Maid Labs
TECHNOLOGIES

FlowMaid

User Manual

Level Monitor and Open Channel Flow Meter

Registration

Equipment designed by Maid Labs Technologies inc. are the result of several years of research and development. They are the sum of ideas and suggestions received by people like you who use this type of product or are in need.

At Maid Labs Technologies inc., we have made every effort to write a manual that is easy to use and understanding. However, it is always possible those errors may occur, or that the devices have sudden hardware or software changes that are not updated in this manual. In these cases, we are sorry. Check if a new version of the manual and firmware are available on our website www.maidlabs.com .

The internal software of products manufactured by Maid Labs Technologies inc. can be updated easily. This means that you will be able to enjoy the majority of the improvements we make in the following years to firmware upgrade, provided that the hardware is compatible. To access the updates, you must complete the *Registration* section on www.maidlabs.com website.

Our services and warrantees are available only for registered products. If you have more than one product, please register them all.

Warranty

Maid Labs Technologies inc. (hereinafter called "MAID Labs") states the following warranty for any new Maid Labs product, sold by our authorized representatives.

MAID Labs guarantees that this product is free under normal use and maintenance of all manufacturing defects, and is subject to the following terms and conditions:

1. To obtain warranty service:
    (a) The product was registered within 14 (fourteen) days from the date of shipment.
    (b) The registration form must be completed fully and returned.
    (c) The product must be shipped to Maid Labs main office or to an approved maintenance and repair service center for maintenance. Shipping is at the customer's expense.

2. Limitations: This warranty does not apply to:
    (a) Repair or replacement of all cabinets, batteries, connecting wires, antennas and accessories.
    (b) Any defect or repair as a result of abuse, neglect, inadequate care and/or misuse.
    (c) Any defect or repair due to failure to follow the recommendations in the user manual.
    (d) Any modification, adjustment or repair to Maid Labs products by any other company other than Maid Labs authorized maintenance and repair centers.
    (e) All Maid Labs products, whose serial number has been damaged, altered or removed.
    (f) The maintenance, cleaning or periodic verifications.
    (g) All Maid Labs products that are not the property of the original owner.
    (h) Products purchased from a bankrupt, insolvent or non-approved representative.
    (i) Any damages caused by fire, flood, lightning, power surges or other events beyond the control of Maid Labs (acts of God).
    (j) The warranty does not cover the elimination of static or electrical interference, adjustments or costs of labor associated with removal or reinstallation of the unit for repair.
    (k) The warranty does not cover damage caused by high humidity, water or leaking batteries.

3. If a Maid Labs product is defective under applied conditions, necessary repairs will be performed, at no additional cost, for parts and labor where Maid Labs recognizes that such defects are caused by materials or manufacturing.

4. This warranty constitutes the entire expressed warranty given by Maid Labs for Maid Labs products. No representative or service maintenance employee is authorized to extend this warranty on behalf of Maid Labs

5. Since each installation may incorporate malfunctions, preventing Maid Labs from ensuring the smooth operation of its devices in all circumstances, Maid Labs will not refund nor exchange the instruments that were caused by connections to any problematic installation.

6. The warranty period is one year on parts and labor from the date of shipment.

7. LIMITATION OF DAMAGES: To the extent permitted by applicable law, under no circumstances MAID Labs or its affiliates be liable to you, to a user or a third party for any indirect, special, consequential, or punitive damages of any kind whether in contract or civil, including but not limited to, personal injury, loss of revenue, loss of goodwill, loss of business opportunities, loss of data, whatever may have been the predictability of such damages. And in no case may the total responsibility of Maid Labs or its affiliates exceed the equipment purchase price received from you, from a user or from a third party, regardless of the laws by which the cause of action was brought. The foregoing does not affect your territory's statutory rights.

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Company Information

The company Maid Labs Technologies inc. strives to provide innovative and tailored products, of high quality at reasonable cost, allowing municipalities and industries to increase the efficiency of their personnel and the equipment and systems they oversee, to increase the efficiency of all.

Maid Labs Technologies inc. has developed highly specialized technologies in the analysis of waste water lift stations, tap water pressure monitoring, recording and calculation of overflow and electrical analysis

Contacts

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Web : www.maidlabs.com   Email : info@maidlabs.com

Product Application

Unless otherwise specified, this manual contains the information required to install, operate and maintain the FlowMaid device and its accessories. The information on the application of the instruments manufactured by Maid Labs Technologies inc. is on the website of the company.

Product Description

The FlowMaid is a small monitoring device recording level, volume and flow. Data is transferred by USB in a text format with separator (csv) or via Internet to the MaidMaps application, which shows the level, and if applicable, the real-time flow and volume since the beginning of the overflow event.

The municipality could strategically deploy the technology in all overflow structures to monitor the volume of water lost during these events. When the level or amount of water discharged exceeds acceptable limits, the icon representing this information on MaidMaps changes color and a warning email is sent.

The device has a relay output that can be activated by level. This function could be used to open or close valves or generate an alarm.

The USB key can be used to change the device settings and update its firmware. These settings can also be changed remotely via the Internet. When the FlowMaid is connected to the web, its firmware will update automatically.

The backlit display allows you to view important information such as the level and flow.

Options / Accessories

Power supply 120V – 12 VDC 2A **MLPS2**
Rechargeable Battery 12VDC 15 Amp/h **MLBATRECH12V-15AH**
Battery charger **MLPSBAT12**
Submersible case for cellular modem or Wi-Fi module hosting **MLENCPEL**
Level sensors by pressure for wastewater **MLPLG, MLPLR, MLPNL**
Ultrasonic sensors **MLUS-1,3M, MLUS-6M**
Resistive level sensor **MLSNR**

Dimensions

130 mm
5 1/8"

USB

65 mm
2 9/16"

MAID LABS

Do not use this image as a template

30 mm
1 3/16"

When installing the instrument, provide enough space above it for the Ethernet port on the top, and below it for the connector and wires input.

Length 5.7 in, Width 3.94 in

Height 2.24 in, Length 5.7 in
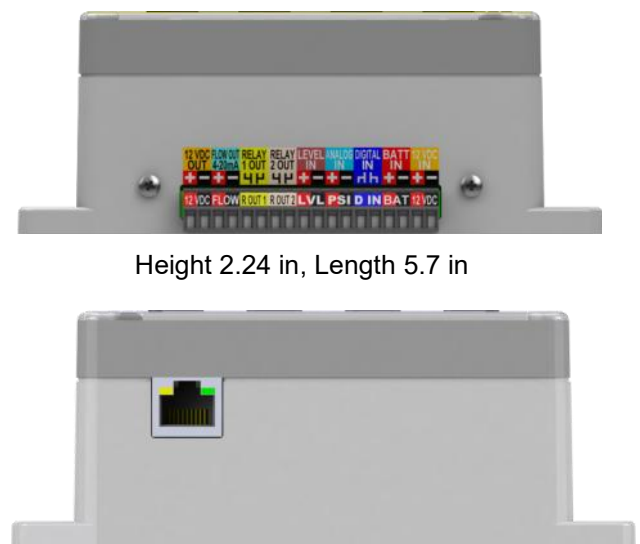
Use and Maintenance

Environmental Conditions

It is the user's responsibility to ensure that this product is not exposed to an environment for which it is not designed. These conditions may include a range of extreme operating temperatures, extreme humidity, vibration or abnormal shock, extended submersion or potentially explosive atmospheres.

Cleaning

If the sensor measurements are not what they should be, this can be caused by fouling of the sensor. Periodic cleaning is recommended. It is important to follow the sensor manufacturer's recommendations.

Electrical Conditions

Each Maid Labs product is designed to operate correctly in a specific range of electrical conditions. The product label identifies the main parameters of connection. All entries are designed to resist reverse polarity, as well as higher voltage to a certain extent. It is the user's responsibility to ensure that all electrical connections are made to the products in accordance with the recommendations of MAID Labs and the local electrical code. **The user should read this manual before connecting the device.**

Power and Batteries

This product can operate with an external 12 VDC power supply (**MLPS2**, 120VAC/12VDC 2A) or external 12V rechargeable battery **MLBATRECH12V-15AH**. It is strongly recommended to check the polarity of the wires before connecting it. **THE 12V EXTERNAL BATTERY MUST BE FULLY CHARGED BEFORE INSTALLATION**. Use with power in the "12 VDC IN" input, the unit will reload itself and maintain the battery charged to address a possible power failure. In the case where the voltage of the external battery is too low and the unit is not powered by the "12 VDC IN" input, the unit will stop recording data.

Operating time on batteries

The device is designed to operate up to 1 year on an external battery **MLBATRECH12V-15AH**. However, the operating time of the device depends on the level interval and the accessories powered by it, for example, a cellular modem.

Installation

The FlowMaid is not waterproof. Avoid placing it in wet locations where liquids could inter the product or condensation is a problem. Damage caused by water or excessive humidity voids the Maid Labs Technologies warranty. The instrument must be placed in a location where there is no risk of being hit or dropped. A label is supplied to cover the Ethernet port to minimize the risk of damaging the port from insects or infiltration.

A desiccant bag is placed inside the instrument in order to minimize or delay damage related to humidity that affects all electronic products. When you open the case to change the batteries, be sure to replace the desiccant bag. If you think it is inefficient, you can order additional desiccant from Maid Labs.

Complete Wiring diagram
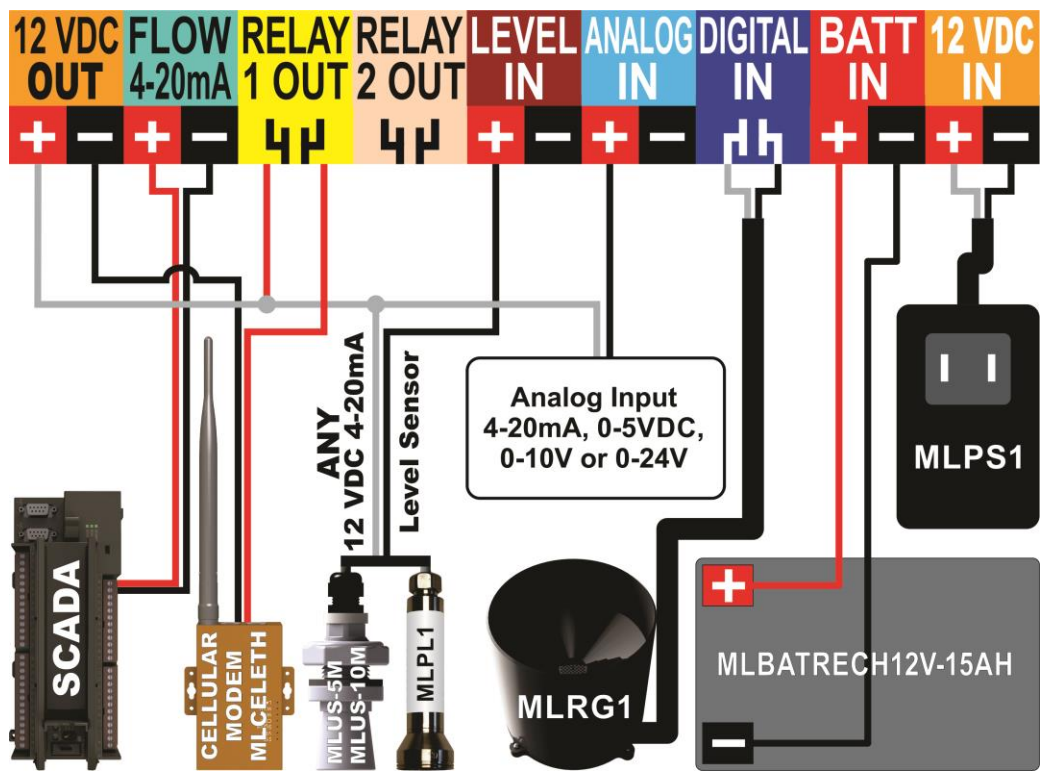
Typical diagram for battery powered installation
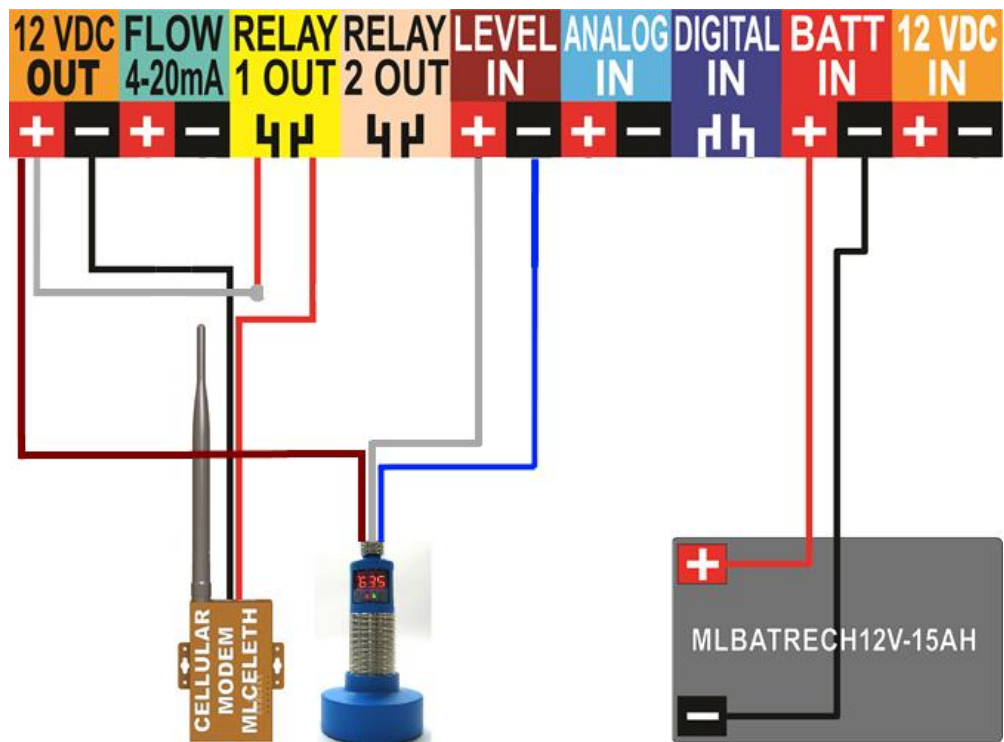
Inputs and outputs description

The "12 VDC" output provides power to the sensors when taking measurements and activates a cellular modem if the device is configured to communicate with MaidMaps.

