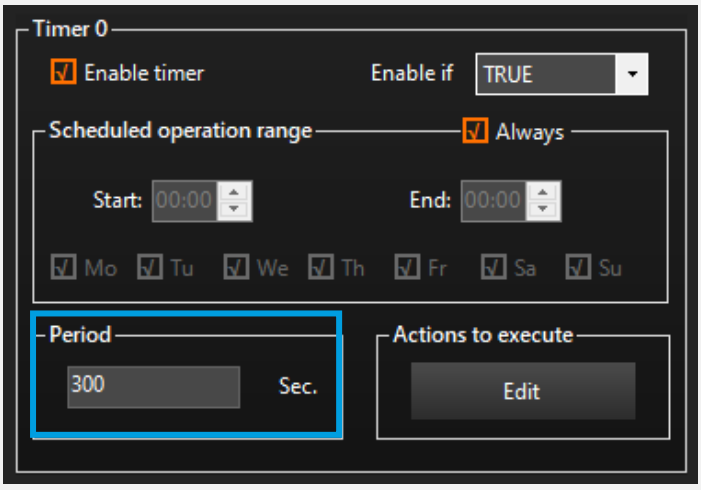
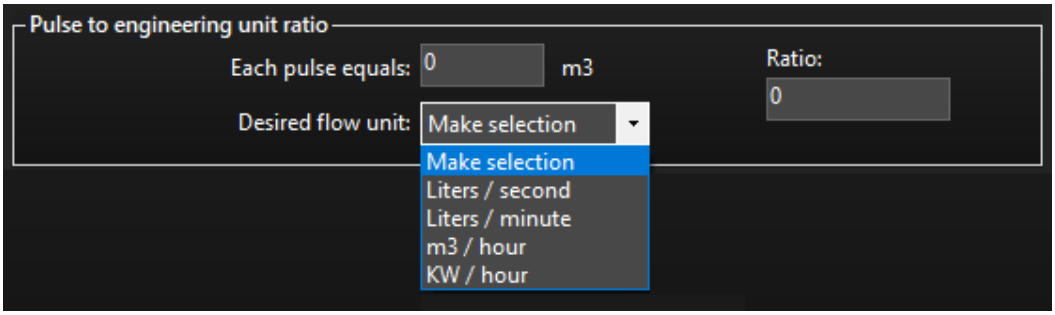


Figure 11-5. "Flowmeter mode expansions" configuration interface details.

Table 11-5. "Flowmeter mode expansions" configuration interface.

Field	Description
	Name: Flowmeter name. Unit: Unit in which flow rate is expressed. Time frame: Time period, in seconds, during which the received pulses are counted before calculating the flow rate (typical time base values: from 300 to 900 seconds).
Configuration	A cyclic counter must be used to register the flowmeter data, stating the same time period configured in the "Time Base" section. 

Field	Description
Pulse – engineering unit equivalence	Flowmeter technical specifications. Allows the pulse/time ratio to be set to the desired engineering unit.  Each pulse equals: This indicates the number of cubic meters (m^3) that the flowmeter logs for each pulse. The flow rate should be expressed in: Unit of measurement in which the information will be received Coefficient: Shows the relationship between the flow rate measured per pulse and the unit of measurement in which the flow rate will be expressed. This text box is automatically filled in.

11.5 FLOWMETER MODE EXPANSION - EXAMPLE OF USE

A SMS alarm must be configured to activate a high flow value. No alarm will be sent for low flow in this case. We wish to use a flowmeter with a pulse output, with a pulse weight of 1 litre and wish to determine the flow rate in l/s. The flowmeter is connected to input 7 of the module with address 4.

The alarm activation conditions are as follows:

High flow alarm..... > 5 l/s.

Low flow alarm ..... < 0 l/s.

Hysteresis..... 0,5 m.

Persistence .....3 reading cycle.

Configuration: Complete this configuration by filling in the fields as shown in Figure 11-6.

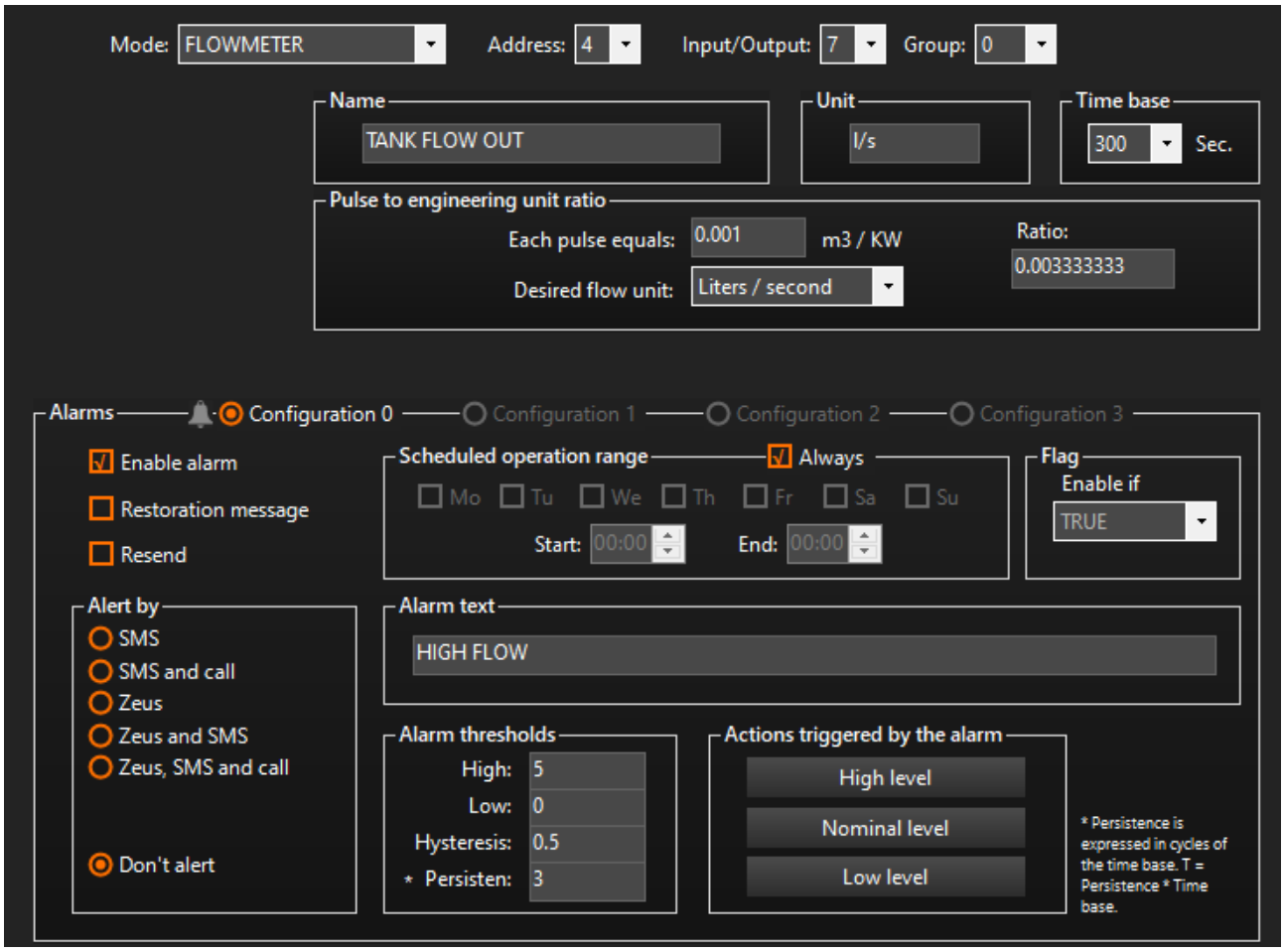


Figure 11-6. Example of "One alarm per expansion channel" configuration

11.6 CONFIGURATION - COUNTER MODE EXPANSION

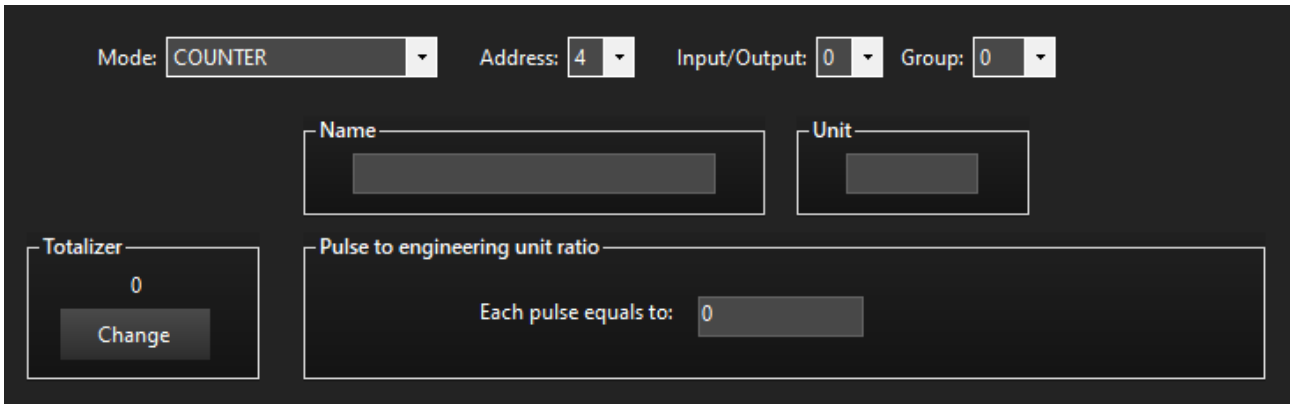


Figure 11-7. "Counter mode expansions" configuration details.

Table 11-6. "Counter mode expansions" configuration interface.

Field	Description
Name	Assigns a name to the counter
Unit	The unit in which the measured quantity is expressed.
Pulse – engineering unit equivalence.	Indicates the number of cubic meters (m^3) that the flowmeter logs in each pulse.
Totaliser	Counter start value.
Change	Initialises the totaliser to the desired value.

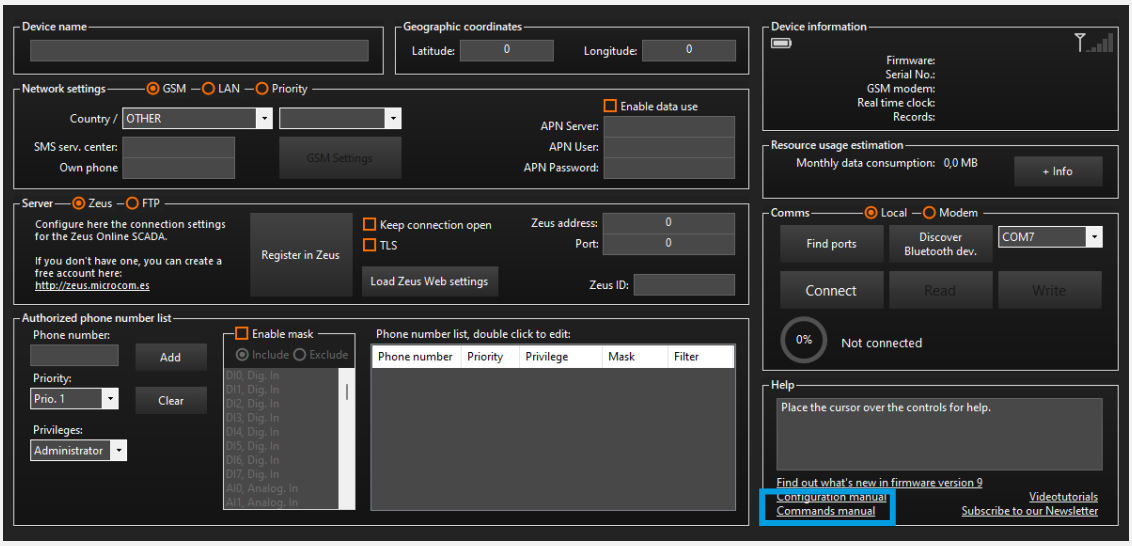
There must be a connection to the device via USB or Bluetooth to change the totaliser value.

The totaliser value can be initialized by SMS or via Zeus Web using the following command:

EXPx = yyyyy

Where x is the totaliser number and yyyyy is the number of cubic metres logged at that time.

You can consult the command manual at www.microcom360.com. or in the configuration software general menu.



11.7 COUNTER MODE EXPANSION - EXAMPLE OF USE

An expansion channel must be configured to read a flow signal and obtain the accumulated flow. The flowmeter is connected to input 7 of the module with address 4. The Pulse - Engineering Unit equivalence has been configured, assuming a flowmeter with one pulse per litre for the totaliser to be expressed in m^3.

When a flowmeter and counter are configured in the expansion channels, the address and input selected in both cases will be the same. Both expansion channels would be configured for input 7 of the module with address 4 in this case.

Configuration: Complete this configuration by filling in the fields as shown in the image below.

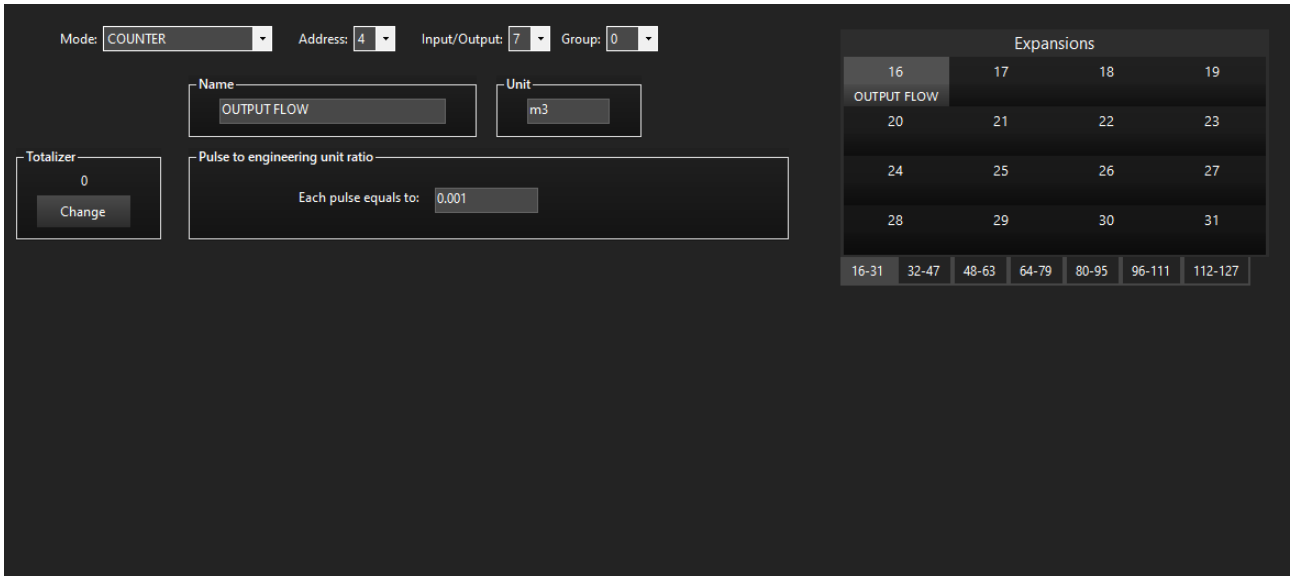


Figure 11-8. Example of "A counter" configuration

11.8 CONFIGURATION - ANALOGUE INPUT MODE EXPANSION

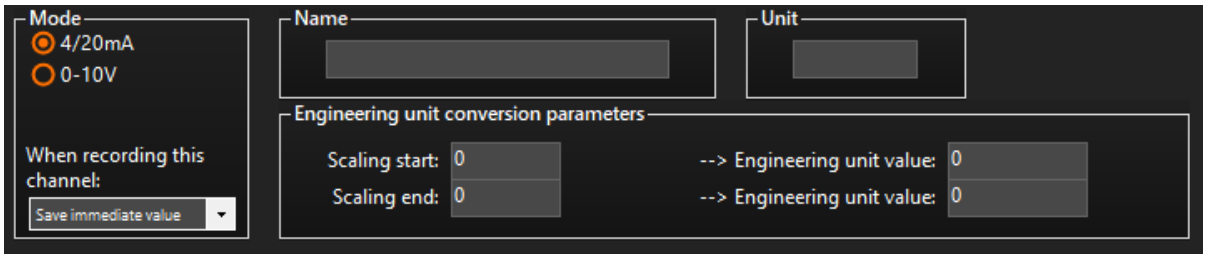


Figure 11-9. "Analogue input mode expansions" configuration details.

Table 11-7. "Counter mode expansions" configuration interface.

Field	Description
Mode	Allows you to configure the nature of the signal (4/20mA or 0-10V). Disconnect the corresponding jumper by removing the front of the Hermes M120 for the 0-10V operating mode. The signal value to be logged based on the following three configurations: Save immediate value: Logs the measured value directly. Save average: Logs the average value of the instantaneous readings taken during the registration period. Save average, mín. max: Logs the minimum and maximum average value of the instantaneous readings taken during the registration period.
Name	Analogue input name.
Unit	The unit in which the measured quantity is expressed.
Engineering unit conversion parameters	Engineering unit conversion parameters for analogue probes. The "Start scale" and "Full scale" parameters link the analogue input value in volts or milliamperes with the real value of the physical quantity measured at both points. The device linearly interpolates the value of the measured quantity between both points.

11.9 ANALOGUE INPUT MODE EXPANSION - EXAMPLE OF USE

An SMS alarm needs to be set for an out-of-range temperature. The probe is located at input number 1 of the module with address 4. An analogue temperature probe will be used that provides 4 mA in the loop for temperatures of -20°C and 20 mA for 70°C

The alarm activation conditions are as follows:

High temperature..... > 25 °C.

Low temperature ..... < 18 °C.

Hysteresis.....1 °C

Persistence ..... 300 seconds.

Configuration: Complete this configuration by filling in the fields as shown in the image below.

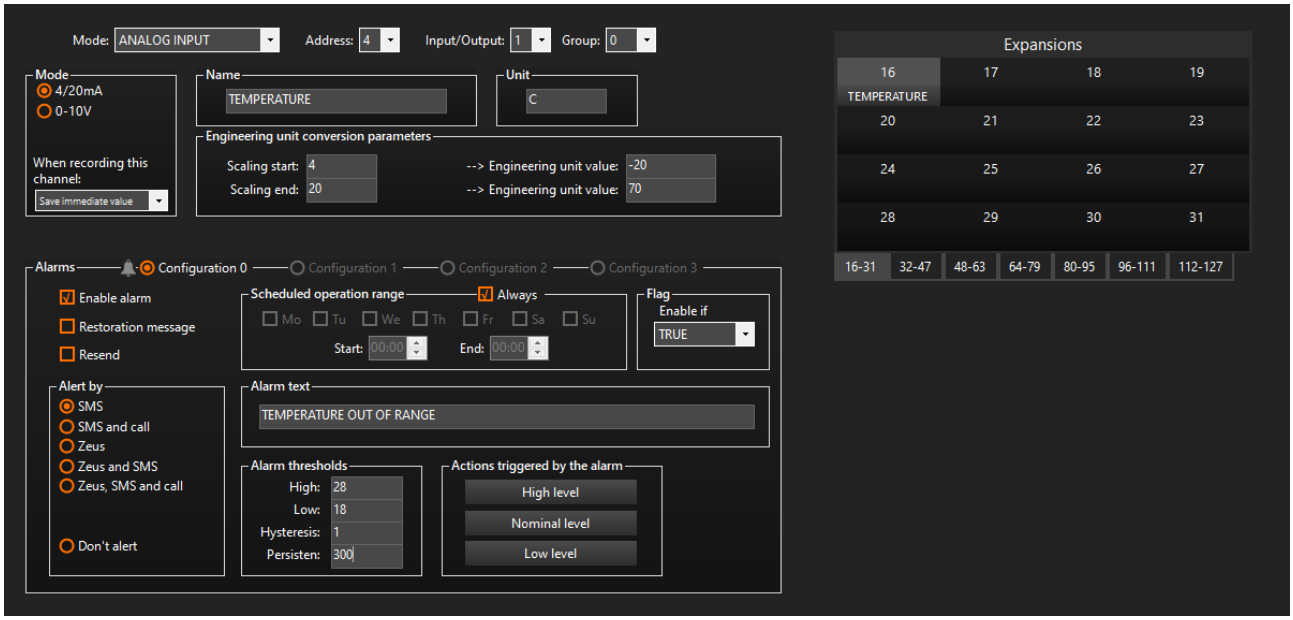


Figure 11-10. Details of "Analogue input mode expansions" configuration example.

11.10 CONFIGURATION - DIGITAL OUTPUT MODE EXPANSION

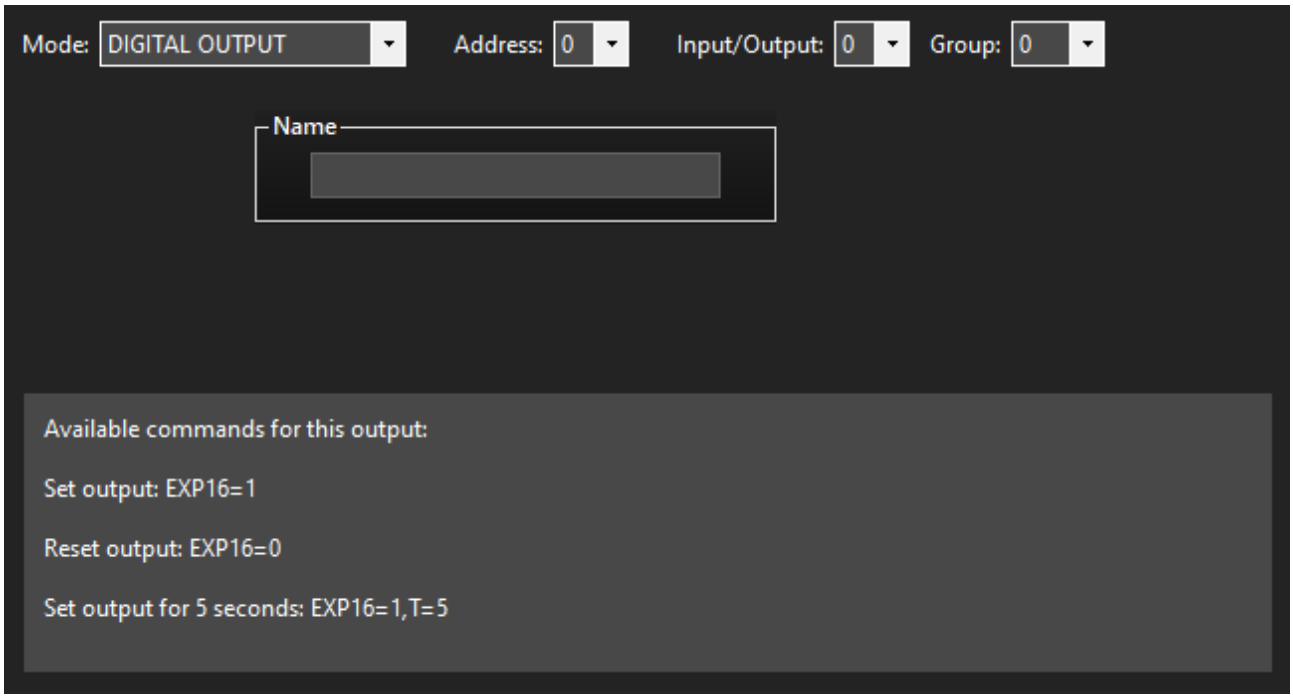


Figure 11-11. "Digital output mode expansions" configuration details.

Table 11-8. "Digital output mode expansions" configuration interface.

Field	Description
Name	Digital output name.

11.11 DIGITAL OUTPUT MODE EXPANSION - EXAMPLE OF USE

Configuration of an expansion channel to activate a digital output. The output is connected to input 1 of the module with address 4.

Configuration: Fill in the fields as shown in the following figure to complete this configuration

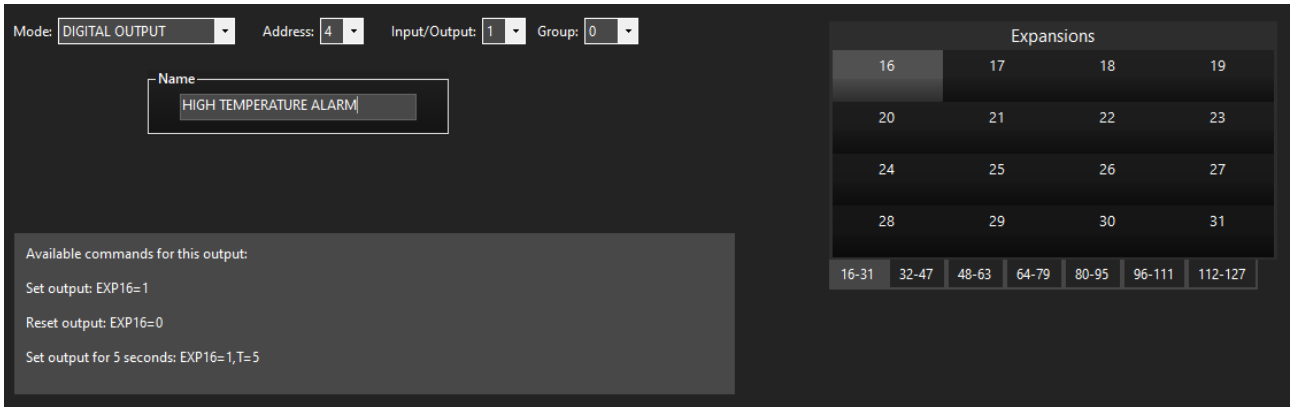


Figure 11-12. Example of digital output configuration in expansion channel.

The commands to be used in this configuration for the activation and deactivation of the output are EXP16=1 and EXP16=0.

