TECHNICAL INSTRUCTIONS

Digital recording module and interconnection for the management of monitoring systems, device management and data recording

G802_instr_eng_0.1.5/22

CE

INDICE

General Characteristics

- Power supply: 12 VDC.
- Power current: 30 µA standby;
- Working temperature range: da -20° a +70°C;
- IP protection: defined by used pack;
- Dimensions: 159 x 110 x 54 mm;
- Weight: 500 g. appr.;
- Local digtal inputs: 2 Channels, Trigger / pulse counter;
- Local analogue inputs: 2 Channels, 4-20 mA / 0-3 Vdc / 0-10 Vdc;
- Local digital outputs: 2 Alarms, relais output max 24 Vac/Vdc 1A
  2 output supplies, 12V 0,5 A;
- Communication ports: • 1 Ethernet • 2 RS485 optocoupled • 2 RS232 • 1 uart TTL • 1 WiFi
- User interface: display LCD with backlight 128 x 64 keyboard a 12 switches;
- Internal clock: with lithium battery 3V;
- Memories: SDcard, internal NAND;
- Sampling rate: 1/59 min - 1/23 hours - 1/10 days;
- Data storage: • via SDcard • via GPRS / UMTS • via Ethernet • Internal NAND memory • Wi-Fi
- Ethernet connections: Local web server for remote control access;
  SSH local server (encrypted FTP access to the module);
  FTP Client (automatic download of data to an FTP server);
- Alarm and notify emails;
- Data download rate: 1 / 59 min. - 1 / 23 hours - 1 / 10 days;
- Number of acquisitions: More than 2.000.000 in maximum configuration;
- Read/write memory access: 1 MHz;
- Data backup: SDcard or internal NAND;
- Backup rate range: 1 / 365 gg;

CURRENT SUPPLY

- Full system functionality: All features are always available. Average current supply 60 mA.
- Low power: All system functions are only available at certain times of the day.
  Periods of full functionality may be daily or hourly. Standby current supply 30 µa.
- Ultra low power supply: Complete system functionality only during acquisitions.
  Average current supply 30 µa.

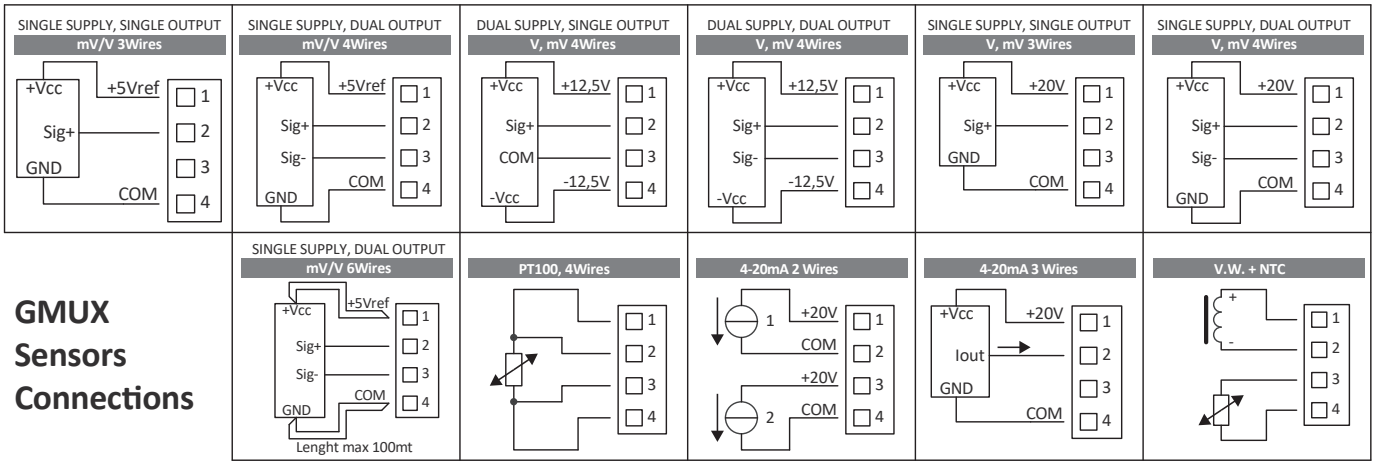
(G)MUX Characteristics

- Voltage supply: 12 VDC. Optional 110/220 Vac or solar panel kit;
- Current supply: • cable connected 1. external 0µA (zero) 2. Internal with local battery 320 µA
  3. Internal with BSM 0µA (zero)
  • radio connection 30 µA
- Working temperature range: da -20° a +70° C;
- IP protection: defined by used rack;

- Number of channels (G)MUX:	4+4	8+8	12 +12	16+16
- Dimensions (mm):	48	72	97	122 x 101 x 119
- Weight (gr):	277	405	533	656

- Supported input signals: V, mV/V, 4/20 mA, VW, Pt 100, NTC;
- N° of multiplexers supported : up to 254 for each RS485 port, max. 508;
- N° of supported channels: up to 32 per MUX, max. 16320;
- Acquisitions resolutions: 24 bit: • V • mV/V • 4/20 mA • Pt 100 • NTC;
  0.1Hz: • vibrating wire;
- Sensors power supply: +20 V, +12 V, +/-12 V, +5 V;
- Communication types: RS485, modulo radio LoRa.

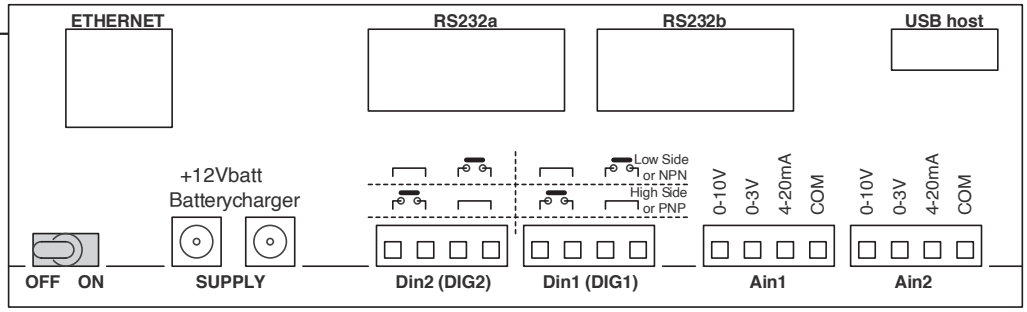
GMUX Sensors Connections



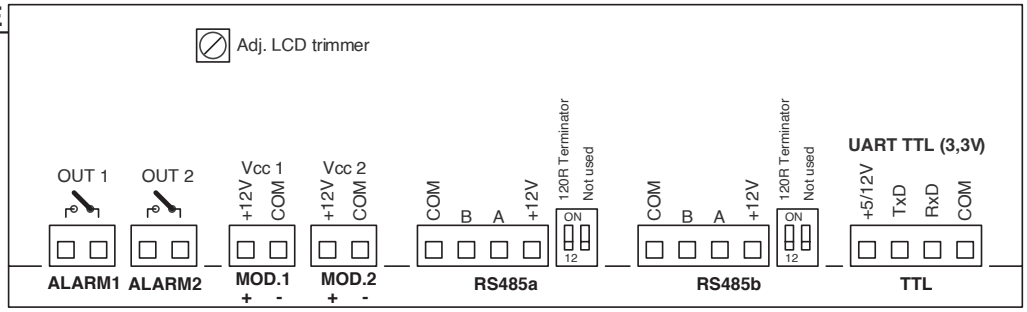
Introduction to the Module

The G802 module is a device designed for the realization of complex geotechnical, structural and environmental monitoring systems. G802 is digitally connected to active peripherals such as multiplexers, digital inclinometric chains or directly to sensors compatible, which may be physically close to the module but also hundreds of metres away.
The connection to the peripherals is made by a four-pole cable used, both to supply the power, and for the exchange data in digital or radio format. In the second case, each device is equipped with its own local power system.
The physical data acquisition work is assigned to the peripherals, while the G802 module manages the storage, the working time and user interface, as well as having some local resources such as analogue and digital channels, power supplies inputs, output and alarm signals.

TOP SIDE



BOTTOM SIDE



How to realize the monitoring systems

The configuration procedures and G802 system wiring, necessary to start a cycle of monitoring, consist of the following steps:
1. Configuring peripherals on the G802 module (see **paragraph 1.2** or specific product manuals);
2. Wiring of peripherals to the module G802;
3. Communication test between peripherals and module G802;
4. Wiring of instrumentation to peripherals;
5. Acquisition tests and validity of the data;
6. Configuration of the working functions of the G802 module;
7. Start of the working session or local acquisition cycles.

1. Peripheral Configuration

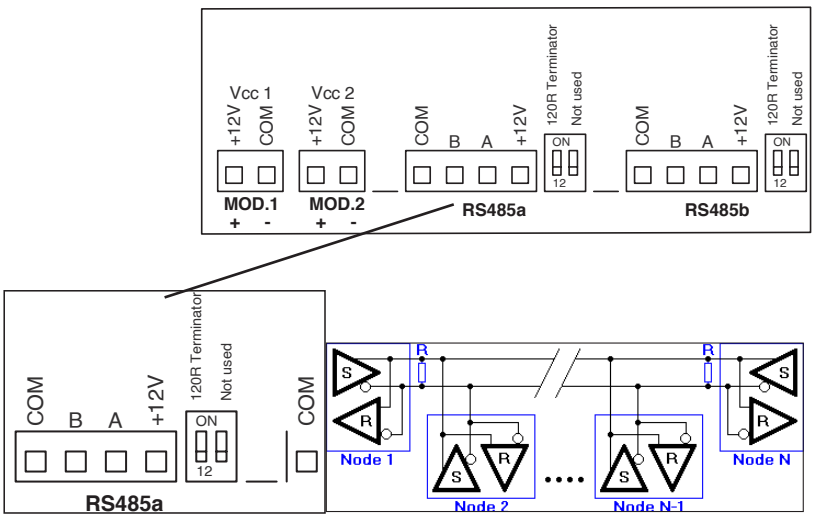
Any peripheral connected to one of the serial input ports must be configured on the G802 module to be acquired.
Details of configuration modes can be found in paragraph 1.2.. Each device identifier assigned by the module G802 must match the hardware and/or firmware settings. Two or more peripherals with the same identifier must never be wired on the same bus, otherwise functional anomalies of the entire system can occur.

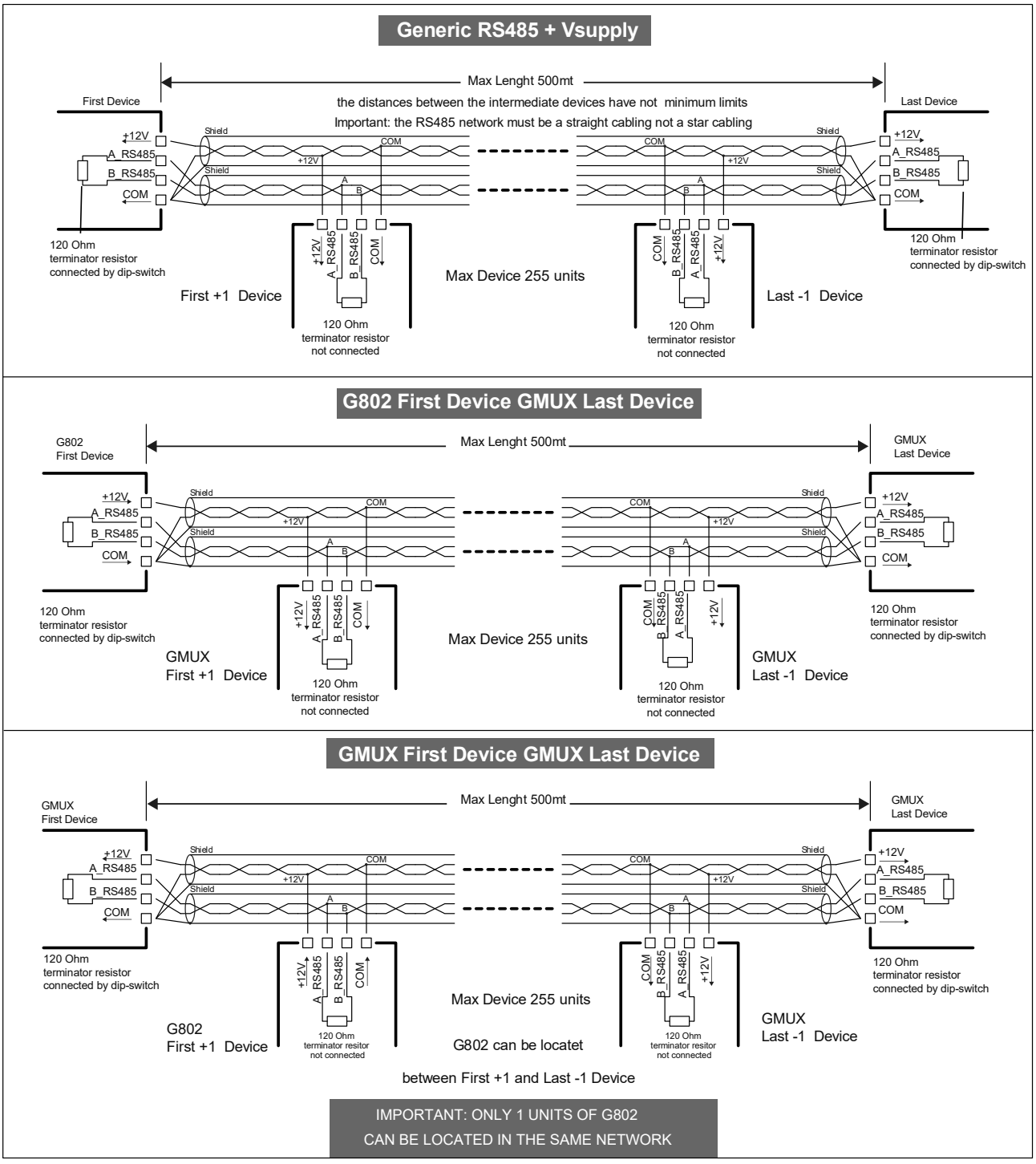
2. Wiring

Unless otherwise specified, the connections of peri-pher-als to the module G802, is realized through one of the two RS485 ports available on the front module. The 4-pole terminal block provides, in addition to the con-nection data, power supply to the device.
The connection between peripherals, according to the RS485 standard, must be serially wired.

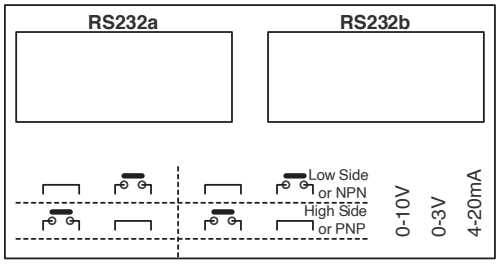
THE FIRST AND THE LAST DEVICE OF THE BUS MUST CLOSED BY A RESISTOR TERMINATOR.

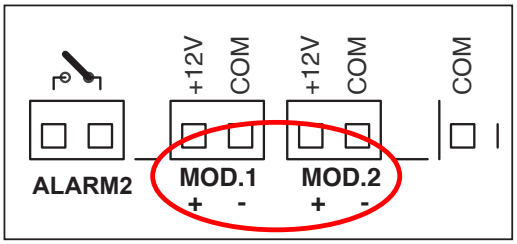
In case the G802 module is in one of these positions please remember to bring the related switch associated with the port in use in ON position.





For how to wire the peripherals please refer to the specific product manuals. The same connection mode can be implemented by the use of other serial communication ports and, if required, via a dedicated signal converter. The power supplies to the device, if not already available, can be provided by one of the two local power terminals.