4-20mA Flow output: Outputs a signal varying in proportion to the rate of overflow. The 4-20mA signal is available only when the unit is powered by the entry "12 VDC IN."

"RELAY 1 OUT" output is a relay contact that can be used to open or close valves, generating an alarm, check the power of a sensor or cellular modem to save energy when the unit is running on battery or issue a pulse each time a certain volume is reached.

As the "RELAY 1 OUT", "RELAY 2 OUT" is a relay contact that can be used to open or close valves, control power sensors or Ethernet modem to save power when operating battery or outputting a pulse each time a certain volume is reached.

The "LEVEL IN" input is an analog input for a level sensor. It can be configured as 4-20 mA, 0-5 V, 0-10 V or 0-24 V depending on the sensor used.

Second analog input "ANALOG IN" can be used for the recording of another sensor. It can be configured as 4-20 mA, 0-5 V, 0-10 V or 0-24 V depending on the sensor used.

The "DIGITAL IN" input allows recording simple state changes of a dry contact, such as a float level or pulse like those from a rain gauge. The contact provided by the sensor must be closed or open, but without voltage, as the contacts of a relay or a float. The instrument generates a low voltage in one of the two wires while the other one is the return. When the instrument detects its own voltage, the contact is closed.

The "BATT IN" input is used to power the FlowMaid in a battery opera ting mode or as a battery backup during power failures by plugging in a rechargable lead acid type 12V battery. The FlowMaid measures and records the remaining energy in an external battery to alert the user when it is time to recharge or replace.

The 12VDC power supply must come from a stable power supply that can provide 2 Amps.

Installation of the FlowMaid on external battery

1. Install the level sensor.
2. Connect the device according to the wiring diagram.
3. On the device, confirm the setup of the level input with the Menu (key 1) / Configuration / Inputs Outputs / Level Input and then choose the proper sensor.
4. Measure the actual water level at the location where the level sensor is installed.
5. Select the proper units used by the device with the Menu (key 1) / Configuration / Units.
6. Proceed with the level calibration with the Menu (key 1) / Configuration / Level setup. Add the value in the device with the Modify key (key 4).
7. Make sure that the displayed level is really the actual level.
8. Proceed with the flow calculation setup with the Menu (Key 1) / Configuration / Flow calculation setup. Select the operating mode (Overflow or Flowmeter). If Overflow was chosen, enter the water level from which the device must do flow calculations.
9. Press on APPL. (Key 4) and choose the proper formula. Enter the required parameters.
10. Setup the alarms of the device like desired (for example, on an overflow level) and if an internet communication is available, make sure to choose the options « Send to MaidMaps and Alerte on start ».
11. If the device is not connected to the internet, disable the communications in Menu (key 1) /Configuration/ Bandwidth setup and set "Server com." to disabled.
12. The device setup is finished. For more advanced configuration, we suggest you to use the Maid Devices Configurator software, available at the following address : http://maidlabs.com/fr/flowmaid

Communication

The devices communicate with a web server *via* an internet connection. There is no configuration to do when connecting to Maid Labs. The devices use port 80 (standard port for all web pages) to communicate with the MaidMaps server. If the computer in the network is capable of browsing the internet, then the communication will work.

Devices are DHCP clients and require no special configuration with the exception of having a DHCP server in the network (present in all standard networks). It is impossible to enter a fixed IP address into the device configuration. It is possible to connect the unit to a Wi-Fi connection using an external module sold by Maid Labs. Configuration of the module is required using a computer. To know the IP address of the device or its MAC address, please refer to the *IP Information* section, page 25.

Instrument start-up

When the instrument is powered by sufficiently charged batteries or functional external power, the instrument automatically saves all the inputs changes even if the screen is off, as in the case of battery operation.

If the device is running on battery only, the display is closed to minimize the energy consumption of the device. The backlight is functioning when the keyboard is active and ceases after a few seconds of inactivity (see *Display* page 16), depending on whether the device is running on batteries or is powered by a 12 VDC adapter.

To turn on the screen of a battery-operated device

With a finger touch on any key for 20 seconds.

The menus

The contextual menu

The keys are touch sensitive when they are pressed. Do not press more than one key at a time. The use of keys is dependent on the current screen.

Alarm Screen

```
♀♀♀    Alarms    ♀♀♀
     Device restart
Start: 04/28/15 14:35:03
End:   04/28/15 14:35:03
Limit:              N/A
 HIDE |    |      | ACK
```

When unusual event occurs, the device can generate an alarm. It is displayed as a window covering the main screen. This alarm can occur, for example, when the device restarts after a power failure. The user must acknowledge the alarm by pressing **ACK** ④ key before returning to the current screen. The user can also navigate into the alarms with keys ② and ③ if there are several, or ignore it all at once by pressing **HIDE** ①. It is then possible to review alarms already recognized, by going through the main screen, following the path with **INFO / Alarms Report** and selecting the correct date.

Main Screen for analog measures

```
04/25|Level (cm)      0.00
14:51|Min:0.00  Max:0.00
 Lcom|Flow (l/s)       N/A
04/25|Min:N/A   Max:N/A
 ⠰⠆|Volume (US gal)   N/A
 ╫╟|Overflows      0 --/--
 MENU |  RT  | INFO | USB
```

04/25
14:51

Date and time shown should be accurate during the reading of the instrument. If not, press the ① key to access the **MENU / Configuration/Date & Time setup**, and then follow the instructions in this section on page 15. If the device has an Internet connection, the will time self-adjust.

Level (cm) indicates the virtual level depending on the unit selected by the user (see *Inputs/Outputs* on page 16). The virtual level is the level that the pumps stop. **Min** and **Max** displays the minimum and maximum reading by the level sensor since the last restart of the device, or since the last *Reset total events* data.

Lcom
--/--

Represents the date (day/month) that there was a communication with the MaidMaps server or a transfer of data on a USB stick.

Flow (l/s) corresponds to the flow, depending on the unit selected by the user (see *Inputs/Outputs* onon page 11). If the device is set to digital mode, **N/A** (not available) symbol will be displayed on the screen. **Min** and **Max** displays the minimum flow and the maximum since the last restart of the device or the last *Reset of the cumulative data*.

The image on the top is the Ethernet connection. When the 3 boxes are linked, the Ethernet cable is connected and the IP address is valid (the communication is not necessarily functional). The bottom icon is the universal sign of a relay and represents the state of the internal relays of the FlowMaid. It is normally open. But when there is a diagonal line in the middle, the relay is closed.

Volume (US gal) displays the amount of total water overflowed since the last *Reset total events* data (on page 23). If the device is set to digital mode, **N/A** (not available) symbol will be displayed on the screen.

Overflows 0 --/-- indicates the number of overflow since the last *Reset total events* and the date (Day/Month) of the last event (overflow).

Main Screen for digital measures

```
04/16 | Not overflowing
13:58 |
Lcom  | Last Duration
04/16 |        0:00:00
▼ Since MMDDYY  04/07/14
╫╫╫ Overflows     4 04/16
MENU |  RT  | INFO |  USB
```

Just like the main screen for analog measurements, the main screen displays the current digital measurement time, the time of the last data communication (MaidMaps or USB), the icons representing the Ethernet connection and the main relay and the number of overflows and the date of the last. Since this is a digital measure of overflow, the level information, the flow and the total volume is not available. However, the display space is utilized to clearly indicate whether or not if an overflow occurs, the duration of the present overflow or the last overflow that took place and the date from which the overflows are cumulative.

From the main screen, digital or analog display, the four keys on the device are used to access various menus.

```
MENU
Configuration
Device Info
IP Informations
Communication test
Lock screen
BACK |  ▲  |  ▼  | ENTER
```

```
Inputs info.
Digital Overflow
Analog flow

BACK |  ▲  |  ▼  | ENTER
```

The **MENU** ① key allows the setup of the instrument or displays information on the device.

RT (real time) key ② displays additional data available in real time.

```
Reports
Events Report
Alarms Report
Overflows report

BACK |  ▲  |  ▼  | ENTER
```

The **INFO** ③ key displays details of the registered events and alarms (reports).

```
USB
Reports
Copy User Manual
MerMaid Data
Raw Data
Technician Data
BACK |  ▲  |  ▼  | ENTER
```

The **USB** ④ key allows creating, on the USB stick different files, including one in CSV format containing the monthly report compatible to Excel™.

Numbers selection screen

```
0 1 2 3 4 5 [6] 7 8 9 . ←↵


              0


CANCEL |  ←  |  →  | ENTER
```

The setting of the device is done easily using the *Maid Devices Configurator* software (on page 31). However, it is possible to do so from the screen. A scale from 0 to 9 to enter the value desired, moving with the keys ② (left) and ③ (right). To select the first digit, press **ENTER** ④.

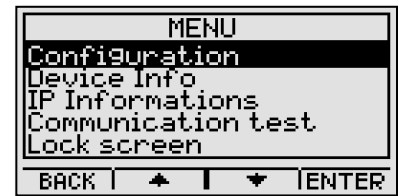← To correct or erase a number, select this arrow.
↵ To accept the number and exit the submenu, use this sign.

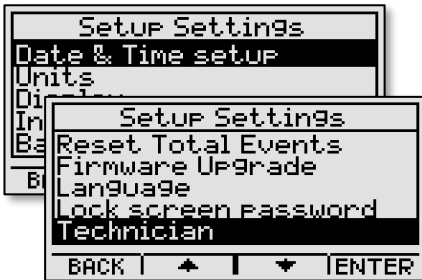When the cursor is on **+** press ④ to change the negative number.

A negative value may be necessary for some parameters in the overflow equations. It is important to note that in certain cases, it is not possible to enter any kind of number. In such cases, an error message might appear below the window. Also, the user will be limited to the number of digits after the dot.

MENU ①

Pressing the **MENU** ① key displays five options, configure the device, display the hardware and the software of the device, reveal IP addresses, testing of communication with the instrument, and locking the screen.

```
        MENU
Configuration
Device Info
IP Informations
Communication test
Lock screen
 BACK │  ▲  │  ▼  │ENTER
```

Instrument setup

```
     Setup Settings
Date & Time setup
Units
Display
In    Setup Settings
Ba Reset Total Events
   Firmware Upgrade
 B Language
   Lock screen password
   Technician
   BACK │  ▲  │  ▼  │ENTER
```

From the main screen, press the **MENU** ① key to enter the menu, and then **ENTER** ④ to reach the configuration menu. The latter allows changing all the items listed below. Scroll through the menu with the keys ② and ③, and then press **ENTER** ④ to move to the action. Once the action is completed press **RETURN** ① back to return to the **Setup** menu. The list of submenus is longer than what is displayed on the initial screen.

*You can use the **Maid Devices Configurator** software provided with the instrument to configure the instrument. It facilitates and accelerates the configuration (on page 31).*

Date & Time setup

This menu displays the time, date, and the difference with the universal time (UTC), also known as Greenwich Mean Time (GMT). The unit, with an internet connection, updates automatically all day with the internet time. It is possible to force the update by internet with the **SET** ③ key. When communication is disabled, the weather modification is possible with the keys –,+ and **NEXT**.

```
    Date & Time setup
Time : │H:15 M:38 S:54│
Date : │D:26 M:06 Y:12│
Time Zone :│GMT −4:00│
 BACK │       │  SET  │
```
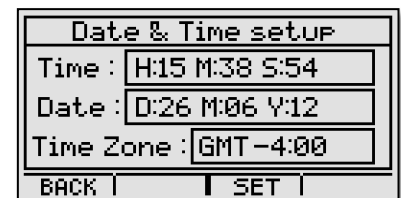
A cursor appears below the first number which can be changed. The keys ② and ③ changes the value and/or **NEXT** ④ to switch to the next variable.

Data is recorded at Greenwich Mean Time (GMT) and then adjusted to the local time, for the creation of files and reports. This prevents the loss of data caused by changes in daylight saving time, to standard time and vice versa.

Changing the date or time can cause loss of data when the date or time entered is remote. When this happens, the data changes will be lost. In this case, an additional screen will appear asking for changes confirmation. Changing the time zone will not cause loss of data.

Units

In the FlowMaid different types of units can be selected such as **Length**, **Volume, Flow**, etc. Each type of unit has a proper setup for the unit being used in the device. The length, for example, can be in meters (**m**), inches (**inch**), feet (**ft**) or centimeters (**cm**).
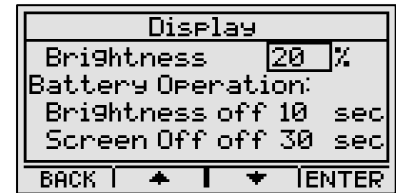
Press the **CHANGE** ④ key to move from one unit to another and press ② or ③ to move from one parameter to the next.

```
        Units
    Length │m│
    Volume l
    Flow l/s
 BACK │  ▲  │  ▼  │ EDIT
```
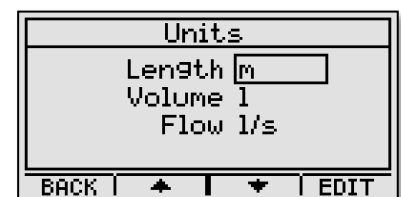
Display

To maximize the duration of the batteries press **ENTER** ④ to select the **Brightness** setting, then ② or ③ to make them vary between 0 (off) % and 100% in increments of 20%, and then ④ again to accept the choice.

```
        Display
 Brightness      20  %
Battery Operation:
 Brightness off 10  sec
 Screen Off off 30  sec
 BACK  |  ♠  |  ♥  |ENTER
```

It is possible to close the backlight (Brightness off) and the screen (Screen off) after an amount of seconds determined by the user. Press the **ENTER** ④ key to accept the selection, then ② or ③ to modify it, followed by ④ to accept the selection.