11.12 CONFIGURATION-PT100 PROBE MODE EXPANSION

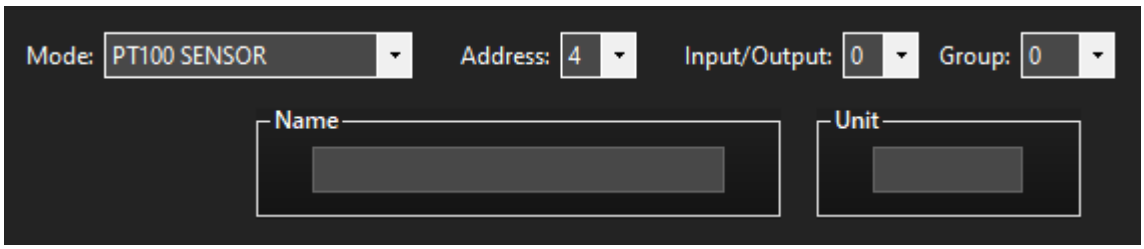


Figure 11-13. "Expansions in PT100 mode" configuration details.

Table 11-9. "PT100 mode expansions" configuration interface.

Field	Description
Name	Sets the name of the expansion channel.
Unit	The unit in which the measured quantity is expressed.

11.13 PT100 PROBE MODE EXPANSION - EXAMPLE OF USE

An SMS alarm needs to be set for an out-of-range temperature. The probe is located at input number 1 of the module with address 4. A PT100 temperature probe will be used.

The alarm activation conditions are as follows:

High temperature..... > 40 °C.

Low temperature ..... < 5 °C.

Hysteresis.....1 °C

Persistence ..... 300 seconds.

Configuration: Complete this configuration by filling in the fields as shown in Figure 11-14.

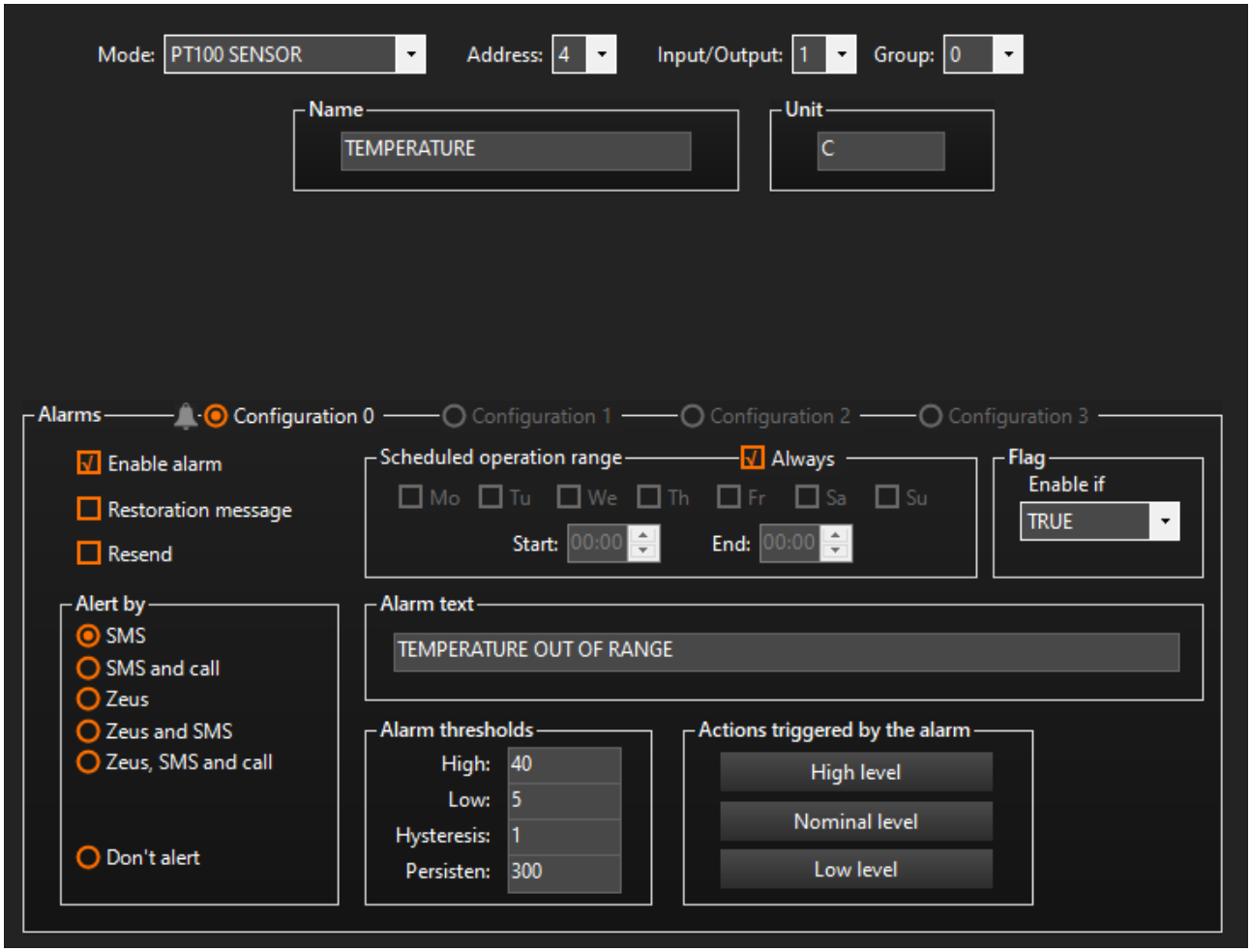


Figure 11-14. Example of PT100 probe configuration in Expansion channel.

11.14 CONFIGURATION - ANALOGUE OUTPUT MODE EXPANSION

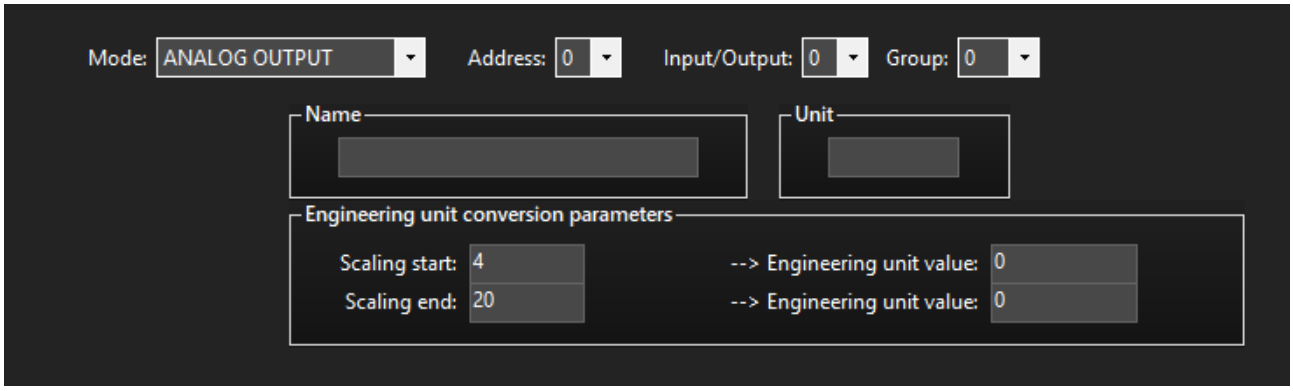


Figure 11-15. "Analogue output mode expansions" configuration details.

Table 11-10. "Analogue output mode expansions" configuration interface.

Field	Description
Name	Sets the name of the expansion channel.
Unit	The unit in which the measured quantity is expressed.
Equivalence in engineering unit	The "Start scale" and "Full scale" parameters link the analogue output value in milliamperes with the real value of the physical quantity measured at both points. The device linearly interpolates the value of the measured quantity between both points.

11.15 ANALOGUE OUTPUT MODE EXPANSION - EXAMPLE OF USE

Configuring an analogue output expansion channel to generate the control setpoint for a gate.

Configuration: Fill in the fields as shown in the following figure to complete this configuration

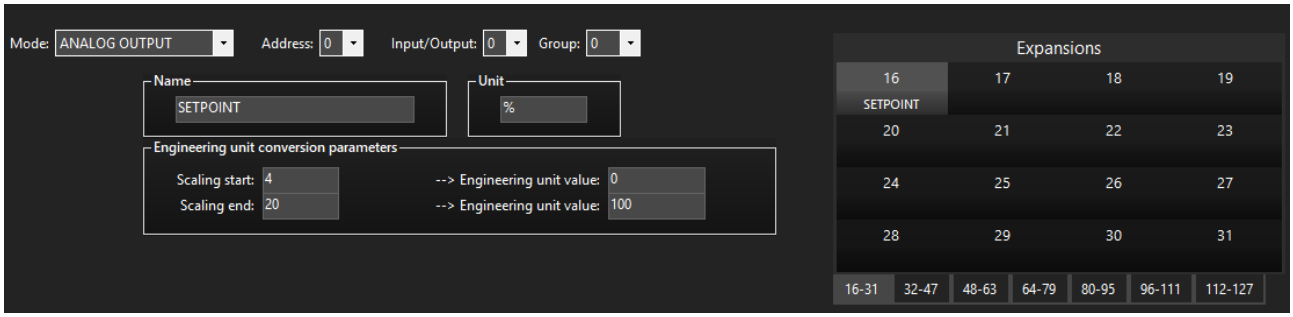


Figure 11-16. Example of analogue output configuration in Expansion channel.

The following is the command to change the gate setpoint: EXP16=*SETPOINT*. For example: EXP16=43 (the output will take the value in mA corresponding to 43% of the opening).

12 - FLAGS

Microcom devices have a set of 32 memories that can contain a binary value, i.e., 0 or 1. These memories, which we refer to as 'flags', offer the following features:

Condition the enabling of alarms: All alarm configurations include the "Enable if" option that allows the enabling of the alarm to be linked to the status of a flag.

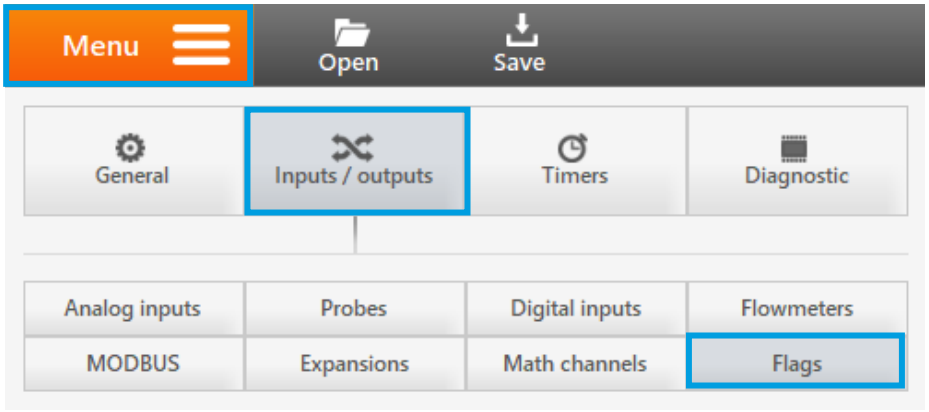
Conditioning the enabling of alarms: Cyclic timers include the "Enable if" option that allows the enabling of the timer to be linked to the status of a flag.

Creation of alarms: Alarms can be created based on the value of a flag. This option is available for flags 0 to 15 and is described below.

The "Macros" screen allows you to declare an equation that defines the behaviour of the flag, e.g., the activation of two digital inputs. See Section 15.

The value of the flags can be set as a result of an alarm, from a timer, from MicroPLC-II or with the commands "Fx=y" where x is the index of the flag and y the value to be loaded, 0 or 1

Access:



Menu → Inputs and outputs → Flags

12.1 FIELD DESCRIPTION

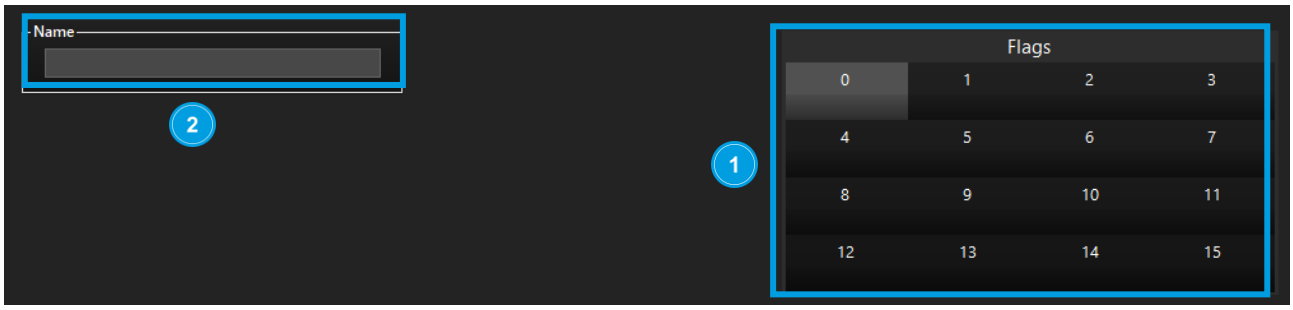


Figure 12-1. "Pressure probe configuration" interface details.

Table 12-1. "Pressure probe configuration" interface.

Item	Field	Description
1	Flag selection	Index of the flag to be configured.
2	Name	Flag name.

12.2 EXAMPLE OF USE WITH EQUATIONS

A SMS alarm must be configured to activate a Flag. The condition for the Flag turning on, in turn, is the simultaneous activation of two digital inputs.

The alarm activation conditions are as follows:

Digital inputs ..... 0 and 1 activated at the same time.

Persistence ..... 10 seconds.

Reset ..... 0 seconds.

Configuration:

1. Create the equation associated with the Flag from the Macros form.
2. In this form, enter the equation in the "Command" field. In this case take the form DI0&DI1, performing the and function from the digital inputs 0 and 1.
3. The new equation is registered once the "Add Equation" button has been clicked.

The "&" and DIx operators are used to define the equation.

The first one performs the logical and function, while the second one returns the value of the specified digital input. See the full list of operators in Section 24

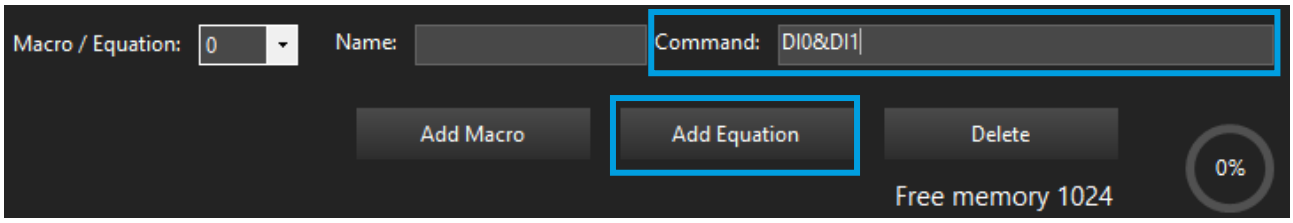


Figure 12-2. Example of "Flag activation equation" configuration

Figure 12-3. Details of "Flag activation equation" configuration

4. Configure flag 0 in order to generate the corresponding alarm from the Flags form. See Figure 12-4.

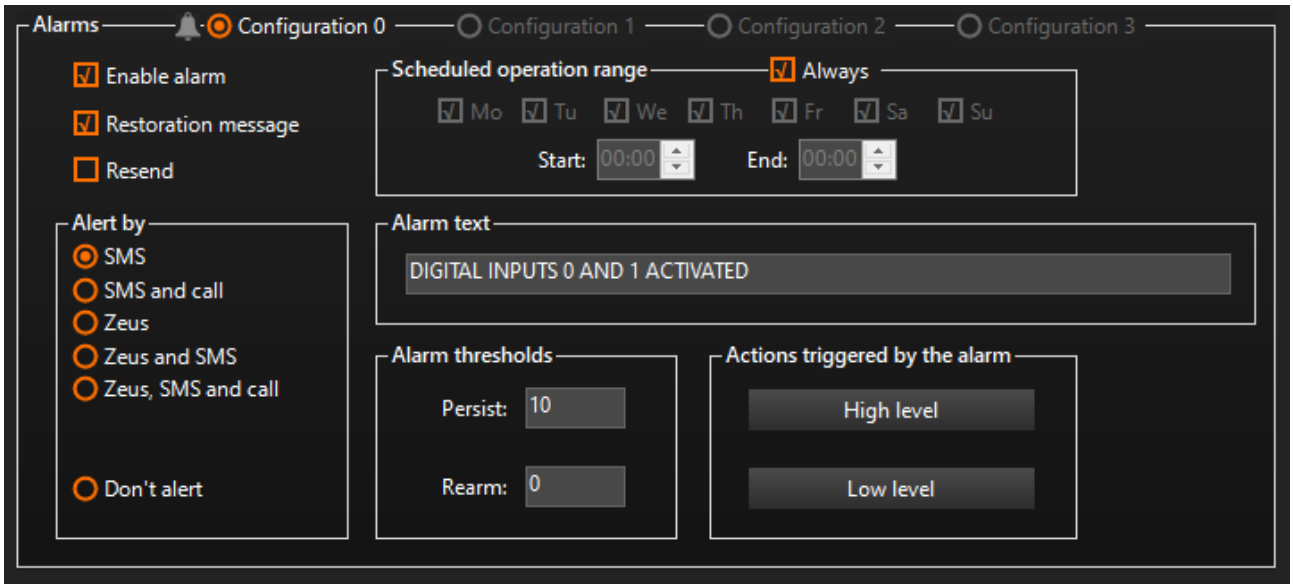


Figure 12-4. Example of alarm configuration based on Flag activation

12.3 EXAMPLE OF USE WITH ACTIONS

The Hermes or Nemos configuration often requires a flag to be activated when a digital input is activated or when an analogue input exceeds a certain value. One example of this is in spillway applications, where a flag is activated when the capacitive probe (digital input) is activated, which, in turn, enables a cyclic timer for the swift registration of the level signal.

The alarm activation conditions are as follows:

Digital input.....0 is activated (high level).

Persistence ..... 10 seconds.

Reset ..... 1 seconds.

Alarms ..... Do not send alarm.

Configuration:

1. Access the "digital inputs" form.
2. Select operating mode.
3. Add a name.
4. Configure one alarm per high level, according to the activation conditions described. Complete this configuration by filling in the fields as shown in the image below.

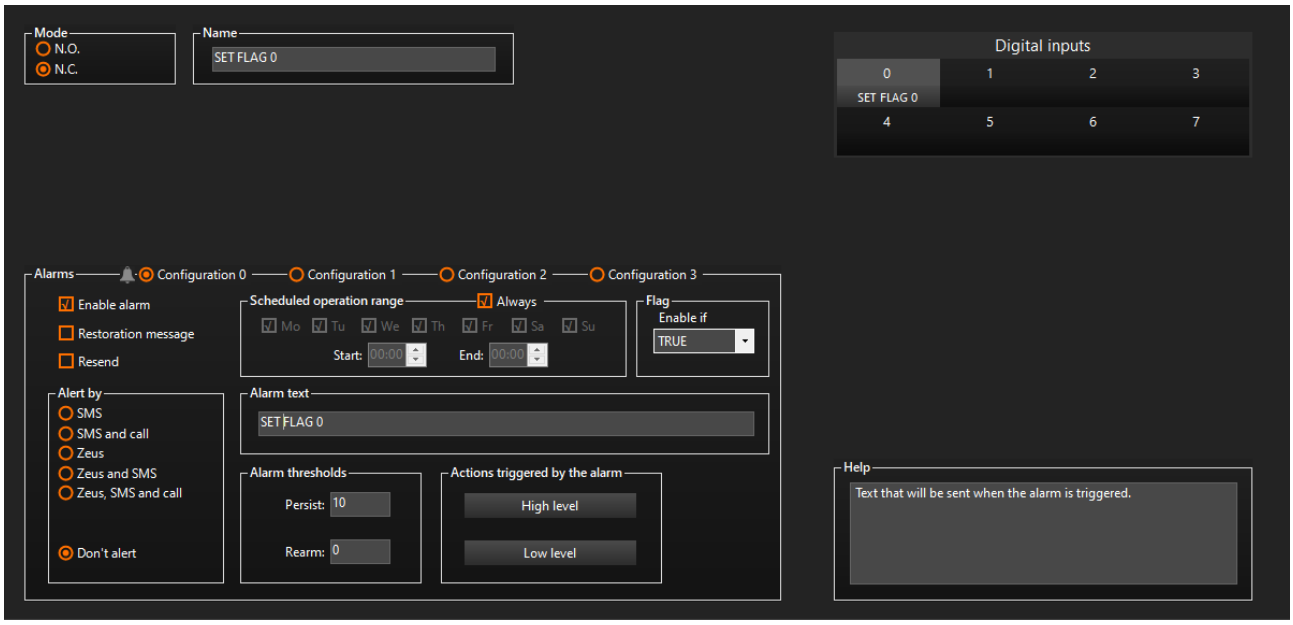
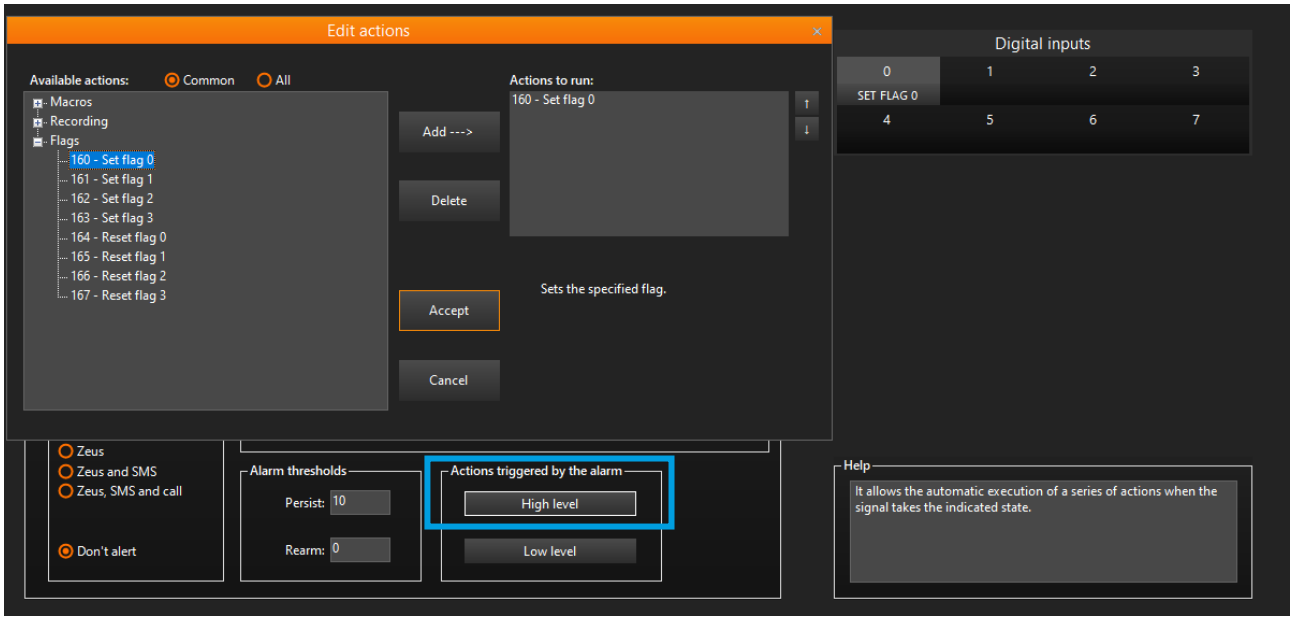
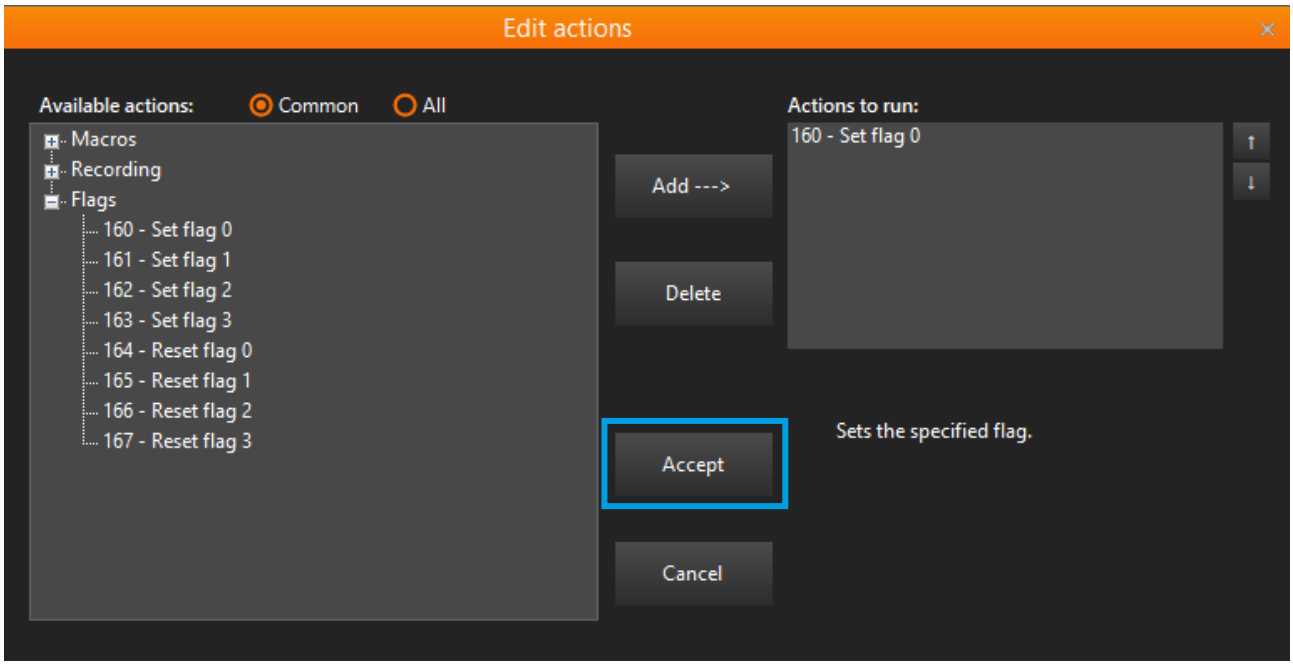


Figure 12-5. Example "Configure Flags"

5. Configure the action: "160 – Activate Flag 0" in actions to be executed by alarm: high level



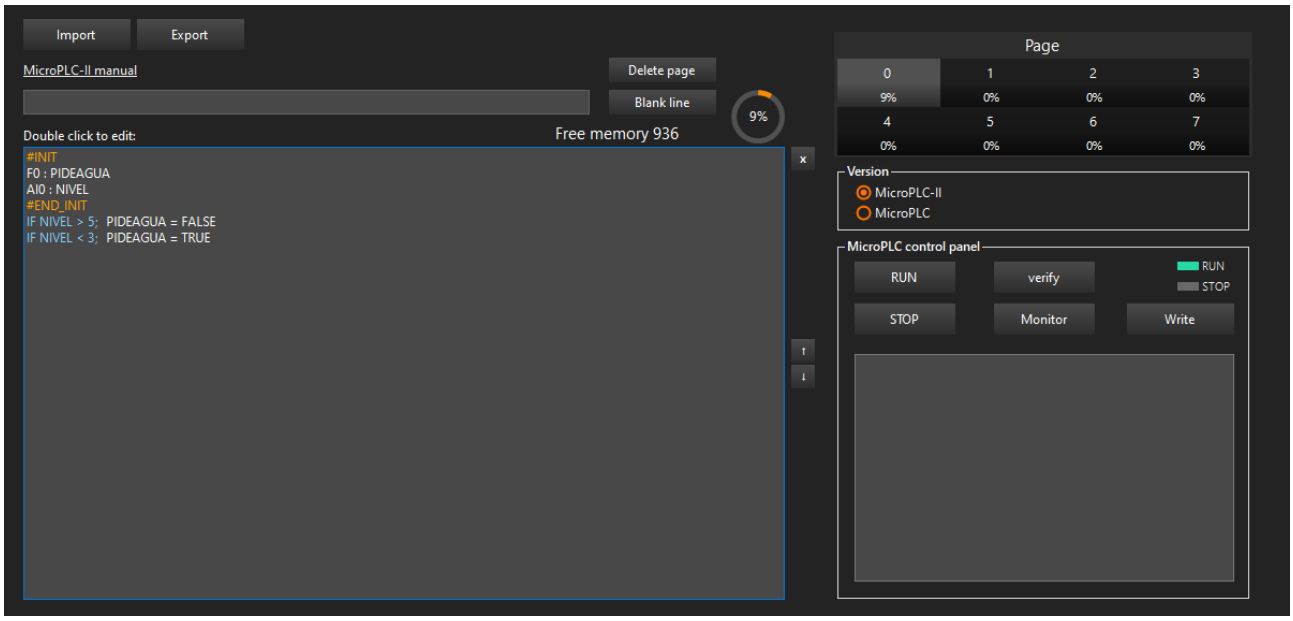
6. Click the "Accept" button



12.4 EXAMPLE OF USE WITH MICROPLC

A flag must be activated indicating the need to turn on a pump

Flag 0 is declared assigning the name “PIDEAGUA”.
Analogue input 0 is declared assigning the name “Level”.
The logic is implemented for the flag to be activated with levels lower than 3 and deactivated for levels higher than 5.