3. COMMUNICATION TEST

Once all the configurations related to the peripherals connected to the system are performed, before proceeding to the wiring of the different channels, communication tests between the G802 module and peripherals are recommended. Performing functional tests after each new wiring could be useful, especially for large monitoring systems, in order to identify quickly and easily possible connection errors and/or hardware problems (see **Section 2.3 Local Acquisition**).

4. Wiring the Sensors

Once all the functions of the system have been verified (digital communication between the components) proceed with the wiring of the sensors to the device. Regarding the connection mode see the manual of each instrument and device in use.

5. Test Acquisition

A check of the data provided by all the peripherals and tools that define the system is recommended before starting a new monitoring session. The G802 module offers the possibility to verify the validity of sensor data by the use of local acquisitions. A complete device reading or every single channel is possible. In the first case, the data is saved on internal memory, generating a new file or saving on the corresponding existing data file on the device. In the second case, the read values can only be displayed on the display but are not saved on internal memory.

6. Configurations of the Functionality

Before starting a monitoring session it is necessary to define the G802 functional configurations such as: power supply mode, backup, download data, etc.. Please refer to the following paragraphs for details of each configuration type.

7. Start of the Monitoring

Once the configurations and wirings are checked a new working session is now possible.

ATTENTION:
Do not use TTL port cable on RS485 port and vice versa.

Using the Keyboard

The keyboard consists of 12 buttons, 10 of which are numbered by the number from 1 to 0, each one with letters for typing alphabetic characters (press the button several times to obtain upper-case letters, then lowercase letters and finally the number indicated).

- button 1: scrolls the menus upwards and deletes (DEL) the texts typed one character at a time;

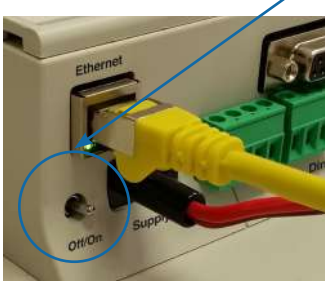
- button 0: scrolls down through the menus and, 0 button: scrolls down the menus and, pressed twice, types special characters (SYM);

- ESC button: press to go back one menu at a time;

- OK button: press it to switch on the G802 and to confirm the selected menus.

Power ON G802

Move the switch place at the back of the G802 module to ON position.



Press the OK button on the keyboard and wait a few seconds to power ON G802.

CONFIGURE THE G802 MODULE

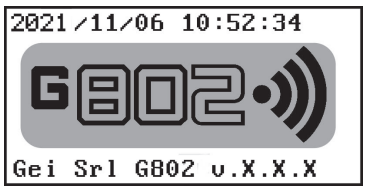
The display shows the presentation screen that highlights the date, power time and firmware version. If no other keys are pressed, the module G802, after a wait of 30 seconds, automatically switches OFF to one of the power saving states, depending on the configuration currently saved on the internal memory. Press the OK button and choose from one of the following menus:

1. CONFIGURATIONS MENU
In this menu you will find all the configurations to set the module according to your working needs.

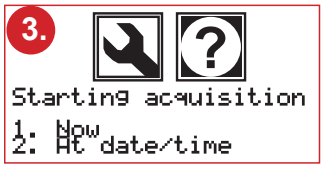
2. ACQUISITIONS MENU
Using this menu you can make readings on the individual channels wired to the module G802 and/or full system readings. The features within this menu are very useful during the installation of the sensors.

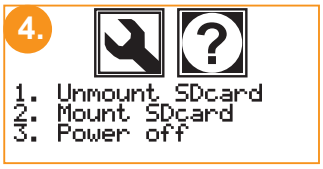
3. START(STOP) ACQ. MODE MENU
Enable/disable G802 logging mode acquiring data from sensors according to the modes defined in the menu **1.CONFIGURATIONS.**

4. SYSTEM TOOLS MENU
Using this menu you can mount and unmount the Sdcard and/or turn OFF the G802.



IMPORTANT NOTE TO CONFIGURE G802
The numbers preceding each paragraph title indicate the sequence of number keys to press to move between menus. For example: 1.1 indicates pressing 1 in the main screen (1. Configurations) and 1 again to enter the G802 logger setup menu.





1. Configurations

1.1. G802 logger setup
The settings, specially intended for the configuration of the module's G802 operating parameters.

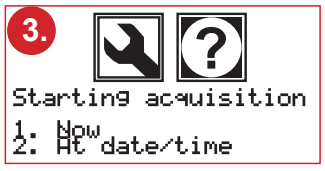
1.2. Devices config
Setting of the characteristics of each sensor connected to the G802 module.

1.3. Wizard setup
Setup menu for quick and easy configurations.

3. Start(Stop) acq. mode MENU

3.1. Now
Acquisition starts immediately.

3.2. At date/time
The acquisition starts automatically at a preset date and time.



4. SYSTEM TOOLS MENU

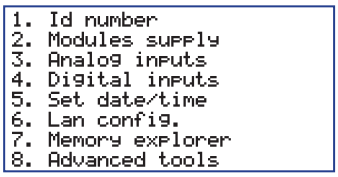
4.1. Unmount SDcard
Unmount the SDcard before removal.

4.2. Mount SDcard
Mount the SD card once it has been inserted into the SD card slot.

4.3. Power Off
Shuts down the system before removing power from the G802.

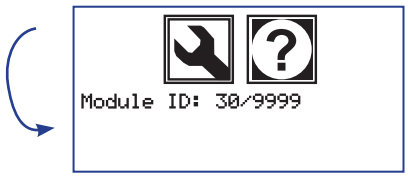
1.1 G802 Logger Setup

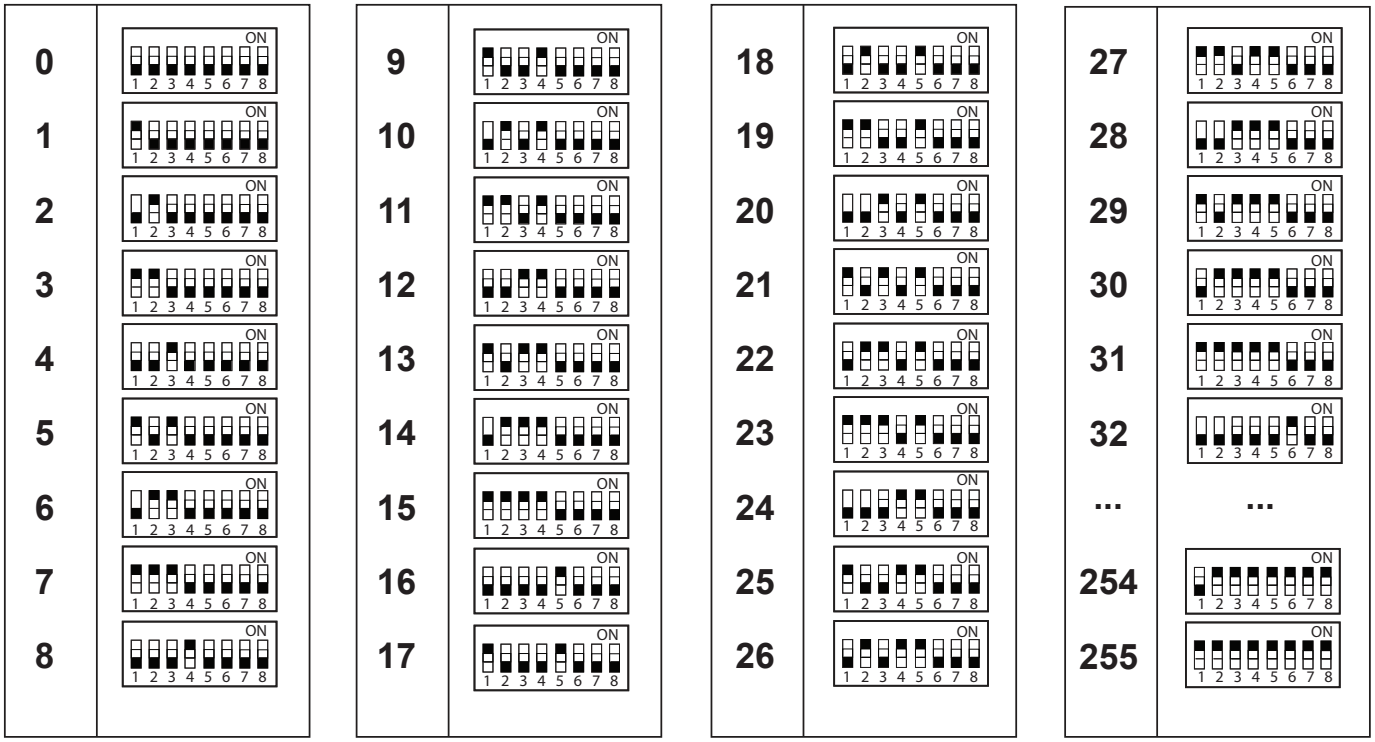
In this menu it is possible to access all the configurations and settings of the logger by means of menu 1 to 8, as shown in the picture opposite.



1.1.1. > Id number

Module identification number. When using systems with several G802 modules, use different numbers for each module. The maximum number that can be set for wired systems is 9999, for LoRa systems it is 254.



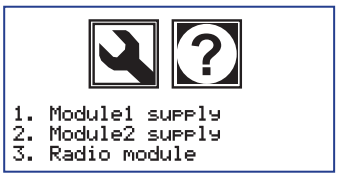


CAUTION! The system ID must be identical to the ID of the LoRa module (LRM-0M Master), which is selectable and editable via 8 ch dipswitch in binary code (p. 16)

Regarding numbers not shown in the table Please use the calculator (Windows operating system) in PROGRAMMER mode or an on-line converter

1.1.2. > Modules Supply

Setting the power supply characteristic of all possible accessories connected to the G802 module.



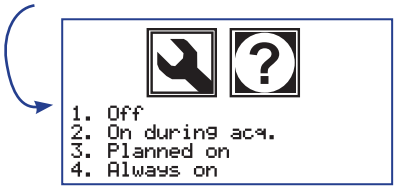
1.1.2.1. Module1 supply

Operation mode for the accessories connected to the terminal block ONE.

1.1.2.2. Module2 supply

Operation mode for the accessories, connected to the terminal block TWO.
The submenus of Module1 and Module2 are repeated the same and are:

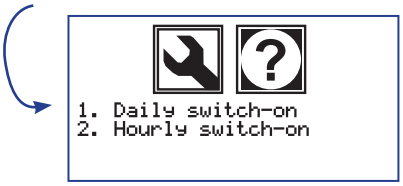
1. Module1 supply
2. Module2 supply



---> Off
The voltage is never supplied to the terminal block.

---> On during acq.
The voltage is supplied to the terminal blocks during the acquisition session.
This mode is particularly useful in case of necessity to supply instruments or accessories from the G802 module.

3. Planned on



---> Planned on
The supply voltage is effected only during some periods of the day.
The function is generally used to allow the complete system's start in preset periods, in order to provide a remote access to data and configurations.
Usually this option is used in systems with solar pannel in order to supply the possible router UMTS.
It is possible to switch on the module daily or hourly.
In this second option, the module remains powered for some minutes of every hour of the day set by an operator.

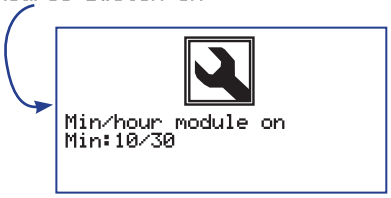
1. Daily switch-on

---> Always on
Function to energise the terminals, always on.

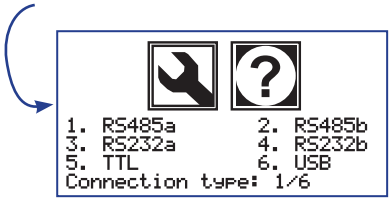
1.1.2.3. Radio module

This menu is used to select which of the wired outputs the radio module is connected to for connection to wireless peripherals.
Typically, the RS485 ports are used for LoRa modules, while the RS232 ports are used for 169 Mhz modules.

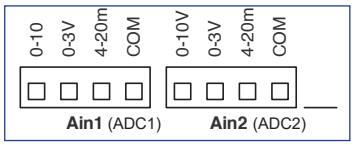
2. Hourly switch-on

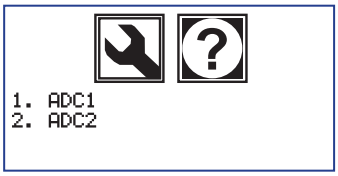


3. Radio Module



1.1.3. > Analog Inputs





The two local analog channels input settings (Ain1/ADC1 and Ain2/ADC2).

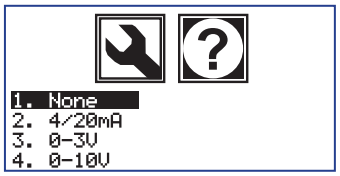
---> None: The channels are not used.

---> 4/20 mA: Input according to the standard analog signal 4/20 mA.

---> 0-3 V: Single-ended voltage input 3 V full scale.

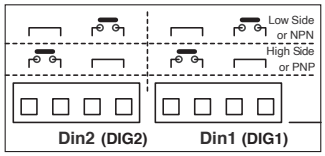
---> 0-10 V: Single-ended voltage input 10 V full scale.

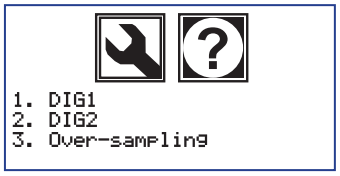
1. ADC1
2. ADC2



1.1.4. > Digital Inputs

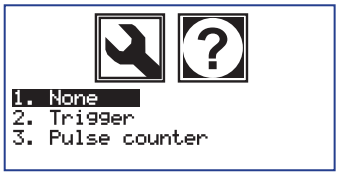
Setup for the input mode of the two local digital channels (Din1/DIG1, Din2/DIG2 and OVER-SAMPLING).





1.DIG1 and 2.DIG2 submenus are the same for both and are:

1. DIG1
2. DIG2



---> None
Channels are not used.

---> Trigger
The change of status of the input triggers a reading event on all available channels.

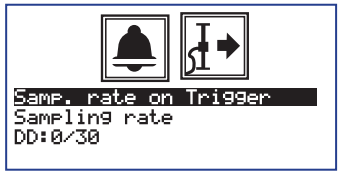
---> Pulse counter
Each change of status of the input increases a counter whose value is available, when downloading data, in the local channels section.

3. Over-sampling

1.1.4.3. Over-sampling

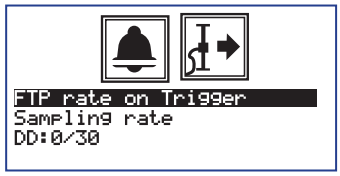
A shorter sampling period related to the TRIGGER event can be set.
The function is useful if a greater number of acquisitions due to a particular event, for a certain period of time, are needed.

2. Trigger-sampling



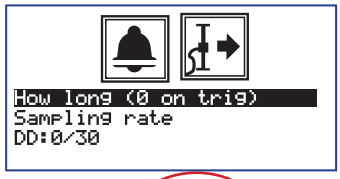
---> Set not Used
Not used.

---> Trigger Sampling
Used to set the higher frequency acquisition function.



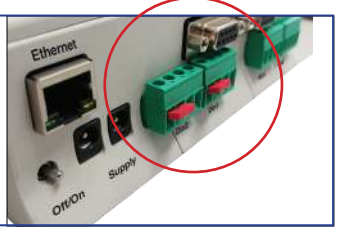
---> Sampling rate on trigger
Setting up a new event-related sampling period.

---> FTP rate on trigger
Setting up a new event-related FTP transmission data rate.



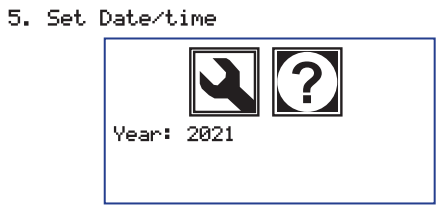
---> How long
Sets how long in time the new sampling period remains active starting from the trigger event. Set **0 (zero)** in case the higher sampling period must only be applied while the trigger is active.