Power supply

```
      Power Supply
Regular readings
Fast readings
Battery limits

 BACK  |  ♠  |  ♥  |ENTER
```
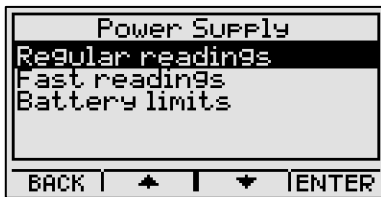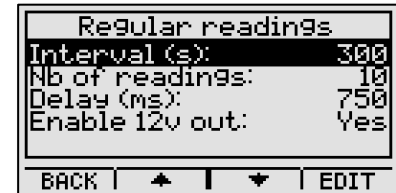
In the power supply menu, it is possible to confirm and change the power and battery settings. The settings are divided into three sections: **Regular readings, Fast readings, Battery limits.**

Regular readings are parameters for the frequency of reading for the analog inputs when operating on batteries. The interval is

```
    Regular readings
Interval (s):       300
Nb of readings:      10
Delay (ms):         750
Enable 12v out:     Yes

 BACK  |  ♠  |  ♥  | EDIT
```

the time between each reading. Other parameters, such as **Nb of readings,** are advanced settings that define the number of consecutive readings (with 25 mili-seconds interval) from which an average will be performed and recorded. **Delay** is the initialization time of the sensor connected to the analog input and **Enable 12v out** defines whether the 12v output should be active or not when the reading is done .

Fast readings are parameters to change the reading interval when the analog input device approaches a certain level in order to have more readings when overflow occurs. The **Margin** is used to define how far from the overflow level the device must begin to make fast readings. For example, the overflow level is at 3m, the margin at 0.2m, so the device will start to make fast readings at 2.8m.

```
     Fast readings
Interval (s)         60
Margin (m)(m)      0.00

 BACK  |  ♠  |  ♥  | EDIT
```
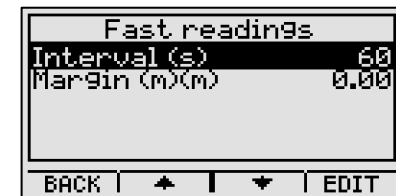
The parameters for the battery limits allows to adjust from what battery voltage the device must stop if no 12v power supply is present and what is the voltage required to determine that a charged battery has been connected to recover the device to operate normally. It is recommended not to change these settings.

```
     Battery limits
Min ext. batt. (V):  10.0
New batt. (V):       12.0

 BACK  |  ♠  |  ♥  | EDIT
```
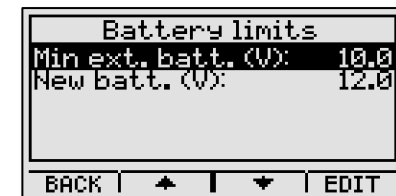
Inputs/Outputs

The FlowMaid has a digital input and an analog input. No configuration is required for the digital input, but is required for the analog input. To use the analog input, a 4-20mA sensor must be connected inside the instrument. The *Installation* section on page 9 shows where to connect the wires.

```
    Inputs/Outputs
Analog Out.
Level Input
Analog In.
Relay Out 1
Relay Out 2
 BACK  |  ♠  |  ♥  |ENTER
```

Press **ENTER** ④ after the level input selection ⟨**Level Input**⟩ and again press **ENTER** ④ after the **Level** selection to access the choice of sensor. Several choices are offered to the user with the key ③. In the case of custom sensor, a choice of four inputs is available: **4-20mA, 0-5V, 0-10V or 0-24V**, that the user can configure itself by entering the settings in the following window.

```
       Hardware
4-20mA
0-5v
0-10v
0-24v

 BACK  |  ♠  |  ♥  |ENTER
```
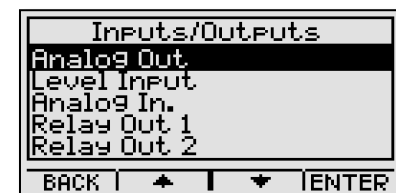
```
   Custom sensor
Unit Type:Length
Unit:m
Value at 4 mA:0.00
Value at 20 mA:6.10
 BACK | EDIT | NEXT |APPLY
```

The **Unit Type** can be changed depending on the type of sensor used. To move from one unit type to another, use the **EDIT** ② key and to accept the choice, access the next field with the **NEXT** ③ key. When the unit type is selected, the corresponding units will be displayed automatically, e.g: Length=**m, cm, in, ft**. To enter the values for the 4-20 mA sensor, press **EDIT** ②, the numbers selection screen appears. When all the settings are properly selected, the **APPLY** ④ key will return to the main inputs/outputs screen.

Level setup

```
   Level setup
Level: 0.00 m

   Enter actual water
        level

 BACK |       |RESET| EDIT
```

The level configuration is used to adjust the values read by the device with the actual measured values. The only parameter to be set is the thickness of water currently read by the sensor. Simply press the **EDIT** ④ key. If there is no water to measure, enter 0. The device will automatically adjust its settings. It is possible to reset all the settings by using the **RESET** ③ key.

Channel Flow Setup

The configuration of the flow rate calculation can be done in two modes: **Overflow** or **Flowmeter**. In the **Flowmeter** mode, the flow calculation is done as soon as a water level is measured while in the **Overflow** mode, it is possible to specify at what level we need to start calculating the flow. Press **APPLY** ④ to select the flow rate calculation equation.

```
   Channel flow Setup
Mode:Overflow
Level: 0.00 m
Compute flow over:
       0.00 m
 BACK | EDIT |   ↓   |APPLY
```

```
   Channel flow Setup
Mode:Flowmeter



 BACK | EDIT |   ↓   |APPLY
```

Channel Flow Formulas

According to the type of Weir being used you will have to choose among 15 equations:

```
  Channel Flow Formula
None
Manning part. pipe
Manning Open Channel
V Notch Weir
Cont. Rect. Weir
 BACK |   ↑   |   ↓   |ENTER
```

```
  Channel Flow Formula
Sup Rect. Weir
Trapezoidal Weir
California Pipe
Standard Formula
Polynomial Formula
 BACK |   ↑   |   ↓   |ENTER
```

```
  Channel Flow Formula
Look-up Table
Measured flow
Parshall
Palmer Bowlus
Leopold Lagco
 BACK |   ↑   |   ↓   |ENTER
```

All flow calculation formulas have their advantages and their disadvantages. None[1] provides 100% accuracy. Choose the one that gives the best results taking into account restrictions on facilities and space debris, risk is the responsibility of the user. Being satisfied that a bad result is better than a good calculation (Marcel Roche in HYDROLOGY of SURFACE), never hesitate to measure.

Make sure that the unit of measure used is displayed in the input of the parameters screen.

Conditions of implementation of the Weirs:

- The plate must be perfectly vertical and perpendicular to the walls of the approach channel, waterproof and crushproof.

- The approach channel should be straight, uniform, and rectangular with constant slope 10 times longer than the width of the blade overflowing to the maximum load.

- The water level in the channel downstream must be sufficiently below the ridge to ensure a free and fully aerated flow.

[1] The volumetric calculation provides an accurate 100% average flow rate, provided that the volume and time are 100% accurate.

Manning equations for partially filled pipes

This equation is the easiest to use to assess the loss of volume and flow during an overflow. The Manning equation usually has the following expression:

$$Q = \frac{KAR^{\frac{2}{3}}S^{\frac{2}{3}}}{n}$$

Q = Flow
K = Relative constant to the units used in the equation
A = Area of the part of the submerged pipe
R = A divided by the perimeter of the submerged section
S = Angle of the pipe (slope)
n = Constant that represents the degree of roughness of the hose wall.

The Manning equation is used to estimate flow in open channel situations where it is not practical to build a Weir or a channel to measure the flow with increased accuracy.

This equation has been developed to calculate the flow in places where water flows to a velocity relative to the angle of the pipe, its roughness and height of the water. When water is part of a tank, as with an overflow pipe located in a manhole or a pump station, an error could be induced, because the equation is not optimized for this type of installation but is the only one available.

When Manning for partially filled pipes is selected, the following settings are required:
- Diameter of the pipe enter this manually.
- Coefficient of roughness to select from a list
- Tilt of the pipe (distance/height): the distance by height, enter this manually
- Basic level of the hose: the level input having been calibrated in another menu (Menu/Configuration/Level setup) specify here how high the bottom of the pipe is located.
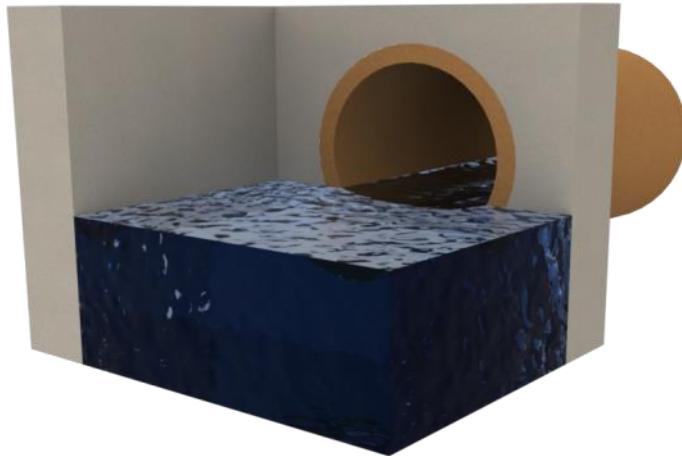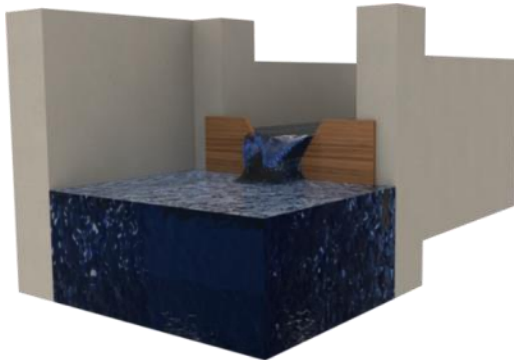
Manning equation for open channel

This type of channel is often encountered in structures that allows the flow of water to overflow. When this function is selected, the following settings are required:

- Width at the bottom of the channel
- Roughness Coefficient, to select from the list
- Pipe angle (distance/height): distance by the height, enter this manually
- Angle of the sloped sides of the channel, in degrees
- Basic level of the channel: the entry level having been calibrated in another menu (Menu/Configuration/Level setup), specify here how high the bottom of the pipe is located.
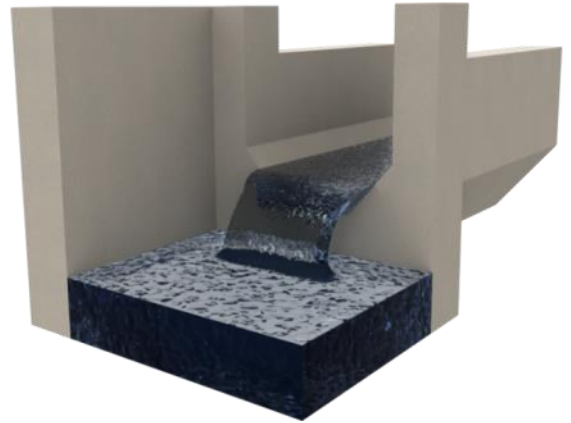
V notch Weir

- The accuracy of the triangular Weir is 1-2% on the flow coefficient when all conditions are met. To maximize the chances for this degree of precision:
  - The distance between the base of channel and point of V must be double the distance between tip of V and the surface of the water above the V.
  - The distance between the sides of the channel and the top of the V should be double the distance between tip of V and the surface of the water above the V.
  - The distance between the base of channel and point of V must be double of distance between tip of V and the surface of the water above the V.

When this function is selected the following settings are required: Angle of the V in degrees, level from which a state of overflow is considered.