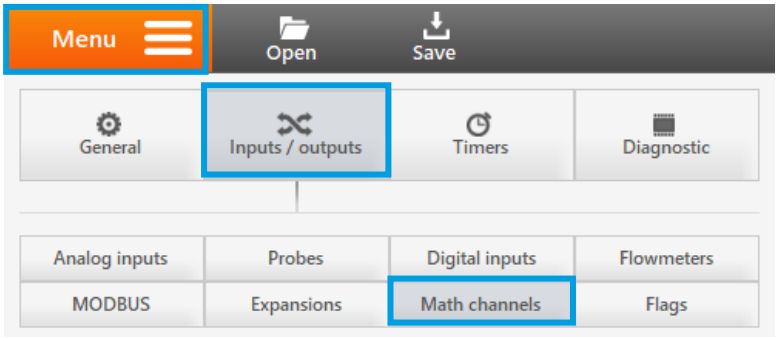
For further information about MicroPLC programming, See Section 16.

13 - MATH CHANNELS

Math channels are virtual channels whose value is the result of an equation that links one or more physical channels.

The list of available operators, including mathematical and logical operations, as well as operators returning the readings of the physical channels of the device, can be consulted in Section 24.

Access:



Menu → Inputs and outputs → Math C.

The most useful applications of math channels include the following:

The conversion of signals from non-linear sensors.

The calculation of quantities resulting from two or more physical measurements.

Registration/sending of internal variables to Zeus.

Hermes: Math channels readings are taken automatically once per second starting from the firmware version 9. A timer must be set to register these readings.

Nemos: The reading and registration of the math channels is done on demand. A timer must be set to perform these readings and registrations.

13.1 FIELD DESCRIPTION

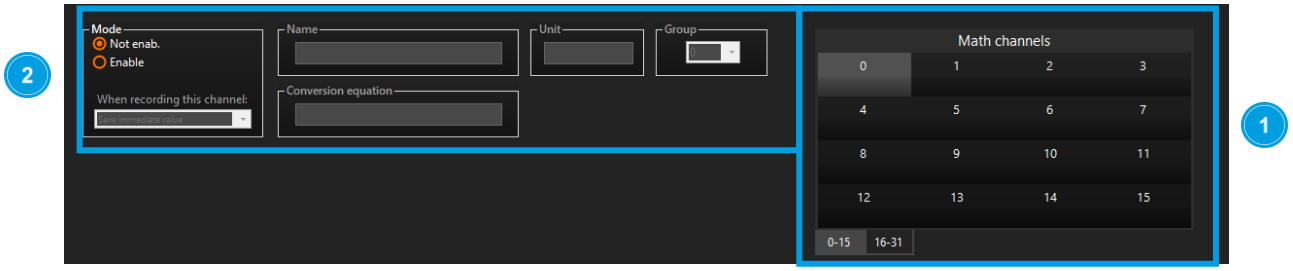


Figure 13-1. "Math channels configuration" interface details.

Table 13-1. "Math channels configuration" interface.

Item	Field	Description
1	Math channel selection	Index of the math channel to be configured.
2	Mode	Enables/inhibits the math channel. When registering this channel: In compatible models, the value of the signal to be logged can be adjusted based on the following three configurations: Save immediate value: Logs the measured value directly. Save average: Logs the average value of the instantaneous readings taken during the registration period. Save average, mín. max: Logs the minimum and maximum average value of the instantaneous readings taken during the registration period. Nemos: Set a timer for the Save Average and Save Average, Min and Max options, to take intermediate channel readings.
2	Name	Math channel name
2	Unit	The unit in which the measured quantity is expressed.
2	Group	Group to which the math channel is associated. All entries in a group are read or logged at once. Set a cyclic timer if you wish to register this signal or group on a periodic basis. See Section 14.2 Math channels 0-15 can be logged in groups or individually. They are logged in groups from 16 onwards.
2	Conversion equation	Sets the equation that defines the behaviour of the Math channel. See Section 24 for available operators.

13.2 EXAMPLE OF USE

Configuration of a math channel to obtain the percentage of filling of a water tank based on:

- A variable value: Water level height (analogue input 0)
- A fixed value: Maximum tank height (6 metres).

The alarm activation conditions are as follows:

Math Channel ..... Channel 0.

Mode .....Enabled.

Name .....Percentage filled.

Unit .....%.

Group..... 0.

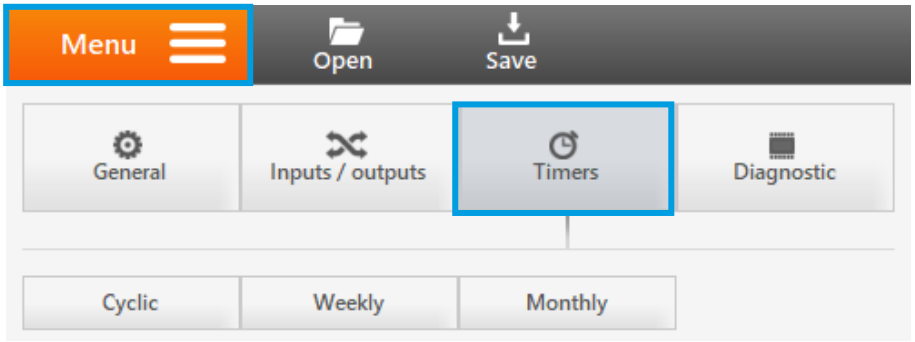
Conversion equation ..... (AI0/6)*100.

Figure 13-2. Example of a "Math channel" configuration

14 - TIMERS

Microcom devices feature a full set of timers. The use of cyclic, weekly or monthly timers will depend on the time range and functionality to be covered.

Access:



Menu → Timers

14.1 GENERAL INFORMATION

Common aspects in all timers:

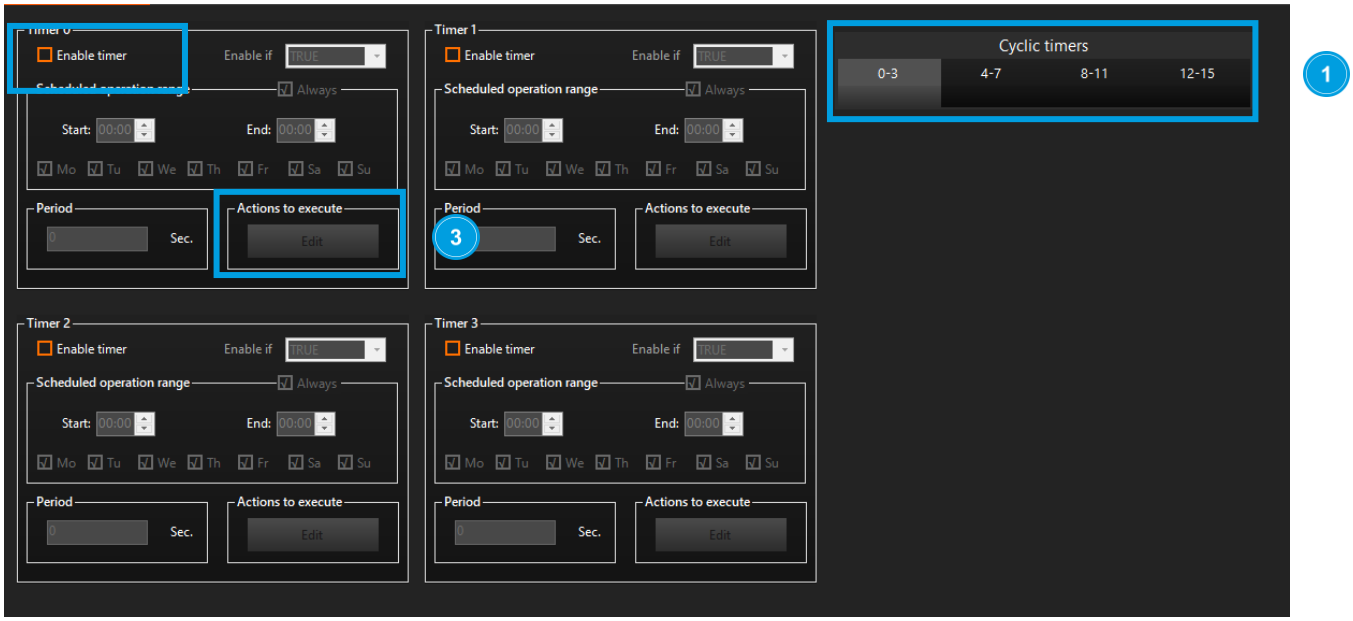
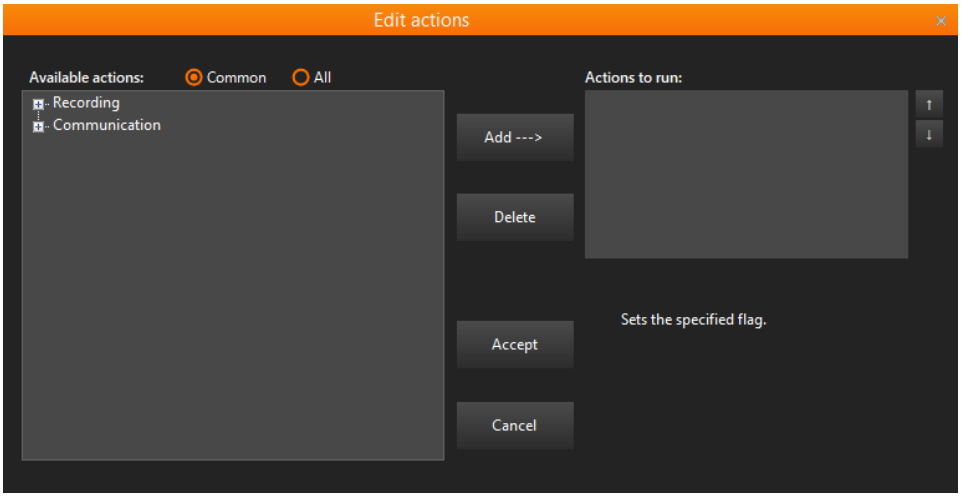


Figure 14-1. "Timer configuration" general screen.

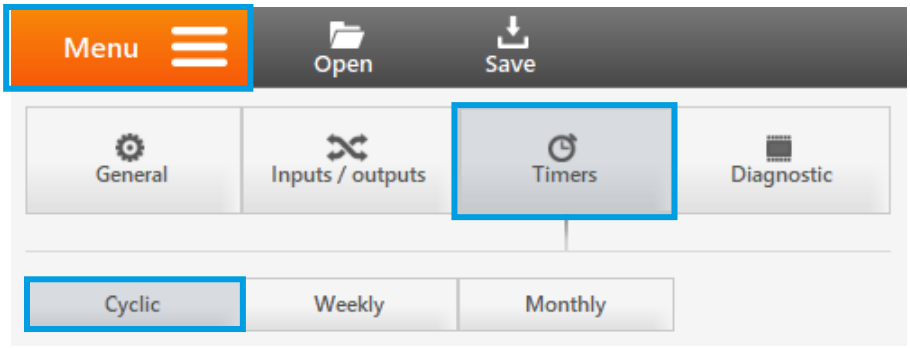
Table 14-1. "Timer configuration" interface.

Item	Field	Description
1	Time selection	Selector for time to be configured. There are 16 instances for each timer type.
2	Enable the timer	Enables the use of this timer.
3	Actions to take place	Allows you to select a list of up to 8 actions, which will be performed upon completion of the activation time period. These 8 actions will take place in the configured order. The availability of these options depends on the device used. The actions are divided into two groups: Common and All.  See Section 23 to find out the available actions.

14.2 CYCLIC TIMERS

Interface that allows you to configure cyclic timers. These operate on a regular basis.

Access:



Menu → Timers → Cyclic

Apart from the common options, the cyclic timers also contain the following configuration fields:

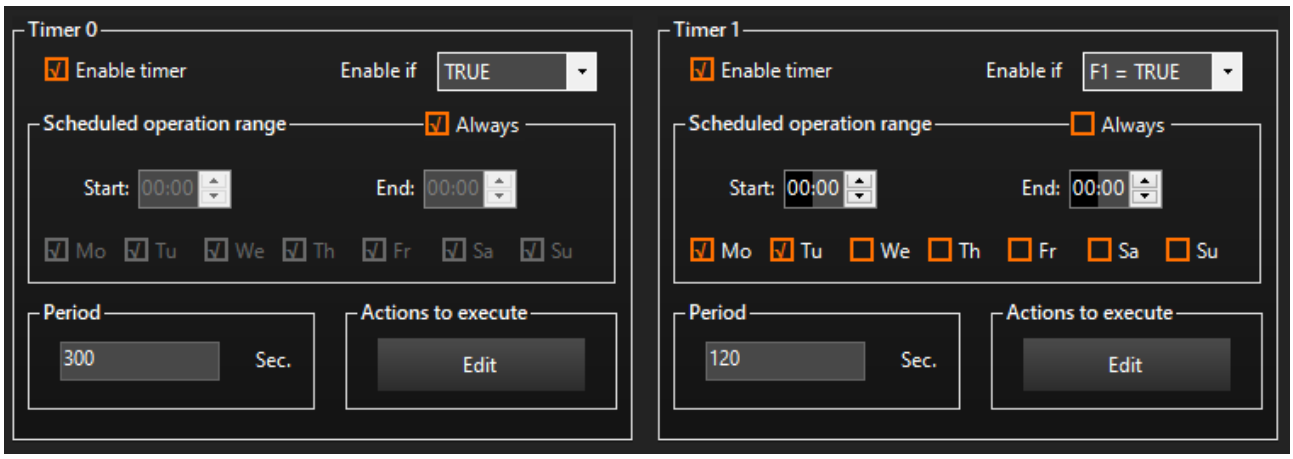


Figure 14-2. Details of the "Cyclic timer configuration" screen.

Table 14-2. "Cyclic timer configuration" interface

Field	Description
Enable if	This links the timer operation to the status of one of the system flags. The timer will activate if the corresponding flag takes the value indicated in the drop-down Fx=TRUE (1, activated) or Fx=FALSE (0, deactivated).  Operates only when some other condition is met, such as the activation of a digital input or the over-range of an analogue input. This option can be inhibited by leaving the Dropdown Menu at TRUE.  See Section 12for detailed information on the operation of the flags.
Scheduled operation range	Sets the time and days of the week when the cyclic timer will be active. "Always" option: The timer will be activated around the clock.
Period	Cyclic timer activation frequency, in seconds. Valid range: From 1 to 43200 seconds (12 hours).

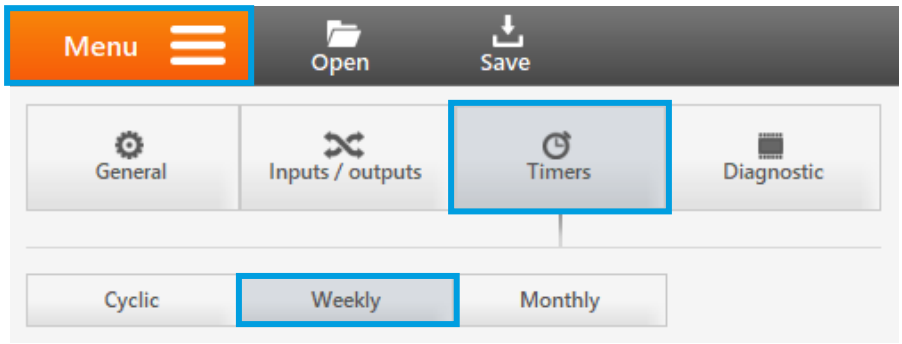
A typical configuration is setting a cyclic timer with a period of 600 seconds, the operation of which Involves registering the channel group 0.

This configuration generates a history of the corresponding analogue input values in 10-minute intervals.

14.3 WEEKLY TIMERS

Interface that allows you to configure weekly timers that operate at certain times of selected days of the week.

Access:



Menu → Timers → Weekly

Each weekly timer contains the following configuration fields apart from the common options.

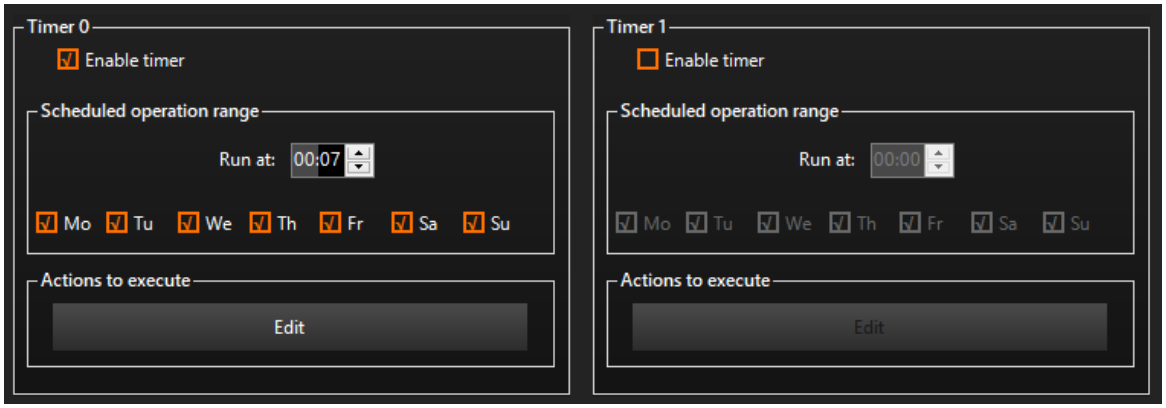


Figure 14-3. Details of the "Weekly timer configuration" screen.

Table 14-3. "Weekly timers configuration" interface.

Field	Description
Scheduled operation range	This allows you to set the time and select the days of the week that the weekly timer will be activated.

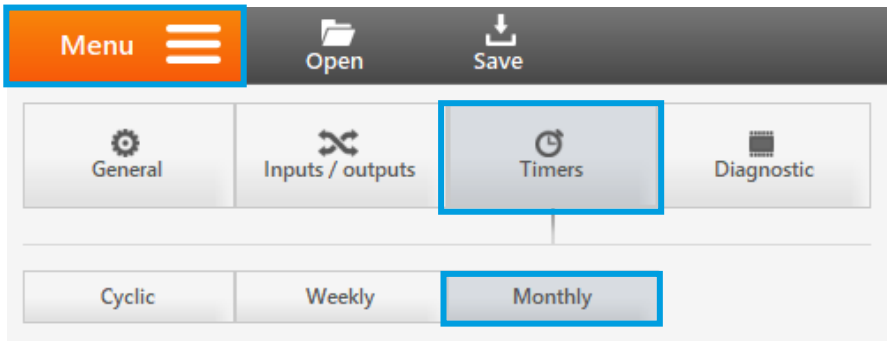
Nemos: One way the cyclic timers are typically applied is to trigger the daily download of the history registered via GPRS.

A weekly timer is configured for this purpose, which will execute the action "79 - Connect/refresh data in Zeus" every day at the selected time.

14.4 MONTHLY TIMERS

Screen that allows you to set the monthly timers. These execute actions at a certain time on the selected days of the month.

Access:



Menu → Timers → Monthly

Apart from the common options, the cyclic timers also contain the following configuration fields:

Figure 14-4. Details of the "Monthly timers configuration" screen.

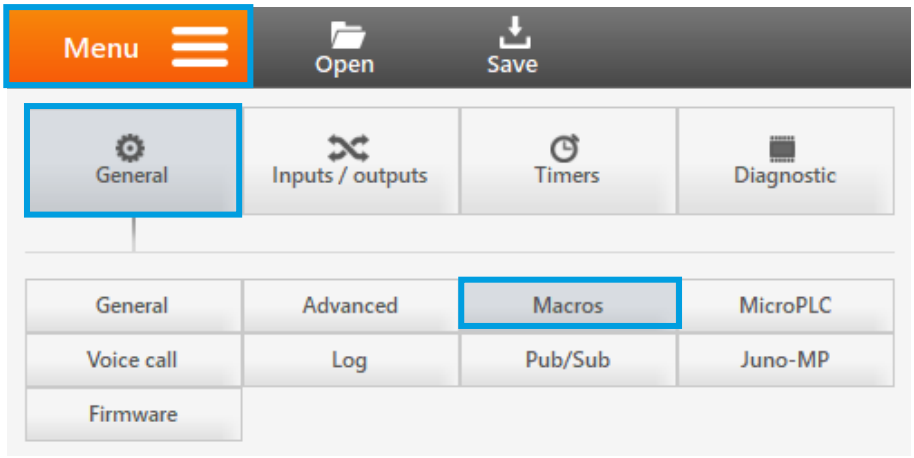
Table 14-4. "Monthly timers configuration" interface.

Field	Description
Days/Time to take place	This allows you to set the time and select the day(s) of the month when the timer will be activated and execute the actions.

A typical setup involves configuring a monthly timer to calculate the monthly consumption of a meter.

15 - MACROS

Screen that allows you to define macros, equations, and conversion tables.



Access:

Menu → General → Macros

15.1.1 Macros

The macros define user commands, establishing equivalence with the real command in the "language" of the device.

The command to activate a digital output could take the form OUT0 = 1 following the device syntax. However, the macros offer the option of generating a user command with the text "Turn on Boiler", which is easier to remember.

A second application for macros involves creating sets of commands that will be executed from an action.

15.1.2 Equations

These are computed once per second, updating the value of the flag accordingly. This allows combinations of several logical operations such as the activation of two digital inputs.

15.2 FIELD DESCRIPTION

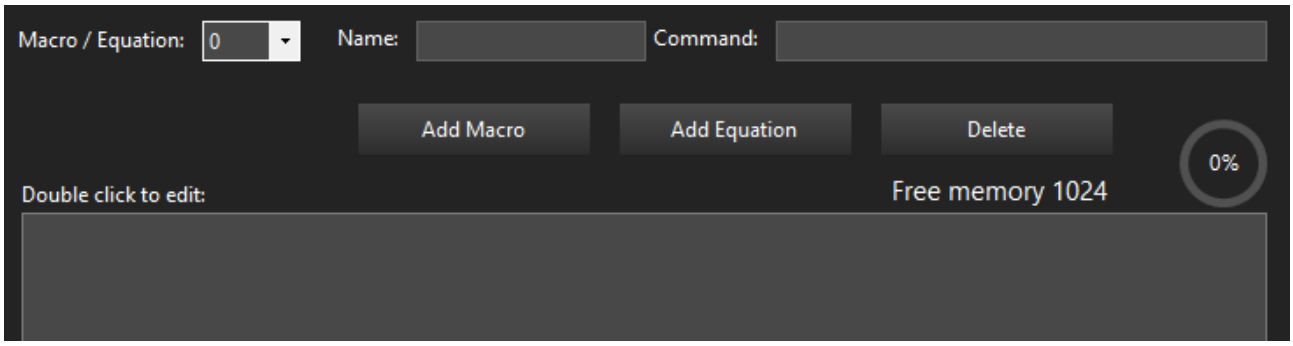


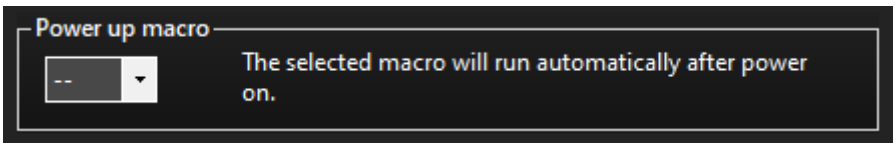
Figure 15-1. Details of general configurations on Macros screen.