WARNING!
Even if 1.None mode is set, a connection between pins 3 and 4 is needed in order to avoid unexpected power up of the equipment when the low power working states are used.



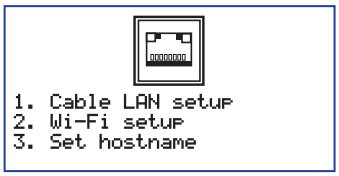
1.1.5. > Set date / time

Sets date and time in the format year / month / day / hours / minutes.



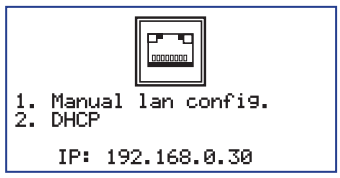
1.1.6. > Lan Config.

Configuration of network settings. You can set the network both manually and automatically. At the base of the display the current IP address is shown.



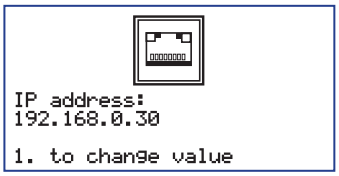
1.1.6.1. Cable Lan

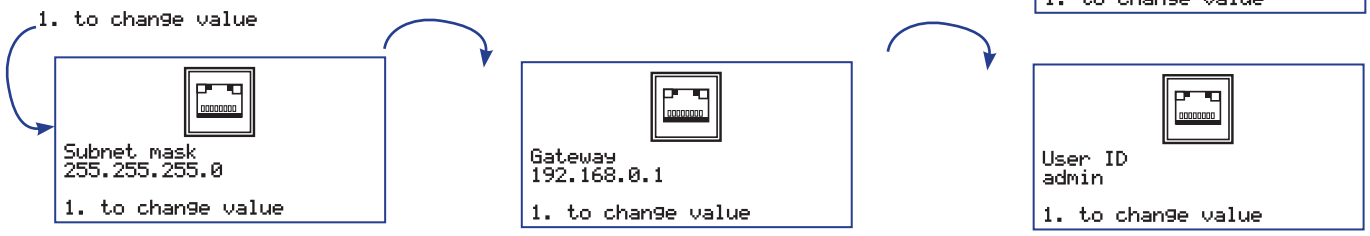
Set the values of IP, subnet mask and gateway of the network to which you intend to connect. The current values are always shown. Press key **1** to change the parameter and **OK** to switch to the next parameter. Once the network parameters are configured, set system User and Password that should be used to connect to the G802 module via web server and/or SSH access.



---> DHCP

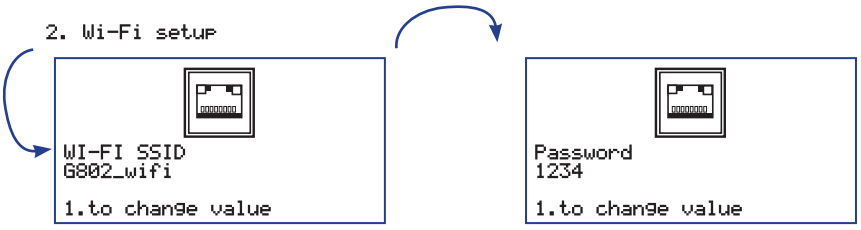
Set this option to let the network automatically assign the configuration for the module.





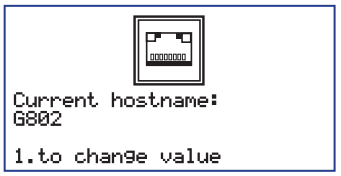
1.1.6.2. Wi-Fi Setup

Set Wi-Fi SSID name and password. G802 module creates a HOT SPOT Wi-Fi to allow wireless connection to the device via local network.



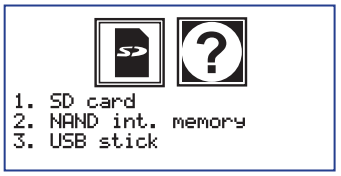
1.1.6.3. Set hostname

If more than one G802 is connected to the same network, in order to easily and mnemonically access to the various services offered by each individual unit, a unique hostname for each device is recommended.
Press **button 3.** to see the current hostname and **press 1.** to edit it. In case of change G802 is restarted using the new set hostname.



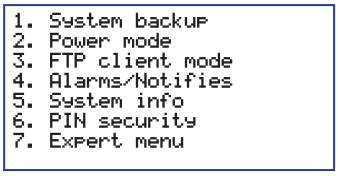
1.1.7. > Memory Explorer

Utility that allows you to view the files and their contents, found within the SDcard and internal NAND memory.
Use the 0 and 1 keys to scroll up or down and view the available data.
Press OK to view the contents of the files or subfolders and ESC to return to the previous folder.



1.1.8. > Advanced Tools

Menu to access the advanced functions of the G802 module



1.1.8.1. > System backup

The acquired data are saved in the specific working folders (DATA/MUX,DATA/MUMS, etc..) depending on the type of device. G802 module allows to save a copy of the data, either manually or automatically, on the Sdcard (if connected).
Data are saved in the subfolders:

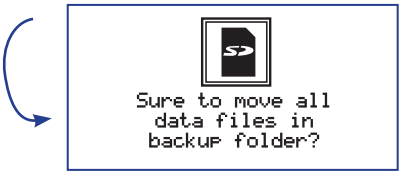
DATA/BACKUP/year/month

and the files are named "**day-hours+minutes+filename**" with extension ***.csv**.

1.1.8.1.1. Data backup

All data on the USB (if any) are moved to the specific backup folders. The Data Saved message, shown on display.

1. Data backup



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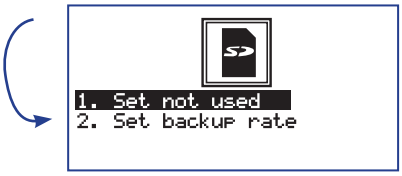
1.1.8.1.2. Backup rate

Setting for the period for automatic data backup.

2. Backup rate



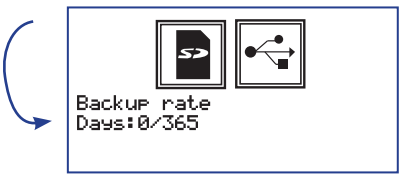
---> Set not used

Set to disable the automatic backup function.

---> Set backup rate

Set the automatic data saving period. The time base is expressed in days, the minimum value set is one (1) day and the maximum one year (365 days).
Automatically saved data are also stored on internal memory.

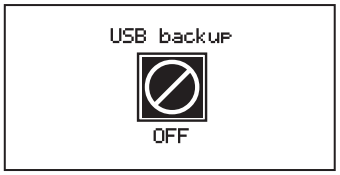
2. Set backup rate

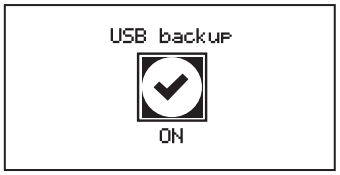


1.1.8.1.3. USB backup

By setting the USB backup **menu to ON**, when the G802 module stores the data acquired on internal memory, a backup copy of the data is created also on USB (if present).
Data copying is done according to the archive logic already set for the internal memory.If the menu is setted **OFF**, USB management is deactivated and data are stored on the internal memory only.

3. USB backup





Note:
The automatic data recovery mode via connection FTPclient already provides for the execution of an automatic backup cycle of the data after each successful transmission.

In case the FTPclient function is set, the backup function is not recommended.

1.1.8.2. > Power mode

Menu to configure different power methods of G802, in order to balance the system between available functions and preserve the battery life.

1.1.8.2.1. Full functions

All system features are always available. Current supply is always relatively high. This working mode is recommended only in case an external power supply 110/220 Vac is available, a photovoltaic panel appropriately sized or any another battery charging mode.

1.1.8.2.2. Midnight reset

The mode of operation is completely similar to what described in the previous paragraph. This working mode also provides an automatic system reboot at midnight (24 hours) of each day.
If a proper external power supply is available and no special working cycles must be executed at midnight, the activation of this function is recommended in order to keep optimized the performance of the operating system.

1.1.8.2.3. Low power mode

The system remains in very low current supply condition for most of the time and automatically wakes up to make the planned acquisitions. One or more timeframes are left active within which the system makes available all the configured features.
In these periods of time is possible, usually remotely, download the captured data rather than control the module in order to modify one or more configuration parameters.
Usually this working mode is used when the system is supplied by a small photovoltaic panel. By selecting this menu the operator is automatically routed to **menu 1.1.2.**.
Usually in these working conditions, remote data management is performed via GPRS/UMTS router or similar that, in order to maintain minimized battery usage, is powered directly from the G802 module only when required. **See paragraph Module supply.**

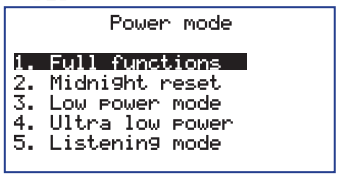
1.1.8.2.4. Ultra low power

The system remains in very low current supply condition for most of the time and automatically wakes up only to make programmed acquisitions and to send the data to an FTP server if the option is set.
This configuration is only justified for installations in which, for technical and/or logistic reasons, the system must work with battery only. Many of the system's features are never available.

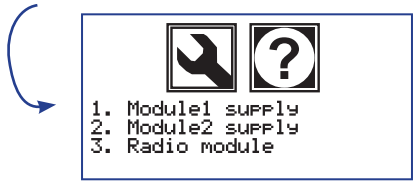
1.1.8.2.5. Listening mode

The system expects the installed peripherals to prompt G802 to start requesting readings. The peripherals, connected to their own LoRa Slaves, stay on and send data by soliciting with a G802 call.
Each peripheral must be programmed with its own sampling schedule.

2. Power mode

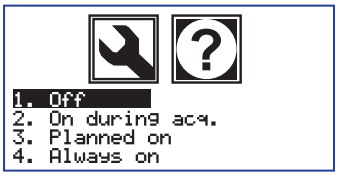


3. Low power mode



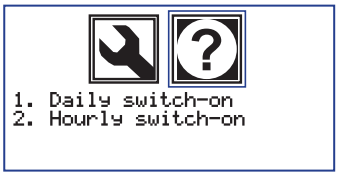
3. Low power mode

1. Module1 supply
2. Module2 supply

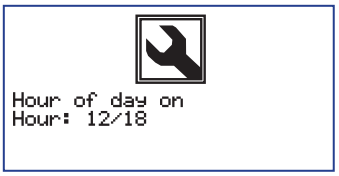


3. Low power mode

Planned on

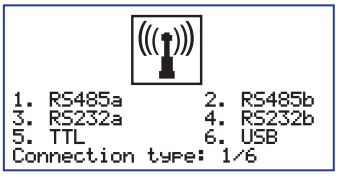


1. Daily switch-on



2. Hourly switch-on

3. Radio Module



1.1.8.3. > FTP client mode

This menu is used to configure all the parameters needed for the G802 module to download automatically acquired data to an FTP server. A log is also available in order to keep the data sending process to the server monitored and analyse any problems related to the failure of automatic data transmissions.
The log file can be sent by email to multiple addresses of the **Notifications list in the Alarms/Notifies menu**. For more details, please refer to the following paragraphs of this chapter.

Note:
Please note that, after each successful transmission, the system makes a back-up of the data in order to minimize the amount of data transmitted during each connection and avoid redundancy at server side.

1.1.8.3.1. Set not used
FTPclient working mode is disabled.

1.1.8.3.2. Set FTP config.
The following setting for the desired FTP server access configuration must be typed:
- IP address,
- Username;
- Server password.

1.1.8.3.3. Set FTP rate
Period with which data must be sent. A value between one minute and 30 days can be set. The most commonly used values ranges are from 12 hours to one day.

1.1.8.3.4. Set FTP supply
If a GSM/UMTS router or a similar equipment is used to remotely send data, this menu sets if and which supply voltage source of the G802 module is used to supply it.

---> None
No GSM/UMTS router is used or it is supplied by a dedicated supply voltage. No supply voltage is provided during FTP connection operations.

---> Mod1/2
Press keys 2. or 3. to select the desired supply voltage.

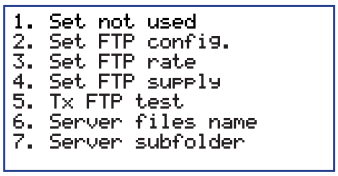
1.1.8.3.5. Tx FTP test
Menu to verify the communication functionality between G802 module and the FTP server.

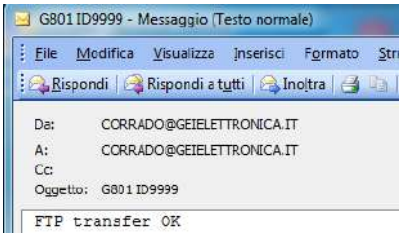
---> Data files
All data files currently stored on memory are sent to the FTP server. Being a test transmission, data are not moved to backup folder.

Since this is a test transmission, no data is backed up during this phase.

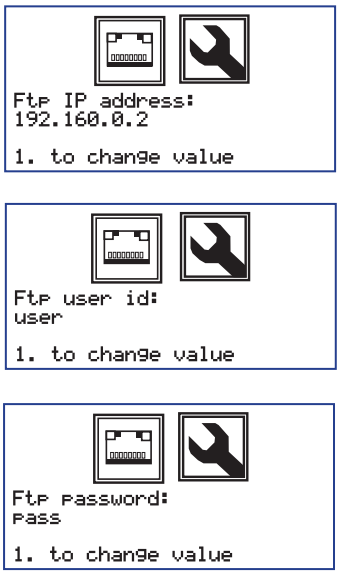
---> Test file
A test text file containing some of the main configuration features of the G802 module is sent to the FTP server.

3. FTP client mode

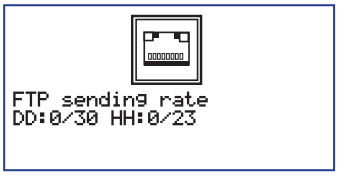




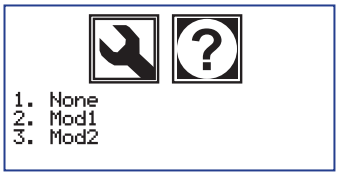
2. Set FTP config.



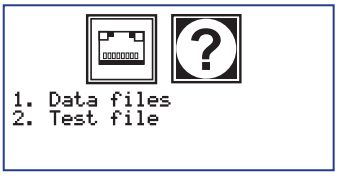
3. Set FTP rate



4. Set FTP supply



5. Tx FTP test



1.1.8.3.6. Server files name

---> Overwrite
The G802 module transmits the files via FTP to the Server. The files are received from the server with the same name generated on the internal memory. Once the module G802 has finished the transmission the files have to be renamed otherwise, the following transmissions, will overwrite previous files.

---> Append
The transmission to the Server are appended to the end of previous sent data over the same files.

---> Rename
Once finished the transmission on the Server, the G802 module takes care directly to rename files with the following characteristics:

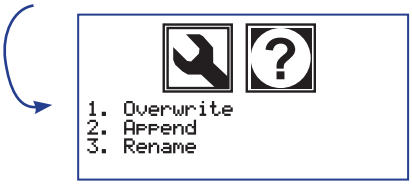
AAAAMMDDHHMMSS.NAME.CSV

with number of characters:

4/2/2/2/2/2

At the end of the data sequence the module adds the file name as it was in source. In this way each sent files is uniquely identified.

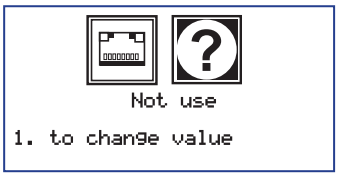
6. Server files name



1.1.8.3.7. Server Subfolder

Feature to download data in an FTP subfolder. By default the module proposes `Not used` option. By pressing 1 you can set with the keyboard the name of the new FTP folder.