Contracted or Supressed rectangular Weir
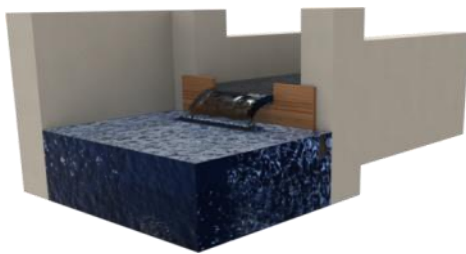
The accuracy of rectangular weirs, with or without contractions, is in the order of 1 to 4% on the flow coefficient when all conditions are met. The following parameters must be entered in the instrument:

- Width of the Weir
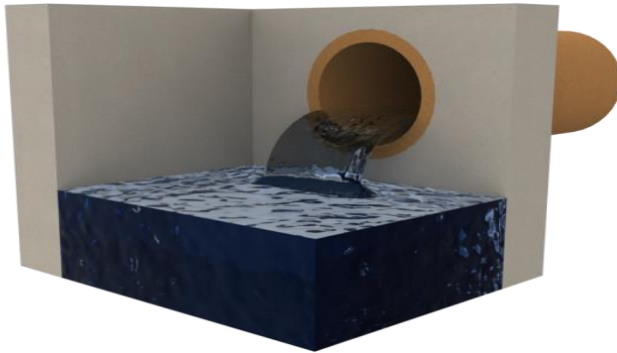- Level at which overflow is considered

Trapezoïdal Weir (Cipoletti)

The accuracy of the trapezoidal Weir or Cipoletti is in the order of 1 to 4% on the flow coefficient when all conditions are met. The following settings are required:

- Width of lateral contraction to the base.
- Level from which a state of overflow is considered.
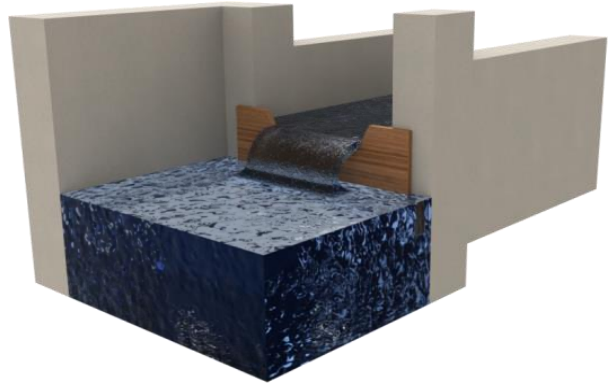
California pipe

This method measures the output of the open end partially filled horizontal pipe which will discharge freely into the air. This method is sometimes considered to be a method of trajectory. However, the measure is really based on the depth at the end of the pipe. The following settings are required:

- Diameter of pipe
- Level from which a state of overflow is considered.

Parshall Weir
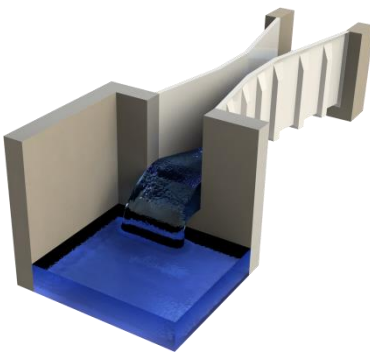
The Parshall weir is available in several sizes. Dimensions directly supported by the device are those in the following table. In the case where the size of the weir is not available in the table, just use the standard formula and set the parameters for the equivalent.

Parshall in inches
1"
2"
3"
6"
9"
12" (1')
18" (1,5')
24" (2')
36" (3')
48" (4')
60" (5')
72" (6')
84" (7')
96" (8')
120" (10')
144" (12')
228" (19')
240" (20')
300" (25')
360" (30')
480" (40')
600" (50')

Palmer-Bowlus Weir
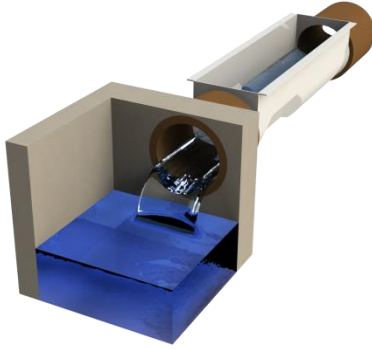
The Palmer- Bowlus Weir is available in several sizes. Dimensions directly supported by the device are those in the following table. In the case where the size of the weir is not available in the table, just use the standard formula and set the parameters for the equivalent.

Palmer-Bowlus en pouces
4"
6"
8"
10"
12" (1')
15"
18"
21"
24" (2')
27"
30"
36" (3')
42"
60" (5')
72" (6')

Leopold-Lagco Weir

The Leopold-Lagco Weir is available in several sizes. Dimensions directly supported by the device are those in the following table. In the case where the size of the weir is not available in the table, just use the standard formula and set the parameters for the equivalent.

Leopold-Lagco in inches
4"
6"
8"
10"
12" (1')
15"
18"
21"
24" (2')
30"

The majority of flow formulas can be summarized in two equations, such as the standard flow and the polynomial flow equations. In both cases, the parameters must be entered according to measurements in feet and flow in cubic feet per second. The tables below are good examples :

Polynomial Formula

$Q=A+Bh+Ch^2+Dh^3$

Polynomiale	A	B	C	D
0.4HS	-3.48e-5	2.1e-3	3.52e-1	4.40e-1
0.6HS	-7.52e-5	8.3e-3	4.02e-1	3.79e-1

Standard Formula

$Q=A*(B+Ch)^D$

Channels

Canal H	A	B	C	D
0.50	1.60	0	1	2.2
0.75	1.77	0	1	2.23
1.00	1.95	0	1	2.30
1.5	2.12	0	1	2.30
2	2.37	0	1	2.23
Trapézoïdal	A	B	C	D
60º	1.55	0	1	2.58

Look-up table

When any type of Weir or channel does not calculate the flow rate with reasonable accuracy, but a known rate proportional to the height of the liquid is known, then the look-up table is the function to use. The following settings are required:

Enter the desired (0-100) table size: n
- Enter level #1
- Enter the flow for level #1
- Enter level #n
- Enter the flow for level #n
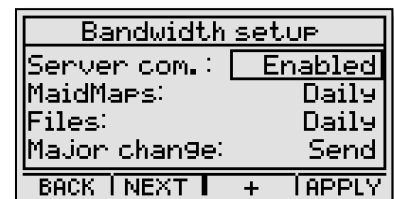- Level from which a state of overflow is considered

Bandwidth setup

The bandwidth setup screen allows changing four parameters for communication with the MaidMaps web server.

The first parameter determines whether or not to activate the communication with the MaidMaps server.

```
   Bandwidth setup
Server com. :   Enabled
MaidMaps:         Daily
Files:            Daily
Major change:      Send
 BACK  NEXT     +   APPLY
```

The second indicates the delay between Event data sending to MaidMaps. These data allows displaying sensor values on the map and generating graphs from the web interface.

The third parameter defines the delay between files sending. This applies to both .csv reports generated by the instrument and useful for the user, and technicians files allowing a detailed monitoring of the operation of the device.
The last parameter allows, when an overflow or an alarm configured accordingly, immediately activate the device to transmit data when the it is running on battery.

Alarms setup

WARNING! Sending alarms to MaidMaps is not fully supported. For the moment, you must create the alarm into the device and also, setup alarms on MaidMaps . If no alarm is configured on the device, when operating on battery, the device will not wake up to transfer its information to MaidMaps so no real-time alarm will be issued.

Alarms setup in the device allows to be notified on the screen, using a relay contact or an internet connection is present, the web application MaidMaps when a predetermined condition occurs. You can configure alarms on several types of readings and conditions. The choices are to add an alarm, edit existing alarms, delete an existing alarm, cancel current changes to alarm or restore the default alarms present in the initial configuration. When **Add** or **Modify** is selected, a window with the options of this alarm is displayed:

```
    Alarms setup
Add
Modify
Delete
Cancel mod.
Load factory default
 BACK     ▲     ▼   ENTER
```

```
       Modify
Activated:        YES
Data:           Level
Type:            High
Threshold:     1.000 m
Threshold2:       N/A
 OK     ▲     ▼    EDIT
```

The **Add** option allows enabling or disabling an alarm without having to delete it. **Data** is used to determine for what type of data this alarm is present. **Type** lets you choose whether the alarm is active, if the reading exceeds **High** or **Low** when under the threshold. **Interval** is a third choice, which allows generating an alarm when the value is in the specific interval. **Threshold** is the value at which an alarm is generated. **Threshold2** can be setup only when the **Type** field is on **Interval**.
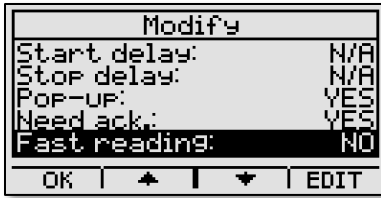
The next parameter is **Start delay** which specifies for how long the state should be valid before an alarm is considered active. **Stop delay** also allows you to filter alarms and wait for a predetermined time when the state is no longer valid before considering the alarm as complete. **Pop-up** will generate a pop-up screen to notify when the alarm is active. **Need ack.** requires an acknowledgment from the user so the alarm shuts down. **Fast readings**. allows, when working on battery, to increase the reading interval of the analog inputs to the fast reading delay (configured in the "Power supply" options.

Send to MaidMaps allows, where internet communication is available, to transmit the list of alarms transferred to the MaidMaps web application. The options **Alert on Start** and **Alert on Stop** allows to be informed *via* the MaidMaps web application by SMS, email or otherwise when the alarm starts or stops. When the **Activate Relay** settings are at **YES**, for a relay output, **Relay Out 1** for example, in the list of inputs and outputs, is set in alarm mode, then the relay contact will close when the alarm will be considered active.

Download settings

To read the file created by **MaidDevices Configurator**, select **Read conf. file**, then **ENTER** 4. Follow the instructions on the screen.

The settings can also be configured from the **MaidDevices Configurator** software. This software can be copied to a USB key from the instrument. Simply select from the configuration menu, **Download Settings**, then **Copy software**, then **ENTER** 4. A USB key is required in the instrument.
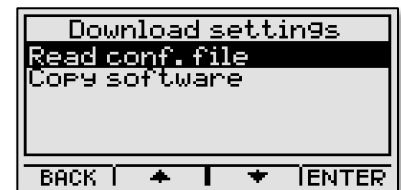
The explanation of the *MaidDevices Configurator* software is on page 31.

Reset total events

This function resets the total events contained in the main screen. After selecting this function, press **YES** 3 to confirm the deletion of the data from the main screen or **CANCEL** 1 to return to the previous screen.

To reset to zero all the total events of the instrument, go to the *Factory Reset* function on page 25, which will completely reset the device including its configuration and data.
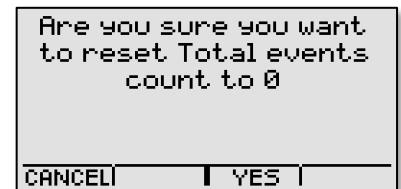
Firmware Upgrade

Maid Labs continually improves its products and especially the internal softwares of its instruments, because improvements are suggested, because bugs are found, despite all the tests that have been performed on the instrument.

The latest version of the internal software can be obtained from the website www.maidlabs.com for devices having been registered.

If the unit is connected to the Internet, updates will be made automatically using the MaidMaps web application.

Make sure of the reliability of the energy source before beginning the programming of the instrument.

If the unit is running on external power there must not be any power loss during the update. To reduce this risk, make sure that the 12V external battery is correctly connected to the device "IN BATT" input and that its charge is equal to or greater than 12V. The battery voltage can be checked on the main display by selecting the **RT** [2] and **Inputs info.**

After selecting **MENU** [1]**, Setup, Firmware update**, insert a USB stick that contains the **flowmaid.hex** file in the root directory. As soon as this file is detected, the programming begins.

The software is first copied to the internal memory of the instrument, and then the actual update begins. A percentage indicates the progress of each of these steps. The instrument restarts when everything is completed.

Language

```
┌─────────────────────┐
│      Language       │
│                     │
│  ┌───────────────┐  │
│  │ English       │  │
│  └───────────────┘  │
│                     │
│ BACK │  ↓  │  ↑  │APPLY│
└─────────────────────┘
```

The instrument can work in **French** or in **English**. Press [2] or [3] to select the language, then **APPLY** [4] to accept the displayed language.

Lock screen password

```
┌─────────────────────┐
│ The current password│
│        is:          │
│        1234         │
│                     │
│ BACK │ERASE│ EDIT │  │
└─────────────────────┘
```

By default, if no key lock has been configured, simply press 1234 to have full access to the menus of the device. To create a custom locking key, press **EDIT** [3] and enter a 5-digit code between 1 and 4.

Reports setup

```
┌─────────────────────┐
│   Min event time    │
│                     │
│      00:00:01       │
│                     │
│ BACK │  ↑  │  ↓  │ENTER│
└─────────────────────┘
```

This menu allows you to configure a minimum event the time to be included in the monthly reports. The + [2] and - [3] keys allows to change the value by progressive increment while the **ENTER** [4] key allows to confirm your choice. This option allows you to create visually more informative reports. For example, consider a position where the water level is slightly below the overflow level. Several small events spaced in time could be saved simply because the swirl of water. These small events are not significant and draw the reader's attention from the real overflow. In the contrary, in a case where the water level is slightly above the overflow level, the swirl could create a separation in several events of what is actually a continuous overflow. This option allows you to overcome these two problems.

In summary, if the time between two or more events is less than the minimum time set, they will be bonded into one. If the duration of a single event or agglomerated events does not reach the minimum time, it will not be mentioned in the report.

If you do not want to take this option and prefer more raw data, but more difficult to analyze, simply set this minimum event time value to one second. Otherwise, it is advisable to choose a value from a few tens of seconds for rapid position changes to several minutes for slower positions variations.

Technician

The technician menu can do operations and access to functions that are normally reserved for an experienced technician who knows what he is doing. In this menu, there are functions that could totally erase the memory of the instrument.

Factory Reset

This resets the device to the same condition that it was when new and never installed. If this is what you want, press in the order 3 and 2 . Nothing will be in the internal memory after this execution and the device setup will be lost.
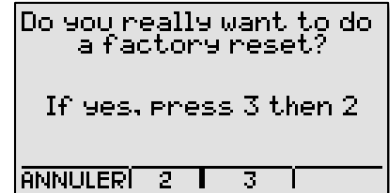
Device info
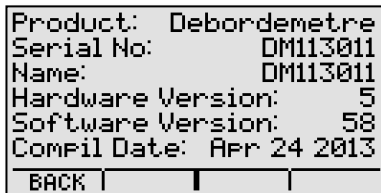
From the main screen, press **MENU** 1 to enter the menu, then the arrow 3 and **ENTER** 4 to display the product information.

IP Information

From the main screen, press **MENU** 1 to enter the menu, then the arrow 3 and **ENTER** 4 to display the IP information.