Table 15-1. Macros screen configuration interface.

Field	Description
Macro/Equation	Number of the macro or flag to be configured.
Name	Macro name.
Command	Equation.
Add Macro	Logs the equation entered into a macro.
Add equation	Logs the equation entered to a flag.
Delete	Deletes the selected macro or equation.

15.3 POWER UP MACRO

Macro selection to run automatically after the device is turned on.



15.4 WAKED UP MAGNET MACRO (EXCLUSIVELY NEMOS COMPATIBLE)

Macro selection to run automatically after the magnetic activation of Nemos.

15.5 CONVERSION TABLES

Conversion tables are used to convert quantities with a non-linear relationship.

There are several ways to load the values into the table:

Manually.

Using the Poleni wizard.

Using the Manning wizard.

A table is generated with two columns in all three cases:

Table 15-2. Conversion table fields.

Field	Description
Raw value	Input value (to be converted).
Converted value	Output value (converted).

Raw value	Converted value
0.2903	1.3932
0.3097	1.5786
0.3290	1.7732
0.3484	1.9763
0.3677	2.1873
0.3871	2.4057
0.4065	2.6307

Conversion tables support a maximum of 32 values.

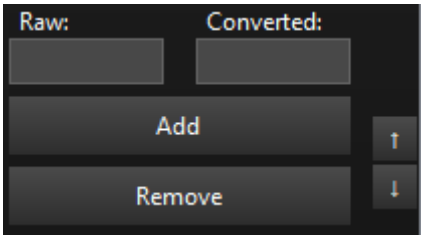
Two conversion tables are available.

15.5.1 Manual mode

Directly logs raw and converted values.

as follows:

1. Fill in the corresponding fields.
2. Click the “Add” button.
3. Click on the “Delete” button to delete the recorded values and reorder the values using the “up” and “down” arrows.



15.5.2 Poleni wizard - Flow rate in spillway channels

This is used when you want to obtain the flow rate in a channel located in a spillway.

In this case, a sensor is required to measure the water level.

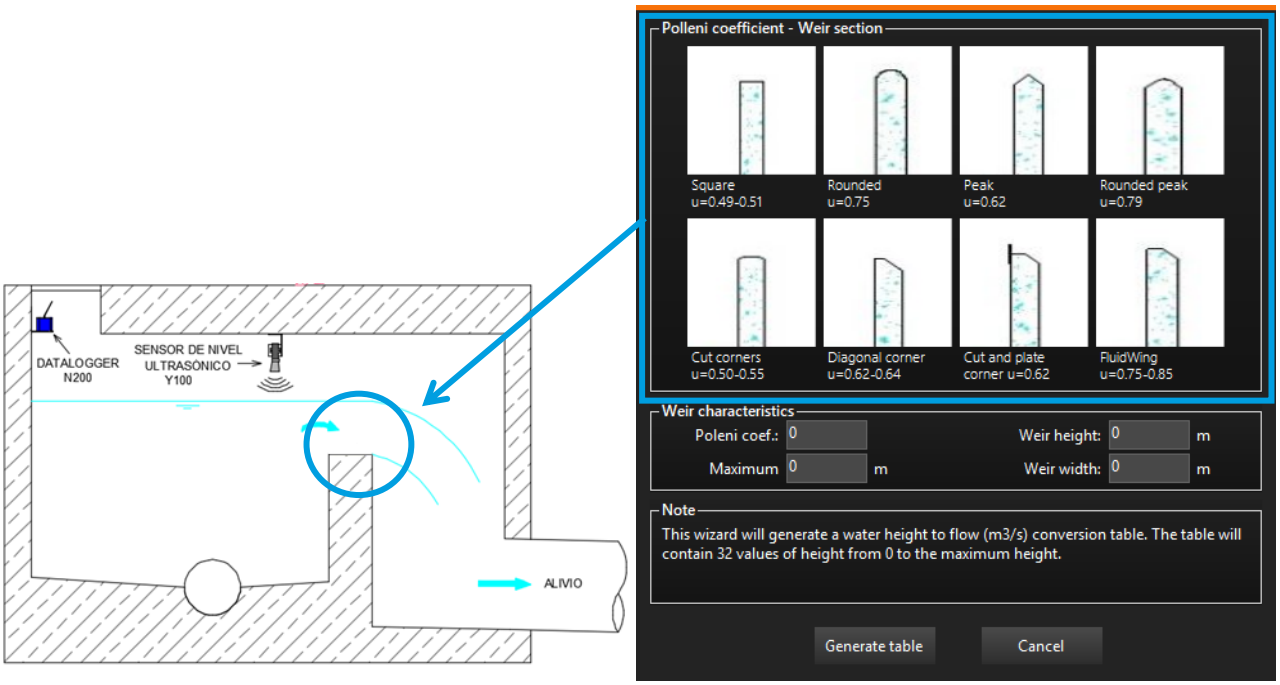


Figure 15-2. Poleni wizard.

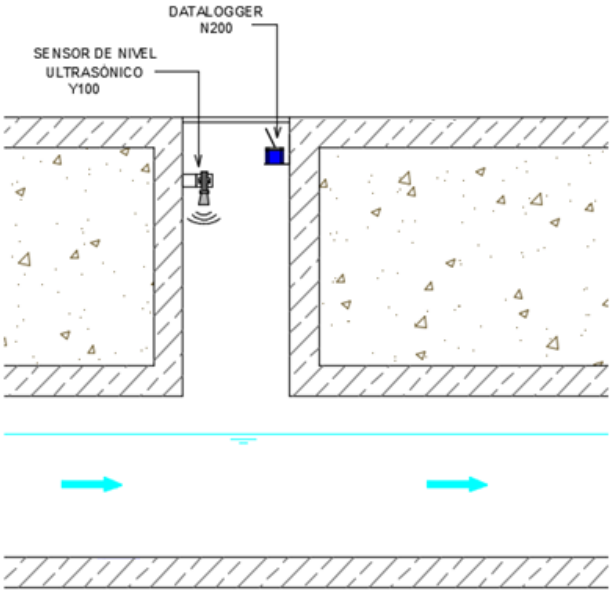
Table 15-3. Fields to report to estimate the flow rate.

Field	Description
Poleni Coef.	Depends on the shape of the wall section. Choose it by clicking on the drawings.
Maximum height (m)	Maximum height that the flow can reach in the channel.
Wall height (m)	Height of the relief wall.
Wall width (m)	Width of relief wall.
Generate table	The wizard generates a conversion table of water level (Raw Value) to flow rate in m^3/s (converted value) The table contains 32 water level values, from 0 to the maximum height.
Cancel	Close Poleni wizard window

15.5.3 Manning wizard - Spillway flow

Used when you want to know the flow rate in a channel.

In this case, a sensor is required to measure the water level.



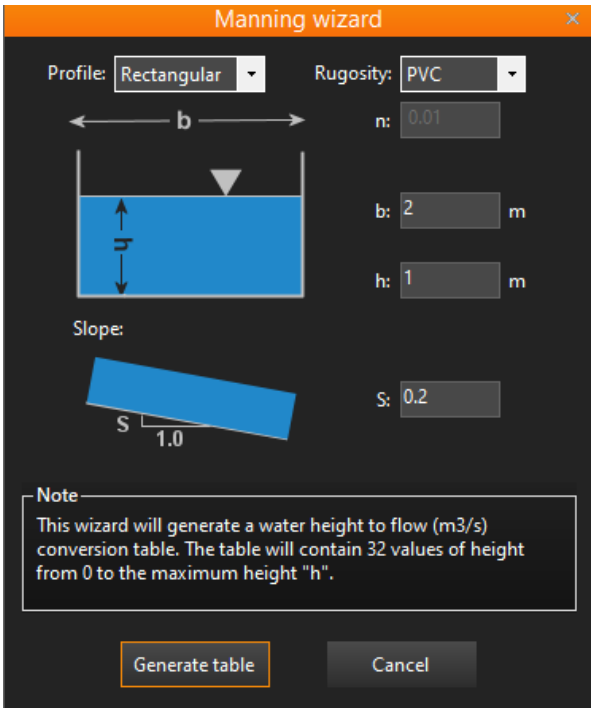


Figure 15-3. Manning wizard.

Table 15-4. Fields to report to estimate the flow rate.

Field	Description
Section	Conduit shape. The wizard allows you to choose from the following options: Circular profile: ▪ D: Diameter. Indicated in metres. ▪ h: Height. Indicated in metres. Rectangular section: ▪ b: Breadth. Indicated in metres. ▪ h: Height. Indicated in metres. Trapezoidal section: ▪ b: Base width. Indicated in metres. ▪ z: Difference between base width and top width. ▪ h: Height. Indicated in metres. Common to all sections: ▪ S: Slope of the water line as a ratio of 1. This is calculated by dividing the metres climbed by the meters travelled.
Rugosity	The rugosity coefficient (n) of the duct varies depending on the material. The wizard gives you the choice of several materials: Cement, Concrete, Iron, PVC or other (the rugosity coefficient can be filled in manually).
Generate table	The wizard generates a conversion table of water level (Raw Value) to flow rate in m^3/s (converted value) The table contains 32 water level values from 0 to the maximum height.
Cancel	Close Manning wizard window

The conversion table is accessed using the command TBLx(y). Returns the engineering value "y" using the table "x"

15.6 EXAMPLE OF USE

Example 1: Creation of a macro called "Turn on boiler" that will activate the digital output 0. With this configuration is on the device, whenever an SMS with the text "Turn on boiler" is received, it will convert it to OUT0 = 1, which will activate the digital output 0.

1. Fill in the following fields with the values indicated in Figure 15-4:
   - Macro.
   - Name.
   - Associated command.
2. Click the "Add Macro" button.

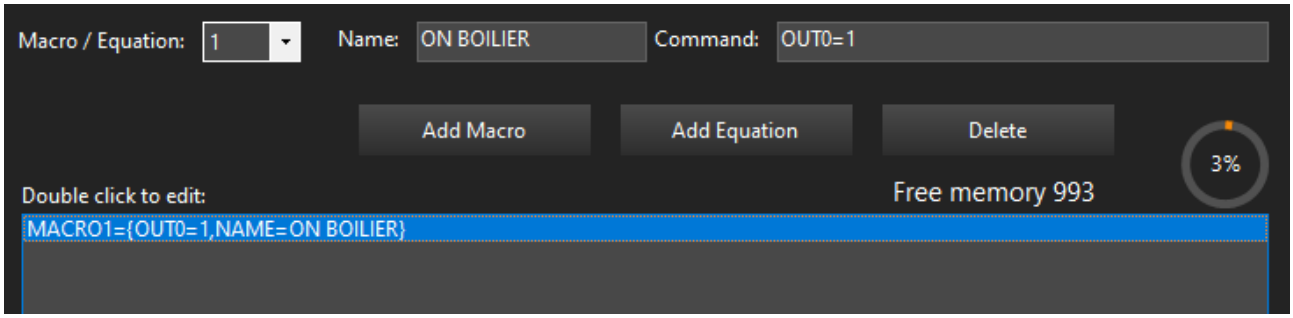


Figure 15-4. "Macros, example 1" configuration details

Example 2: Creation of a weekly timer to activate the automatic start-up of the boiler by running the "Example 1" macro

1. Enables a timer in the Weekly Timers form
2. Access to edit actions and click the "Run" button.
3. Select the macro from the "Edit Actions" screen that you wish to run from the list when the timer is activated.
4. Click on the "Add" button.
5. Click on the "Accept" button.

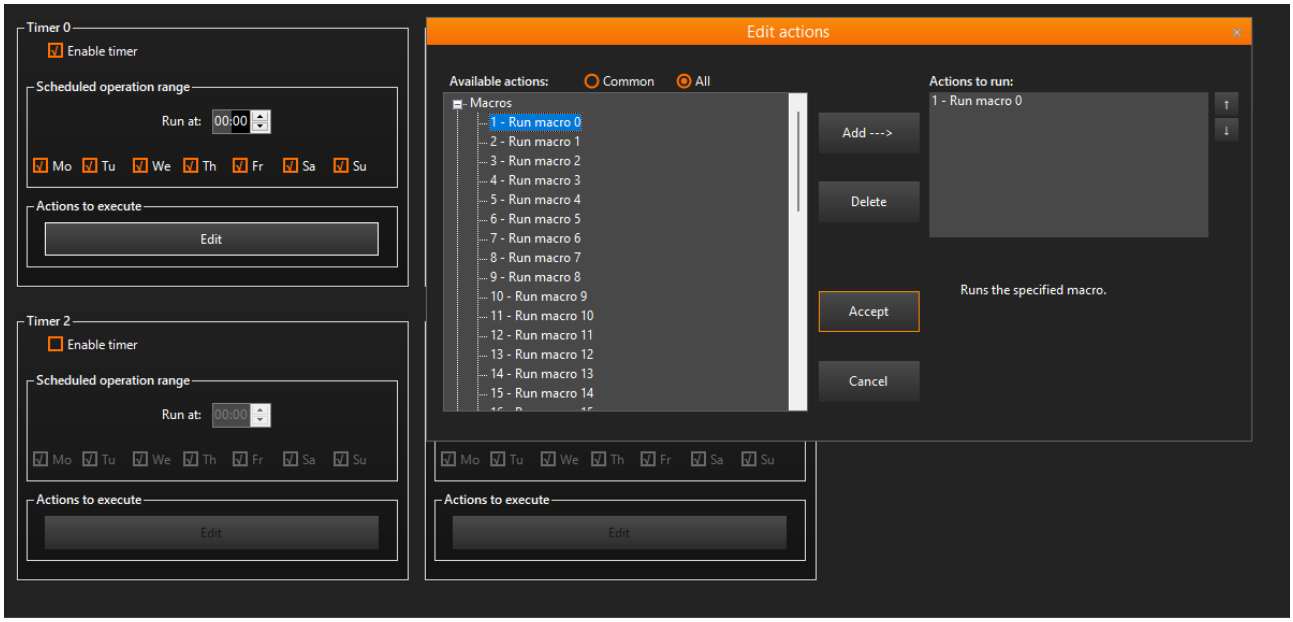


Figure 15-5. "Macros, example 2" configuration details

Example 3: A flag activation needs to be configured. The condition for the Flag turning on, in turn, is the simultaneous activation of two digital inputs.

The alarm activation conditions are as follows:

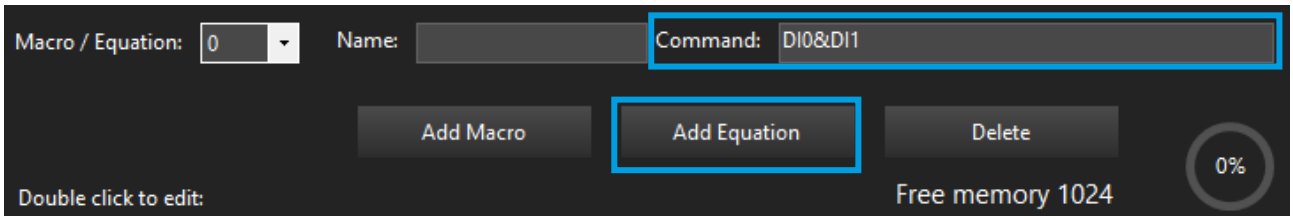
Digital inputs ..... 0 and 1 activated at the same time.

Configuration:

1. Create the equation associated with the Flag from the Macros form.
2. In this form, enter the equation in the "Command" field. In this case take the form DI0&DI1, performing the and function from the digital inputs 0 and 1.
3. The new equation is registered once the "Add Equation" button has been clicked.

The "&" and DIx operators are used to define the equation.

The first one performs the logical and function, while the second one returns the value of the specified digital input. See the full list of operators in Section 24

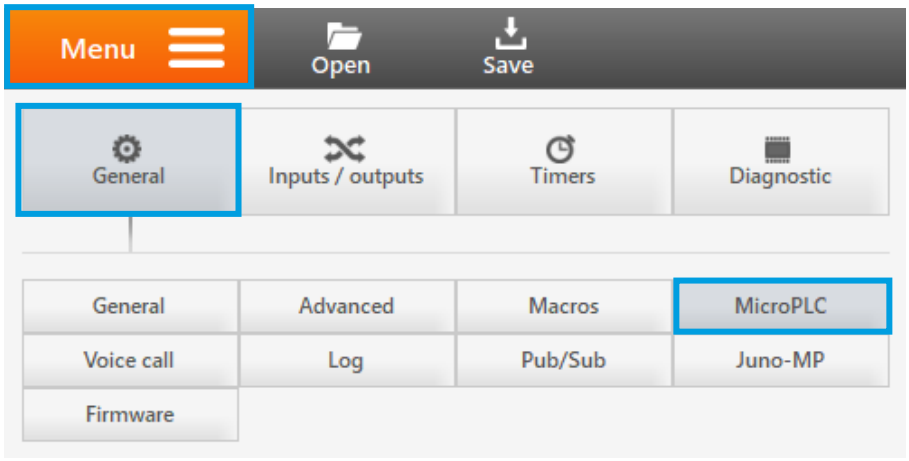


16 - MICROPLC-II

MicroPLC-II is an automation programming language, available on most Hermes models. Thanks to MicroPLC-II, Hermes has gone from simple monitoring systems to being able to fully automate small facilities, such as pumps, wells, industrial cooling systems, etc.

The MicroPLC-II interface is described below. We recommend reading the "MicroPLC-II Manual" for a more comprehensive description of the language and its capabilities.

Access:



Menu → General → MicroPLC

Firmware version 9 (and later) and MICROCONF version 9 (and later) integrate MicroPLC-II.

MicroPLC-II compatible devices are also backwards compatible with the MicroPLC language.

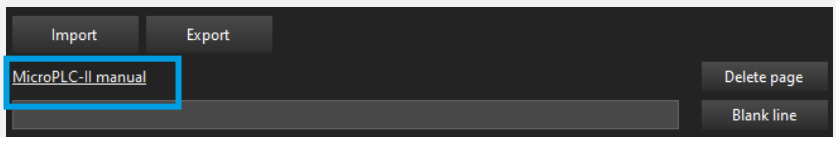
Programming manuals for both languages are available for download on the website: www.microcom360.com.

They can also be requested by:

Email: soporte@microcom.es

Phone number: (+34) 943 639 724 (Extension 2).

Direct download (MicroPLC-II): Clicking on the following after accessing the screen:



Example of MicroPLC II script:

```
L1 #INIT
L2 REM EXAMPLE CONFIGURATION SECTION
L3 AI0 : TANK_LEVEL
L4 DO0 : PUMP
L5 #END_INIT

L6 REM EXAMPLE MAIN PROGRAM LOOP
L7 IF TANK_LEVEL >= 3.5 ; PUMP = 0
L8 IF TANK_LEVEL <= 1.5 ; PUMP = 1
```

Figure 16-1. Example of a script in MicroPLC-II language for the automatic activation of a pump according to the tank level.

Table 16-1. Explanation of the language used.

Line	Description
L1	Keyword to start the initialisation section. The initialisation section is executed only once when the script starts running.
L2	Comment to describe the program. This line does not run.
L3	Assigns the alias “TANK_LEVEL” to the analogue input 0 “AI0”. A sensor that measures the water level of a tank has been connected and configured at analogue input 0.
L4	Assigns the alias “PUMP” to the digital output 0 “DO0”. Digital output relay 0 controls the turning on and off of a water pumping motor that refills the water tank.
L5	Keyword to finish the initialisation section.
L6	Comment to describe the program. This line does not run.
L7	“PUMP” is deactivated if the value in “TANK_LEVEL” is greater than or equal to 3.5 metres.
L8	“PUMP” is activated if the value in “TANK_LEVEL” is less than 1.5 metres.

16.1 INTERFACE

Figure 16-2. MICROPLC-II interface.

Table 16-2. MICROPLC-II interface.

Item	Field	Description
1	Import	Allows you to import a plain text file (.TXT) with lines of code in MICROPLC-II language. This file must include all pages.
2	Export	Allows you to export all lines of MICROPLC-II code to a plain text file (.TXT). This file includes the information from all the pages.
3	Page selector	This allows you to navigate between pages and find out the percentage of use of each page.
4	Code input box	Program line. Press the "ENTER" button to add the code to the page script.

Item	Field	Description
5	Delete page	Allows you to delete the code from the selected page
6	Blank line	Allows you to add a blank line to the code.
7	Code panel	Lines of code or script.  Upper section: Amount of free memory. Right side: Buttons to change the order of the lines of code and delete them.
8	MicroPLC control panel	See the following section.

16.2 MICROPLC CONTROL PANEL

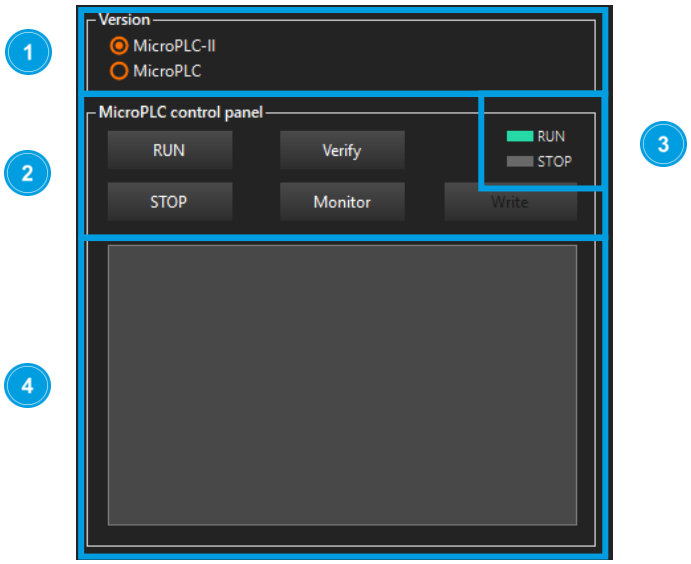


Figure 16-3. MICROPLC-II control panel.

Table 16-3. MICROPLC-II control panel.

Item	Field	Description
1	Language selector	Programming language to be used. MicroPLC-II: Version available from firmware version 9. Described in this manual. MicroPLC: Version available in previous firmware versions, which is maintained by backwards compatibility.
2	Buttons	Buttons enabled for MICROPLC-II language only: RUN: Sets the run mode. See Section 16.3.2. STOP: Sets safe mode. The code is not running See Section 16.3.1. Verify: Verification button. Review the program and look for errors in the syntax. See Section 16.4 The system needs to be in STOP in order to verify the Script. Monitor: Opens the variable monitor window. See Section 16.5. Write: Writes the programming code on the device.

Item	Field	Description
3	Operational status	Indicates the status of the device. See Section 16.3.
4	Terminal	Message area. Shows error details and traces. Clicking on an error message highlights the line on which the error is located in the code panel. See Section 16.4

16.3 RUN AND STOP OPERATING STATUS

Indicates whether you are running the programmed code in MICROPLC II.

16.3.1 Stop

Safe status. The device enters this state manually, by pressing the "STOP" button, or automatically, if it detects a code failure.

The device is not running the program and all outputs remain disabled.

This status allows you to review the programming and installation safely and load new programs.

16.3.2 Run

Run status. The device automatically enters this mode after switching on or when the "RUN" button is clicked.

The device:

1. It will run the lines that are within the initialisation section (#INIT ...#END_INIT) for all the pages.
2. The code of every page will then be cyclically executed, from left to right and from top to bottom (once per second), reading the inputs, running all the program conditions, and activating the necessary outputs at all times.

16.4 ASSOCIATED COMMANDS.

The following commands are available for MicroPLC-II functionality management:

Table 16-4. Associated commands.

Command	Description
PLCRUN	Sets RUN mode.
PLCSTOP	Sets STOP mode.

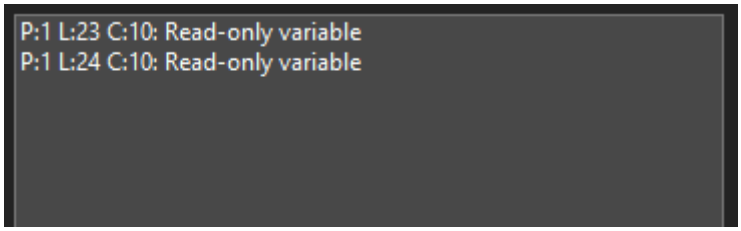
16.5 VERIFICATION

The MICROCONF configuration software integrates a code reviewer that returns the following error messages.

16.5.1 Error message format

P:*00* L:*00* C:*00*: *Error message*

P:xx	xx indicates the programming page
L:xx	xx indicates the line
C:xx	xx indicates column
Error message	See next section for more information.



16.5.2 Description of error messages

Error message	Description
Variable name or alias already exists	A previously declared variable name or alias declaration has been found.
Index out of range	The index is out of range; e.g., F32 is an out-of-range index since the flags cover F0 to F31.
Invalid variable name or alias	An invalid variable name or alias declaration has been found. The most common reasons are the use of a reserved name or the presence of invalid characters.
Invalid property	The object does not have any properties with the given name. e.g.: DI0.Q. 'Q' is not a valid DIx property.
No enough memory for the variable	There is no memory space left for the declared variable.
Read-only variable	An assignment to a read-only variable has been found. e.g., assign 'DI0 = 1'. 'DI0' returns the value of the digital input 0, meaning it cannot be written.
Syntax error	A syntax error was found.
Unknown identifier	An operation with an undeclared variable or alias was found.

Variable redefinition	A variable name or alias has been declared more than once. E.g.: BOOL : BOYA_LOW INT : BOYA_LOW

16.6 VARIABLES MONITOR

The variables monitor allows the inspection and modification of MicroPLC-II variables in real time for code debugging purposes.