7. Server subfolder



1.1.8.4. > Alarm/Notifies

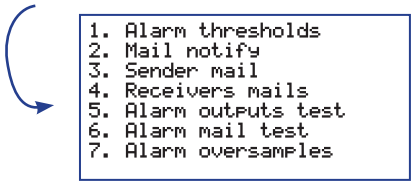
1.1.8.4.1. Alarm thresholds

Setting menu for pre-alarm and alarm threshold limits, low and high.

---> View lim
The list of devices for which, at the moment, have already been defined alarm thresholds, is shown on display, specifying for each device, the file name and date of creation.

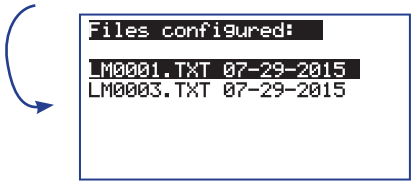
---> New/edit lim
The list of configured peripherals is displayed on display. Select from the list the device whose limits must be to set.
To follow, for each channel of the device, starting from battery voltage and local temperature to continue with analogue channels, low/high pre-alarm limit values and low/high alarm must be set respectively.
For each value the 0 or 1 keys must be used to select the positive or negative sign of the number you are entering, then press the OK button to confirm.
Type the whole part of the number followed by the OK confirmation and finally the part decimal. Press the ESC key to delete a digit.
On display, additionally to the typed number, the limit type, the channel and the last set value for the specific limit is shown. In case no value has ever been introduced +/-1000000.00000 is proposed.
Press ESC to skip the channel or confirm the proposed value.

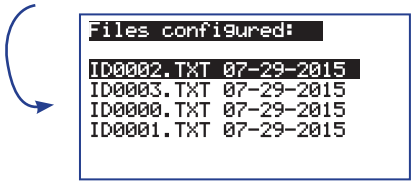
4. Alarm/Notifies



4 >
1. Alarm thresholds

1. View lim





2. New/edit lim

1.1.8.4. > Alarm/Notifies

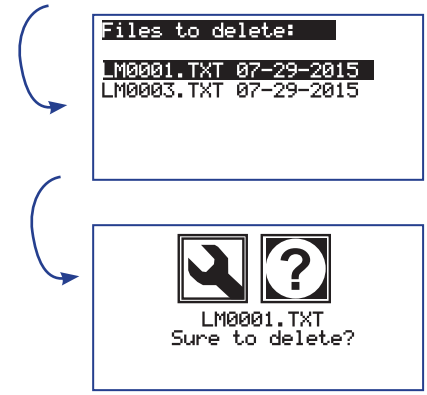
---> Delete lim

The whole limits related to a device are deleted. From the moment the *.txt file related to a device is deleted, the related limits will no longer be checked. It's always possible, of course, in a second moment, recreate a new limit file.
The menu proposes the list of limit files currently generated. Select with the keys 0 and 1 which limits to delete, press OK to confirm.
Before permanently deleting the file containing the limits a further confirm to the operator is asked.

--> Delete all lim

Clear all previously configured limits. An additional confirm is requested before performing the operation.

3. Delete lim

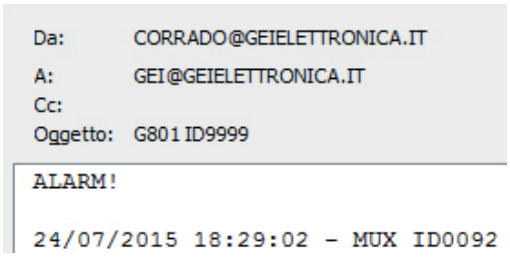


4. Delete all lim

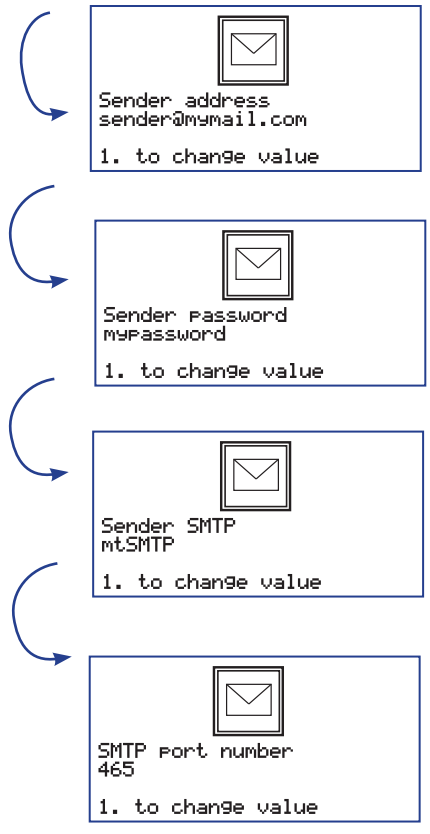
1.1.8.4.2. Mail Notify

Any reading outside the range between the low and high pre-alarm limits generates a **WARNING event**. If the reading also falls outside low and high alarm range an alarm event is generated. In case of a pre-alarm event, the G802 unit will send an email to each address on the **WARNING list**.

The e-mail has the module ID in the subject and date, acquisition time, device ID, acquired value and set limits in the body. In the case of an **ALARM event**, a similar e-mail to all addresses in the WARNING and ALARM lists is sent.
An WARNING event switches the status of alarm output 1 while ALARM switches output 2.
The status is maintained at least until the next acquisition cycle.
In case the channel remains outside the limits, or another channel comes out from its own threshold limits, the alarm states of the relays remain confirmed.
If, after reading all channels and all peripherals, no channels are out of limits, the alarm relays are disarmed.



3. Sender mail



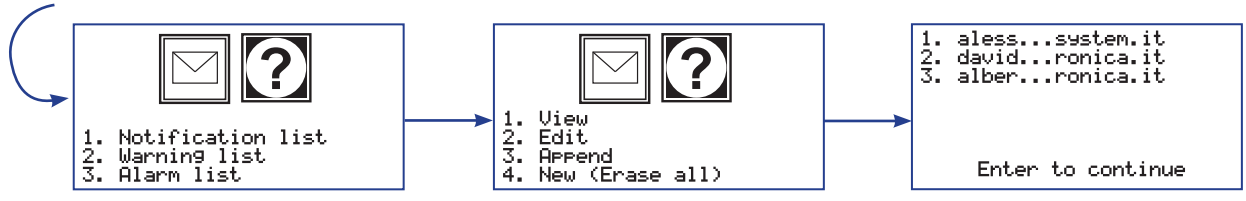
1.1.8.4.3 Sender mail

Set the configuration parameters of the email from which you want to send the alarm messages. The following are required: e-mail address, password for the address, SMTP of mail provider and SMTP port number.

1.1.8.4.4 Receivers mails

List of e-mail addresses to send alarms to. The lists are divided into two lists: **WARNING and ALARM**. A notification list is also available to use as a log of the sending state files via FTP. For more details **see paragraph 1.1.8.3.** of this document.
For each list you can view, edit, add or delete files or individual addresses.

4. Receivers mail



1.1.8.4.5. Alarm outputs test
The menu is used to force alarm output status in order to test external cabling functionality. Button 1 and 2 toggle the output status. The current value is shown on display.

1.1.8.4.6. Alarm mail test
A test mail is sent to any of the addresses in the Notify, Warning and Alarm list. An additional confirm is asked to the operator before to start the procedure. Once started the mails will be sent and the steps shown on display.

1.1.8.4.7. Alarm oversamples
A shorter sampling period related to the ALARM event can be set. The function is useful if a greater number of acquisitions related to a particular event are requested for a certain period of time.

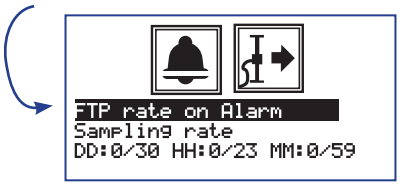
---> Set not Used
Not used.

---> Alarm Sampling
Used to set the higher frequency acquisition function.

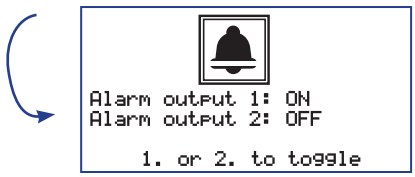
---> Sampling rate on Alarm
Sets up a new event-related sampling period.

---> FTP rate on alarm
Sets up a new event-related FTP server data sending period.

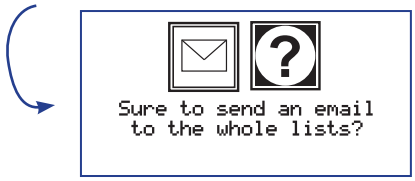
---> How long
Set the time for which the new sampling period remains active from the trigger event. Set 0 (zero) in case you want to
have the shortest sampling period
short only during the moment when the trigger is engaged.



5. Alarm outputs test

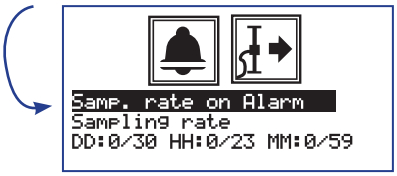


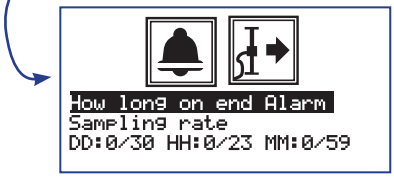
6. Alarm mail test



7. Alarm oversamples

7.
2. Alarm sampling



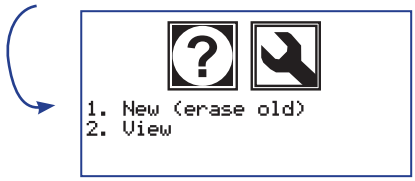


1.1.8.5. > System info

1.1.8.5.1. New (erase old)
Text editor to create by the use of the keyboard a file containing the desired system information.

1.1.8.5.2. View
Displays the content of the system information file.

5. System info



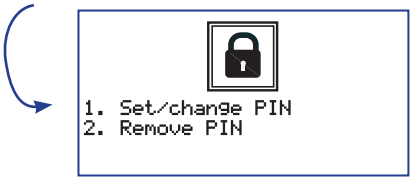
1.1.8.6. > PIN security

Access to the G802 module can be protected by a PIN code to avoid accidental or unwanted operations in the configuration menus.
The module in default configuration is not password protected and no menu access code is required.

---> Set/Change PIN
Set menu 1 to activate the protection function. Double type the four numbers PIN to **1. SET/Change PIN.**
Enter the PIN code twice to protected the board in access.
Every time you try to enter the configuration menus, you are asked to enter the PIN set.

---> Remove Pin
Choose option **2. Remove PIN** to return to unprotected operating mode.

6. PIN security



1. Set/change PIN

1.1.8.7. > Expert menu

1.1.8.7.1. Custom Setting

Menu for customizing data files in csv format.

---> Set separator

Select to set and/or change the type of system field separator that will be used when producing data files in csv format. The default value is “semicolon” (;).
Typical alternate value is “comma” (,) but any other character or a sequence of multiple characters can be used.

---> File header

Select whether or not you want a header to appear in csv-format data files containing some generic information about the file itself and the logger that generated it, such as creation date, type of data provided, device and logger identifiers, etc..
See the example below.
It may be useful to remove file headers in cases where “Append” mode is used to send data to FTP servers as the file produced is easier to read and manage.

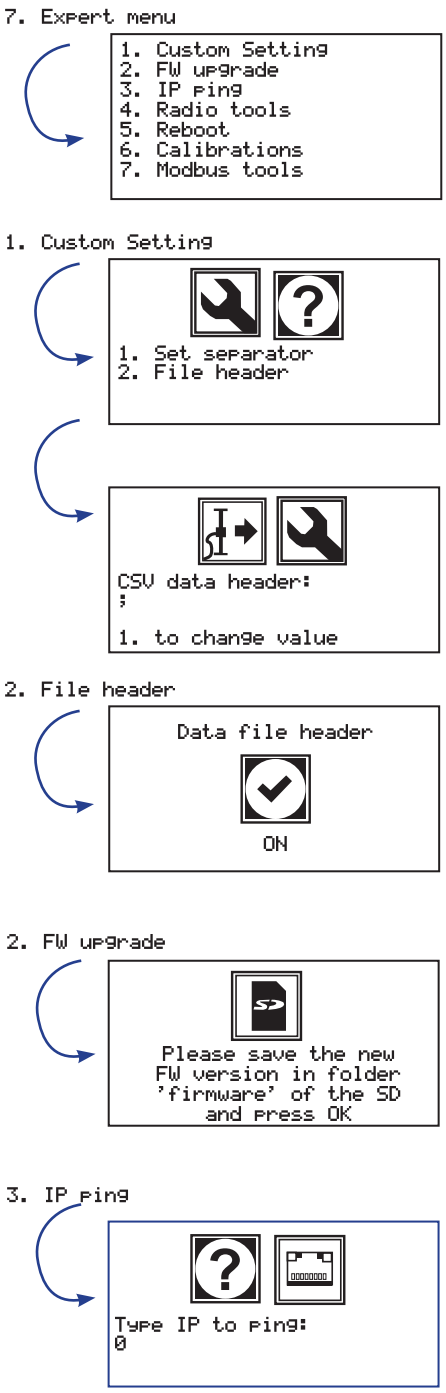
```
File Creation Date: 2021/11/02 09:48:09

G802 id0001
IP: 192.168.3.1
Subnet: 255.255.255.0
Gateway: 192.168.0.1
SD path: /home/root/data/mux/DT0001.csv

        Loc.    Vmux    Tmux    Ch1     4/20mA 3wires    Disabled
```

1.1.8.7.2. FW upgrade

G802 Module Firmware Update Tool. Follow the Instructions displayed in order to perform a firmware upgrade.

1.1.8.7.3. IP ping

Utility to test if an IP address responds to direct requests. To be used mainly in FTP-client mode configuration steps.



1.1.8.7.4 > RADIO TOOLS

LoRa SYSTEM

General Information

• Battery life	1 cell	2 cells
• Sampling frequency 5 min.	0.9 years	1.8 years
• Sampling frequency 1 h.	5 years	8.1 years
• Sampling frequency 6 h.	> 7.3 years	> 10 years
• Battery type	2 x 3.6V C-size	
• Sampling frequency	30 seconds to one day	
• Internal temperature	Collected and transmitted at each reading (Accuracy 2 °C)	
• Software configuration	ANDROID APP	
• Power supply	6-14 Vdc, RS485 Logger interface port. 2x3.6 V 3600 mAh Lithium batteries size A, field interface	
• Power consumption	45 mA Typ. operating mode, 30 µA standby	
• Operating temperature	-20° to +70 °C	
• Protection	IP66	
• Installation	Wall mounting	
• LoRa MASTER dimensions	80 x 70 x 57 mm	
• LoRa SLAVE dimensions	80 x 70 x 57 mm	
• LoRa SLAVE single-channel dim.	125 x 80 x 57 mm	
• Weight	300g approx. without batteries	
• Internal connections	terminal blocks for RS485;	
• External connections	SMA panel antenna 50 Ohm connector	
• Communication ports	1 RS485 - 1 Radio - LoRa	
• Details LRM01	869.4 - 869.6 MHz. - 118 dB at -135 dBm. 100 mW max.	