Communication test
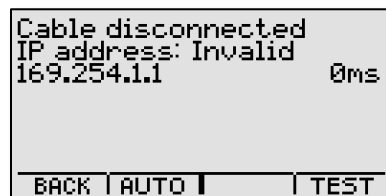
From the main screen, press MENU 1 to enter the menu, then the arrow 3 and **ENTER** 4 to initiate the communication test. The **TEST** 4 key allows to manually repeat the test to observe the commands that are sent. *Communication Test* screen indicates if a network cable is connected to the device, if its IP address is valid or not and its IP address (in this case 169.254.1.1). On the screen, under the IP address, the text **Successful Communication** and **Communication Failed** will appear after the communication test. The test may take a few seconds to execute.

Successful Comm.
26/09 10 :10, 4. 0

Information appearing under the "Successful Communication" status is the date and time of the last communication, the command sent (represented by a digit) and the replies received. This information is not important to the user but allowed the technician to better diagnose a problem.

```
       Auto Test
  Place device in final
  installation position.
  Then wait 10 minutes.
   Test will begin in :
        0:00:58
 CANCEL|  -  |  +  |
```
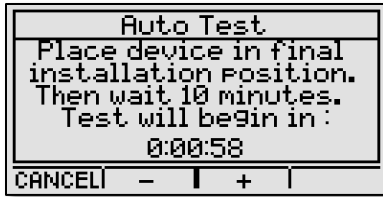
The **AUTO** key allows testing the communication (mainly when the device operates with a wireless communication such as a cellular modem). Once the key is pressed, the device will display a countdown to reboot. It is possible to adjust the countdown using keys ③ and ④. Then, place the unit in its final installation position and wait 10 minutes. After this, go to the device and an alarm message indicating whether the communication has succeeded or failed will appear.

Analog output test

This menu enables the analog output to verify correct operation during the installation of a device. Use the keys ② and ③ to change the intensity of the current between 4 and 20mA. The key ① allows returning to the previous menu. The output remains active when you leave the menu. It is then possible, by connecting the 4-20mA output to the LEVEL input, after setting the LEVEL input into a 4-20mA mode, to confirm the proper functioning of these two ports by simply checking the level value displayed on the main screen in the analog mode. It is important to note that the analog output can only be activated if the 12V DC IN is connected to a power supply. It will not work if the unit is only powered by an external battery.

Relay test

```
  Press on button 3 to
  open and button 4 to
    close the relays.

  Relays state:⫴⊦

 BACK |   |  3  |  4
```
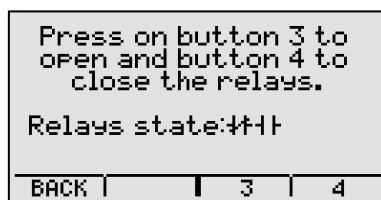
Allows to manually and simultaneously activate the relays for testing purposes.

Lock screen

Lock screen allows restricting access to the device in the main menu. By default, if no lock key has been configured, simply press 1234 to have full access to the menus of the unit. If the lock key has been configured (*lock screen password*, page 24), just grab it with the keys. The device automatically locks the screen after 30 seconds.

Shutdown device

This procedure is recommended when there is maintenance to do on the device, for example, a battery change. This avoids the possibility of loss of recent data that has not yet been stored. This function causes a stop of all operations of the device. To return to normal operation, simply remove the power including the batteries and reconnect after a few seconds.

RT ②

```
 Internal Info
 Digital Overflow
 Analog Overflow


 BACK |  ▲  |  ▼  |ENTER
```
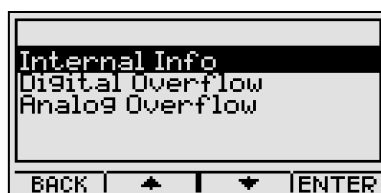
Internal Info

This screen provides access to other useful information updated in real time like the analog input values, the battery voltage or the internal temperature of the device.

Digital Overflow

Specifies the device to use the real-time display, optimized for digital measures as the main screen information display.

Analog Overflow

Specifies the device to use the real-time display, optimized for analog measures as the main screen information display.

INFO 3

From the main screen, enter the desired report type: Events report shows the events from the digital input (Digital In), **Alarms report** or **Channel flow report,** displays the computed or measured flow recorded. Press **ENTRER** 4 to move to the next step.

The current month is automatically pre-selected. Press **MONTH** 2 or **YEAR** 3 to select the month or the year to edit, and 2 and 3 to vary among months and years for which data is recorded, and press **ENTER** 4.

The following window shows for the desired month, the amount and duration of events each day of the month or the total volume, when it applies. To display the detail of each of the events for the selected month, select a day by pressing the arrow keys 2 and 3 then press **ENTER** 4 to view the details. If the device is configured to work in "Flowmeter" mode, the first screen will display the total volume for each days. If more information is needed, press enter to see the detail of each day.

The detailed report displays the date and time at which the event started, followed by the duration of the event in Hour: Minute. Note that an event with a duration of **00:00** means that it lasted less than 60 seconds. In the case of an overflow report, the **Flow**, according to the units previously chosen by the user, will also be displayed. By pressing the **Next** 4 key the last column shows the **Volume**, according to selected units.

If no day is selected, the first event of the month will be displayed, as well as the following. In all cases, press 2 and 3 to scroll through all events in the selected month.

USB 4️⃣

To copy to the USB key reports, user manual, raw data, MerMaid data or technician data, from the main screen, press the **USB** 4️⃣ key.

Monthly events displays the events in the digital input (Digital In), **Monthly flow**, displays computed or recorded flow.

Use a USB drive formatted in FAT16 or FAT32. The amount of files located on the key influences the time of copying files. It is best to reserve use of a USB key devices just for MAID Labs Technologies inc. downloads. Insert a USB key when prompted. When the transfer completes, a message indicating that you can remove the key will be displayed.
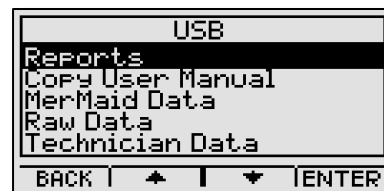
Monthly Reports

Monthly event reports will be on the USB stick, in the monthly subdirectory reports, which is located under the directory with the name given to the instrument or its serial number in the root directory. See *Device name* on page 31.

Depending if the device is configured in "Flowmeter" or "Overflow" mode, the "Monthly flow" report will display less information like the quantity of events and the duration.

		Report generated on 04/22/2014 at 00:01,			
		www.maidlabs.com Phone: 450-375-2144,			
Device name:		133003			
Serial number:		DM133003			
Report:		Overflow			
Month:		March 2014			

Warning, this report doesn't consider events lasting less than 00:00:10

Date	Duration	Events Quantity	Average flow l/s	Total volume L	
1	00:00	0	0	0	
2	00:00	0	0	0	
3	00:00	0	0	0	
4	00:00	0	0	0	
5	00:00	0	0	0	
6	00:00	0	0	0	
7	14:31	2	2,3	122474,7	
8	00:02	1	2,4	238,5	
9	00:00	0	0	0	
10	00:00	0	0	0	
11	00:00	0	0	0	
12	00:00	0	0	0	
13	00:00	0	0	0	
14	00:00	0	0	0	
15	00:00	0	0	0	
16	00:00	0	0	0	
17	00:00	0	0	0	
18	00:00	0	0	0	
19	00:00	0	0	0	
20	00:00	0	0	0	
21	00:00	0	0	0	
22	00:00	0	0	0	
23	00:00	0	0	0	
24	00:00	0	0	0	
25	00:00	0	0	0	
26	00:00	0	0	0	
27	00:00	0	0	0	
28	00:00	0	0	0	
29	00:00	0	0	0	
30	00:00	0	0	0	
31	00:00	0	0	0	
Total:	14:33	3	2,35	122713,2	

A file is created for each month of operation of the instrument.

The monthly reports are in CSV format. If Excel is installed on the computer, the monthly reports will load automatically. The name of the file consists of an identifier, or the name or serial number, the year and the month for which it was created. Note that if the language of the device is different from that of your computer, the data may not be presented properly. To remedy this problem, simply select the proper separator when importing the spreadsheet (Excel).

For the present month, the dates following the day of creation of the monthly report are not displayed. This and the date of the file creation are two ways to know of the time of creation of the monthly report.

If the FlowMaid is not installed the first day of the month, N/A will appear on the lines for those dates.

The next monthly report has been formatted in Excel, to center columns and display the titles correctly on a single page.

As a result the daily report begins with a report on each event.

Date	From	To	Duration	Average flow	Total volume
7	00:00:00	14:25:41	14:25:41	2,3	121787,4
7	23:55:07	23:59:59	00:04:52	2,4	687,2
8	23:58:21	23:59:59	00:01:38	2,4	238,5

Copy User Manual

This function copies an internet shortcut to the device webpage on the Maidlabs webpage on a USB key. It's possible to download the lastest version of the user manual on our website.

MerMaid Data

This menu allows you to export the complete file of all the events recorded by the FlowMaid on a USB stick in an encrypted format. Although unreadable directly, you will usually need to open this file with Mermaid software or send this file to a technician Maid Labs Technologies if you call technical support to solve a problem.

Raw Data

The raw data is saved in a simple format in a text file. For each selection, the entire file can be copied, for last week or last month.

Data recorded at the hour in universal time (UTC). The *Date & time* section on page 14 explains how to see the difference with the local time (GMT).
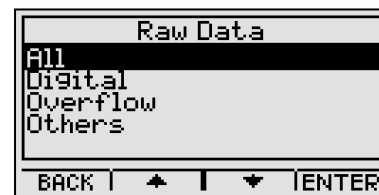
All allows you to copy the digital data, the voltage of the batteries, the instrument temperature and the analog input on the USB stick.

Selecting **Digital**, file **Digital.txt** will be created. This is the list of all digital events recorded in the format:**2011-02-10 15:57:44.666 1.** The last « **1** » means that the contact is open and « **0** » that the contact is closed. It is possible to see several **1** or **0** since the state of the input is registered at the start of the instrument, like when the batteries are changed.

In the case of **Overflow**, the **overflow.txt** file is created and it contains the overflow in the selected unit.
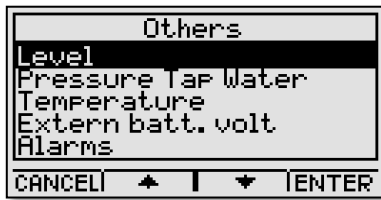
By selecting **Others**, you have access to a new list of items. It includes among other things: **Level, Pressure, internal Temperature of the device, External battery voltage**, etc. By selecting an item, it allows to retrieve in a dated list format, all records that the device made for this type of data. The device creates on a USB key in the "Device Name" folder/Monthly report/ a file for current month and one file for the month before as the "Event Type" _ReportFromMIdata_ "date ".

Download settings

Like the menu with the same name in **MENU / Configuration**, this choice allows you to import a configuration file. mlcfg from the USB key.

Firmware upgrade

Like the **Download settings** option, **Firmware upgrade**, is also available in **MENU / Configuration**. For more information, see section *Firmware upgrade* on page 23.

Maid Devices Configurator Software

The last version of the Configurator is available at the following address:
http://maidlabs.com/flowmaid
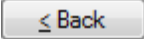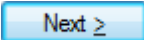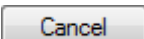
Read the *USB* section on page 28 to learn how to copy the configuration software to a USB key.

Maid Devices Configurator allows the setup of all the instruments manufactured by Maid Labs Technologies except for the « Mermaid » datalogger :

- **EE-400** Event encoder
- **FlowMaid** level monitor and open chanel flowmeter
- **PressureMaid** tap water pressure monitor
- **Volucalc RT**, advanced volumetric flowmeter for variable or fixed speed pump.

At any time, in the configuration software, three actions are allowed:

≤ Back   Returns to the previous window without saving the values of the current window.

Next ≥   Allows you to continue with the configuration to the next window.

Cancel   Closes the MaidDevices configuration software.

Creating or opening a configuration file

Configurator allows `Create a new file`, `Open an existing file` if the configuration of the device has already been performed or `Next >` `Create from an existing file`, which allows you to enter the parameters of a device already created. By default, the Configurator starts the process of creating a new file when the key ___ is selected.
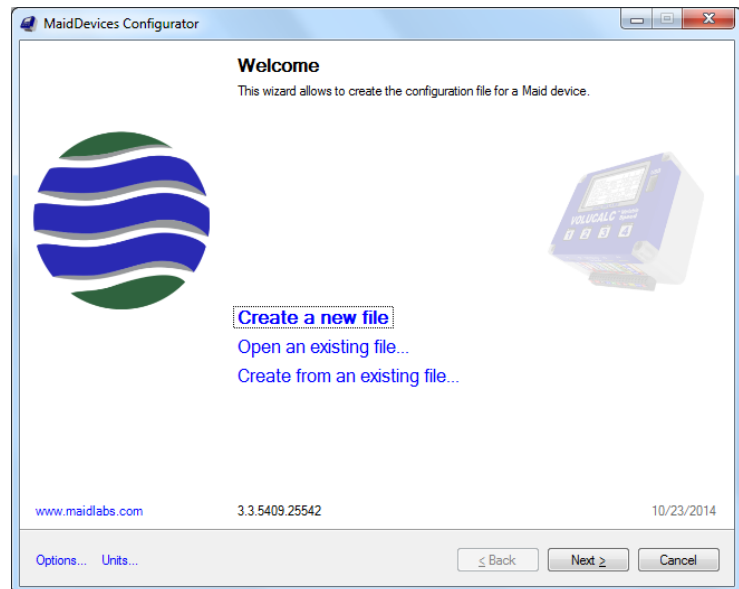
Options, units and language set up

For a first configuration, you may select the `Options` link on the bottom left corner of the window. Two menus are available: `General` and `Units` (examples of the two windows are below). By default, it will open on the `Units` menu. If you select `United States`, the standard units seen in the USA will immediately appear. However, it is possible to change them to fit your needs.