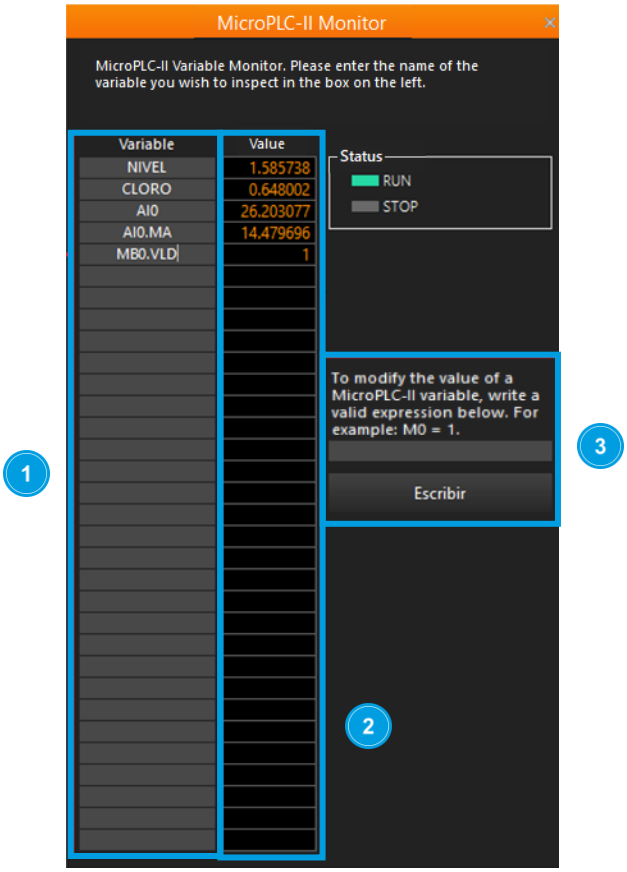


Figure 16-4. Variables monitor.

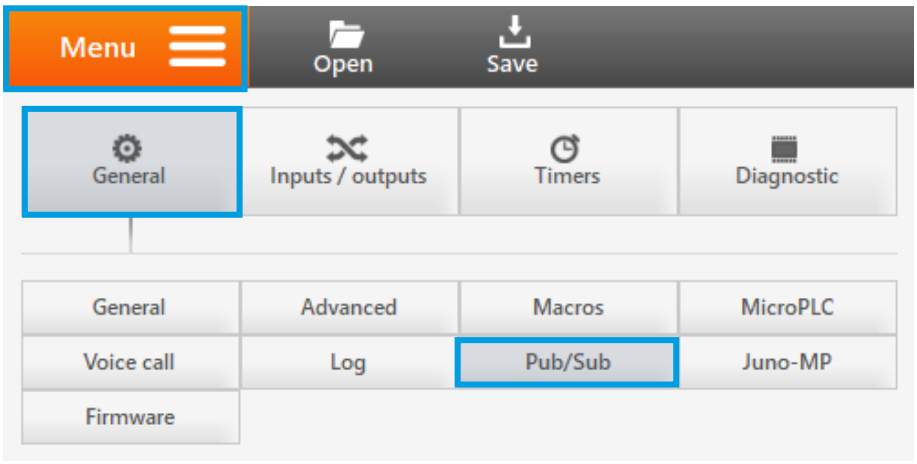
Table 16-5. Variables monitor.

Item	Field	Description
1	Variable	Name of the variables to be inspected. Both the variables declared within MICROPLC-II and the internal variables of the system are valid.
2	Value	Value of the variable. The ? character indicates that the variable is not recognised.
3	Write	Modification of variables in real time.

17 - PUBLISH/SUBSCRIBE

Interface for configuring the inter-station variable exchange functionality.

Access:



Menu → General → Pub/Sub

17.1 FUNCTIONALITY

The inter-station variable exchange functionality follows a publication/subscription type scheme. According to this scheme, one station publishes its status in Zeus, while a second station subscribes to a certain variable of the first one.

The publication/subscription data is refreshed together with the other communication tasks when running the action '79 - Connect/refresh data in Zeus'.

Each station can subscribe up to a total of 8 channels, indicating the channel and the Zeus ID of the publishing device. The subscribing station will use its first 8 math registers to save the data and the first 8 flags to report the communication status between the devices.

This feature is supported by the following software versions onwards:

Microconf: v8.4.0

Firmware: v8.44

See Section 22 to update the device firmware.

Recommendations to increase fault tolerance:

This method of transferring variables between stations via GPRS can be supplemented with the programming of a "failover" system based on SMS messaging.

This second system will assume the exchange of information whenever the GPRS network is not available. This switching between systems is transparent to the user.

The programming of this system is detailed in the application note entitled: "GPRS tank pumping communication application note" (not included in this document). Please contact Microcom for further information.

Publication/Subscription video tutorial on our Youtube channel

17.2 FIELD DESCRIPTION

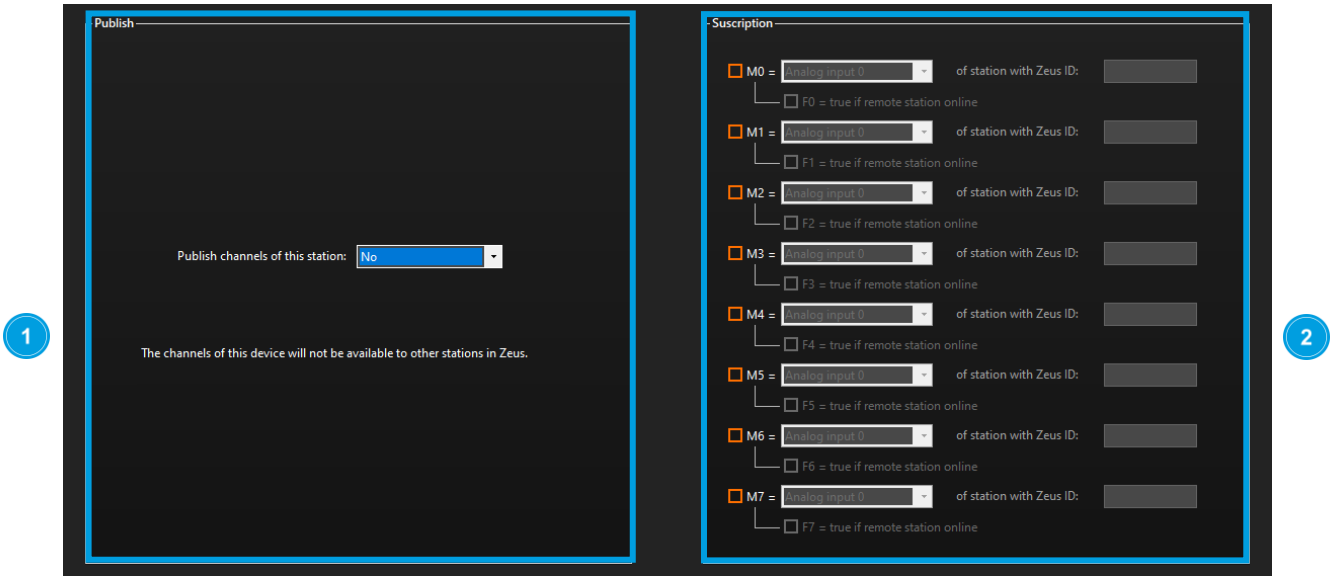
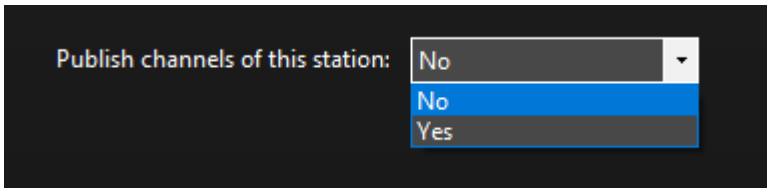
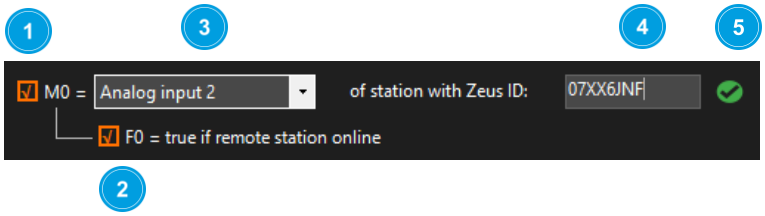


Figure 17-1. Publication/Subscribe interface.

Table 17-1. Publication/Subscribe interface.

Item	Field	Description
1	Publication	Channel publishing: No: Channels on this device will not be available to other stations on Zeus. Yes: The channels of this device will be available to other stations on Zeus. 
2	Subscription	Math registers and flags are related to the published channels.  1 Assignment of the value of the input selected in point 3 of the station with the Zeus ID selected in point 4 to the math register. 2 The flag takes the true value if the remote station is connected. 3 Channel to be assigned to the math register (analogue channel, totaliser, flowmeter, etc.). 4 Zeus ID of the station publishing the channel. 5 Zeus ID validity verification.

17.3 EXAMPLE OF USE

Three stations are logged in Zeus:

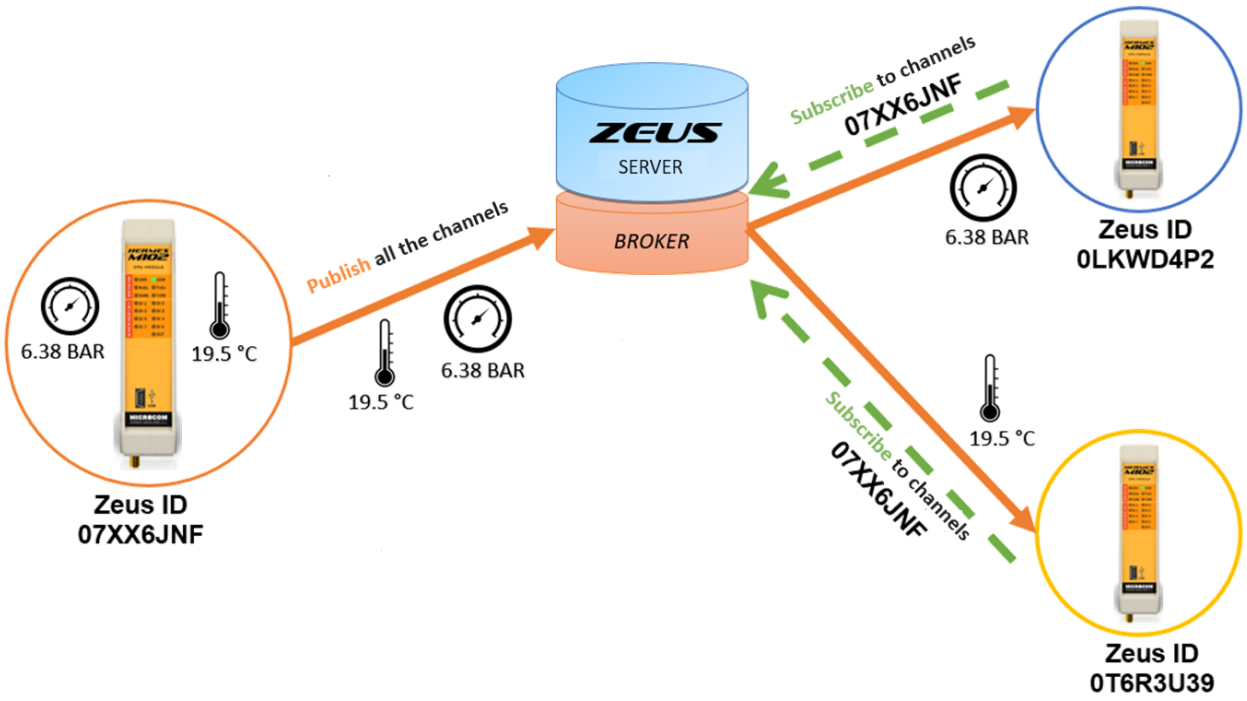
Orange (Zeus ID 07XX6JNF).

Blue (Zeus ID 0LKWD4P2).

Yellow (Zeus ID 0T6R3U39).

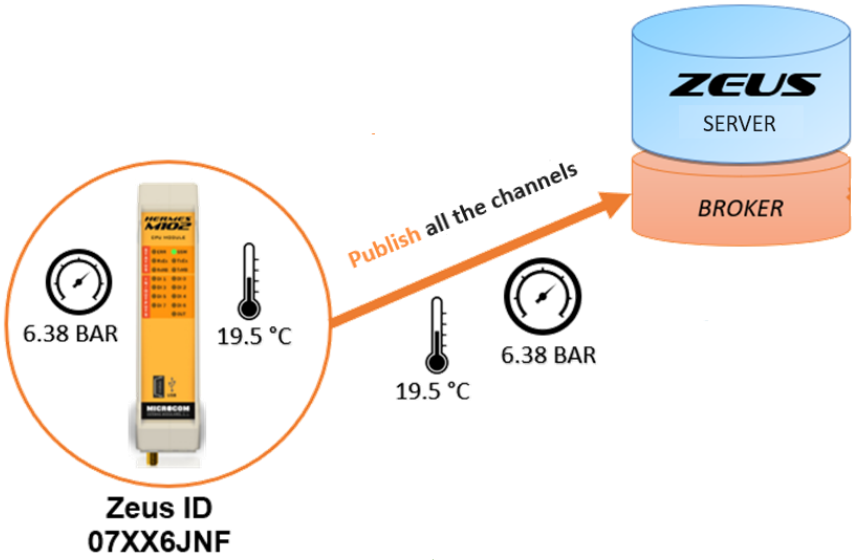
The Orange station is configured to read two signals: Room temperature and pressure. Once configured, the publication of all the channels of this station (Orange) will be enabled on the Zeus server.

Finally, the Blue and Yellow stations will subscribe to the Orange station, specifically, the Blue station will receive the pressure information (6.38 bar) while the Yellow station will receive the temperature (19.5 ºC)



ORANGE STATION CONFIGURATION

PUBLISH (SEND) THE DATA OF ALL ITS CHANNELS TO ZEUS



1. Configure the sensors.

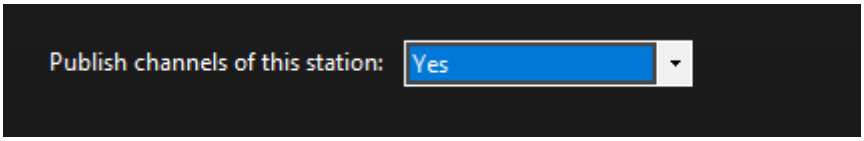
   A Hermes M102 device is configured to connect two analogue sensors at inputs 0 and 1. See Section 7.

   - Analogue input 0 ➔ Temperature sensor.
   - Analogue input 1 ➔ Pressure sensor.

   A cyclic timer is configured in this device to register and refresh the value of both analogue inputs in Zeus every 300 seconds. See Section 14.

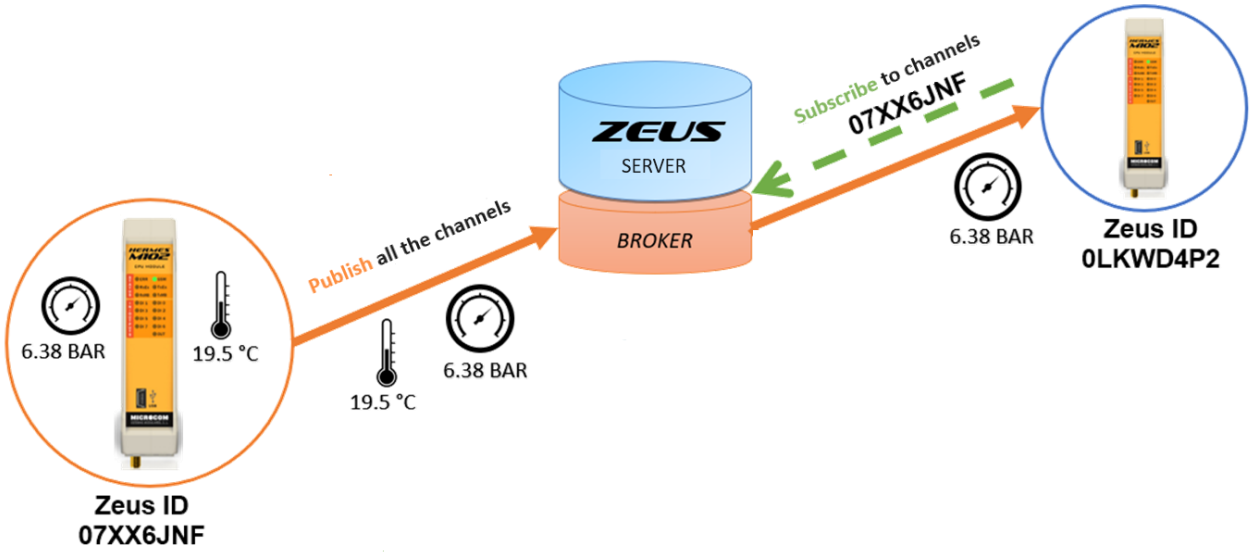
2. Enable the publication of all channels in Zeus.

   Access the Pub/Sub screen and select "Yes" in the "Publish the channels of this station:" option. The value of all the channels of the Orange station (digital inputs, analogue inputs, probes, MODBUS, etc.) will be therefore public on the Zeus server.



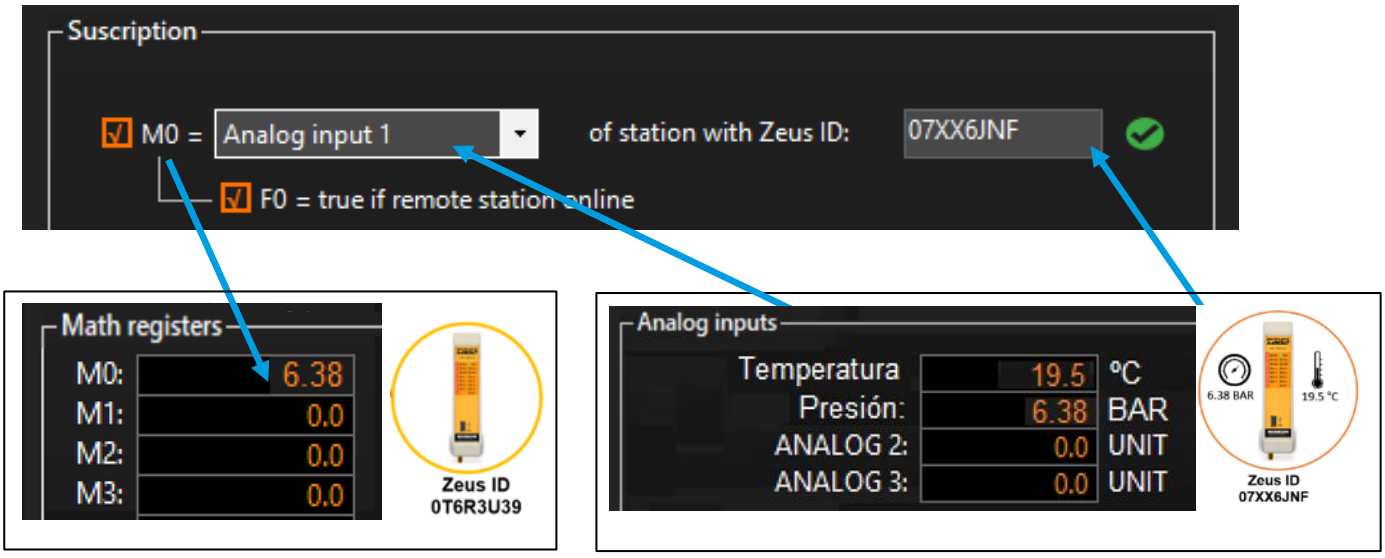
BLUE STATION CONFIGURATION

RECEIVE ORANGE STATION PRESSURE DATA



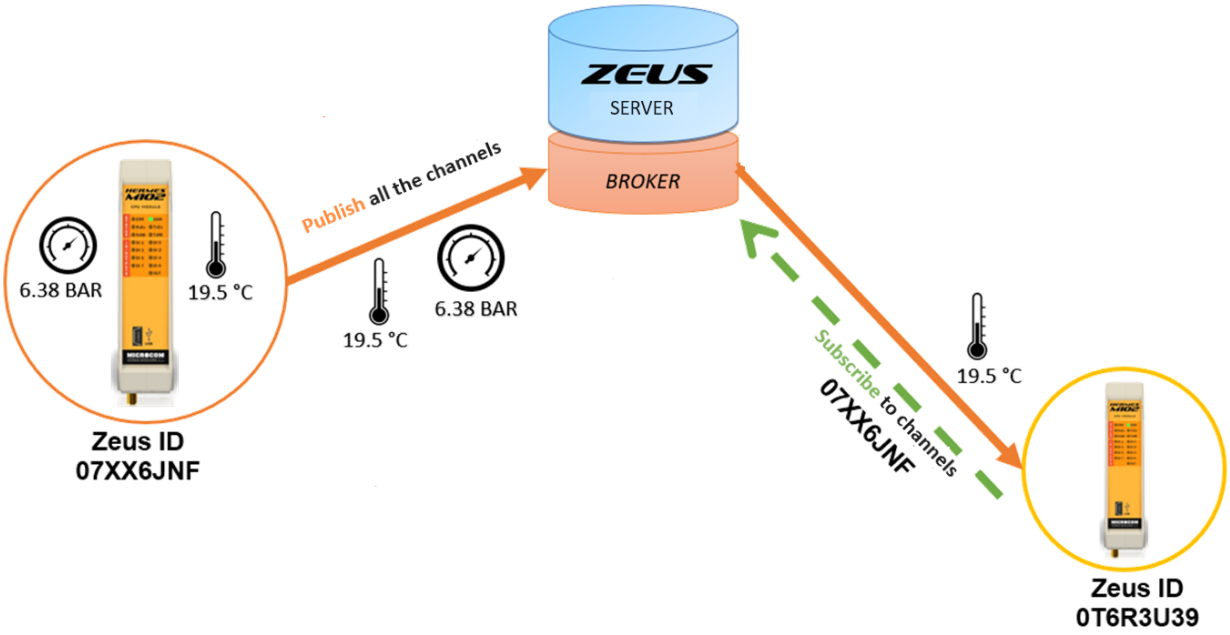
1. Subscribe to the pressure value published by the orange station.

   - Go to Pub/Sub.
   - Enable the math register 0 (M0) to receive the values of the analogue input 1 (Pressure sensor) of the Orange station (Zeus ID 07XX6JNF).
   - The Flag 0 (F0) should be enabled to see if the station that publishes the data (Orange) is connected.



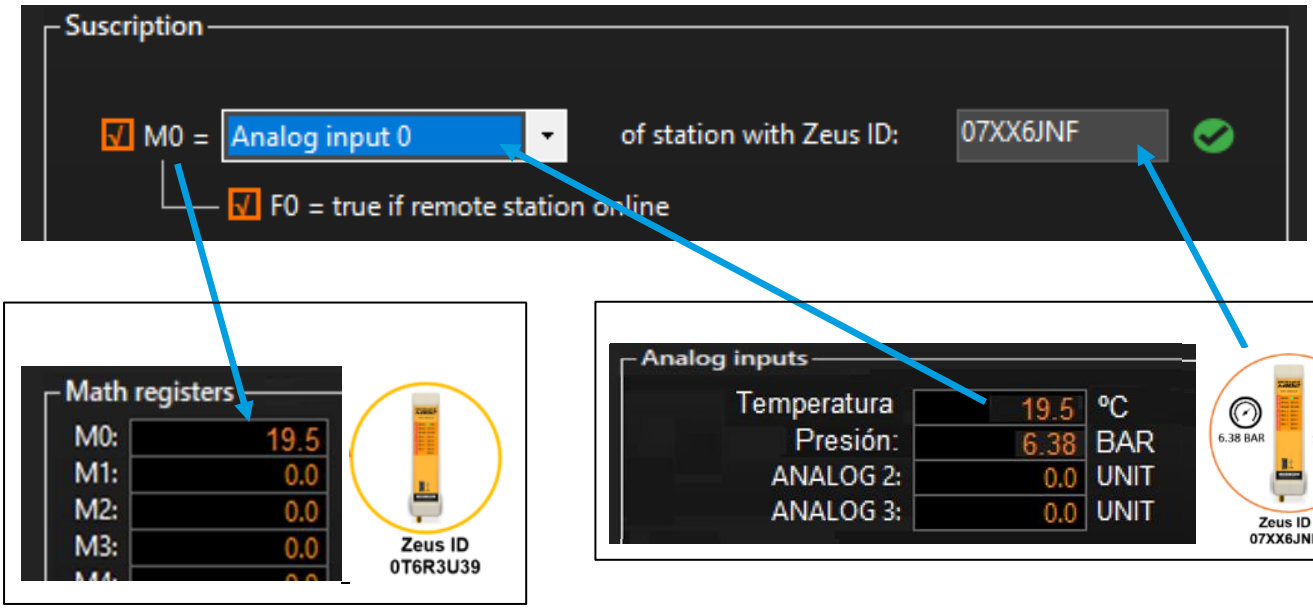
YELLOW STATION CONFIGURATION

RECEIVE ORANGE STATION TEMPERATURE DATA



1. Subscribe to the temperature value published by the orange station.

   - Go to the Pub/Sub screen.
   - Enable the math register 0 (M0) to receive the values of the analogue input 0 (Temperature sensor) of the Orange station (Zeus ID 07XX6JNF).
   - The Flag 0 (F0) should be enabled to see if the station that publishes the data (Orange) is connected.



18 - ADVANCED CONFIGURATION

Interface that allows advanced configurations to manage:

Voice call alert configuration: See Section 18.1.

SMS alerts configuration: See Section 18.2.

Alarm forwarding configuration: See Section 18.3.

Password management: See Section 18.4.

Device regional configuration See Section 18.5.

Sampling frequency: See Section 18.6.