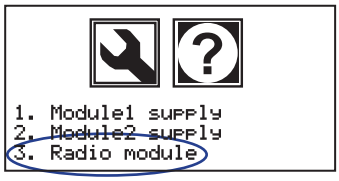
Analogic Inputs

• Excitation voltage	5 VDC up to 50 mA	
• 1 configurable channel + 1 thermistor chanr el		
• Full Wheastone bridge	Measuring range	± 7.8 mV/V
	Accuracy (-40 to +80°C)	0.13% FS
• Ratiometric potentiometer	Input range	0 - 5VDC (0-1 V/V)
	Accuracy (-40 to +80°C)	0.1% FS
• Single-ended voltage	Input range	0 - 5VDC
	Accuracy (-40 to +80°C)	0.6% FS
• Potential-free pulses	Pulse count	0 to 294967295 pulses
(dry contact) and open collector	Pulse frequency	from 0 to 50 Hz
	Accuracy	± 1 pulse
• Thermistor	Measuring range	0 to 2 Mohms
	Accuracy (-40 to +80°C)	0.04 °C (0.03% FS)
• Reading capacity	200,000 readings	

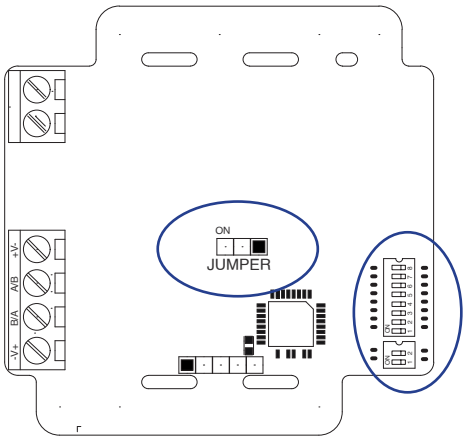
1.1.8.7.4. > Radio tools - LoRa System

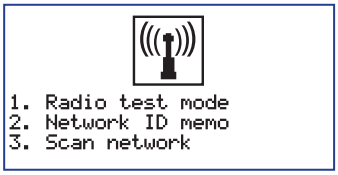
Tools menu for systems equipped with Lora radio connections modules.

NOTE: Before making any type of test on LoRa radio modules make sure that the G802 is properly configured to support a Master radio module.
Access the **Modules supply menu** and set in the **Radio module menu** the serial port to which the Master radio module has been connected, typically one of the two RS485 ports. Also set **ID Number** with the same configured value through the 8 minidips on the LoRa master module connected to G802.

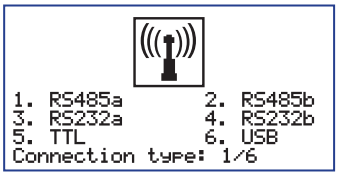


Highlighted in the image are the jumper and the minidips

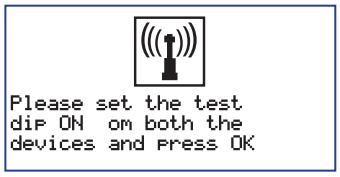




3. Radio test mode



---> Connection type: 1/6
By setting 1 to indicate connection via RS485a and pressing OK, G802 presents this window



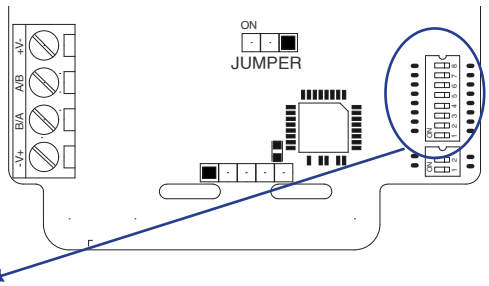
---> Radio test mode
The test mode is used in LoRa radio systems to verify the functionality and the main connection parameters between the Master module of G802 and the various Slave peripherals connected to it.
Press button 1. to enter **radio test mode**. Set then the serial port to which the G802 master module is connected, typically one of the two RS485 ports, and press the OK button to confirm.
The shown message on display remembers that both Master and Slave modules must be configured in test mode moving the jumper as highlighted in the figure.

WARNING: Radio test can only be performed on a slave device at a time.

Every time the OK key is pressed, a new radio test is carried out on the pair of Lora radio modules under test and the results are shown on display.

In case of GMUXxx, the LRM_ OS radio network peripheral must have the same ID as the GMUXxx, both selectable via 8-way dipswitch (table page 8).

If all the configurations of G802 and the related Master module settings are properly configured, on the left side of the display some information about the technical characteristics of the Master system are shown.



In detail the information is:

---> IDsys:
Is the ID of the LoRa radio network under construction. This value can be set through the block of 8 minidip available on the Master module and must match the ID logger value set in the “Id number” menu. Each Slave device will only respond to commands coming from Master with this system ID. The function allows the superposition of more independent networks over the same working area. Configuration values must be set in the range between 0 and 254.
The value 255 (i.e. all dips in ON position) is used for special open function. For more details see the NOTE at the end of this paragraph. For the storage of the network ID on Slave peripherals please refer to the next menu “Network ID memo”.

MASTER	SLAVE
	IDsys=0
IDsys=0	Iddev=3
Mode=2	Mode=2
Vbatt=9.6	Vbatt=13.3
T=21	T=21
v.0.1.1.	v.0.1.1.
	RSSI=-74

---> Mode:
Radio modules working mode. LoRa modulation technology, through the setting of a set of parameters, allows long range radio transmissions with relatively low power supply. This product provides three different default working modes plus a fourth for custom applications. The three standard working modes optimize the system by balancing, according to specific needs, transmission range, time of transmission and current supply.
In **mode -0-** the flow rate is maximized, in **mode -2-** the current supply is minimized while **mode -1-** is a compromise between the two previous. The custom mode **-4-** can only be used by properly trained staff. For more details please contact the Technical Support. To change the working mode see **NOTE 2** at the end of this paragraph.

WARNING: All devices, both Master and Slaves, belonging to the same network, must be configured with the same working mode.

---> Vbatt: Power supply voltage detected by the Master module.
---> T: Local temperature detected by the Master module.
---> **Firmware version of the Master module.**

While the display shows the working parameters, the Master module requires to the Slave module in test, through a radio transmission, similar information.
If the Slave module is also properly configured in the network, the requested information is returned from the module Slave to Master and then displayed on the right side of the display. This operation can last from some ten milliseconds up to a few seconds depending on the chosen working mode. In detail the information is:

---> IDsys:
Indicates the ID of the LoRa radio network and must be the same as the Master module and all other peripherals Slave of the network.

---> IDdev:
Device identifier. It is set through the 8 minidip of the Slave module (image at the top of this page) and must correspond to the ID of the device connected to it, as configured in the menu **Devices config.**. Possible configuration values are in the range 0 to 254. For the value 255 (i.e. all dips ON) please refer to the **NOTE** at the end of this paragraph.

---> Mode:
Working mode of the radio module. It must be the same as the Master module and any other Slave connected to the network.

---> Vbatt:
Supply voltage detected by the Slave module.

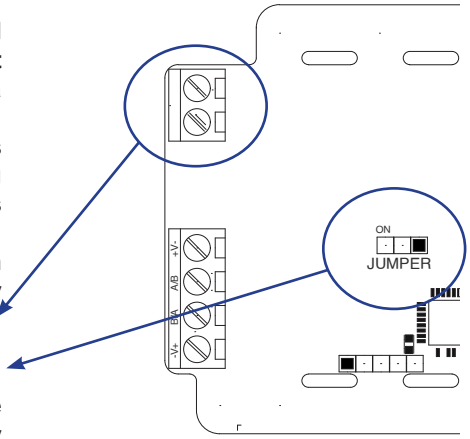
---> T:
Local temperature detected by the Slave module.

---> Firmware version of the Slave module.

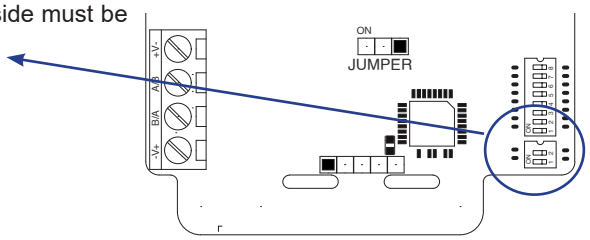
---> RSSI:
Signal strength received by the Master module expressed in dB. It is a value that at most can be zero and otherwise it is negative. The higher the number and the higher the signal strength received and consequently the higher is the quality of the transmission. The table below indicates the minimum value in dB for the three working modes.

0 / -137 dB
1 / -131 dB
2 / -126 dB

NOTE:
If both Master and Slave modules are set respectively with IDsys and IDdev equal to 255 (i.e. with all the dip to one) the network becomes a pure **cable replacement** system where every transmission sent by the Master is received by all Slaves in a transparent way and without addressing management.
Multiple GMUX peripherals can be connected in this mode to the same Slave, thus being able to realize parts of connection via cable and other by radio, but introducing limitations to the number and management of connected digital peripherals such as MUMS, DSAS or Modbus.
In addition, the current supply of each individual Slave module can increase as, in case of cable connections, they are always fully operational even when not directly involved in the acquisition.



NOTE 2:
To change the working mode set the jumper to test mode as shown in the next image and remove the power supply of the modules. The Master module is already normally not powered while for the Slave the battery-connector indicated on the side must be physically removed.



Then move the dips shown in the figure to the desired position.

OFF	**OFF**	**modo -0-**
ON	**OFF**	**modo -1-**
OFF	**ON**	**modo -2-**
ON	**ON**	**modo -custom-**

Then power again the board. For the Slave module the battery must be reconnected while for the Master move to the `Radio test mode` menu.
The green led starts flashing fast showing the update operation is in progress. When the flashing frequency becomes slower the procedure is successfully completed. In the Slave module remove again power supply by removing the battery-connector, wait a few seconds and then reconnect it.
In the Master module exit the **"Radio test mode" menu**.

`---> Network ID memo`
Network ID memo is a system function to store the IDsys parameter in Slave modules. For more details about the parameter see the previous chapter.
Press the 2. button to enter the **Network ID memo mode**.
Then set the serial port to which the G802 master module is connected, typically one of the two RS485 ports, and press the OK button to confirm the option.
The message displayed reminds that both Master and Slave modules must be configured in test mode using the previously seen jumper.

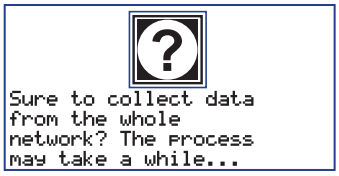
ATTENTION:
The storage procedure of the IDsys parameter can only be done on a Slave peripheral at a time.

Press OK to continue. If the test of the previous paragraph has been successfully performed all configurations of G802, of Master module and Slave module are correct. If so, in the left side of the display again the same information about the technical characteristics of the Master module are shown. After a time that can last from a few tens of milliseconds
up to a few seconds, depending on the working mode, the line **"New IDsys"** appears in the right part of the screen and in the row below the stored IDsys value to state the procedure has been successfully performed.

`1.1.8.7.5 Reboot`
System Restart Command. Particularly useful function during remote configurations of the module via web server. Before rebooting a confirmation is requested.

`1.1.8.7.6. Calibrations`
Service menu for local channel calibration. Use only by staff suitably formed.

3. Scan network



5. Reebot

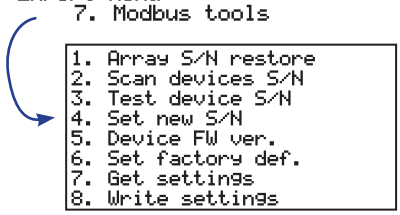
1.1.8.7.5. > Modbus tools

Utility menu for managing sensors in Modbus mode.

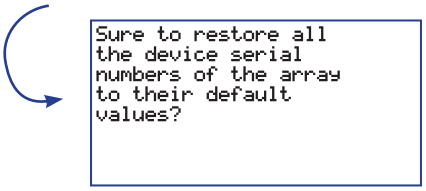
---> Array S/N restore
Are you sure to restore all serial numbers of the array devices to their default values?

---> Scan devices S/N
Sure to scan the entire sensor chain to find and display the S/N list? The process may take some time

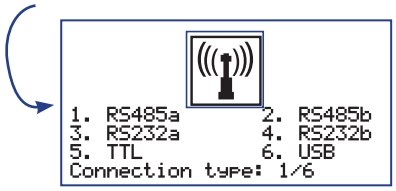
7. Expert menu
7. Modbus tools

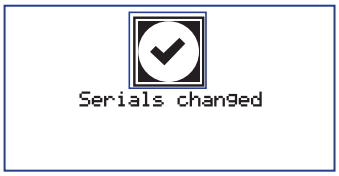


1. Array S/N restore

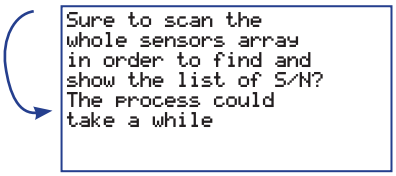


OK

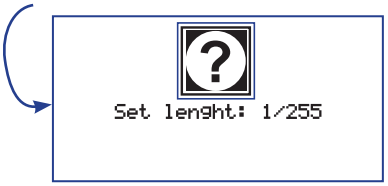




2. Scan devices S/N

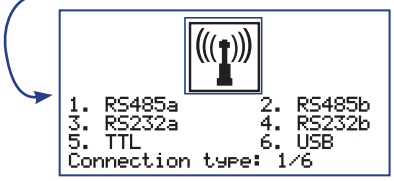


OK

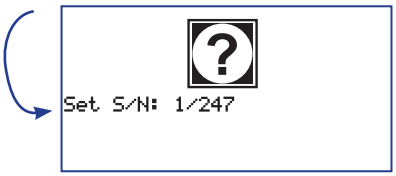


OK

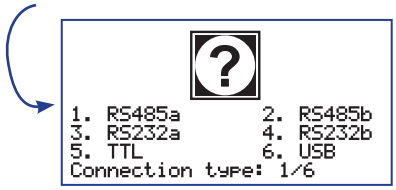
Sensor 1 - S/N 1



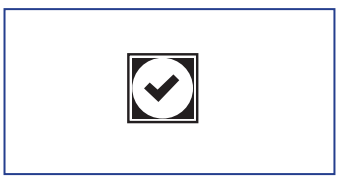
3. Test device S/N



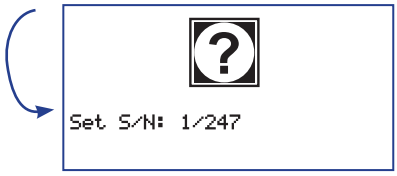
OK



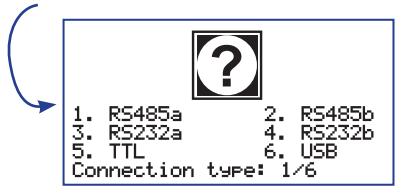
OK



4. Set new S/N

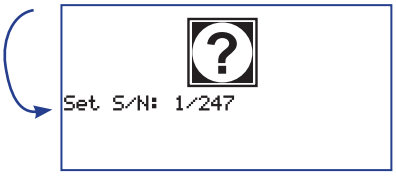


OK

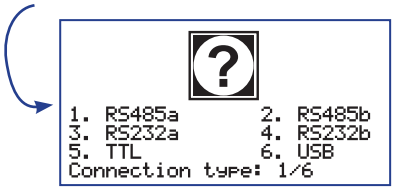


OK

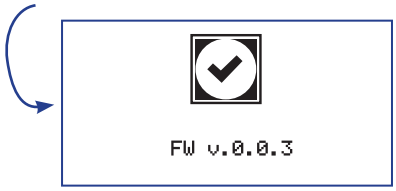
5. Device FW ver.



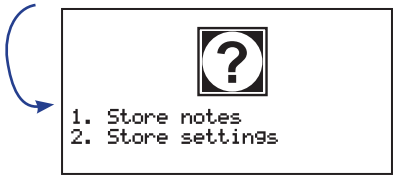
OK



OK

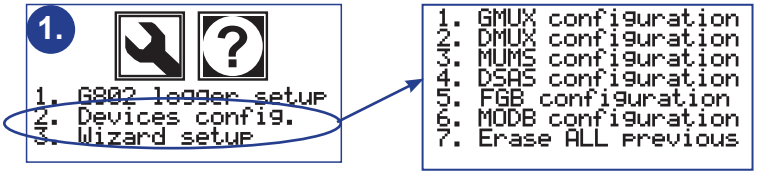


8. Write settings



1.2. > DEVICES CONFIG.

