



Instructions manual



PREFACE

Thank you for choosing the MT03F converter from MT03 series of Tecfluid S.A.

This instruction manual allows the installation, programming and operation of the MT03F converter. It is recommended to read it before using the equipment.

WARNINGS

- This document shall not be copied or disclosed in whole or in any part by any means, without the written permission of Tecfluid S.A.
- Tecfluid S.A. reserves the right to make changes as deemed necessary at any time and without notice, in order to improve the quality and safety, with no obligation to update this manual.
- Make sure this manual goes to the end user.
- Keep this manual in a place where you can find it when you need it.
- In case of loss, ask for a new manual or download it directly from our website www.tecfluid.com Downloads section.
- Any deviation from the procedures described in this instruction manual, may cause user safety risks, damage of the unit or cause errors in the equipment performance.
- Do not modify the equipment without permission. Tecfluid S.A. is not responsible for any problems caused by a change not allowed. If you need to modify the equipment for any reason, please contact us in advance.

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1 INTRODUCTION

MT03F converters are flow rate indicators, totalizers and controllers for batching processes.

The electronic circuit is based on the most advanced technology in digital signal processing, in order to obtain accurate and reliable measurements.

The equipment provides the following features (depending on the model):

- Graphic display with intuitive menus.
- Pulse input compatible with oscillating piston flowmeters series COVOL and turbine flowmeters series TM, as well as with most of existing pulse transmitters on the market.
- Volume preset and relay outputs for batching processes.
- Flow rate, totalizer and accumulated total indication.
- Pulse output (input signal repeater).
- Current output (4-20 mA) proportional to the flow rate and user programmable.
- Relay outputs user programmable as flow rate alarm.

2 RECEPTION

The MT03F converters are supplied conveniently packaged for transportation together with their instruction manual for installation and operation.

All devices have been verified in our facilities.

2.1 Storage temperature

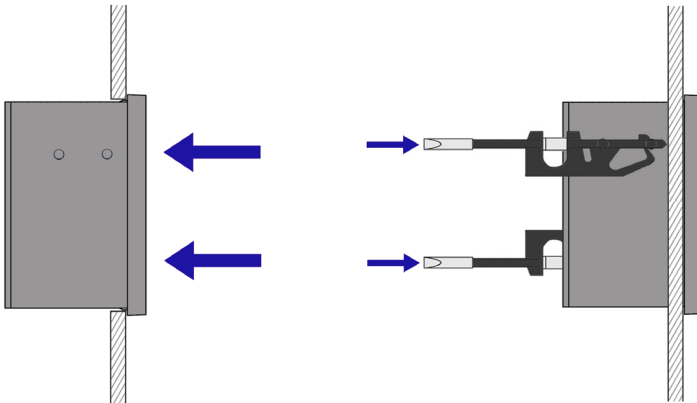
-20°C +60°C

3 INSTALLATION

3.1 Location

The MT03F converter is housed in a box according to IEC 61554 standard. Its size is 96x96 mm and is intended to be mounted on a panel of a cabinet with a square hole of 90 x 90 mm +0.5 mm / -0 mm. The cabinet should have a minimum depth of 90 mm behind the panel.

To place it into the cabinet, slide it through the front panel to the bottom as shown in the following figure. Then screw the clamping arms until exert pressure on the panel.



3.2 Electrical connection

The connection of the equipment is via plug-in connectors, polarized to avoid mistakes when plugged in. The connectors have screw terminals, as per VDE standards, to accept cables with section of 1.5 mm².

The pictures of the connections in this manual are always looking the equipment from the back.

To help in the wiring of the equipment, the description of the terminals is marked on a label in the rear side of the device..

For the electrical installation it is recommended to use multiple conductor cables with individual cable sections in the order of 0.25 to 0.5 mm² in order to make it easier to connect. It is better to maintain the cables with mains voltage (power supply) separated from the cables with low level signals (4-20 mA, etc.).

To connect the cables, peel the outside insulation to free the inner cables. It is recommended to put a terminal at the ends of the wires to avoid loose ends.