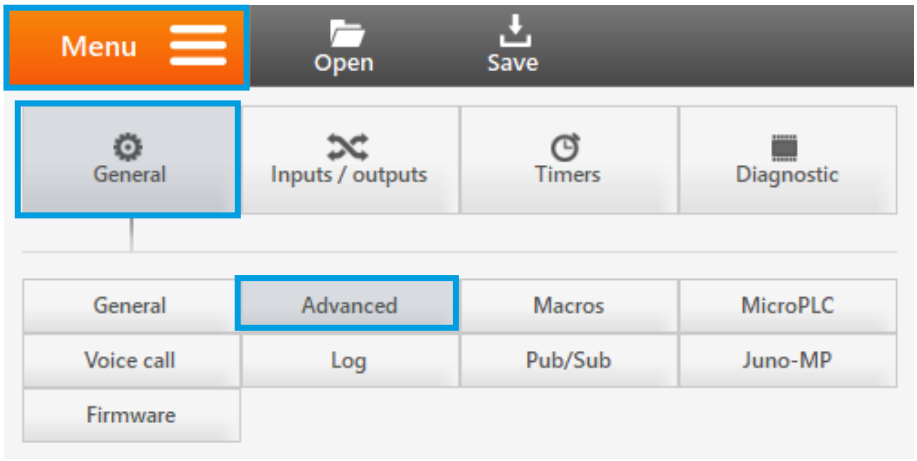
MODBUS/Expansion channel allocation: See Section 18.7.

Output module selector: See Section 18.8.

Pressure probe energy configuration: See Section 18.9.

Internal pressure probe calibration: See Section 18.10.

Access:



Menu → General → Advanced

18.1 VOICE CALL ALERT SETTINGS

Defines when a voice call alarm is considered delivered. There are two options:

The alarm is considered delivered when the call is picked up by the authorised phone (default).

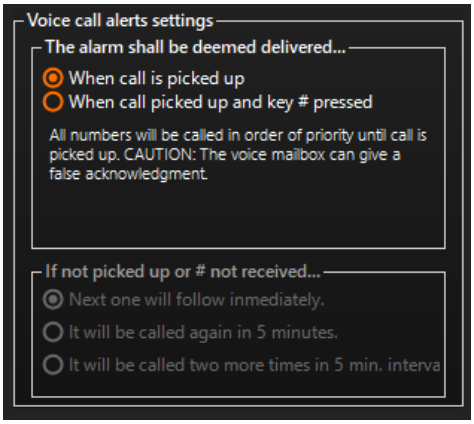


Figure 18-1. Voice call alert "Upon answering"

If it is not answered, the device will continue to call.

By default, if any of the receivers has activated voicemail, this will automatically pick up the call and the device will consider the alarm as delivered, when in fact the user is not aware that it has been received.

The alarm is considered delivered whenever the authorised phone picks up and presses the # key. (recommended option).

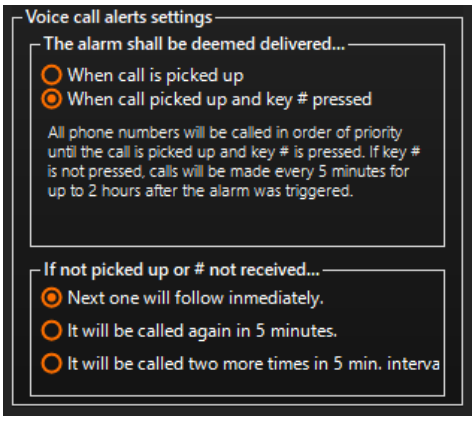


Figure 18-2. Voice call alert "Upon answering and pressing the # key".

If it is not picked up or # is not received, it can be configured to:

Try to get through to the same number.

Change and contact them using the next authorised number.

If the alarm is not delivered, the device will continue calling for up to 2 hours.

18.2 SMS ALERTS SETTINGS

Defines the behaviour of the device in the alarms configured for SMS notification.

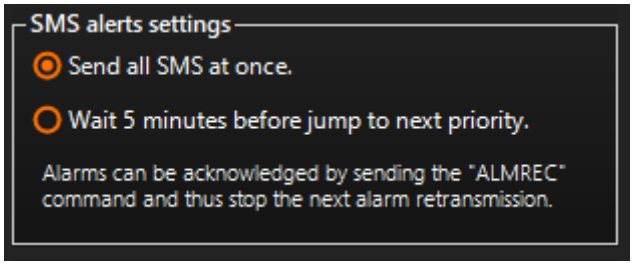


Figure 18-3. SMS alert configuration.

Reset text. Message sent by the device when an alarm has been reset. This message precedes the text of the alarm that has just been reset.

An alarm input is triggered by out-of-range nighttime flow. When the network returns to normal, the text will be sent in the Reset text box preceding the "Out-of-range nighttime flow" one.

If "RESET" had been written in that box, the following text would be received on the mobile: "RESET out-of-range nighttime flow".

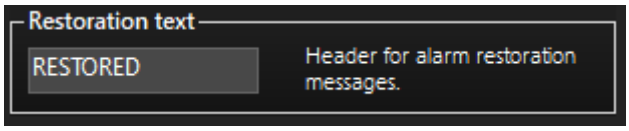


Figure 18-4. SMS alert reset text.

SMS daily limit. Daily limit for sending SMS messages (200, 300, 400 and 500).

When this limit is exceeded, the device will stop sending notifications of new alarms until 12 a.m. the following day.

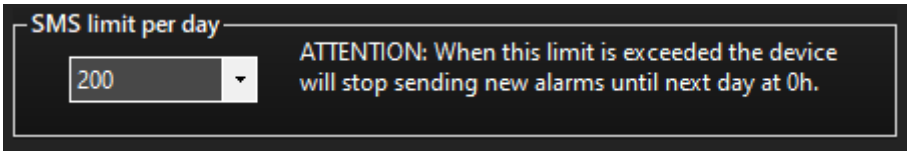


Figure 18-5. SMS alert reset text.

18.3 ALARM FORWARDING CONFIGURATION

Defines the forwarding behaviour of alarms. An alarm, with the forwarding option enabled, will be forwarded as long as the alarm condition remains in place.

Table 18-1. Alarm forwarding

Field	Description
Number of times it is resent	Sets the maximum number of times an alarm will be transmitted while active if forwarding is enabled.
Forwarding time	Determines the time that will elapse between successive forwarding of an alarm if forwarding is enabled.

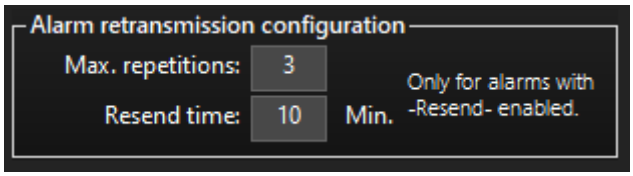


Figure 18-6. Alarm forwarding configuration

18.4 PASSWORD MANAGEMENT

The default password is "1234" and is requested when accessing the device via Bluetooth or GSM.

Users will also be requested to establish communication via USB cable when updating the password.

The password consists of a 4-digit number.

To update the password:

1. Click on the "Change" button.
2. Type the new password.
3. Click on the "Update" button.

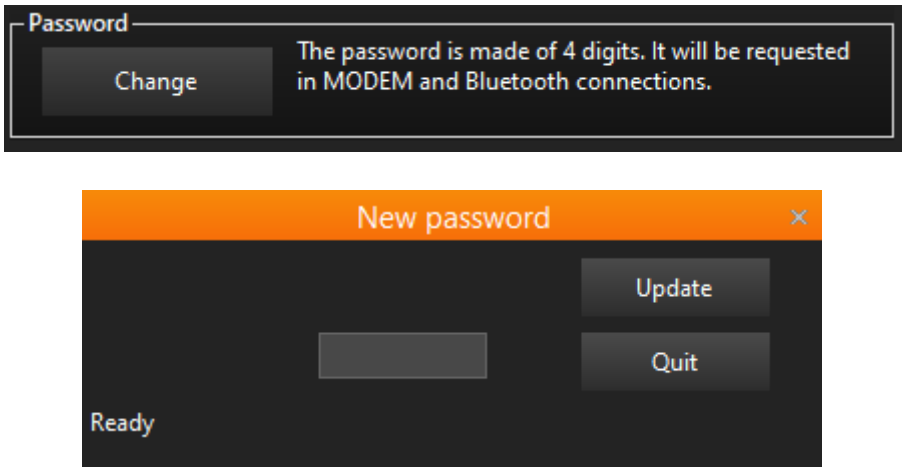


Figure 18-7. Password management.

18.5 REGIONAL SETTINGS

Displays the time zone that is currently configured.

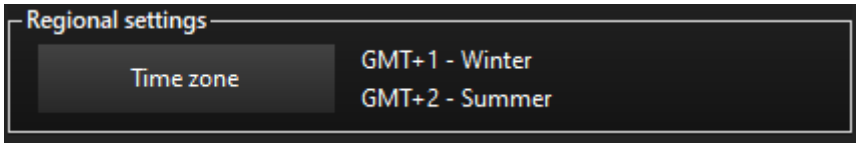
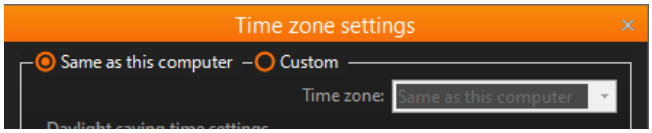
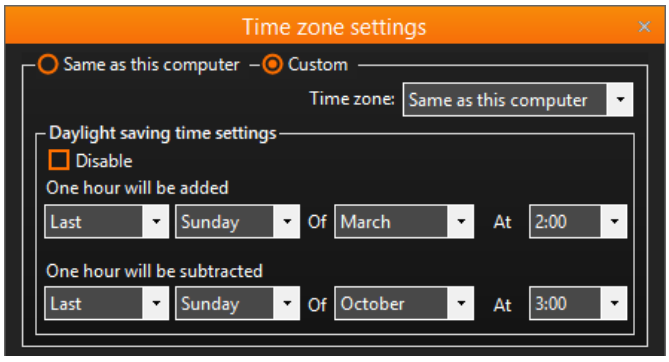


Figure 18-8. Regional configuration details.

Click the "Time Zone" button to change it.

Table 18-2. Changing the time zone.

Field	Description
Same as this computer	The time zone and summer/winter time settings of the computer used to configure the device are loaded by default. 
Manual	Manual setting of the time zone and dates on which the summer/winter time change is automatically adjusted.  Time Zone: Time zone selector. State the standard or winter time zone in the case of manual configuration. Config. Summer/winter time: ▪ Disable: Automatic summer/winter time change is disabled. ▪ Select date and time for forward and backward adjustments.

18.6 SAMPLING FREQUENCY (EXCLUSIVELY SUPPORTED FOR NEMOS)

This allows you to choose a sampling frequency of 64 or 256 Hz for the digital inputs.

This option is only enabled for compatible models (Nemos LP+, N100, N100+, N200 and N200+).

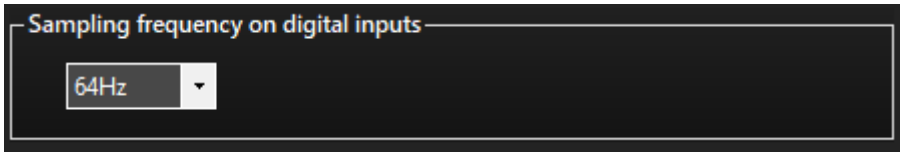


Figure 18-9. Sampling frequency selection details.

18.7 MODBUS/EXPANSION CHANNEL ALLOCATION (EXCLUSIVELY SUPPORTED FOR HERMES)

This allows the allocation of channels between the two to be modified in models with MODBUS and Expansion channels.

Figure 18-10. MODBUS/EXPANSION channel configuration details.

18.8 OUTPUT DEVICE SELECTOR (EXCLUSIVELY SUPPORTED FOR NEMOS)

Allows you to select the latch valve piloting module model (THOR-2 or THOR-7) connected.

Option only available on Nemos N200 and N200+.

Figure 18-11. Details of the output module selector.

18.9 PRESSURE PROBE ENERGY SETTINGS (EXCLUSIVELY SUPPORTED FOR NEMOS)

Adjustment parameter for integrated pressure probes.

Option is only enabled for Nemos with integrated pressure probe.

Do not modify this parameter unless expressly instructed by MICROCOM personnel.

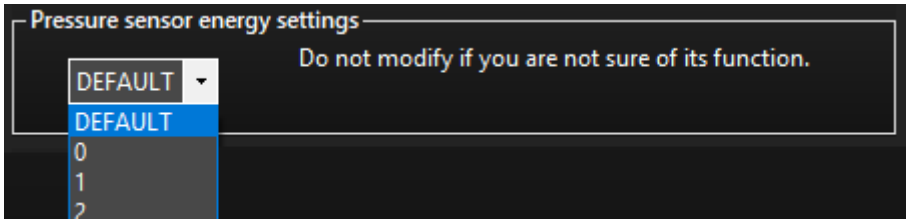


Figure 18-12. Pressure probe energy configuration details.

18.10 INTERNAL PRESSURE TRASDUCER CALIBRATION (NEMOS N100, N100+, N200 AND N200+)

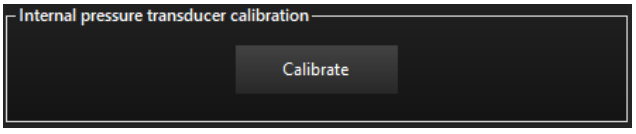
The calibration function allows you to calibrate the internal pressure probes to compensate for potential ageing errors.

Ensure the following are in place to use this feature:

- The Microconf configuration software version is 8.3.0 or higher.
- The firmware version of the device is 8.38 or higher.

18.10.1 Example of calibration tool use

1. Press the "Calibrate" button.



2. Configure calibration parameters.

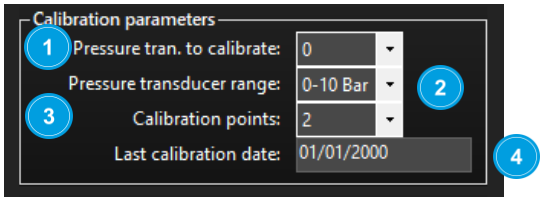


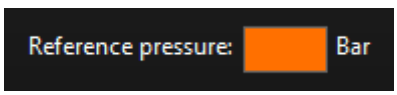
Table 18-3. Calibration parameters.

Item	Field	Description
1	Probe to be calibrated	Pressure probe to be calibrated.
2	Probe range	Range of the probe to be calibrated in Bar.
3	Calibration points	Between 2 and 5. The more calibration points used, the more accurate the calibration. If 3 points are chosen for a 10-bar probe, the ideal scenario is to distribute the points equidistantly (first point, start of scale and last point, the full scale): • P0: Scale start = 0 Bar. • P1: Intermediate point = 5 Bar. • P2: Full scale = 10 Bar.
4	Last calibration date	If the date shown is 01/01/2000, this indicates that no calibration has been performed.

3. Click on the "Start calibration" button. At this time, you must indicate the reference pressure to the probe for each of the selected points.

   The first calibration point is "P0", the scale start. This process will have to be repeated as many times as the calibration points have been selected.

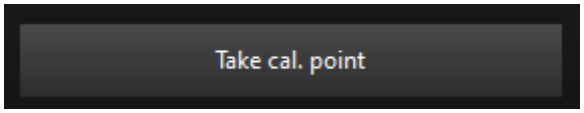
   a. Report the reference pressure (calibrated pressure) that the probe will receive.



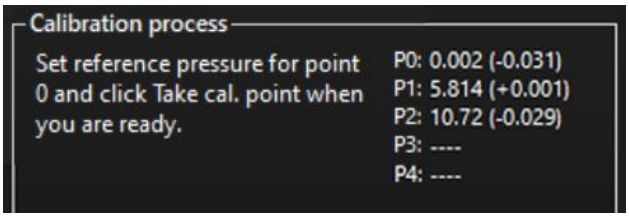
   b. Connect the manual pressure pump to the pressure probe to be calibrated.

The reference pressure should be stable for at least 3 seconds. Otherwise, an error will be displayed.

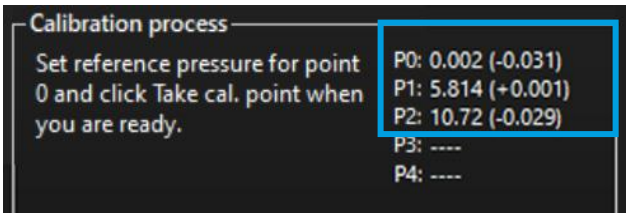
c. Press the "Take measurement" button.



The corresponding calibration point will be filled in if the measurement is correct. Repeat this process for all calibration points

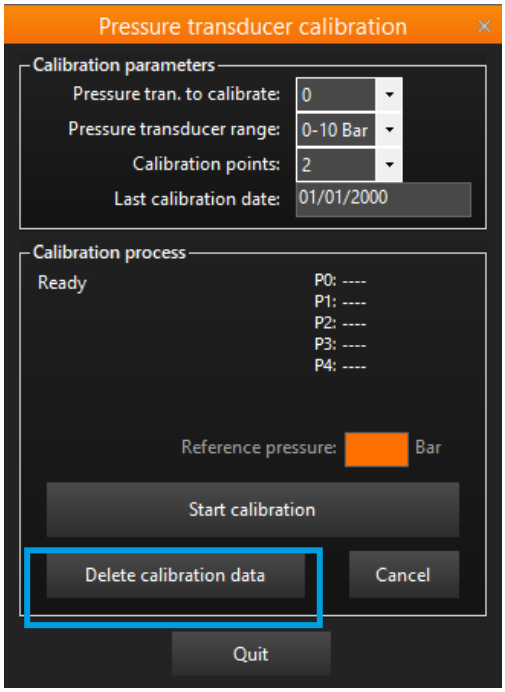


d. Press the "Write calibration data" button to save the data in the device's memory. Once the process is finished, the following message will be displayed:

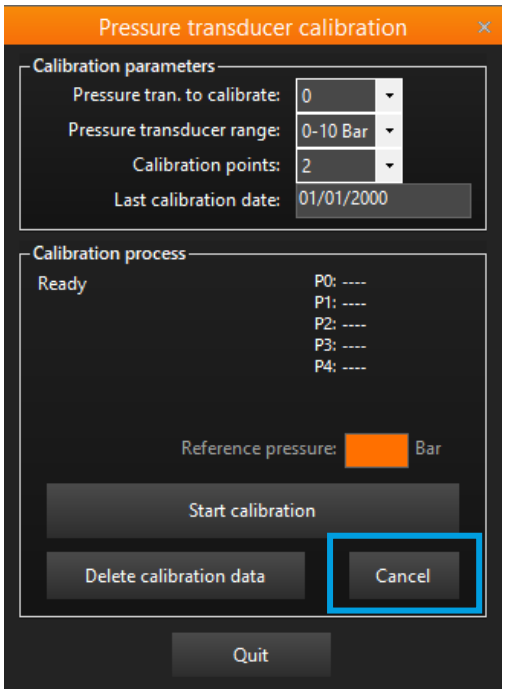


e. Calibration completed. Press the exit button to close the wizard.

4. "Delete calibration data": Deletes the last registered calibration.



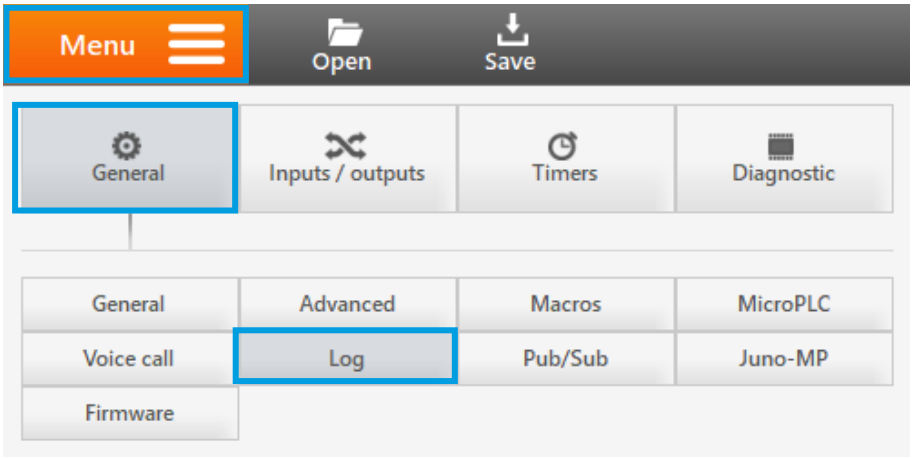
5. "Cancel": Closes the window.



19 - LOG

Interface to download the logs stored in the device's internal memory.

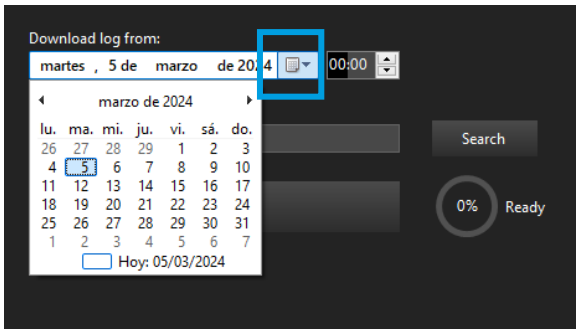
Access:



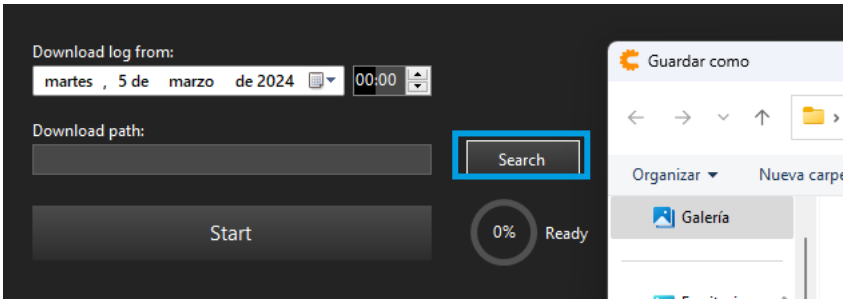
Menu → General → History

Downloading process:

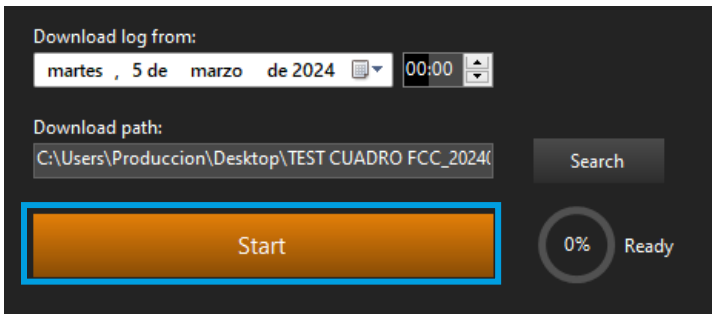
1. Select the date:



2. Press the "Search" button and select the PC path to download the CSV file with the registers.



3. Click on the "Start" button. Wait for the process to finish (100% complete).



The CSV file is automatically downloaded to the PC at the end of the process.

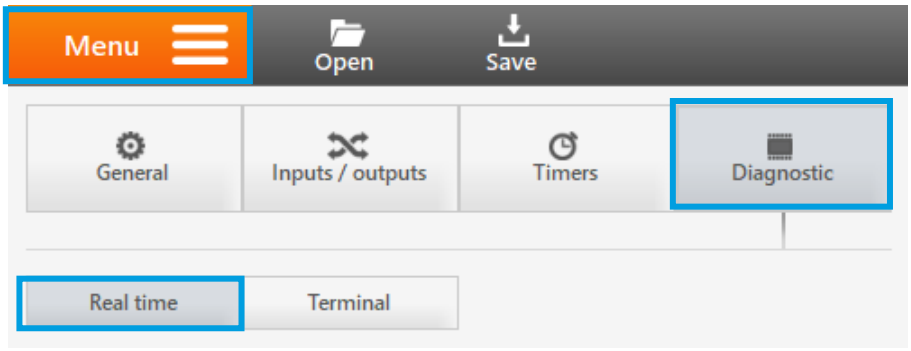
20 - REAL TIME

Screen showing the status of the different channels available on the device (inputs, outputs, registers, Modbus, etc.)

Especially useful when starting up a new installation, fault detection and diagnosis.

You must be connected to the device via USB/Bluetooth to be able to view the data in real time.

Access:



Menu → Diagnostics → Real time

Figure 20-1. "Real Time" screen for the Nemos N200+ device.

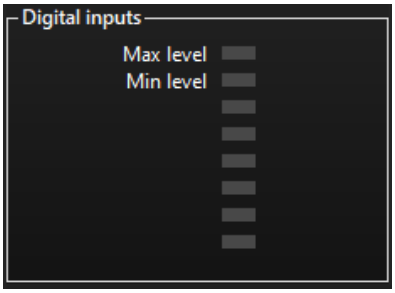
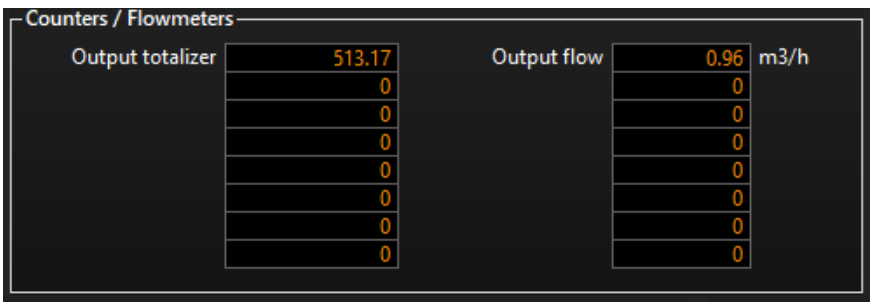
The form adapts to the device being configured and only shows the parameters available for that device.