Setup of the sensor characteristics connected to G802.



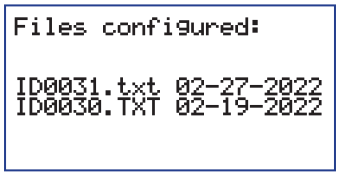
1.2.1. > GMUX Configuration

Menu for the configuration of (G)MUX in all their working specifications.

1.2.1.1 View (G)MUX

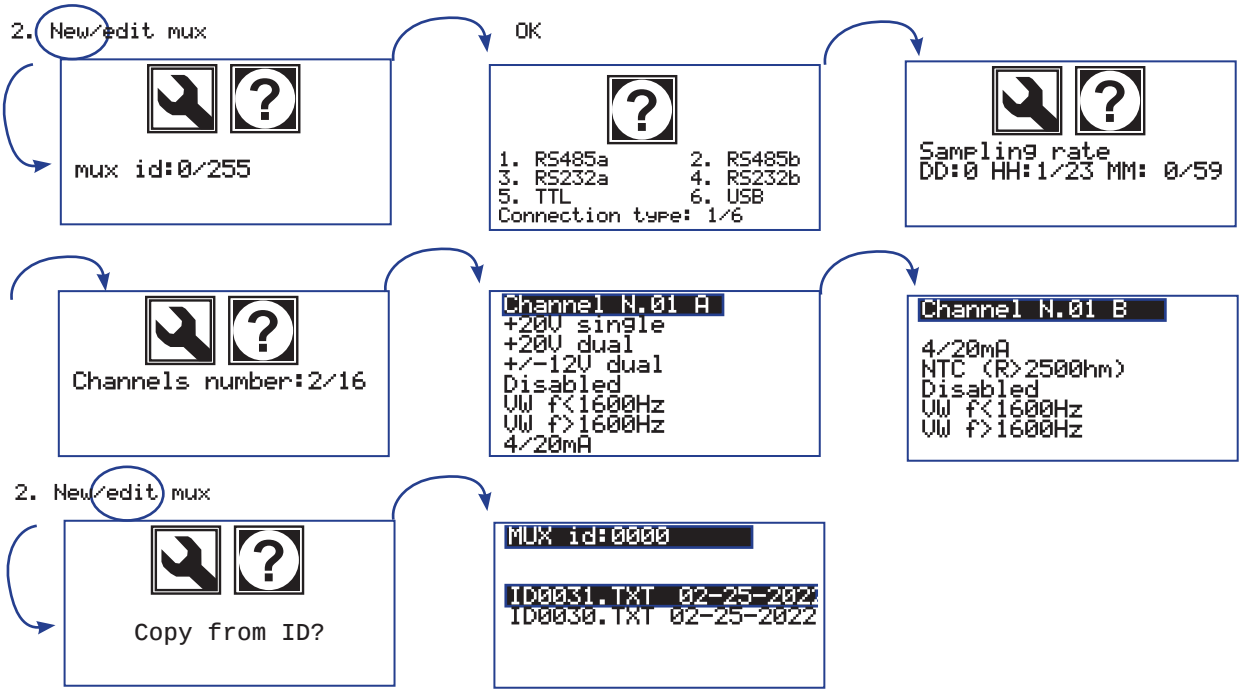
View the list of all available multiplexer configuration files stored on internal memory. Useful especially when creating a new multiplexer to verify which identifiers are already in use by the system.

1. View mux



1.2.1.2 New/edit (G)MUX

Procedure for creating a new multiplexer or modifying one or more parameters of an existing multiplexer.
All the information for the complete configuration of a multiplexer are requested. In case this already exists, the settings currently in use are proposed.
As a first information the identification number of the multiplexer to be configured is requested.



1.2.1.2.1 (G)MUX ID

The identification number is written on the label of the multiplexer or can be also obtained from the position of the eight minidip visible from the front transparent panel. Values in the range 0 to 254 are expected.
When the ID is confirmed, the message **"Copy from ID"** appear to make a copy of any other multiplexer configuration. By pressing the OK button the list of the currently configured multiplexers is proposed. Press keys 1 and 0 to scroll up and down respectively and OK to select the multiplexer, while the ESC key exits the menu. Press ESC from the "Copy from ID" menu to continue with the manual configuration of the multiplexer.
Then a number between 1 and 6, related to the serial input port into which the multiplexer will be physically wired, is asked. 2 RS485 ports, 2 RS232 ports, 1 TTL serial port and 1 USB port are available.

The acquisitions sampling rate of the channels connected to the multiplexer is then requested. The sampling rate can be set from a minimum of 1 minute up to a maximum of 30 days.

NOTE: Depending on the monitoring needs, each individual multiplexer may have its own specific sampling rate and many multiplexers can be configured with different sampling rates. The G802 module manages the multiplexers by starting acquisition cycles when needed.

Once the sampling period has been defined, the number of channels is requested. A number between 1 and 16, also depending on the multiplexer model which is being configured, must be set. Then the type of sensor must be defined by choosing from a proposed list of supported type of sensors.

Each channel of any multiplexer model is equipped with a 4-pole input terminal.

Two of the sensors equipped with only two wires, such as the current-loop 4/20 ma signal sensors, all the vibrating wire sensors and the NTC thermistors, can be both connected on the same 4-pole channel input terminal so becoming a double channel.

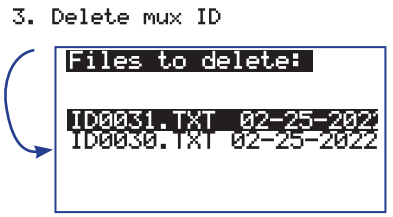
In case a two-wired sensor is selected (i.e. current loop, Vibrating Wire or NTC) the type of a second two-wired sensor that may be wired to the same channel is also requested. For each channel the warming time is also requested which is the time in seconds the sensor is supplied before to read it with values from a minimum of 1 second up to a maximum of 60 sec. This operation is required for each multiplexer channel. Once at least one channel has been configured, the copying of the features of a previously configured channel is proposed too. Select the number of the channel to be copied or the OK key to continue with the manual configuration.

1.2.1.3 Delete (G)MUX ID

The list of all files related to the currently configured multiplexers is displayed.
Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the multiplexer, ESC to exit the menu. A confirmation is requested before deleting.

1.2.1.4 Delete all (G)MUX

Delete all currently configured multiplexers. A confirmation is required before to proceed.



1.2.2. > DMUX Configuration

Menu for the configuration of DMUX in all their working specifications.

1.2.2.1. View dmux

View the list of all available multiplexer configuration files stored on internal memory. Useful especially when creating a new multiplexer to verify which identifiers are already in use by the system.

1.2.2.2. New/edit dmux

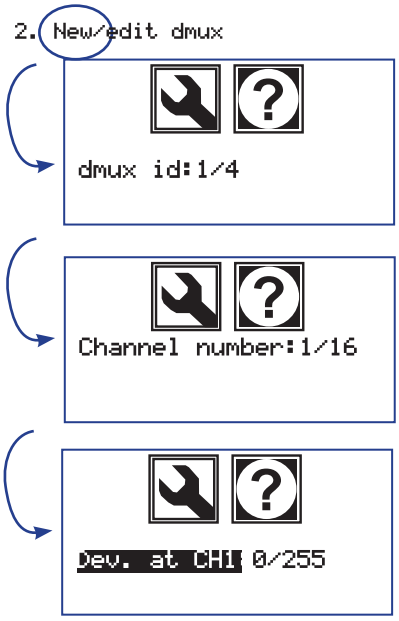
Procedure for creating a new multiplexer or modifying one or more parameters of an existing multiplexer.
All the information for the complete configuration of a multiplexer are requested. In case this already exists, the settings currently in use are proposed.
As a first information the serial port in use by of the multiplexer is requested. The port in use must be set to a values in the range 1 to 4.
Two RS485 ports and two RS232 ports are available. By pressing the OK button the number of channels to be used is asked.
The value is set in the range 1 to 16. Then for any channel a device id must be paired by continuously pressing the OK key up to the end.

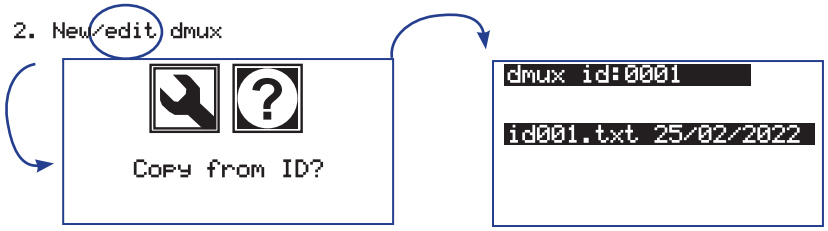
1.2.2.3. Delete dmux

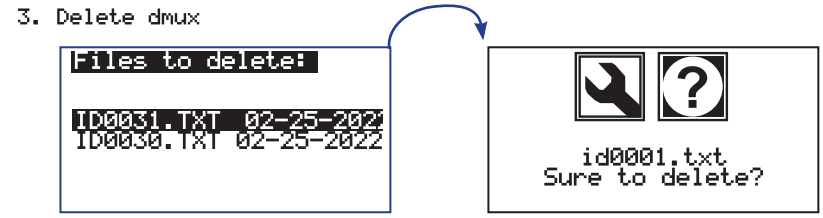
The list of all files related to the currently configured multiplexers is displayed. Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the multiplexer, ESC to exit the menu.
A confirmation is requested before deleting.

1.2.2.4. Del all dmux

Delete all currently configured multiplexers. A confirmation is required before to proceed.







1.2.3. > MUMS Configuration

Menu for the configuration of the MUMS inclinometric arrays in all their working specifications.

1.2.3.1. View mums

View the list of all available inclinometric array configuration files stored on internal memory. Useful especially when creating a new inclinometric array to verify which identifiers are already in use by the system.

1.2.3.2. New/edit mums

Procedure for creating a new inclinometric array or modifying one or more parameters of an existing inclinometric array.
All the information, for the complete configuration of a inclinometric array, are requested. In case this already exists, the settings currently in use are proposed.
As a first information the identification number of the inclinometric array to be configured is requested. Values in the range 0 to 255 are allowed.
When the ID is confirmed, the message “Copy from ID” appear to make a copy of any other inclinometric array configuration. By pressing the OK button the list of the currently configured inclinometric array is proposed. Press keys 1 and 0 to scroll up and down respectively and OK to select the inclinometric array number, while the ESC key exits the menu. Press ESC from the “Copy from ID” menu to continue with the manual configuration of the inclinometric array.
Then a number between 1 and 6, related to the serial input port into which the inclinometric array will be physically wired, is asked.
2 RS485 ports, 2 RS232 ports, 1 TTL serial port and 1 USB port are available.
The Tilt Link, the Piezometers, the Barometers/Strain Gauges and the precision Temperature Link numbers are then requested. The acquisitions sampling rate is finally requested. The sampling rate can be set from a minimum of 1 minute up to a maximum of 30 days.

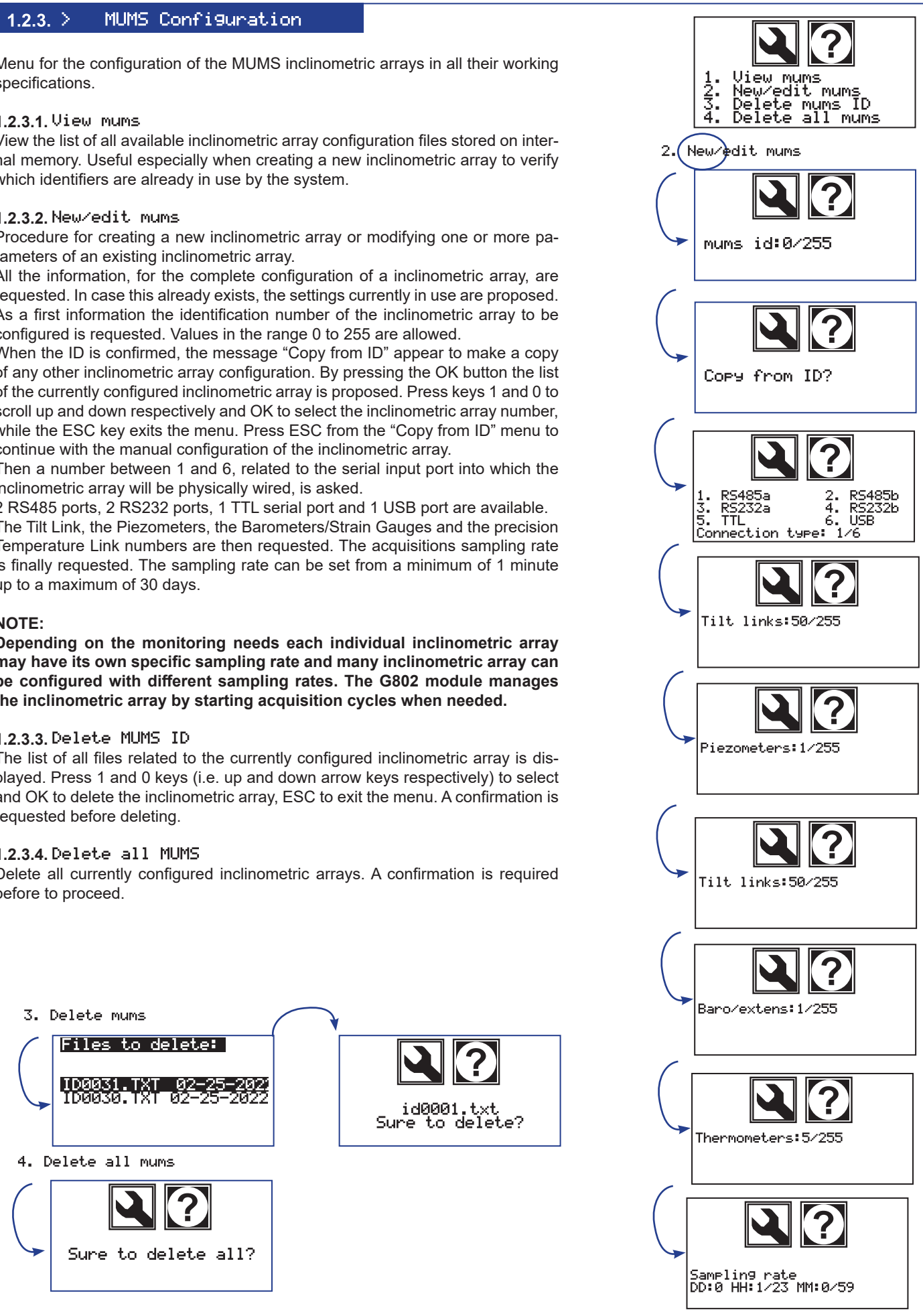
NOTE:
Depending on the monitoring needs each individual inclinometric array may have its own specific sampling rate and many inclinometric array can be configured with different sampling rates. The G802 module manages the inclinometric array by starting acquisition cycles when needed.

1.2.3.3. Delete MUMS ID

The list of all files related to the currently configured inclinometric array is displayed. Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the inclinometric array, ESC to exit the menu. A confirmation is requested before deleting.

1.2.3.4. Delete all MUMS

Delete all currently configured inclinometric arrays. A confirmation is required before to proceed.



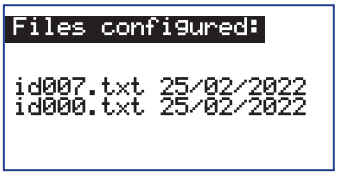
1.2.4. > DSAS Configuration

Menu for the configuration of the DSAS digital sensors arrays in all their working specifications.