Press the `Apply` key when the units selection is complete.
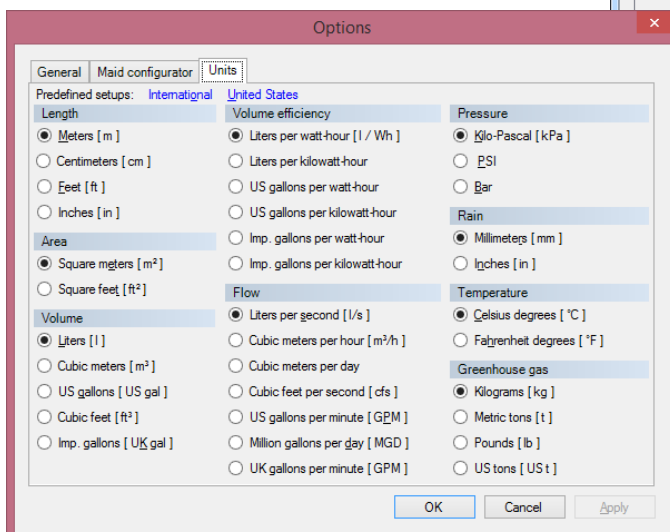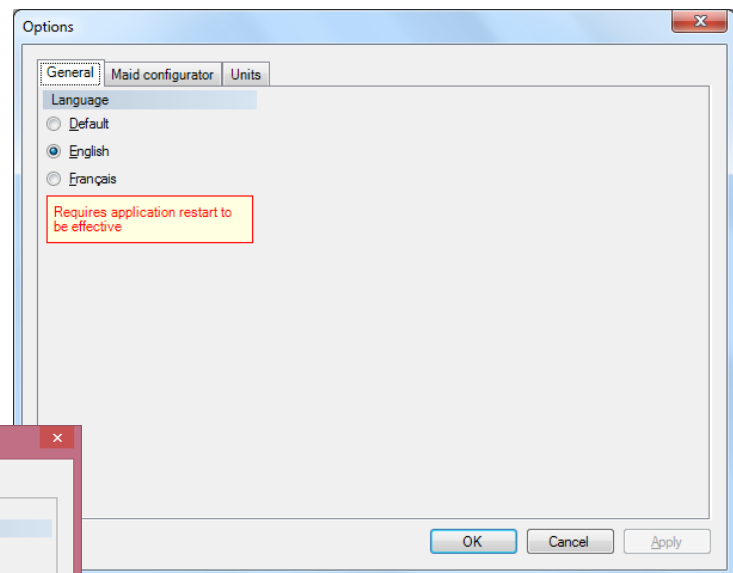
The General menu helps you choose the desired language. The configurator will appear in the language of your computer (`Default`), but it is possible to change to `French` or `English` at anytime.

Device details
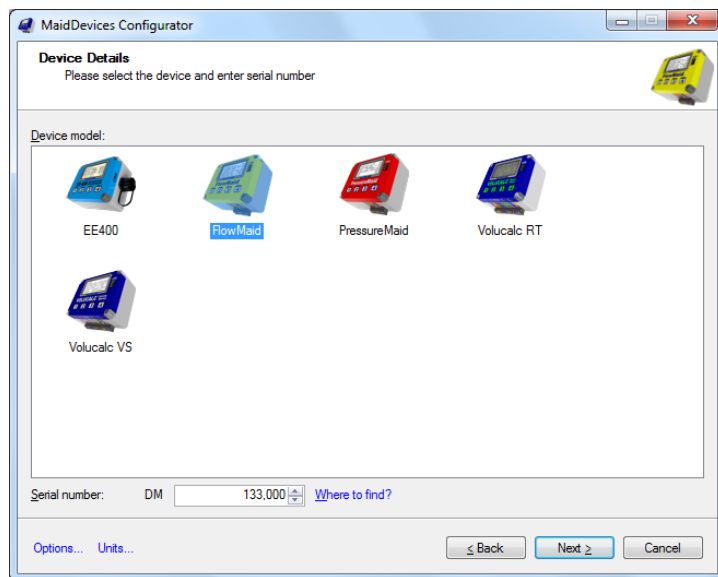
Click on the icon of the desired device. In this case "FlowMaid". Enter the serial number of the device. This number is on the label underneath the device and also appears on the *Device Info* screen (see p. 25). If the serial number is incorrect, the instrument will not be able to read the configuration intended for it.

The configuration file created by MaidDevices Configurator in the main directory of the USB drive is called FMxxxx, where xxxx is the serial number of the instrument.
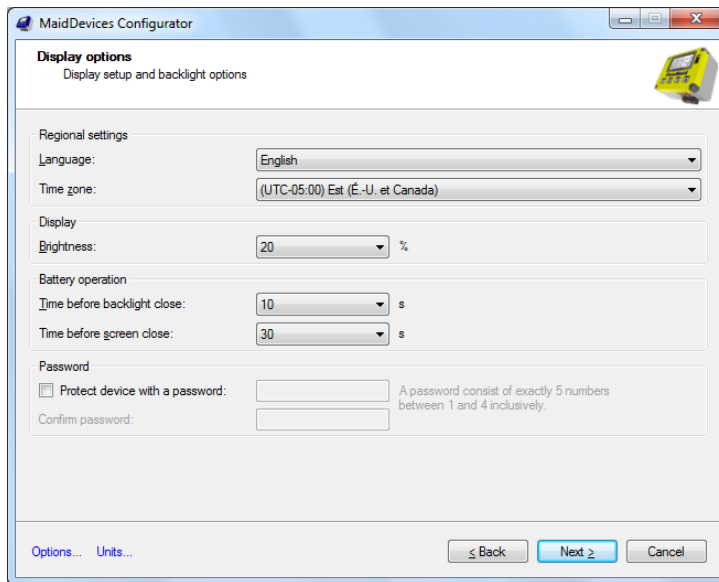
General Information
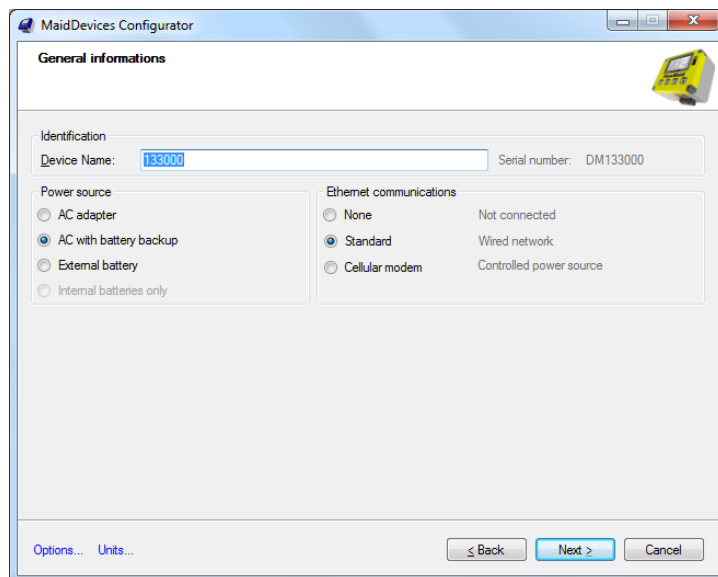
The `Device Name`: will be used to identify data files copied to the USB drive. This is necessary when a key is used for multiple devices.

The `Power Source` and `Ethernet communications` fields allows the selection of the type of power and communication used by the device and also configure the following parameters with default values.

Display options

Language: is the one for the operation and the device display. French or English.
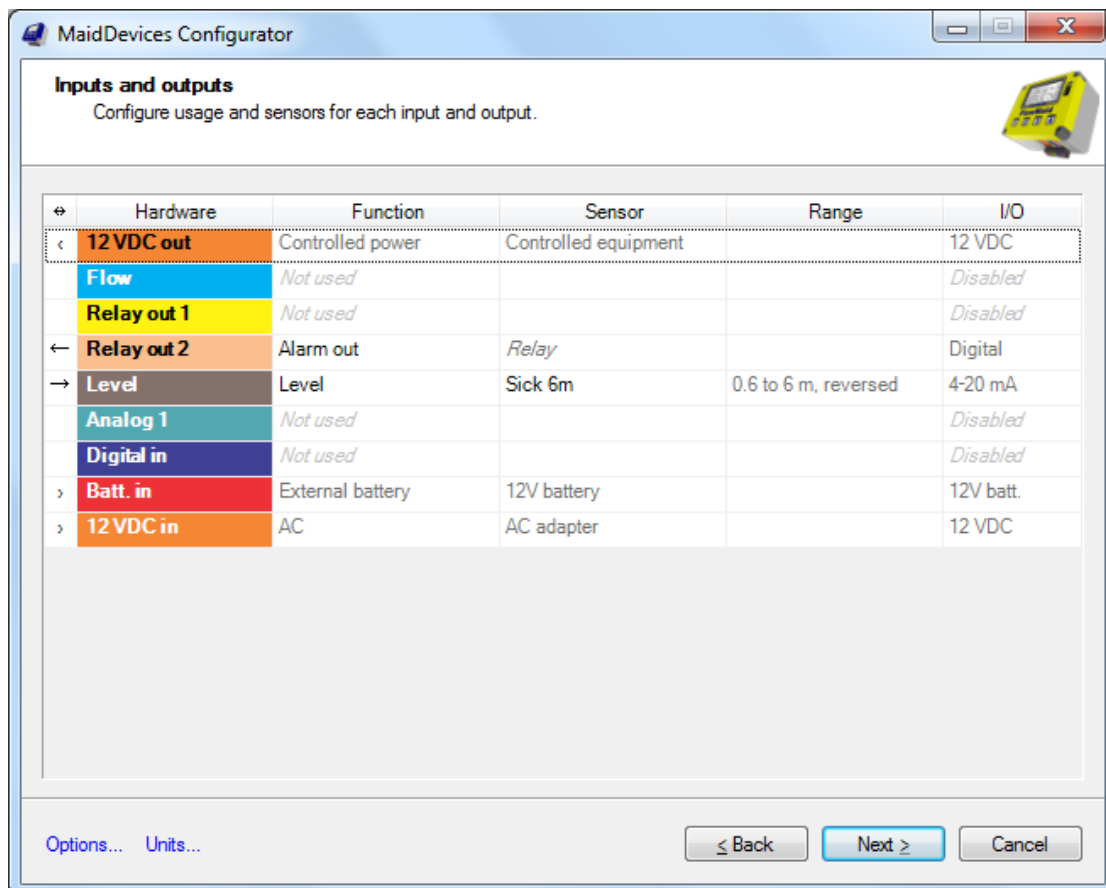
The **Time zone**: is automatically adjusted to that of the computer that is running MaidDevices Configurator.

The **Display (backlight)** can be adjusted between 0% and 100% of brightness in increments of 20%. The default value is 20%.

To maximize the operating time on battery, the **Time before backlight close** function can be selected: where the choices are **0**, **10** and **30** seconds, while those for the **Time before screen close** function: are **10**, **30**, **60** or **300** seconds.

Creating a lock screen password is also possible at this point. Just create a code of 5 numbers between 1 and 4, as explained in the *Lock screen password setup* section (p. 24).

Inputs and outputs

⇔	Hardware	Function	Sensor	Range	I/O
‹	12 VDC out	Controlled power	Controlled equipment		12 VDC
	Flow	*Not used*			*Disabled*
	Relay out 1	*Not used*			*Disabled*
←	Relay out 2	Alarm out	*Relay*		Digital
→	Level	Level	Sick 6m	0.6 to 6 m, reversed	4-20 mA
	Analog 1	*Not used*			*Disabled*
	Digital in	*Not used*			*Disabled*
›	Batt. in	External battery	12V battery		12V batt.
›	12 VDC in	AC	AC adapter		12 VDC
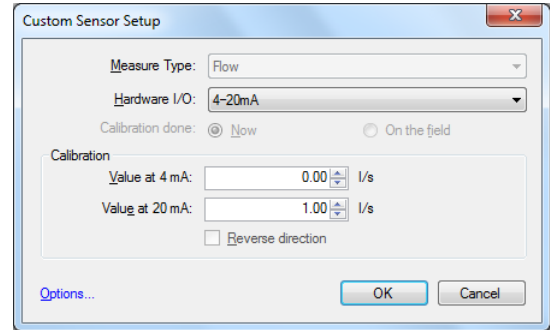
12 VDC out   Setup for device power

Flow   Configurable analog 4 to 20 mA output which outputs the overflow or other flow only when the 12 VDC power input is present. The following setup window will appear by selecting the **Range** field:

In the side window shown, the values at 4 mA and 20 mA (or the type of input/output selected), can be selected or changed using the arrows ⬍ or directly through the device keypad. When setup is complete, press OK.
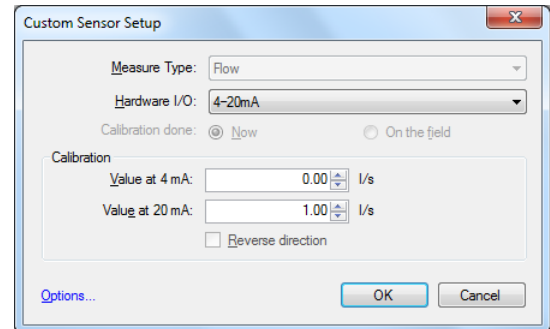
Relay out 1   The Relay out 1 is a relay contact that can be used to open or close valves, generating an alarm, control sensor power or cellular modem to save power when the unit is running on battery or transmit a pulse each time a certain volume is reached.