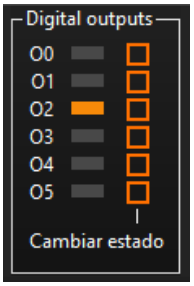
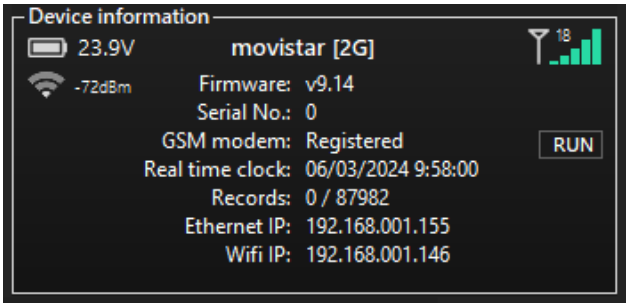
The ! character in any value displayed in real time indicates that it is invalid.

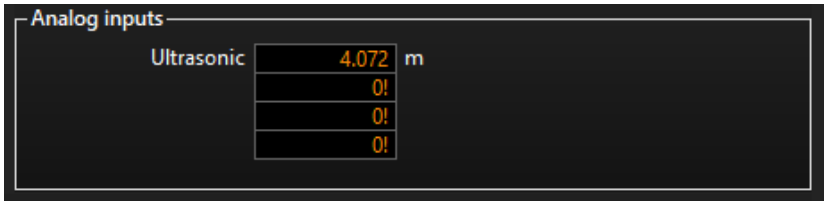
The reasons why a channel may be invalid are:

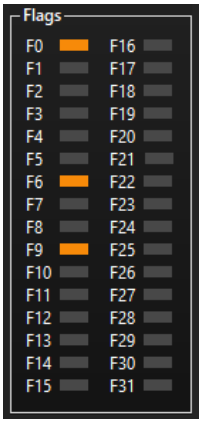
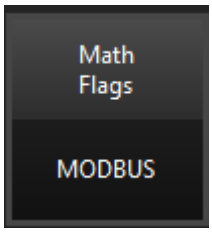
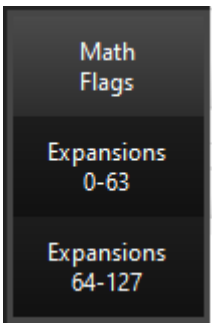
- MODBUS channel read failure.
- Reading fault in expansion channel or 1Wire probe.
- Loop break in analogue input 4/20mA.

Table 20-1. Real Time.

Item	Field	Description
1	Digital Inputs	Name and status of the configured digital inputs. Orange box: Activated. Grey box: Not activated.  The electrical state of the input is displayed rather than the logical one. Therefore, an entry configured as N.C. will be displayed identically to one configured as N.O.
2	Counters/flowmeters.	Name, value and unit of the configured counters and flowmeters 

Item	Field	Description
3	Digital outputs	Name and status of configured digital outputs. They can be activated and deactivated manually.  Right column: The status of the output can be manually changed by clicking on it. Left column: Monitors the status of the output (orange=activated, grey=deactivated).
4	Device information	A range of important parameters about the device with which communication has been established. See Section 4.3. 
5	Probes	Name, value and unit of the different Microcom probes connected to the device.  A reading of the value of the probe at that given time i obtained each time the "Update" button is pressed. "Update" button only available on Nemos range devices This automatically refreshes every 10 seconds i Hermes.

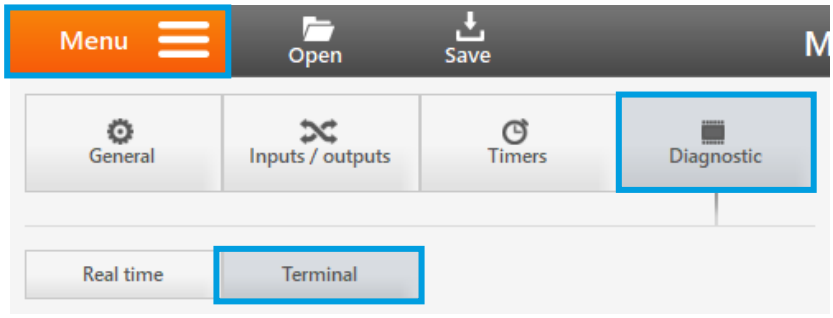
Item	Field	Description
6	Analogue inputs	Name, value and unit of the different analogue inputs connected to the device.   A reading of the value of the probe at that given time i obtained each time the "Update" button is pressed. "Update" button only available on Nemos devices. Thi automatically refreshes every second in Hermes.
7	Math registers	math register value. 
8	Math channels	Name, value and unit of the math channels. 

Item	Field	Description
9	Flags	Flags status. Orange box: Activated. Grey box: Not activated. 
	MODBUS Variables	Name, value and unit of the MODBUS channels. 
10	Expansions	Name, value and unit of the expansions.  

21 - TERMINAL

Section to interact with the Microcom device through a command interface and view traces of its operation.

Access:



Menu → Diagnostics → Terminal

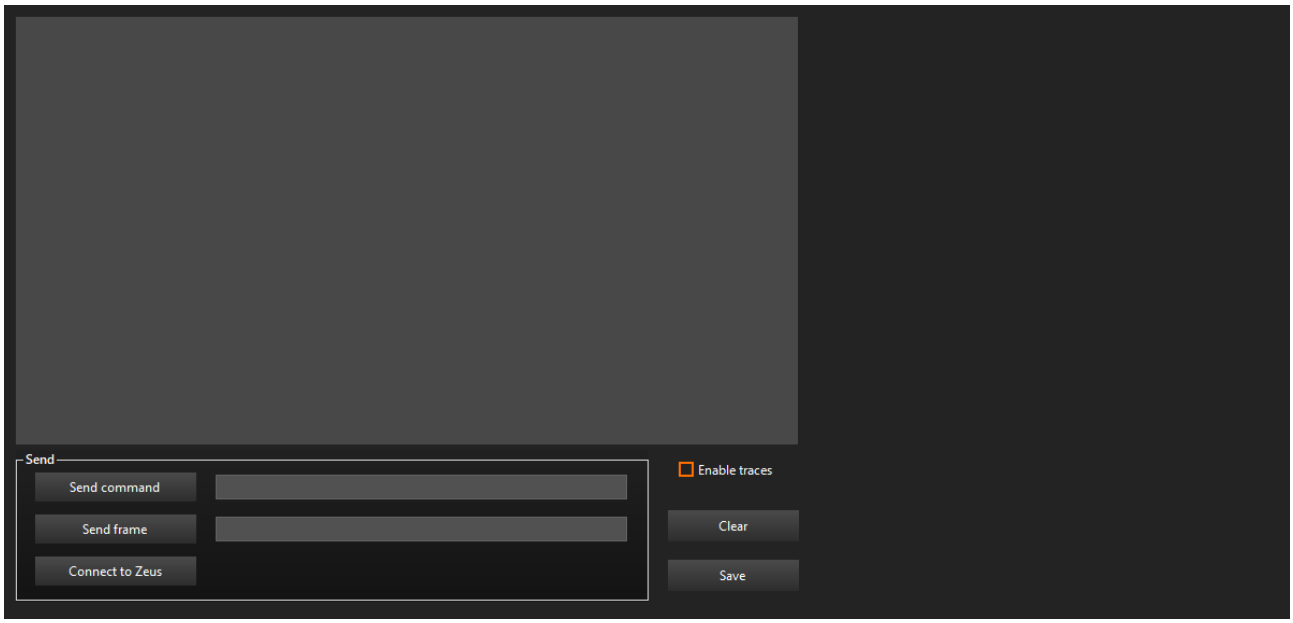


Figure 21-1. "Terminal" screen.

It provides the following functionalities:

Access to the traces of the operations executed by the device.

Sends configuration commands and frames.

Forces a connection to Zeus.

21.1 OPERATIONS TRACES

1. Check the "Enable traces" box to enable the output of traces.

Figure 21-2. "Enable traces" box.

2. Within a few seconds, messages about the status of the device will appear on the screen. These messages provide an important source of information about the operations that are executed (communications, reading inputs, etc.) as well as any errors that may occur.

3. Uncheck the "Enable traces" box to disable the output of traces.

21.2 SEND COMMANDS AND FRAMES

Microcom devices accept a wide variety of commands and frames that allow you to interact and configure the device by sending/replying to SMS messages and using this screen.

Using commands allows you to:

- Modify the status of the outputs.
- Change configuration parameters.
- etc.

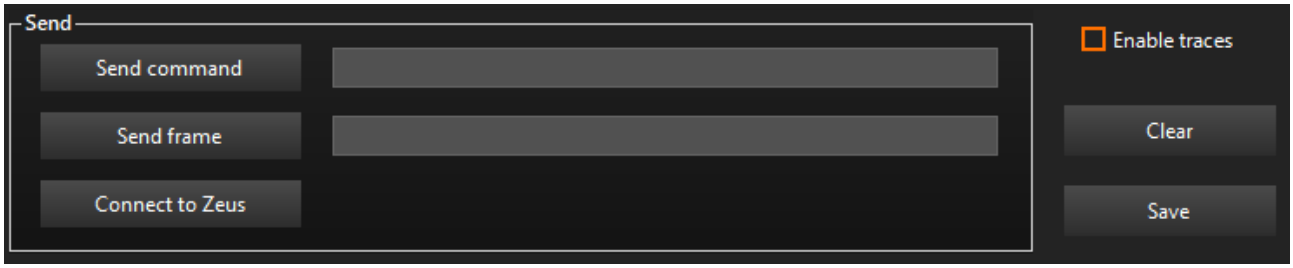
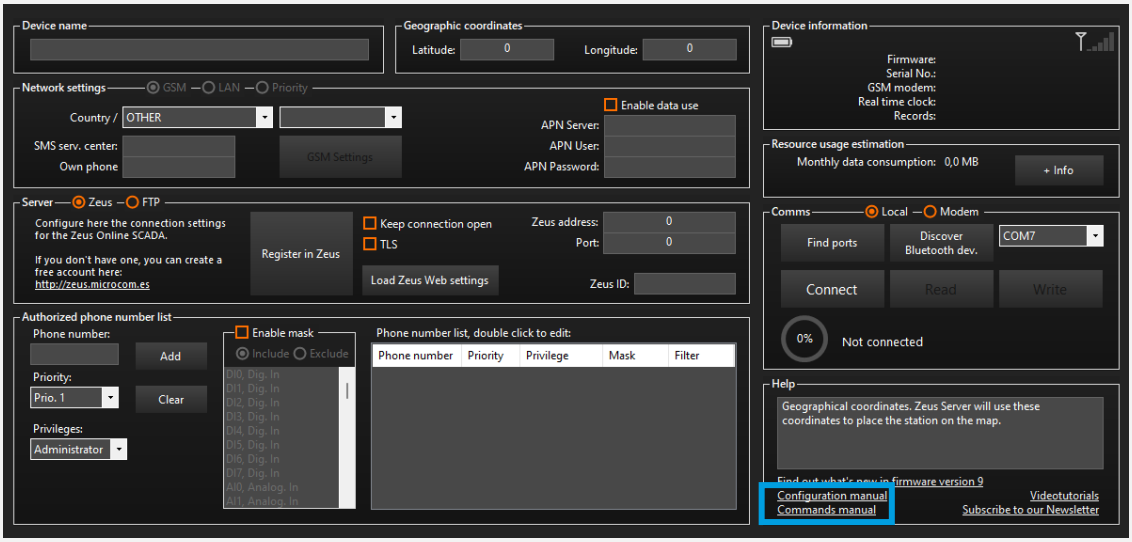


Figure 21-3. Details of the "Terminal" screen.

Table 21-1. Terminal.

Field	Description
Enable traces	Enables the display of the traces of operations and the information transmitted and received by the device on the console screen.
Send command	It sends the standard commands that are usually sent by SMS, but from the PC itself.
Send frame	Runs diagnostic commands and advanced configurations.
Connect to Zeus	Connects to Zeus server.
Delete	Deletes the contents of the console screen.
Save	Saves a copy of the traces displayed on the terminal in plain text format (.txt).

The complete commands manual can be found at the bottom left in the general menu of the configuration software and on the website: www.microcom360.com.



22 - FIRMWARE

Interface that allows you to update the firmware or operating system of the Microcom device.

Access:

Menu → General → Firmware

The firmware update process will completely clear device's configurations on device with firmware versions prior to version 8.82.

Ensure that the configurations are saved before starting the upgrade process.

Ensure that the appropriate firmware files for the model you want to update are used.

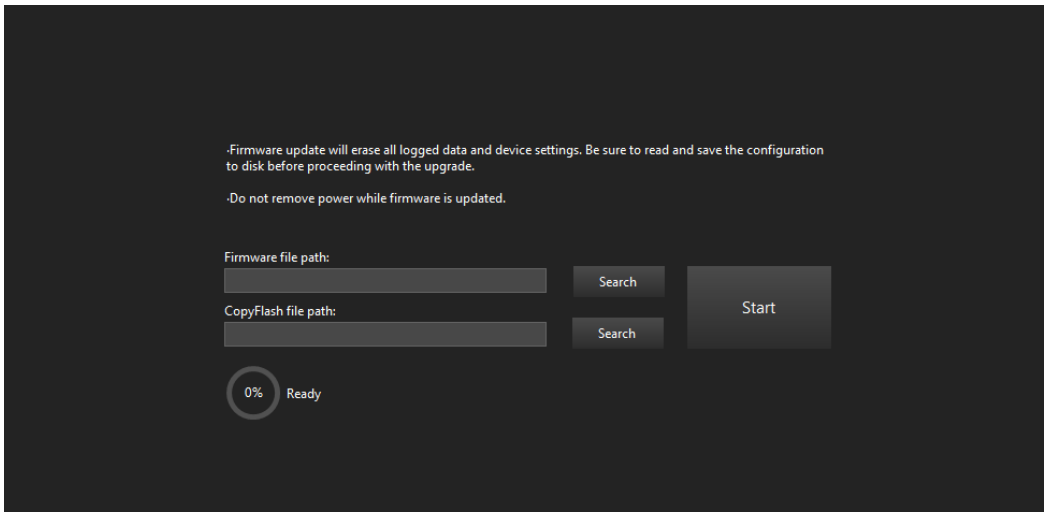


Figure 22-1. "Firmware for Nemos N200 model" screen.

22.1 DOWNLOAD FIRMWARE

Download the firmware from the following address:

1. www.microcom360.com, download area. Request the username and password from Microcom.
2. Select and the model of the Microcom device to be updated.
3. Find and click on the corresponding firmware file.

The file name consists of the word firmware followed by the model and version number.

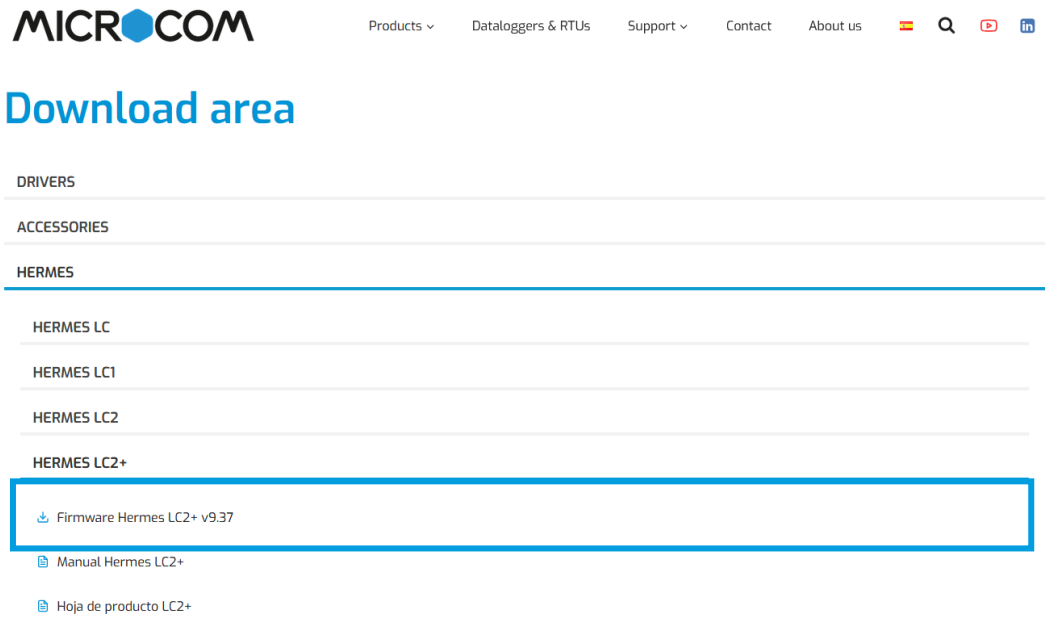


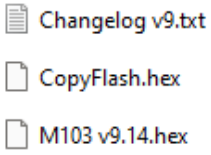
Figure 22-2. Example of firmware download for Hermes LC2 Plus model.

The downloaded file contains three elements:

Firmware.

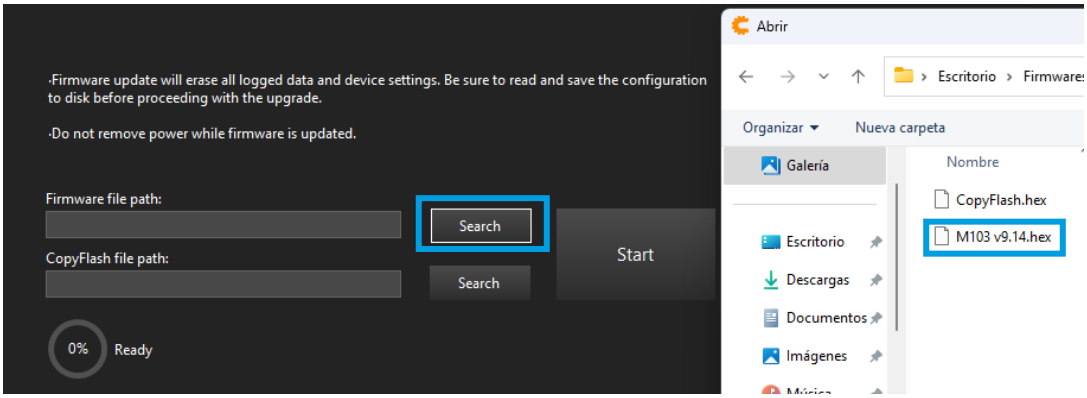
CopyFlash.hex file: Required for the built-in microcontroller configuration.

Informative text with the latest updates.

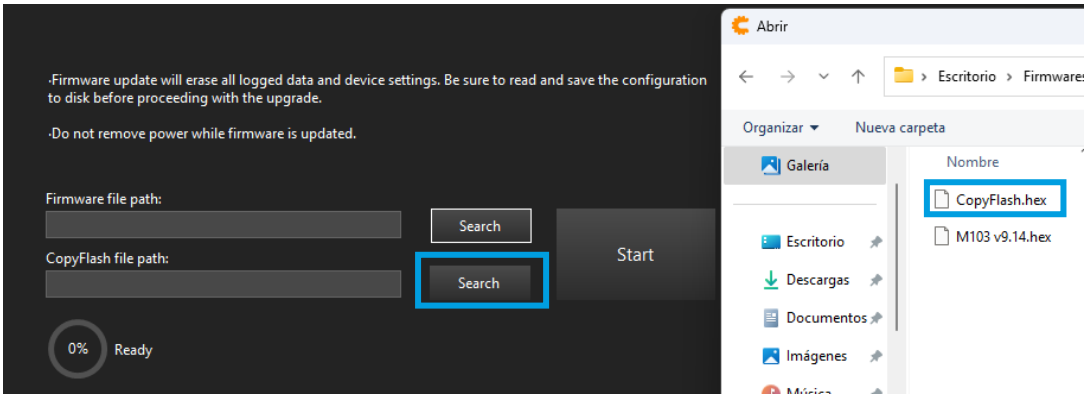


22.2 UPDATE DEVICE FIRMWARE

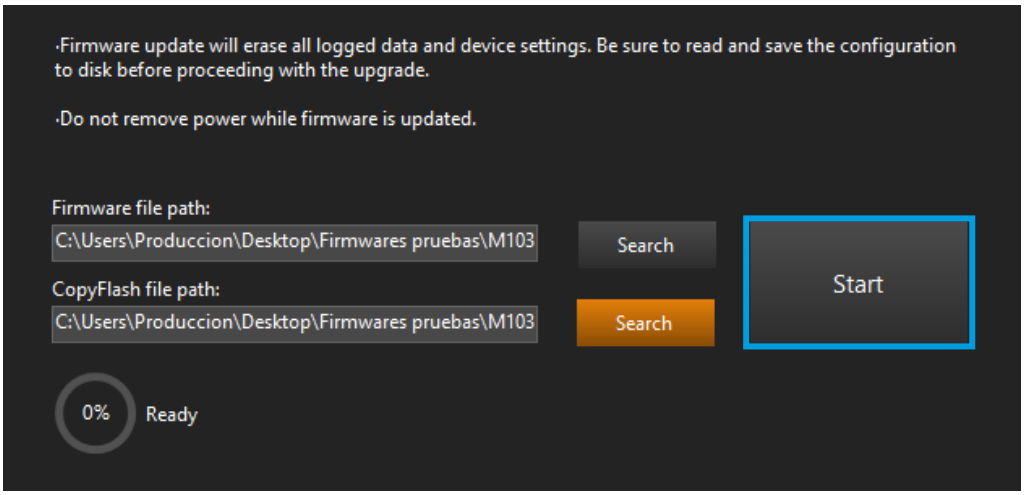
1. Select the new firmware to download to the device: Press the "Search" button and select the corresponding firmware file.



2. Select the CopyFlash.hex file: Press the "Search" button and select the corresponding CopyFlash file.



3. Press the "Start" button: The firmware update process will begin, showing the progress of the operation in the progress bar.



4. Wait for the process to finish: Once the firmware transfer to the device is complete, it starts the internal process of updating the code flash memory.

Power should not be interrupted until this operation is completed. The operation ends when the status LED starts flashing again.

The firmware update process can be performed:

In local mode, connecting it to a PC via the USB port.

In remote mode, via GSM data connection.

Remotely sending the UPDATE command (Available from firmware version 8.83)

23 - APPENDIX A: LIST OF ACTIONS

Microcom devices have a series of predefined actions that can take place under different circumstances:

From a timer.

By activating/deactivating digital inputs or flags.

By high/nominal/low level in analogue or similar inputs.

The actions are divided into two blocks, Common and All, to facilitate the search for the most used actions.

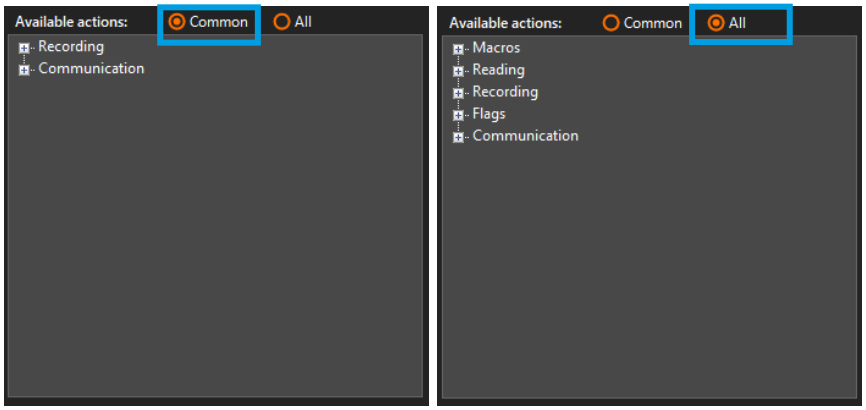


Figure 23-1. "Action selection" screen.

You can select up to 8 actions for each event that will run in the established order.

Add an action: a. Select the new action from the list of "Available Actions".

b. Press the "Add" button or double-click on the action.

The new action will appear in the "Actions to be executed" list.

Delete an action: a. Select the action to be deleted from the configured actions list.

b. Click the "Delete" button.

Actions with the * symbol are only maintained for backward compatibility.

NOT RECOMMENDED FOR USE

Differences between reading and registration:

Read: Takes a reading and transmits the result (if an alarm has gone off, etc.). The reading is not registered in the history memory and is therefore not sent to the Zeus platform.

Log: Takes a reading and saves the data in the history memory. These data will then be sent to the ZEUS platform, where they can be viewed.

Table 23-1. List of available actions.

Action	Description
X - Execute macro X	Executes macro number X.
41 – Send counters by SMS (*)	Obsolete, kept for compatibility purposes.
42 - Sync clock (*)	Synchronises the clock in real time with the time of the GSM network. Requires an SMS message to be sent.
43 - Turn on GSM for 5m (*)	Turns on the GSM MODEM for 5 minutes.
44 - Read analogue 0 group	Reads analogue 0 group channels.
45 - Read analogue 1 group	Reads analogue 1 group channels.
46 - Read analogue 2 group	Reads analogue 2 group channels.
46 - Read pressure	Nemos only. Reads the group of integrated pressure probes.
47 - Read analogue 3 group	Reads analogue 3 group channels.
48 - Send Zeus SMS (*)	Sends Zeus an SMS with the status of all inputs/outputs.
50 - Turn on GSM for 10m (*)	Turns on the GSM MODEM for 10 minutes. Useful for implementing the communication window.
51 - Turn on GSM for 20m (*)	Turns on the GSM MODEM for 20 minutes.
52 - Turn on GSM for 30m (*)	Turns on the GSM MODEM for 30 minutes.