1.2.4.1. View Dsas

View the list of all available digital sensors arrays configuration files stored on internal memory. Useful especially when creating a new digital sensors array to verify which identifiers are already in use by the system.

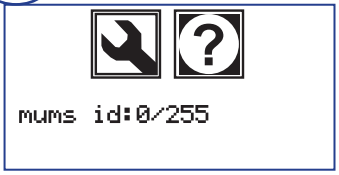
1. View dmux

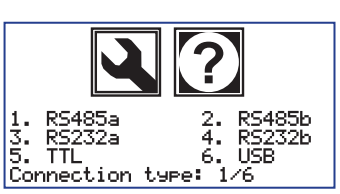


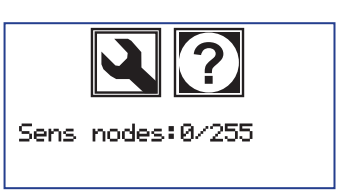
1.2.4.2. New/edit Dsas

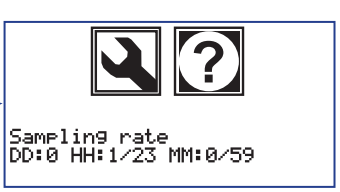
Procedure for creating a new digital sensors array or modifying one or more parameters of an existing digital sensors array.
All the information, for the complete configuration of a digital sensors arrays, are requested. In case this already exists, the settings currently in use are proposed.
As a first information the identification number of the digital sensors array to be configured is requested. Values in the range 0 to 255 are allowed.
When the ID is confirmed, the message “Copy from ID” appear to make a copy of any other digital sensors array configuration. By pressing the OK button the list of the currently configured digital sensors arrays is proposed. Press keys 1 and 0 to scroll up and down respectively and OK to select the digital sensors array number, while the ESC key exits the menu. Press ESC from the “Copy from ID” menu to continue with the manual configuration of the digital sensors array.
Then a number between 1 and 6, related to the serial input port into which the digital sensors array will be physically wired, is asked.
2 RS485 ports, 2 RS232 ports, 1 TTL serial port and 1 USB port are available.
The number of sensors and the related unique serial number is then asked. Once the first serial number is set, the proposed following serial numbers related to the following sensors are automatically incremented. The acquisitions sampling rate is finally requested. The sampling rate can be set from a minimum of 1 minute up to a maximum of 30 days.

2. New/edit mums









NOTE:
Depending on the monitoring needs each individual digital sensors array may have its own specific sampling rate and many digital sensors arrays can be configured with different sampling rates. The G802 module manages the digital sensors array by starting acquisition cycles when needed.

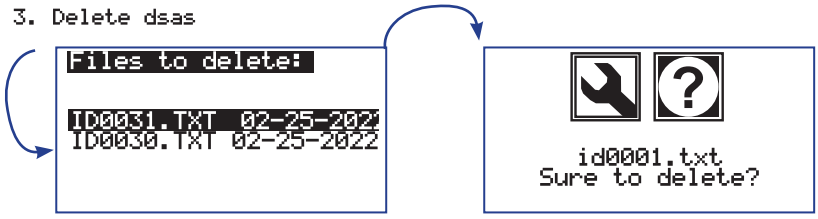
1.2.4.3. Delete Dsas

The list of all files related to the currently configured digital sensors arrays is displayed.
Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the digital sensors array, ESC to exit the menu.
A confirmation is requested before deleting.

1.2.4.4. Del all Dsas

Delete all currently configured digital sensors arrays. A confirmation is required before to proceed.

3. Delete dsas



4. Delete all dsas

1.2.5. > FBG Configuration

Menu for the configuration of the Fiber Bragg grating (FBG) in all their working specifications.

1.2.5.1. View fbg

View the list of all available Fiber Bragg grating configuration files stored on internal memory. Useful especially when creating a new Fiber Bragg grating to verify which identifiers are already in use by the system.

1.2.5.2. New/edit fbg

Procedure for creating a new Fiber Bragg grating or modifying one or more parameters of an existing Fiber Bragg grating.
All the information for the complete configuration of a Fiber Bragg grating are requested. In case this already exists, the settings currently in use are proposed.
As a first information the identification number of the Fiber Bragg grating to be configured is requested. Values in the range 0 to 255 are allowed.
When the ID is confirmed, the message “Copy from ID” appear to make a copy of any other Fiber Bragg grating configuration. By pressing the OK button the list of the currently configured Fiber Bragg grating is proposed. Press keys 1 and 0 to scroll up and down respectively and OK to select the Fiber Bragg grating number, while the ESC key exits the menu. Press ESC from the “Copy from ID” menu to continue with the manual configuration of the Fiber Bragg grating.
Then a number between 1 and 6, related to the serial input port into which the digital sensors array will be physically wired, is asked. Press 6 to select USB input if not expressly differently defined by the system producer. The number of sensor arrays, the integration time in the values from 1 to 99999 and the number of average acquisitions between 1 and 10000.
The acquisitions sampling rate is finally requested. The sampling rate can be set from a minimum of 1 minute up to a maximum of 30 days.

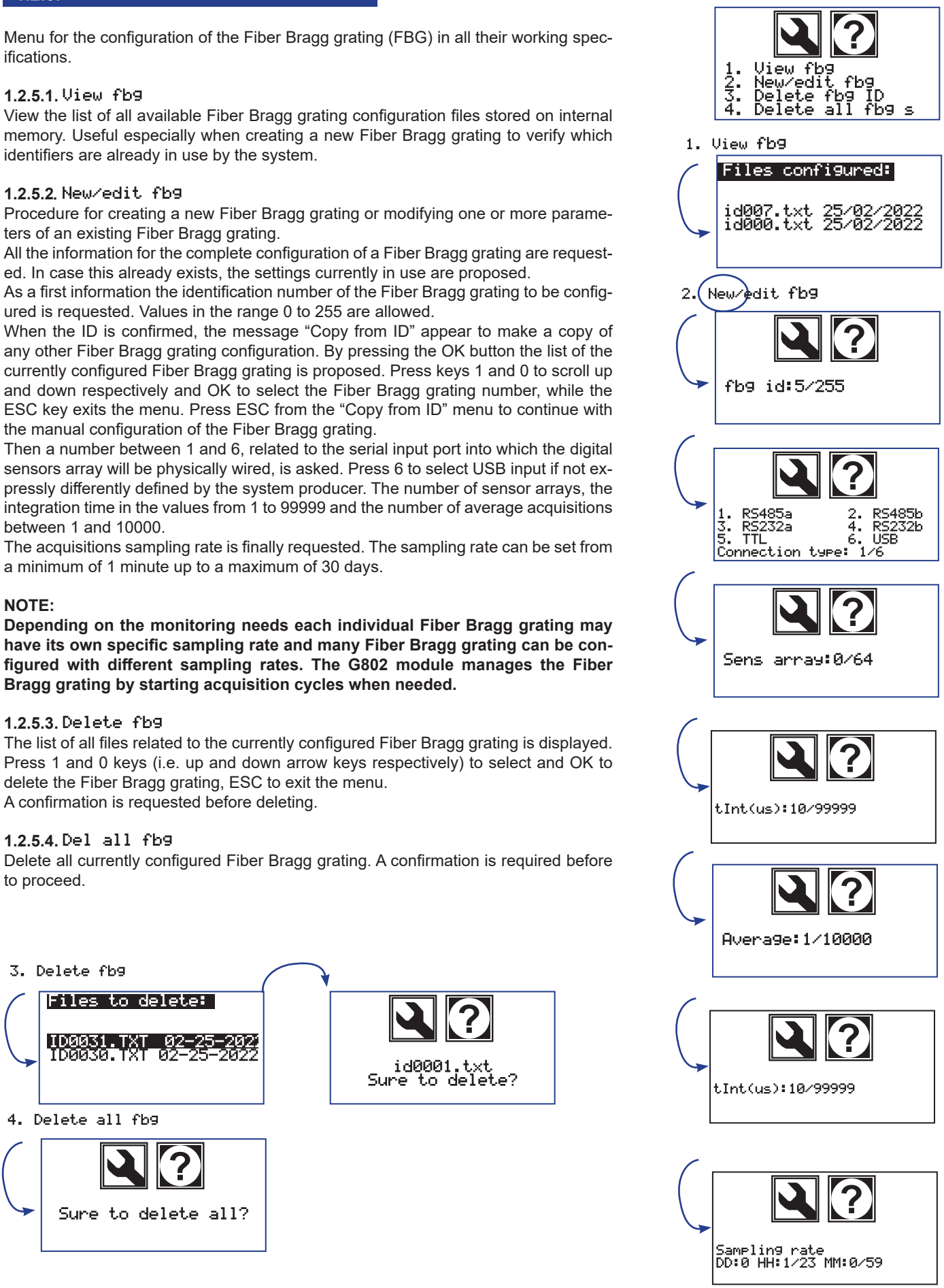
NOTE:
Depending on the monitoring needs each individual Fiber Bragg grating may have its own specific sampling rate and many Fiber Bragg grating can be configured with different sampling rates. The G802 module manages the Fiber Bragg grating by starting acquisition cycles when needed.

1.2.5.3. Delete fbg

The list of all files related to the currently configured Fiber Bragg grating is displayed. Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the Fiber Bragg grating, ESC to exit the menu.
A confirmation is requested before deleting.

1.2.5.4. Del all fbg

Delete all currently configured Fiber Bragg grating. A confirmation is required before to proceed.



1.2.6. > MODB Configuration

Menu for the configuration of the MODBUS digital sensors arrays in all their working specifications.

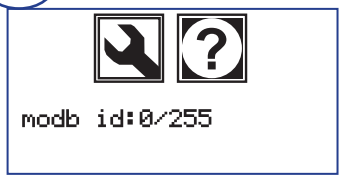
1.2.6.1. View modb

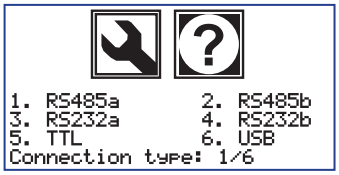
View the list of all available MODBUS digital sensors arrays configuration files stored on internal memory. Useful especially when creating a new MODBUS digital sensors array to verify which identifiers are already in use by the system.

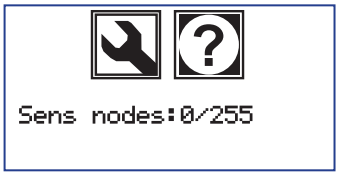
1.2.6.2. New/edit modb

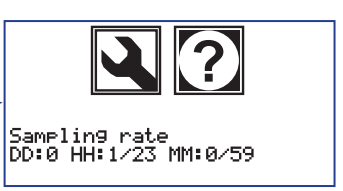
Procedure for creating a new MODBUS digital sensors array or modifying one or more parameters of an existing digital sensors array.
All the information for the complete configuration of a MODBUS digital sensors arrays are requested. In case this already exists, the settings currently in use are proposed.
As a first information the identification number of the MODBUS digital sensors array to be configured is requested. Values in the range 0 to 255 are allowed.
When the ID is confirmed, the message “Copy from ID” appear to make a copy of any other MODBUS digital sensors array configuration. By pressing the OK button the list of the currently configured digital sensors arrays is proposed. Press keys 1 and 0 to scroll up and down respectively and OK to select the digital sensors array number, while the ESC key exits the menu. Press ESC from the “Copy from ID” menu to continue with the manual configuration of the MODBUS digital sensors array.
Then a number between 1 and 6, related to the serial input port into which the digital sensors array will be physically wired, is asked. 2 RS485 ports, 2 RS232 ports, 1 TTL serial port and 1 USB port are available.
The number of sensors and the related unique serial number is then asked. Once the first serial number is set, the proposed following serial numbers related to the following sensors are automatically incremented. The acquisitions sampling rate is finally requested. The sampling rate can be set from a minimum of 1 minute up to a maximum of 30 days.

2. New/edit modb







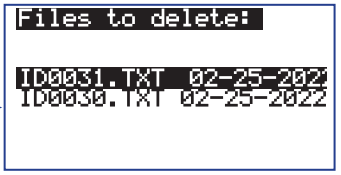


NOTA:
Depending on the monitoring needs each individual MODBUS digital sensors array may have its own specific sampling rate and many MODBUS digital sensors arrays can be configured with different sampling rates.
The G802 module manages the MODBUS digital sensors array by starting acquisition cycles when needed.

1.2.6.3. Delete modb

The list of all files related to the currently configured MODBUS digital sensors arrays is displayed.
Press 1 and 0 keys (i.e. up and down arrow keys respectively) to select and OK to delete the MODBUS digital sensors array, ESC to exit the menu.
A confirmation is requested before deleting.

3. Delete modb



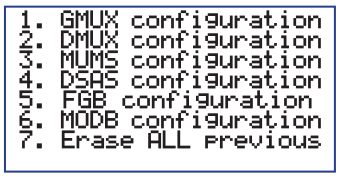
1.2.6.4. Del all modb

Delete all currently configured MODBUS digital sensors arrays. A confirmation is required before to proceed.

4. Delete all modb

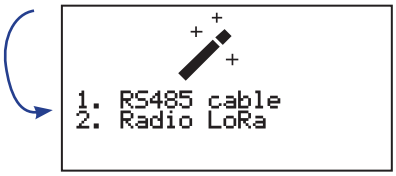
1.2.7. Erase ALL previous

Function to erase all the devices of any of the types previously configured. A confirm to delete is asked for any of the families of devices.

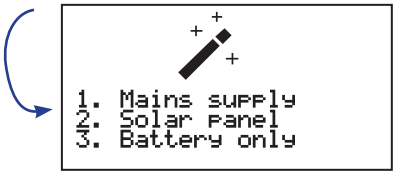


1.3. > WIZARD SETUP

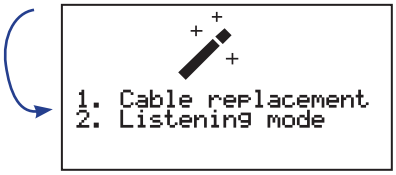
Easy and fast guided settings menu for programming G802 directly.



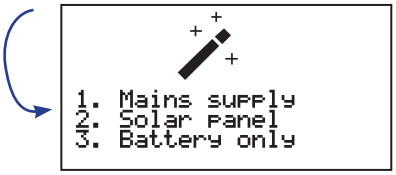
1. RS485 cable

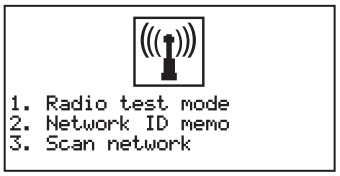


2. Radio LoRa



1. Cable replacement



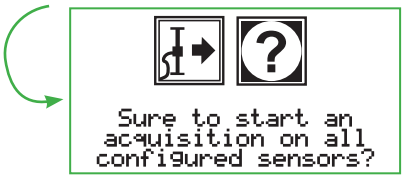


2. ACQUISITIONS Menu

2.1. New data acq.

An acquisition cycle is carried out on all channels currently configured and the acquired values are stored on the internal memory.
If previously saved data exist, they are moved to the dedicated folder SD card backup (if any) and then new data files are created, one for each system device. A confirmation is required before to proceed.

1. New data acq.



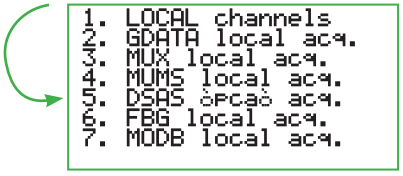
2.2. Append data acq.

An acquisition cycle is carried out on all channels currently configured and the acquired values are saved on the internal memory and a copy on SD card (if any). If previously saved data exist, the new data will be appended. A confirmation is required before to proceed.