Relay out 2   Like the Relay out 1, this Relay out 2 is a relay contact that can be used to open or close valves, generating an alarm, control sensor power or cellular modem to save power when the unit is running on battery or transmit a pulse each time a certain volume is reached.

Level   Configurable analog input 4-20 mA, 0-5V, 0-10V or 0-24V can record the level. A choice of sensors are available or a `Custom level` setup to access another range of measures. In this case, the following setup window will appear by selecting in the **Range** field. The `Reversed direction` option is useful for measuring the level, when the read value decreases as the level increases, as in the use of an ultrasonic sensor. In this case, simply enter the range sensor measurement (for example, 0m at 4mA , 6m at 20mA and have the `Reverse direction` option selected.

Analog 1   Second analog input for another sensor. This input is configurable in 4-20 mA, 0-5V, 0-10V or 0-24V, depending on the sensor used.

Digital in   This entry may have different functions depending on the choice of drop down menu. Depending on the case, a choice of sensor and range are available.

Batt. in   Input power from a 12V lead-acid battery when operating on batteries or backup power.

12 VDC in   Input for the device 12 VDC power.

Level setup

This window allows the setup of the level and the overflow level . An interactive image on the right of the window helps to view the completed configuration. For the device to displays the real water level measured where it is installed, just enter the distance from the sensor to the water level and then enter the water level or simply enter the distance between the sensor and the benchmark for measuring the water level (usually the bottom) and to enter a water level of 0. Depending on the type of sensor used to read the level, it can be placed above the water (ultrasonic sensor) or under water (pressure sensor).

The overflow level is used to indicate how high the unit will perform a flow calculation based on the overflow equation on the next page. If the device is setup as a flow meter, then simply not check the "overflow" option box and select a equation at the next page. In this case, the flow rate calculation is done once a positive level measurement is read .

Open chanal flow

According to different methods of calculation, a choice of several overflows equations is available:
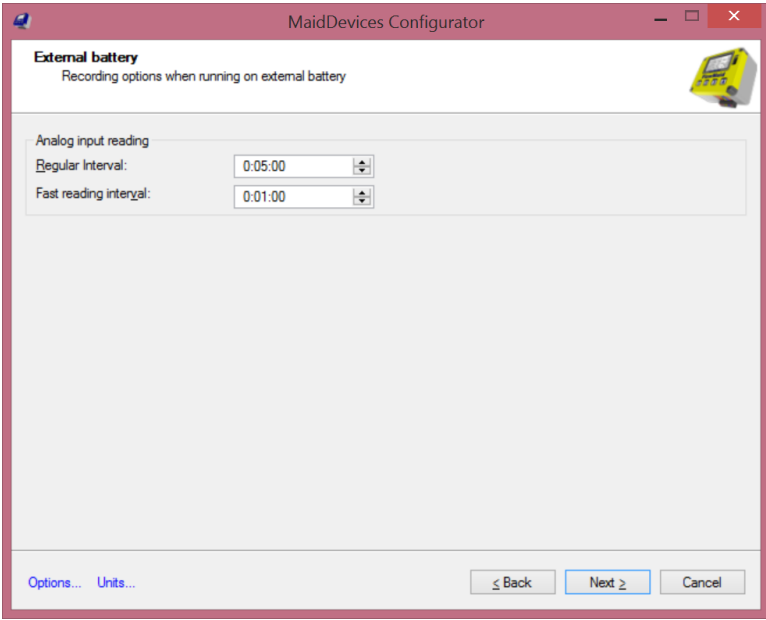
- California pipe (page 20)
- Cipoletti weir (page 20)
- Contracted rectangular weir (page 19)
- Leopold-Largo flume (page 21)
- Look-up table (page 22)
- Manning equation (open channel) (page 19)
- Manning equation (partially full pipe) (page 18)
- Measured flow (page
- None
- Palmer-Bowlus flume (page 21)
- Parshall flume (page 20)
- Polynomial flow formula (page 21)
- Standard flow formula (page 21)
- Supressed rectangular weir
- V Notch weir (page 19)

In the case that **None** is chosen and the previous page, an overflow level was specified, the level sensor records the overflow but no flow is calculated.

If the **Lookup table** is selected, the level and the flow will have to be entered manually in the corresponding fields.

The alarm setup window lets you configure how to be warned of certain situations and what to do when they occur.

External battery
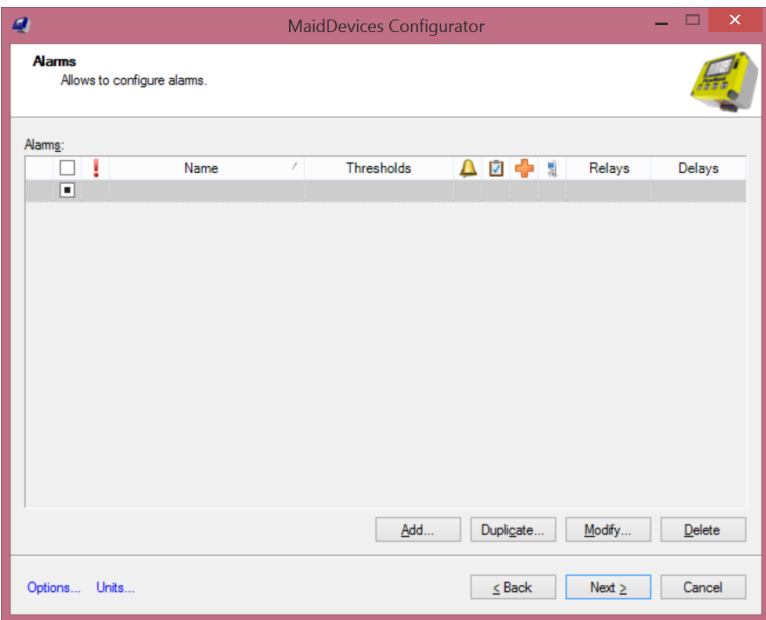
Analog input reading:

Regular Interval is the time between the readings of the analog inputs where the level sensor is connected, for example.

Fast reading interval is the time between the readings of the analog inputs when the accelerating readings option is selected, based on the level, in case of overflow or when an alarm, setup to activate fast readings, occurs.

Alarms

To create a new alarm condition, simply press the **"Add"** button. The following window will open :

Start by selecting the desired **Alarm type** :

- Value in bad range
- Value too high (or present)
- Value too low (or missing)

Continue by selecting the **Event type** for which the alarm is for. The choices will differ depending on the device's setup.

Depending ont the **Alarm type**, it is possible to assign a **Custom alarm name** and specify its **thresholds**.

Delays parameters are the following :

- **Initial** : Sets how long the condition must be active before it is considered an alarm.
- **Final** : Sets how long the condition must be completed and inactive before the alarm is considered final.
- **Mute** : Sets a time where consecutive alarms will be ignored during this period.

Options :

- **Active** : Allows to enable or disable the alarm without deleting.
- **Display alert** : A message to the device's screen will be displayed when the alarm is active
- **Critical** : Allows to set the priority of the alarm : normal or critical.
- **Read analog inputs faster** : When running on battery, enables the fast reading mode for more details on the recorded values.
- **Must acknowledge to stop alarm** : This alarm must be acknowledge by a user to stop the alarm from being displayed.
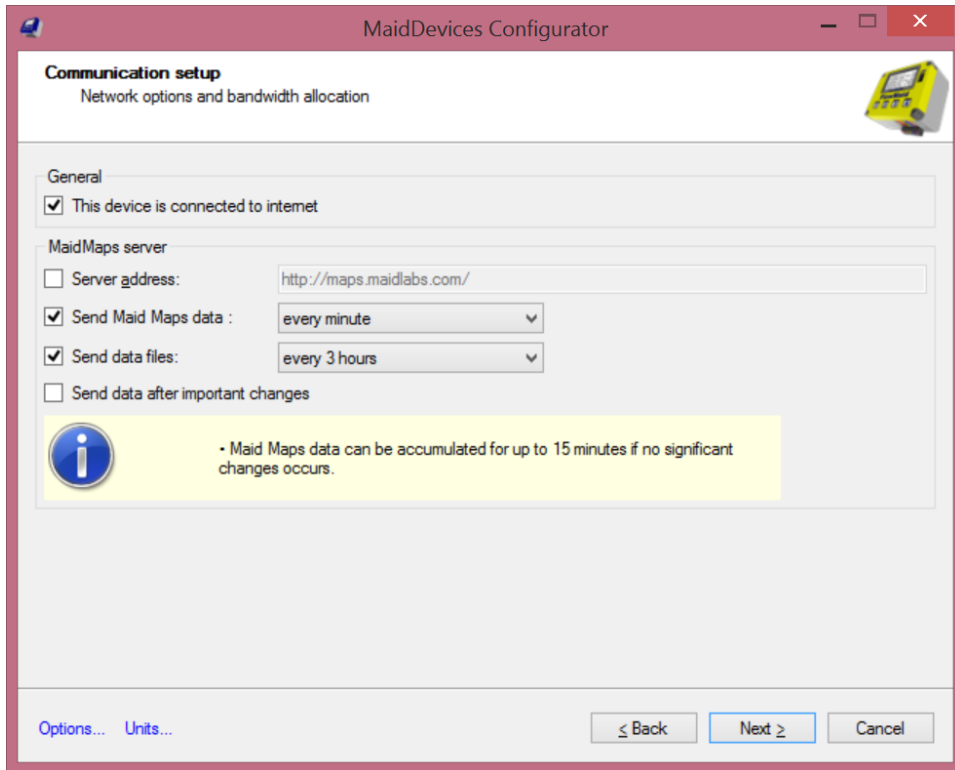
WARNING! sending alarms to MaidMaps is not yet supported. Therefore, for now, you must create the alarm in the device as well as configure alarms on MaidMaps.

MaidMaps : « This device is connected to internet », on the Communication setup window, must be active and the device must communicate with the MaidMaps web application.

- **Send to MaidMaps** : Allows to send the alarm to MaidMaps to display into the alarms report.
- **Notify user at start** : Allows to send a notification *via* MaidMaps to the users (email and sms).
- **Notify user at end** : Allows to send a notification *via* MaidMaps to the users (email and sms).

The **Relays** section allows you to close the contact of one of the device's relay when the alarm is active. The relay output must have been previously configured in the " Inputs/Outputs " MaidDevices Configurator window. It is possible to configure several different alarms on the same relay.

Communication setup

Depending on the bandwidth quality, communication with the server will be fast or slow. In the **General** section, if the checkbox **The device is connected to the Internet** is not checked, the communication will not work. This mode also disables the Ethernet module, which reduces consumption of the device (and of the external battery) and allows options in an "offline" mode, like manually adjust the time. By checking this box, different configuration options will be available.

By default, the server uses the MaidMaps link http://maps.maidlabs.com. However, it is possible to use another server by checking the box indicating the connection and the server to use.

Send MaidMaps data can be setup with different ranges. In order to reduce de bandwidth used, it is recommended to increase the communication range.

Send data files are various reports of the device and the technician data files. It is recommended to send these files only 1 time per day or greater time interval.

The **Send data after important changes** option can be selected if desired, and means that the communication with MaidMaps will be forced when the device is battery powered and when an alarm that needs a communication with MaidMaps becomes active.

Report options
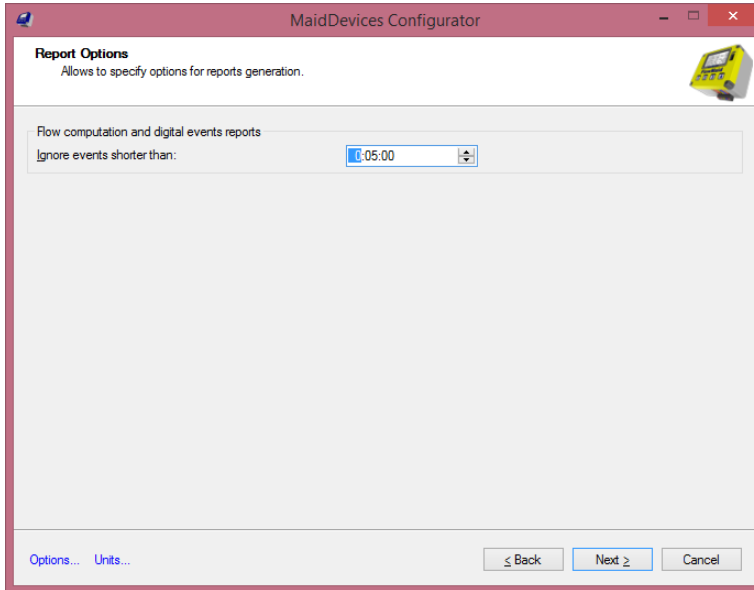
This feature allows you to ignore digital events or shorter flow data than the time indicated in the reports of the unit. It allows to filter the shorter events.

Save folder
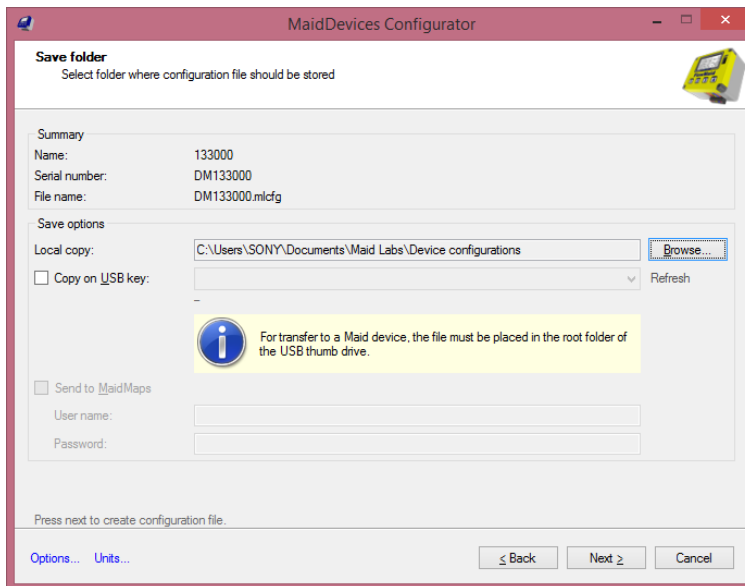
Choose a destination folder for the configuration file. When saved on a USB key to be programmed to the device, the configuration file must be in the root directory of the USB key. If the file is in a subfolder, the FlowMaid will not find the file when it searches for it.