Action	Description
53 – Register analogue group 0	Reads the analogue 0 channel group and logs it in the memory.
53 - Register pressure.	Nemos only. Reads the group of integrated pressure probes and logs it in the memory.
54 – Register analogue group 1	Reads the analogue 1 channel group and logs it in the memory.
55 – Register analogue group 2	Reads the analogue 2 channel group and logs it in the memory.
56 – Register analogue group 3	Reads the analogue 3 channel group and logs it in the memory.
57 – Register counter 0	Reads and logs in the memory the totalizing counter of digital input 0.
58 – Register counter 1	Reads and logs in the memory the totalizing counter of digital input 1.
59 – Register counter 2	Reads and logs in the memory the totalizing counter of digital input 2.
60 – Register counter 3	Reads and logs in the memory the totalizing counter of digital input 3.
61 – Register counter 4	Reads and logs in the memory the totalizing counter of digital input 4.
62 – Register counter 5	Reads and logs in the memory the totalizing counter of digital input 5.
63 – Register counter 6	Reads and logs in the memory the totalizing counter of digital input 6.
64 – Register counter 7	Reads and logs in the memory the totalizing counter of digital input 7.
65 – Register flow 0 and 1	Reads the flowmeters in digital inputs 0 and 1 and logs it in the memory. The flow rate is logged in pairs for memory optimisation reasons.
66 – Register flow 2 and 3	Reads the flowmeters in digital inputs 2 and 3 and logs it in the memory. The flow rate is logged in pairs for memory optimisation reasons.
67 – Register flow 4 and 5	Reads the flowmeters in digital inputs 4 and 5 and logs it in the memory. The flow rate is logged in pairs for memory optimisation reasons.

Action	Description
68 – Register flow 6 and 7	Reads the flowmeters in digital inputs 6 and 7 and logs it in the memory. The flow rate is logged in pairs for memory optimisation reasons.
70 - Read all MODBUS	Reads all configured MODBUS channels.
71 - Read MODBUS group 0	Reads the MODBUS 0 channel group.
72 - Read MODBUS group 1	Reads the MODBUS 1 channel group.
73 - Read MODBUS group 2	Reads the MODBUS 2 channel group.
74 - Read MODBUS group 3	Reads the MODBUS 3 channel group.
75 - Register MODBUS group 0	Reads and logs in the memory the MODBUS 0 group of channels.
76 - Register MODBUS group 1	Reads and logs in the memory the MODBUS 1 group of channels.
77 - Register MODBUS group 2	Reads and logs in the memory the MODBUS 2 group of channels.
78 - Register MODBUS group 3	Reads and logs in the memory the MODBUS 3 group of channels.
79 - Connect/refresh data in Zeus	Connects to Zeus server.
80 – Register Alarm	Take a reading and save the data in the history memory to register an "Alarm".
89 - Download history to ftp	Connects to the FTP server to download history.
90 - Read math channel 0	Reads math channel 0.
91 - Read math channel 1	Reads math channel 1.
92 - Read math channel 2	Reads math channel 2.
93 - Read math channel 3	Reads math channel 3.
94 – Register math channel 0	Reads math channel 0 and logs it in the memory.
95 – Register math channel 1	Reads math channel 1 and logs it in the memory.
96 – Register math channel 2	Reads math channel 2 and logs it in the memory.
97 – Register math channel 3	Reads math channel 3 and logs it in the memory.
98 - Register probe 0	Reads the temperature or humidity probe 0 and logs it in the memory.

Action	Description
99 - Register probe 1	Reads the temperature or humidity probe 1 and logs it in the memory.
100 - Register probe 2	Reads the temperature or humidity probe 2 and logs it in the memory.
101 - Register probe 3	Reads the temperature or humidity probe 3 and logs it in the memory.
102 - Register digital input 0	Reads digital input 0 and logs it in the memory.
103 - Register digital input 1	Reads digital input 1 and logs it in the memory.
104 - Register digital input 2	Reads digital input 2 and logs it in the memory.
105 - Register digital input 3	Reads digital input 3 and logs it in the memory.
106 - Register digital input 4	Reads digital input 4 and logs it in the memory.
107 - Register digital input 5	Reads digital input 5 and logs it in the memory.
108 - Register digital input 6	Reads digital input 6 and logs it in the memory.
109 - Register digital input 7	Reads digital input 7 and logs it in the memory.
110 - Register expansion group 0	Reads expansion group 0 and logs it in the memory.
111 - Register expansion group 1	Reads expansion group 1 and logs it in the memory.
112 - Register expansion group 2	Reads expansion group 2 and logs it in the memory.
113 - Register expansion group 3	Reads expansion group 3 and logs it in the memory.
114 - Register expansion group 4	Reads expansion group 4 and logs it in the memory.
115 - Register expansion group 5	Reads expansion group 5 and logs it in the memory.
116 - Register expansion group 6	Reads expansion group 6 and logs it in the memory.
117 - Register expansion group 7	Reads expansion group 7 and logs it in the memory.
118 - Register expansion group 8	Reads expansion group 8 and logs it in the memory.

Action	Description
119 - Register expansion group 9	Reads expansion group 9 and logs it in the memory.
120 - Register expansion group 10	Reads expansion group 10 and logs it in the memory.
121 - Register expansion group 11	Reads expansion group 11 and logs it in the memory.
122 - Register expansion group 12	Reads expansion group 12 and logs it in the memory.
123 - Register expansion group 13	Reads expansion group 13 and logs it in the memory.
124 - Register expansion group 14	Reads expansion group 14 and logs it in the memory.
125 - Register expansion group 15	Reads expansion group 15 and logs it in the memory.
126 - Read math channel 4	Reads math channel 4.
127 - Read math channel 5	Reads math channel 5.
128 - Read math channel 6	Reads math channel 6.
129 - Read math channel 7	Reads math channel 7.
130 - Read math channel 8	Reads math channel 8.
131 - Read math channel 9	Reads math channel 9.
132 - Read math channel 10	Reads math channel 10.
133 - Read math channel 11	Reads math channel 11.
134 - Read math channel 12	Reads math channel 12.
135 - Read math channel 13	Reads math channel 13.
136 - Read math channel 14	Reads math channel 14.
137 - Read math channel 15	Reads math channel 15.
138 – Register math channel 4	Reads math channel 4 and logs it in the memory.
139 – Register math channel 5	Reads math channel 5 and logs it in the memory.
140 – Register math channel 6	Reads math channel 6 and logs it in the memory.
141 – Register math channel 7	Reads math channel 7 and logs it in the memory.

Action	Description
142 – Register math channel 8	Reads math channel 8 and logs it in the memory.
143 – Register math channel 9	Reads math channel 9 and logs it in the memory.
144 – Register math channel 10	Reads math channel 10 and logs it in the memory.
145 – Register math channel 11	Reads math channel 11 and logs it in the memory.
146 – Register math channel 12	Reads math channel 12 and logs it in the memory.
147 – Register math channel 13	Reads math channel 13 and logs it in the memory.
148 – Register math channel 14	Reads math channel 14 and logs it in the memory.
149 – Register math channel 15	Reads math channel 15 and logs it in the memory.
150 - Read digital probe 0	Reads the temperature or humidity probe 0.
151 - Read digital probe 1	Reads the temperature or humidity probe 1.
152 - Read digital probe 2	Reads the temperature or humidity probe 2.
153 - Read digital probe 3	Reads the temperature or humidity probe 3.
154 - Register event	Take a reading and save the data in the history memory to register an "Event".
155 - Register probe 4	Reads the temperature or humidity probe 4 and logs it in the memory.
156 - Register probe 5	Reads the temperature or humidity probe 5 and logs it in the memory.
157 - Register probe 6	Reads the temperature or humidity probe 6 and logs it in the memory.
158 - Register probe 7	Reads the temperature or humidity probe 7 and logs it in the memory.
159 - Obtain GSM tracker	Tracks using GSM mobile masts. Accuracy up to 200 metres. Only in compatible models.
160 – Activate flag 0	Activate (equals 1) flag number 0. Equivalent command: F0=1.

Action	Description
161 – Activate flag 1	Activate (equals 1) flag number 1. Equivalent command: F1=1.
162 – Activate flag 2	Activate (equals 1) flag number 2. Equivalent command: F2=1.
163 – Activate flag 3	Activate (equals 1) flag number 3. Equivalent command: F3=1.
164 – Deactivate flag 0	Deactivate (equals 0) flag number 0. Equivalent command: F0=0.
165 – Deactivate flag 1	Deactivate (equals 0) flag number 1. Equivalent command: F1=0.
166 – Deactivate flag 2	Deactivate (equals 0) flag number 2. Equivalent command: F2=0.
167 – Deactivate flag 3	Deactivate (equals 0) flag number 3. Equivalent command: F3=0.
168 – Register math channels group 0	Reads and logs the group 0 math channels.
169 – Register math channels group 1	Reads and logs the group 1 math channels.
170 – Register math channels group 2	Reads and logs the group 2 math channels.
171 – Register math channels group 3	Reads and logs the group 3 math channels.
172 – Register math channels group 4	Reads and logs the group 4 math channels.
173 – Register math channels group 5	Reads and logs the group 5 math channels.
174 – Register math channels group 6	Reads and logs the group 6 math channels.
175 – Register math channels group 7	Reads and logs the group 7 math channels.

24 - APPENDIX B: MATH OPERATORS

From version v9.14 onwards:

Compatibility with all listed operators is ensured.

Backward compatibility with the operators of previous versions is ensured.

24.1 ARITHMETICAL OPERATORS.

Table 24-1. Arithmetical operators.

Field	Description
+	Add.
-	Subtract.
*	Multiplication.
/	Division.
^	Enhancement.
\	Module. Integer of a division.
SQRT( )	Square root.

24.2 MATH CONSTANTS.

Table 24-2. Math constants.

Field	Description
TRUE	Equivalent to a logical 1.
FALSE	Equivalent to a logical 0.
PI	PI Number.
E	The number “e”, Euler's number.

24.3 OTHER OPERATORS AND FUNCTIONS.

Table 24-3. Other operators and functions.

Field	Description
SIN( )	Sine.
ASIN( )	Arc sine.
COS( )	Cosine.
ACOS( )	Arc cosine.
TAN( )	Tangent.
ATAN( )	Arc Tangent.
EXP( )	Exponentiation.
LOG( )	Decimal logarithm.
LN( )	Neperian logarithm.
ABS( )	Absolute value.
INT( )	Returns the integer part of a value.
FRAC( )	Returns the decimal part of a value.
RAND	Random number generator. Range: 0... 1.
DELAY	Generates a delay of 1 second.

24.4 COMPARISON FUNCTIONS.

Table 24-4. Comparison functions.

Field	Description
MIN(n1,n2)	Compares two values (n1 and n2) and returns the lowest value.
MAX(n1,n2)	Compares two values (n1 and n2) and returns the highest value.

24.5 COMPARISON OPERATORS

Table 24-5. Comparison operators.

	Description	*Example	Result example
>	More than	FLAG = LEVEL > 3	If “LEVEL” is greater than 3, “FLAG” will obtain the value 1. If “LEVEL” is less than 3, it will obtain the value 0.
<	Less than	FLAG = LEVEL < 4	If “LEVEL” is less than 4, “FLAG” will obtain the value 1. If “LEVEL” is greater than 4, it will obtain the value 0.
=	Equal to	FLAG = LEVEL = 2	If “LEVEL” is equal to 2, “FLAG” will obtain the value 1. If “LEVEL” is other than 2, it will obtain the value 0.
>=	Greater than or equal to	FLAG = LEVEL >= 3	If “LEVEL” is greater than or equal to 3, “FLAG” will obtain the value 1. If “LEVEL” is less than 3, it will obtain the value 0.
<=	Less than or equal to	FLAG = LEVEL <= 4	If “LEVEL” is less than or equal to 4, “FLAG” will obtain the value 1. If “LEVEL” is greater than 4, “ it will obtain the value 0.
<>	Other than	FLAG = LEVEL <> 5	If “LEVEL” is other than 5, “FLAG” will obtain the value 1. If “LEVEL” is equal to 5, it will obtain the value 0.

*In the examples, the variables are assumed to have been previously declared and that FLAG is a BOOL type, and the LEVEL variable is a REAL type.

24.6 LOGICAL OPERATORS

Table 24-6. Logical operators

	Description	*Example	Result example
NOT	Reverses the result of the expression that follows immediately	FLAG = NOT OVERFLOW	If "OVERFLOW" is equal to 0, "FLAG" will obtain the value 1. If "OVERFLOW" is equal to 1, "FLAG" will obtain the value 0.
		DO1 = NOT(LEVEL>3.25)	If "LEVEL" is greater than 3.25, DO1 will obtain the value 0. If "LEVEL" is less than or equal to 3.25, DO will obtain the value 1.
AND	Logical AND	FLAG = OVERFLOW AND PUMP_ON	If "OVERFLOW" is equal to 1 and PUMP_ON is equal to 1, "FLAG" will obtain the value 1.
OR	Logical OR	FLAG = OVERFLOW OR PUMP_ON	If "OVERFLOW" is equal to 1 or PUMP_ON is equal to 1, "FLAG" will obtain the value 1.
&	Binary AND	A = B & C	If B=0101 and C=1100, A = 0100 0101 & 1100 -------- 0100
|	Binary inclusive OR	A = B | C	If B=0101 and C=1100, A = 0100 0101 | 1100 -------- 1101
~	Supplements one. Each bit that is 1 in the operand is 0 in the result, and vice versa.	A = ~B	If B contains the value 39 (00100111 in binary), A will contain the value 216 (11011000 in binary).
>>n	Bit offset "n" positions to the right	TEMP = LEVEL >> 2	If LEVEL contains the value 8 (1000 in binary), TEMP will

	Description	*Example	Result example
			contain the value 2 (0010 in binary).
<<n	Bit offset "n" positions to the left	TEMP = LEVEL << 1	If LEVEL contains the value 2 (0010 in binary), TEMP will contain the value 4 (0100 in binary).

* In the examples, the variables are assumed to have been previously declared and that "FLAG", "OVERFLOW" and "PUMP_ON" are assumed to be BOOL type, and the variables "LEVEL" and "TEMP" to be REAL type.

24.7 STATUS OPERATORS

Table 24-7. Status operators

Field	Description
PWR.VIN	Returns the external supply voltage.
PWR.VBAT	Returns the voltage value from the internal battery with the highest voltage. Compatible with all Nemos models.
PWR.VBAT1	Returns the voltage value of the internal battery connected to port 1. Compatible with Nemos N200 and N200+.
PWR.VBAT2	Returns the voltage value of the internal battery connected to port 2. Compatible with Nemos N200 and N200+.
PWR.FAIL	Returns 1 in the event of a power outrage and the device is running off its internal battery. Compatible with Hermes LC2+ and TCR210.
PWR.BL	(Battery Life) Returns a value between 0 and 2 (included), which represents the status of the internal battery in a colour code, where: 0=Green (OK), 1=Orange (less than 3 months), 2=Red (Out of stock). In the case of two battery packs, it shows the one with the best status. Compatible with all Nemos models.
GSM	RSSI or GSM signal field strength. The device returns a numeric value between 1 and 32. The recommended minimum is 8. Conversion equation to dBm: dBm = -113 + N * 2 (where N is the return value)
STAT.MBCE	Returns a 1 if there is a MODBUS communication error.
STAT.EXCE	Returns a 1 if there is a communication error with expansion modules.

Field	Description
STAT.PBCE	Returns a 1 if there is a communication error with the Microcom STDV01/STDV02 digital probes.
TEMP	The device's internal temperature. Compatible with all Nemos models.

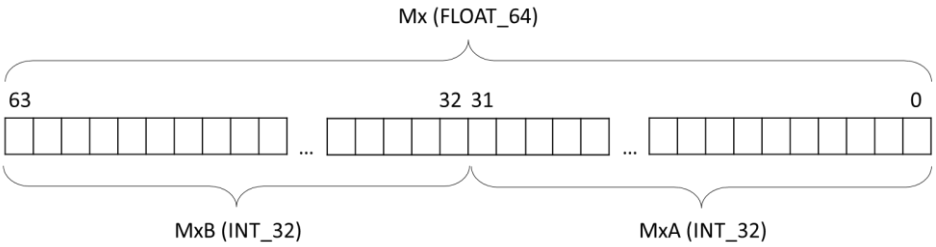
24.8 DATE AND TIME OPERATORS.

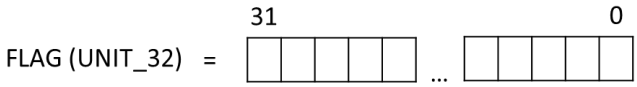
Table 24-8. Date and time operators.

Field	Description
NOW.Y	Returns a four-digit number representing the current year.
NOW.MO	Returns a number between 1 and 12 (inclusive), representing the month of the current year.
NOW.D	Returns a number between 1 and 31 (inclusive), representing the day of the current month.
NOW.WD	Returns a number between 0 and 6 (inclusive), representing the day of the week: Monday = 0 / Tuesday = 1 / Wednesday = 2 / Thursday = 3 / Friday = 4 / Saturday = 5 / Sunday = 6
NOW.YD	Returns a number between 1 and 366 (included), representing the day of the current year.
NOW.HHMM	Returns the current time of day in 24h format: HH: Returns a number between 0 and 23 (included). MM: Returns a number between 0 and 59 (included).
NOW.SOD	(Seconds Of Day). Returns a number between 0 and 86399 (inclusive), representing the elapsed seconds of the current day.
SUMMER	Returns a number between 0 and 1 (included), indicating the time change: 0=Winter, 1=Summer
SUNRISE	Returns a number between 0 and 86399 (included), which represents the time sunrise takes place for the current day in seconds for the configured geographical coordinates (astronomical clock).
SUNSET	Returns a number between 0 and 86399 (included), which represents the time sunset takes place for the current day in seconds for the configured geographical coordinates (astronomical clock).

24.9 INPUT AND OUTPUT OPERATORS

Table 24-9. Input and output operators

Inputs and outputs	Description
Mx	Value of the math register x. A math register is a 64-bit double-precision floating-point variable. They are non-volatile variables, and their values are not lost if the electrical flow is interrupted. MICROPLC-II compatible devices have 32 math Logs.
MxA MxB	Each 64-bit double-precision floating-point math register can be used as two 32-bit signed integer math register. Where MxA is the 32 bits with the lowest weight and MxB is the 32 bits with the highest weight. This doubles the number of math registers available.  Example: M0A = M0A + 1 M0B = M0B + 1
Fx	Flag x status.

<table>
<tr><td>FLAG</td><td>Word containing the status of the device's 32 Flags. In binary representation, the least significant bit corresponds to FLAG 0 and the most significant bit corresponds to FLAG 31.
 

<table>
<tr><th>Active flag</th><th>Decimal</th><th>Binary</th></tr>
<tr><td>None</td><td>0</td><td>0000 0000 0000 0000 0000 0000 0000 0000</td></tr>
<tr><td>0</td><td>1</td><td>0000 0000 0000 0000 0000 0000 0000 0001</td></tr>
<tr><td>1</td><td>2</td><td>0000 0000 0000 0000 0000 0000 0000 0010</td></tr>
<tr><td>2</td><td>4</td><td>0000 0000 0000 0000 0000 0000 0000 0100</td></tr>
<tr><td>…</td><td>…</td><td>…</td></tr>
<tr><td>29</td><td>536.870.912</td><td>0010 0000 0000 0000 0000 0000 0000 0000</td></tr>
<tr><td>30</td><td>1.073.741.824</td><td>0100 0000 0000 0000 0000 0000 0000 0000</td></tr>
<tr><td>31</td><td>2.147.483.648</td><td>1000 0000 0000 0000 0000 0000 0000 0000</td></tr>
</table>
Example:
If Flag 1 (second bit activated) and Flag 4 (fifth bit activated) are activated, the word FLAG returns an 18: FLAG = 18 (10010 binary)</td></tr>
<tr><td>DIx</td><td>Digital input status x.</td></tr>
<tr><td>DIx.AC</td><td>Accumulated time in seconds that the digital input x has been activated (hour count).</td></tr>
<tr><td>DIx.T</td><td>Activation time in seconds since the last activation with digital input x.</td></tr>
<tr><td>DIx.H</td><td>True if the digital input x is in an active state, according to the NO/NC configuration of that input.</td></tr>
<tr><td>DIx.L</td><td>True if the digital input x is in an inactive state, according to the NO/NC configuration of that input.</td></tr>
<tr><td>CNTx</td><td>Raw value without conversion of counter x.</td></tr>
<tr><td>CNTx.H</td><td>16 bits heavier than the raw value without conversion of the counter x.</td></tr>
<tr><td>CNTx.L</td><td>16 bits lighter than the raw value without conversion of the counter x.</td></tr>
<tr><td>CNTx.M3</td><td>Value converted to cubic metres of the counter x.</td></tr>
<tr><td>DAYFLOW(x)</td><td>Value in cubic metres of the volume accumulated over 24hrs of the flowmeter x. Start time 12 a.m. and end time 11.59 p.m.</td></tr>
</table>

FRx	Flow value x.
FRx.IM	Instantaneous value of the flow x.
DIP	Status of the digital input port. This allows you to read the status of several digital inputs at once by adding their decimal values. In binary representation, the least significant bit is digital input 0 and the most significant bit is digital input 7.

Digital input active	Decimal	Binary
none	0	0000 0000
0	1	0000 0001
1	2	0000 0010
2	4	0000 0100
3	8	0000 1000
4	16	0001 0000
5	32	0010 0000
6	64	0100 0000
7	128	1000 0000

Example: If digital inputs 1 (2 decimal) and 4 (16 decimal) are enabled, the DIP identifier returns an 18: DIP=18 (0001 0010 in binary).

AIx	Converted value of analogue input x.
AIx.MA	Value in milliamperes of the current in the loop of analogue input x.
AIx.VLD	Validity flag of analogue input x. It will return 1 if the current in the loop is greater than 3.8mA.
DOx	Status of digital output x.

DOP

Digital output port status. Returns the status of several digital outputs at once by adding their decimal values. In binary representation, the least significant bit is digital output 0 and the most significant bit is digital output 7.

Digital output active	Decimal	Binary
none	0	0000 0000
0	1	0000 0001
1	2	0000 0010
2	4	0000 0100
3	8	0000 1000
4	16	0001 0000
5	32	0010 0000
6	64	0100 0000
7	128	1000 0000

Example: If digital outputs 2 (4 decimal) and 3 (8 decimal) are enabled, the DOP operator returns a 12: DOP=12 (0000 1100 in binary).

AOx	Value of analogue output x.
AOx.MA	Value in milliamperes of the current in the loop of analogue output x.
MBx	Value of the MODBUS x channel.
MBx.VLD	Validity flag of the MODBUS x channel. It will return 1 if the reading is successful.
MBIRx	Value of the MODBUS INPUT REG x.
EXPx	Value of the expansion x.
EXPx.T	Activation time in seconds since the last activation with expansion x in digital input mode.
EXPx.H	True if the expansion x in digital input mode is in an active state, according to the NO/NC configuration of that input. This is equivalent to EXPx and is provided to maintain consistency with the digital inputs of the main module (DIx.H).

EXPx.VLD	Validity flag of the expansion x. It will return 1 if the reading is successful. The value in the loop for analogue expansions in current mode must also be greater than 3.8mA in order for the signal to be considered valid.
PBx	Probe value 1-wire x.
PBx.VLD	Probe validity flag 1-wire x. It will return 1 if the reading is successful.
ALM_CCx.PROP	Check and set alarms. Where CCx is the abbreviation of the corresponding channel and PROP is the property to be modified.

24.10 CHECK AND SET ALARMS (ALM_CCX.PROP)

Table 24-10. Configure alarms.

	Description
ALM_DIx	Digital input alarm x.
ALM_AIx	Analogue input alarm x.
ALM_FRx	Flowmeter alarms x.
ALM_MBx	MODBUS channel alarms x.
ALM_PBx	MICROCOM probe alarms (STDV01 and STDV02) x.
ALM_EXPx	Expansion channel alarms x.

Check and modify channel alarms with digital values. Table 24-11. Channel alarms with digital values.

	Prop.	Description	Type
ALM_DIx ALM_MBx ALM_EXPx	PH	Reading and writing. Persistence. Time in seconds that the digital signal must be in the active state for the alarm to go off. Maximum persistence: 65535 seconds.	INT
	PL	Reading and writing. Reset Time in seconds for the alarm to reset (become active again) after going off. Maximum reset time: 65535 seconds.	INT

Check and modify channel alarms with analogue values.

Table 24-12. Channel alarms with analogue values

	Prop.	Description	Type
ALM_AIx ALM_FRx ALM_MBx ALM_PBx ALM_EXPx	MAX	Reading and writing. Maximum threshold. The value above which the alarm goes off.	REAL
	MIN	Reading and writing. Minimum threshold. The value below which the alarm goes off.	REAL
	HYS	Reading and writing. Hysteresis or "Dead Band". Difference between alarm and reset threshold.	INT
	PER	Reading and writing. Persistence. The amount of time the signal must be out of range before the alarm goes off. Maximum persistence: 65535 reading cycles (Expressed in seconds, unless otherwise indicated).	INT

Check and modify alarms in the different configurations (optional).

Each interface can have up to 4 independent alarm configurations identified as: 0, 1, 2 and 3, and each of them is accessed by specifying the alarm number in the corresponding property, for example: "MAX1" corresponds to configuration 1. If the alarm configuration number is not specified, number 0 is considered to be configured.

The stop command to set the maximum threshold value of the alarm configuration 1 of the analogue input 3 in 4.15 would be:

ALM_AI3.MAX1=4.15

25 - APPENDIX C: MODBUS MEMORY MAP

Memory map of Microcom devices in slave/server mode.

Table 25-1. User Channels.

Register address	Description	Access (l/e)	Data type
30.001	User Channel 0	Reading/Writing	16 bits
30.002	User Channel 1	Reading/Writing	16 bits
…	…	…	…
30.063	User Channel 62	Reading/Writing	16 bits
30.064	User Channel 63	Reading/Writing	16 bits

Use the command MBIRX=Y to write in the user channels.

X: Number of the user channel.

Y: Numeric value or value of a channel.

The MicroPLC-II manual shows how to configure the MODBUS map to slave mode.

Table 25-2. MODBUS channels

Register address	Description	Access (l/e)	Data type
40.001	MODBUS 0 channel	Reading/Writing	16 bits
40.002	MODBUS 1 channel	Reading/Writing	16 bits
…	…	…	…
40.127	MODBUS 126 channel	Reading/Writing	16 bits
40.128	MODBUS 127 channel	Reading/Writing	16 bits

Can only be written in MODBUS channels from the master/client.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