2.3. Local acquisitions

Acquisitions on individual channels of the system. The acquired value is displayed at display but is NOT saved.

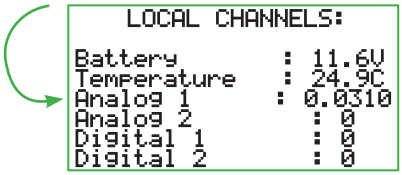
3. Local acquisition



2.3.1. Local channels

Displays the status and values of local channels on G802. Displays on screen the value of battery voltage, internal temperature, the values of the two analogue inputs and the status of the two digital inputs.

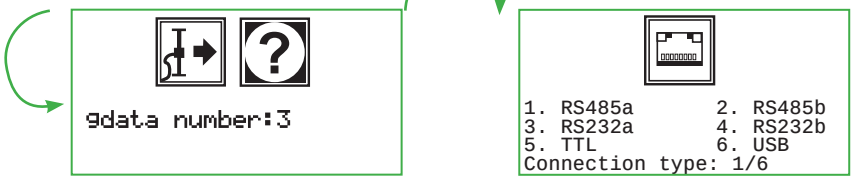
3. Local acquisition
3. LOCAL channels



2.3.2. GDATA local acq.

Menu to acquire the local values of battery voltage and temperature of the LoRa modules connected to G802, if any. Press 2. to access the menu and type the LoRa device number from which to receive the values. Then select the port on which the Master module is connected and press OK. Battery and temperature values are displayed on display.

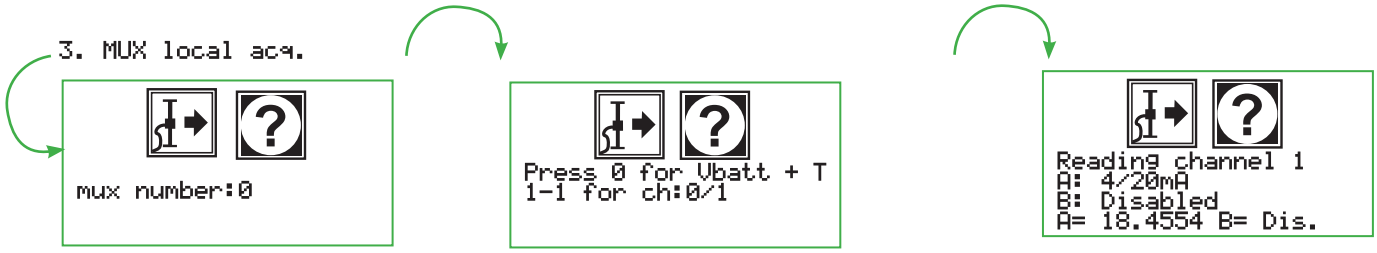
3. Local acquisition
2. GDATA local acq.



2.3.3. MUX local acq.

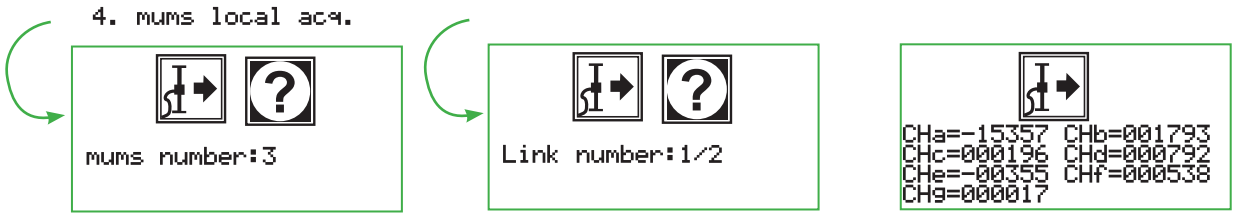
Menu to acquire the individual channels of all GMUX connected by cable to the module G802. Press button 3. to access the menu and type the device number from which to receive the values.
Then type the number of the channel to be acquired or 0 to get information on the GMUX local battery voltage and temperature. By pressing the OK key a local reading is made and the acquired value is shown on display.

3. MUX local acq.



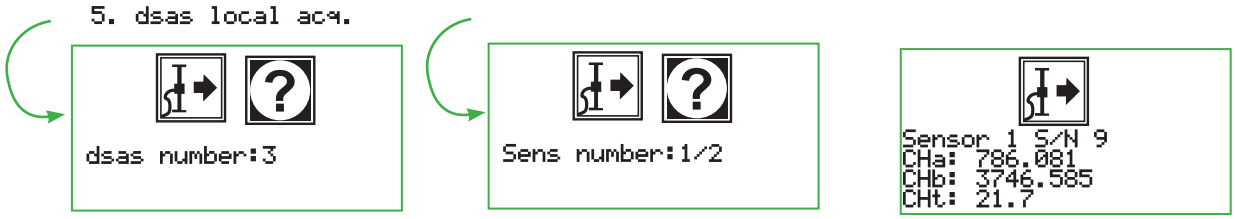
2.3.4. MUMS local acq.

Menu to acquire single nodes in a digital MUMS inclinometric array connected by cable to the G802 module. Press button 4. to access the menu and type the device number from which to receive the values.
Then type the number of the node to be acquired. By pressing the OK button a local reading is performed and the values of the node shown on display.



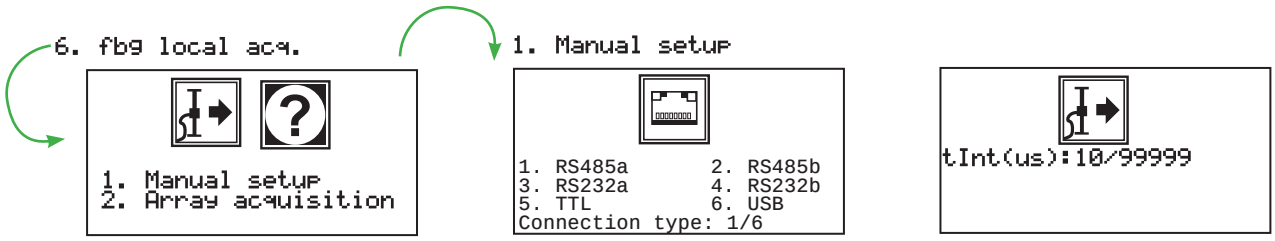
2.3.5. DSAS local acq.

Menu to acquire single nodes of a DSAS digital array connected via cable to the G802 module. Press button 5. to access the menu and type the device number from which to receive the values. Then type the number of the node to be acquired. By pressing the OK key a local reading is made and the acquired value is shown on display.

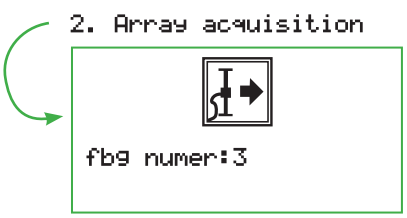


2.3.6. FBG local acq.

Menu to acquire Fiber Bragg grating (FBG) through a special interrogator module connected to module G802. Press button 6. to access the menu and then choose between manual or file configuration parameters previously saved in chain configuration according to the instructions of paragraph “FBG configuration”.
Press the 1. button to enter the parameters manually. Then select the serial port to which the interrogator module is connected, typically the port USB.

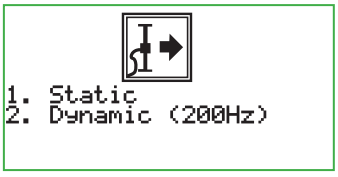


Then set the integration time expressed in micro seconds in the interval 1-99999 and the average number of readings made by the system in the range 1-10000



Press button 2. to use device configuration parameters previously configured for auto capture. Type the device number from which to receive the values.

select whether to make a static or dynamic measurement at 200Hz.

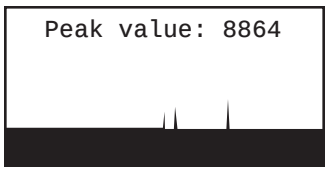


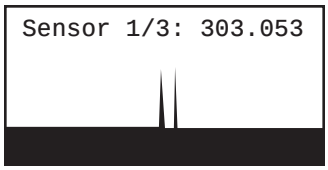
By pressing the OK button a local reading is executed and the acquired values of the array are shown on display in both graphical and numerical form.

A first graph represents the whole acquired band and the highest peak value of those acquired is numerically highlighted.

After each following press of the OK button, in rotation, any single peak of the spectrum is displayed in 1:1 scale centred on the screen and the relative numerical frequency peak value is shown.

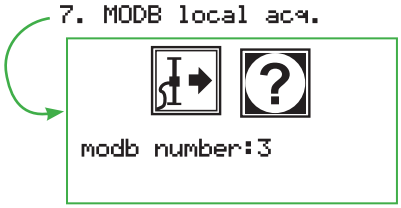
Press the ESC key to make new acquisitions or exit the menu.

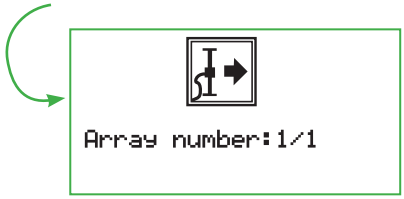


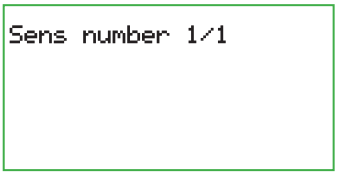


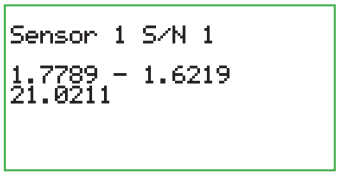
2.3.7. MODB local acq.

Menù per acquisire i singoli nodi di una catena digitale Modbus connessa via Menu to capture individual sensors of a Modbus digital sensors array connected via cable to the G802 module. Press button 7. to access the menu and type the device number from which to receive the values. Then type the number of the sensor to be acquired. By pressing the OK button a local reading is performed and the values of the acquired sensor are shown on display.



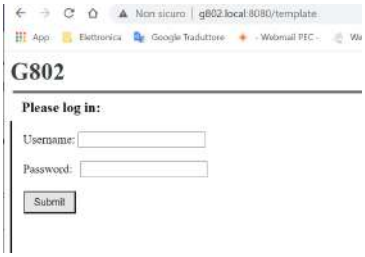






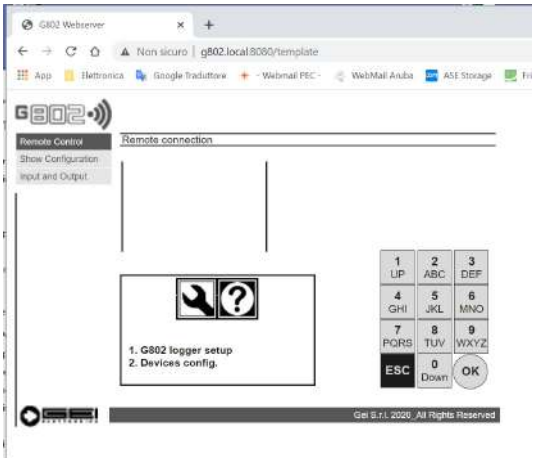
Web server

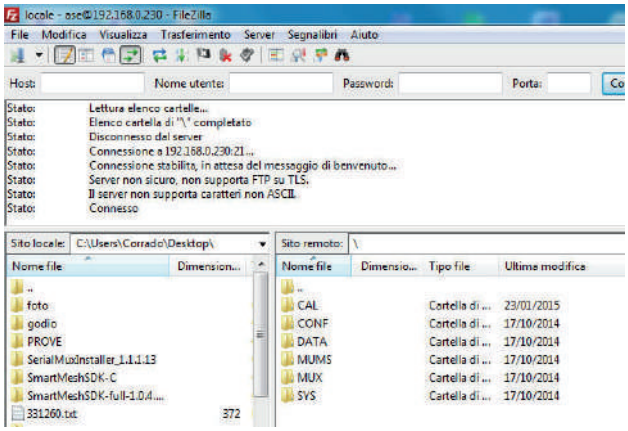
The G802 module publishes a web server protected by user ID and password. Provides information on the main module settings and values and allows a complete remote control of all the functionalities. Use the virtual keyboard to navigate between the various menus of the G802, apply any changes to configurations, perform forced total and local acquisitions etc..
For the configuration of user ID and password please refer to paragraph 1.1.6.1 of this manual.

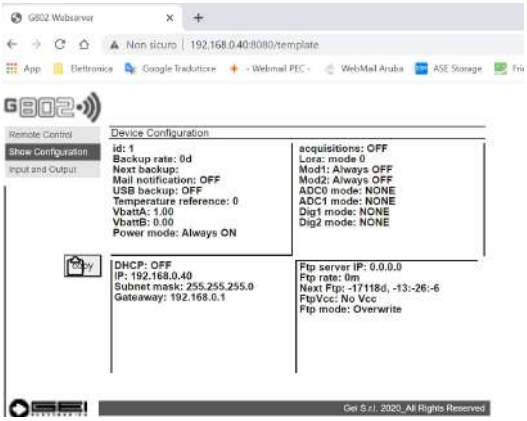


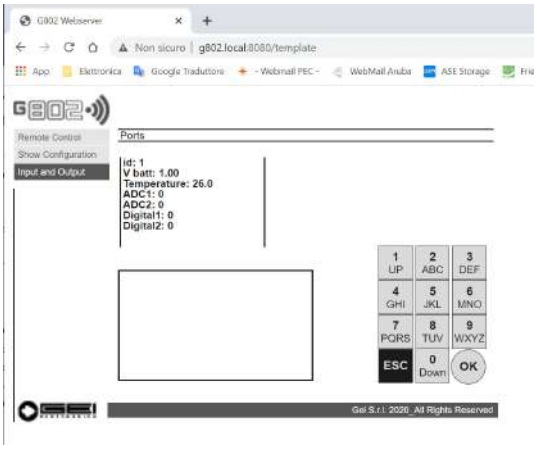
SSH server

The G802 module publishes an SSH server, protected by user id and password, which allows remote access to the data contained into the internal memory. With this option you can connect to the G802 module and download or upload the available data both in the working and backup folders, both in internal NAND memory and on SDcard. The replacement or editing of configuration files can be performed too. This procedure is recommended only to experienced users of the the system. The same result can in fact be obtained more safely by use of the web server, even if in longer times.









Dichiarazione di Conformita'

CE

Declaration of Conformity

La società Gei S.r.l. (a S.U.), nella figura del Responsabile dell'Ufficio Tecnico, dopo aver verificato la corrispondenza alle disposizioni delle seguenti Direttive Comunitarie,

Gei S.r.l. (a S.U.), as the Technical Officer, after having checked the correspondence to the provisions of the following Community Directives,

2014/30/UE (Compatibilità Elettromagnetica - *Electromagnetic Compatibility*)

2011/65/CE (RoHS)

e delle norme armonizzate vigenti, con relative revisioni
and of the current harmonized standards, with relative revisions

EN 61000-6-2, EN 61000-6-3

Dichiara - *States*

che il prodotto modello G802 risulta conforme alle specifiche imposte dalle norme in materia di Direttiva Compatibilità Elettromagnetica e Direttiva RoHS.

that the G802 model product complies with the specifications imposed by the regulations regarding the Electromagnetic Compatibility Directive and the RoHS Directive.

Parma, 15/10/2021

Il Responsabile Ufficio Tecnico
The Technical Officer
Ing. Corrado Carini

GEI S.r.l. (a S.U.)

GEI ELETTRONICA
GEI S.r.l. (a S.U.) - 43123 Parma - ITALY
Via Robert Koch, 55/A - Pilastrello
Cod. Fisc. e P. Iva 02161390345
Reg. Impr. PR 215541 - Cap. Soc. Euro 20.000 i.v.
sales@geielettronica.it
www.geielettronica.it
Tel. +39 0521 642229