MaidMaps web server

MaidMaps is a Web based application that allows users to remotely view the information displayed and recorded by Maid Labs devices. This SCADA software indicates on a user editable map the location of the instrument and the current measurement value.
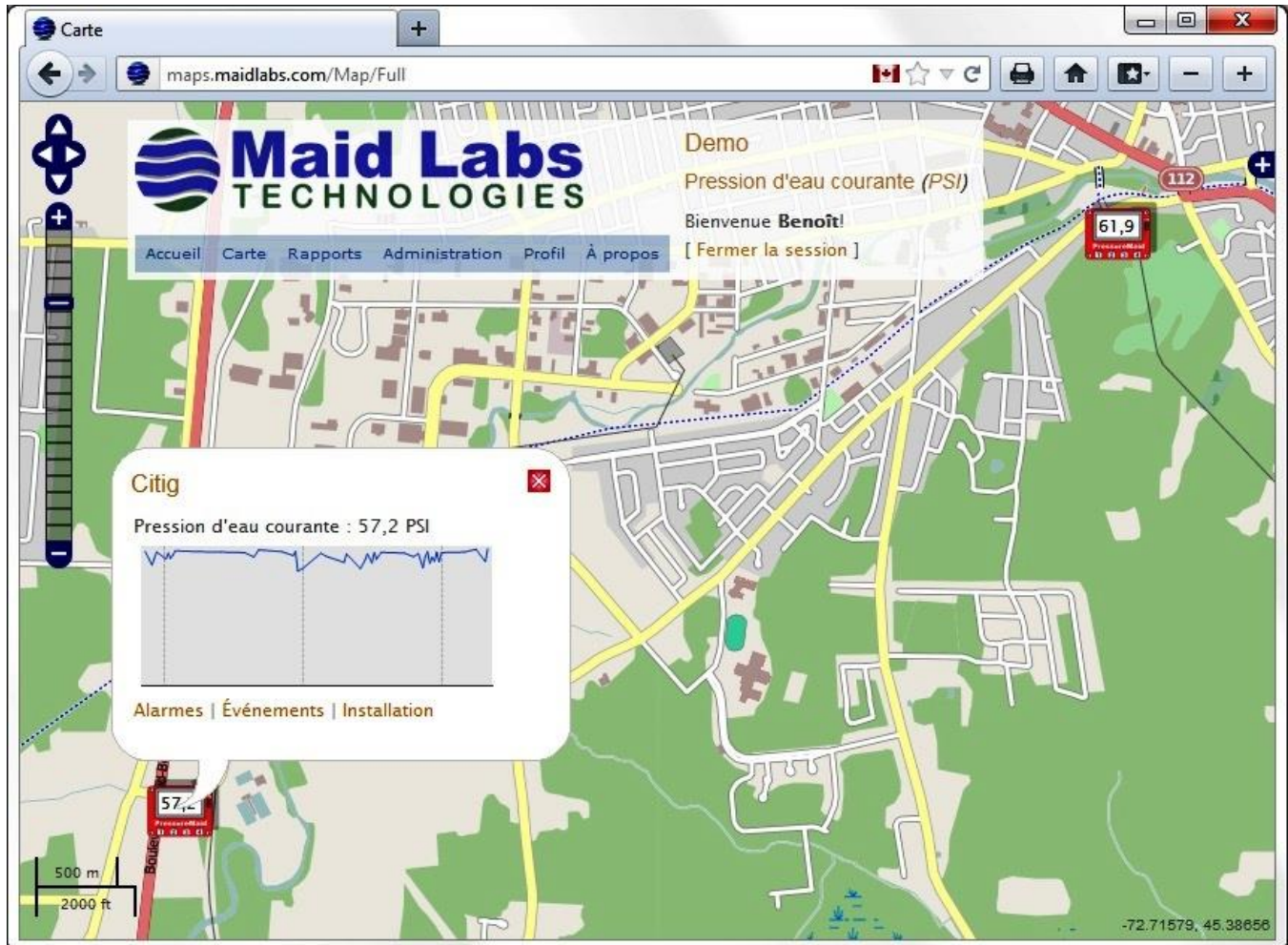
The following instruments are compatible with MaidMaps.

FlowMaid   Volucalc Hybrid CS and VS

The PressureMaid, FlowMaid and the Volucalc communicate via the Internet to our MaidMaps server, or to a server of your choosing. The instruments access the server like a computer accesses a web page. This way, the server does not need to break through firewalls to get the data from private locations. Instead of requesting a web page, the instrument transmits its latest data and receives back orders, if necessary.

The instruments can be connected directly through the Ethernet port, through Wifi, or Cellular modem. The data are transmitted to the server in real time or on a time based frequency. When a value exceeds a warning or alarm limit, the reading frequency is increased and the values are immediately transferred to the MaidMaps server, which can send a SMS or email to the right person. Even the voltage of the battery can generate a warning reminding it is time to replace it by a recharged battery.

The devices communicate with a web server *via* an continuous internet connection. No configuration is needed when connecting to a Maid Labs devices. The devices use port 80 (standard port for all web pages) to communicate with the MaidMaps server. If a computer present in the network is able to browse on the internet, then the communication will work.

MaidMaps therefore receives data from all sites depending on the setting of the instruments. When an instrument has not communicated with the server for a longer period than desired, then a warning can be configured, then an alarm will be triggered by sending an email and an icon indicating a loss of communication will appear.
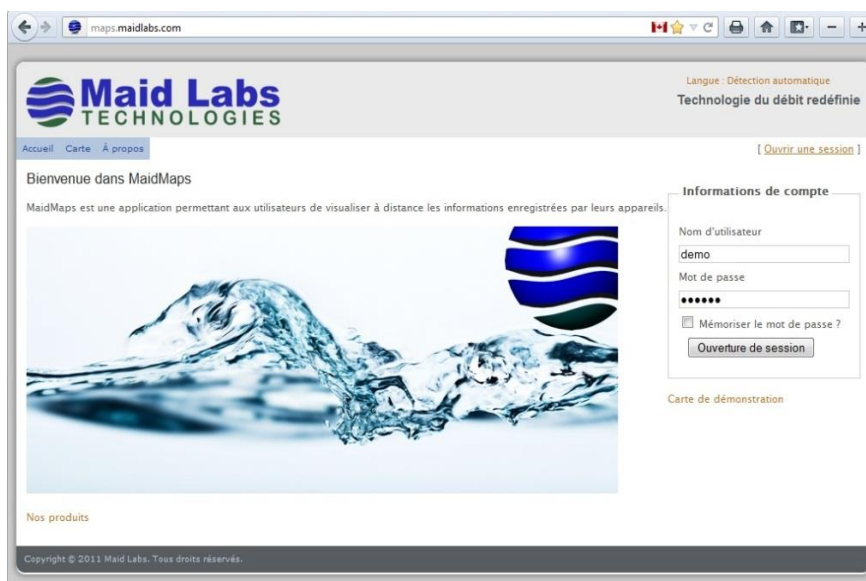
To access MaidMaps, click on http://maps.maidlabs.com. The user name is "demo" and the password is "123456". In this mode, only a few devices are actually connected to MaidMaps but the user can't reach the configuration parameters and alarms. However, the user can access the history, the measurements and other interesting elements from the instruments.
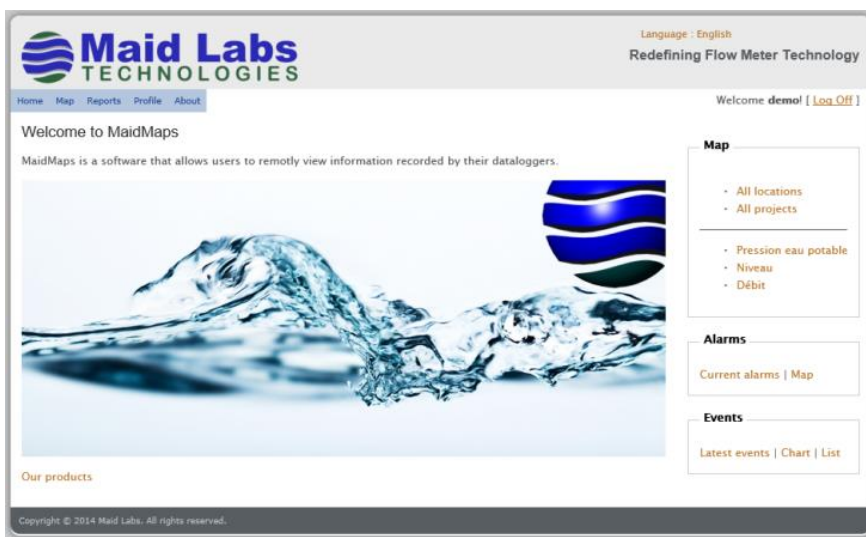
Data accessed by "Demo" is a mixture of data from instruments installed in the city of Granby, Quebec, and other used to do tests to improve our software and instruments. The following explanation assumes that you entered as a "Demo" MaidMaps user.

When you click on "All locations " in the "Map" section, all instruments recorded on the server and that Demo has permission to view are displayed. Clicking with the left button of an icon, the related geographic information will be displayed.

From the "All locations" screen, you can press the back button on your browser or click on the " All places " link, then select "All projects".
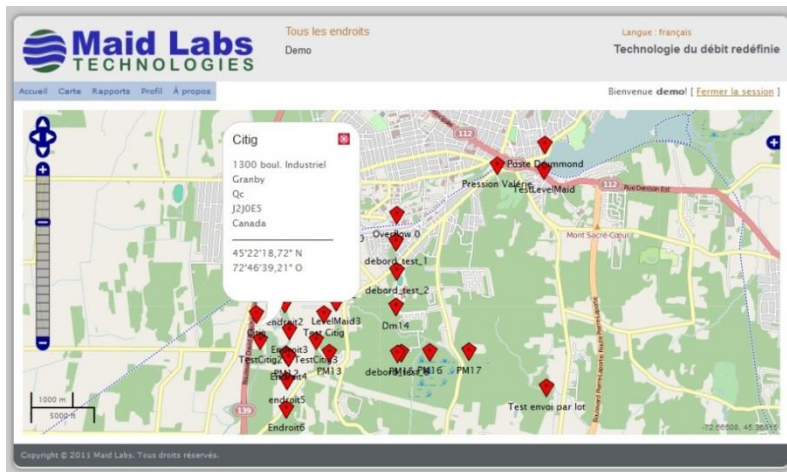

Icons are added to the instrument's symbol to visually inform of problems related to communication (✖), alarms (🔔) or alarming situation going on (instrument's background color). A left click on the icon allows more details on the problem to be displayed.

Also, if the reading measurements are outside the normal operating measures, then the background of the screen showing the measures change from white (normal) to yellow (warning) to red (alarm).
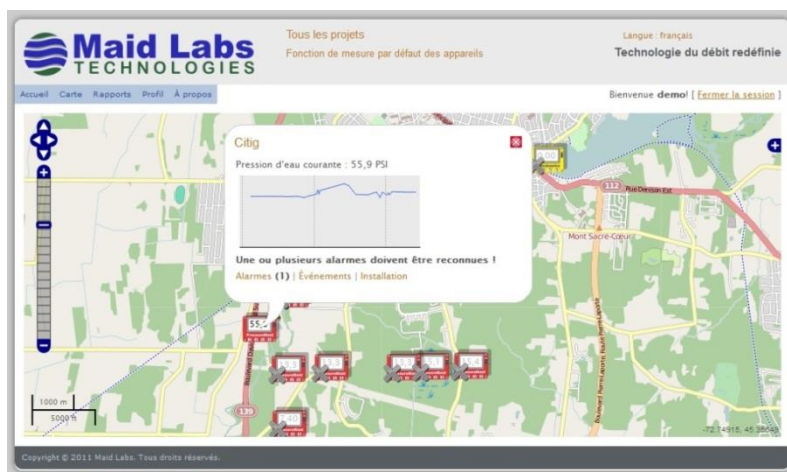
When an icon is selected, if data is available, a graph of the last hour will be displayed and will be updated when the data will be received.

If the user clicks outside of an icon, then the geographical data of the selected location will be displayed. If the user has the right to create "Locations", a link allowing it to set up the location will be displayed.
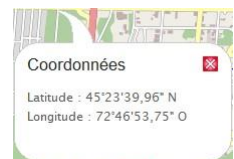
If the user clicks on « Alarms » in the open window, the following active alarms table will appear:

When "Details" is selected, the following screen provides all the information required to understand the problem. When the user selects "Acknowledge" the alarm disappears. To view the history of all alarms related to this location, select "History".

When the user clicks on the graph, the graph of the present day is displayed. To view previous days, select "previous day" or directly on the date, which will open a calendar to quickly choose the required day. To view a table of data constituting the graph, select " Table" at the bottom of the graph.

The graph and the table can be exported in Excel format by selecting "Export to Excel". The measures being recorded only when it changes, it is normal to find that table rows are not in constant time intervals.

Other reports are also available, but they are directly dependent on the chosen instrument. In all cases, a monthly report similar to the one generated by the instrument will soon be available.

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