Then, screw the wires into the corresponding positions in the female aerial connector. Finally, place each connector with its corresponding male connector on the rear side of the converter.



IMPORTANT NOTE: In order to comply with the electrical safety requirements as per EN-61010-1 (IEC 1010-1), the installation of the equipment must take into account the following:

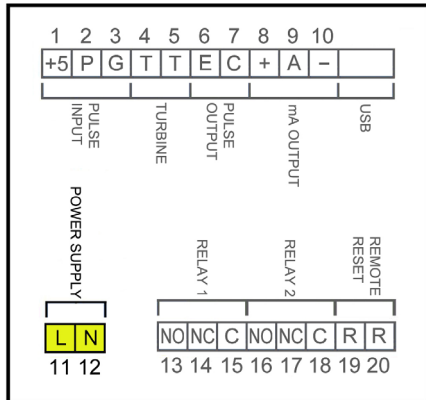
- The equipment must be installed in the front panel of an electrical mounting cabinet, leaving only the front of the equipment accessible to the operator.
- In case of AC power supply, a mains switch must be provided to disconnect the equipment. This switch must be marked as the disconnecting device for the equipment and be within easy reach of the operator.
- The housing must not be opened when the instrument has mains supply connected.



IMPORTANT NOTE: To ensure a right operation of the equipment, it is recommended to make the connection paying attention to the following points:

- For the output signals, use shielded cable when possible.
- Keep the cables away from strong sources of noise.

3.2.1 Power supply wiring



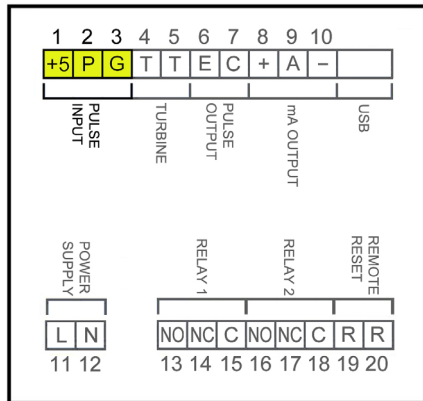


Before starting the wiring of the instrument, check that the supply voltage available is the same as marked on the label of the converter.

<u>Terminal</u>	<u>Power supply AC</u>	<u>Power supply DC</u>
11	Phase	DC
12	Neutral	DC

In case of DC power supply, the equipment is provided by a diode bridge that allows connecting it regardless of the polarity .

3.2.2 Pulse input wiring



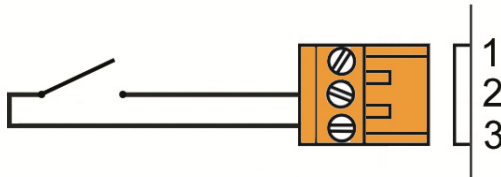
Terminal

1	Voltage output +5V
2	Contact
3	Ground

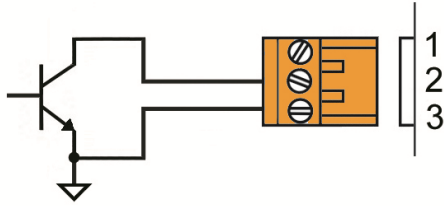
This input is compatible with all oscillating piston flowmeters series COVOL, as well as with instruments that provide an output of the following types:

- From 0 to VCC, where VCC = 5 ... 24V
- NPN open collector
- Free potential contact

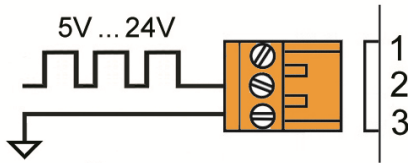
For those devices requiring be powered to 5VDC to generate output pulses, the MT03F have this supply voltage in Terminal 1.



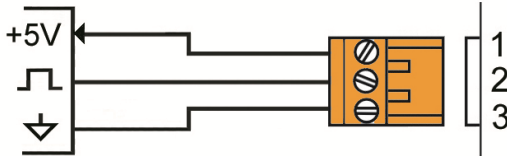
Free potential contact



Open collector

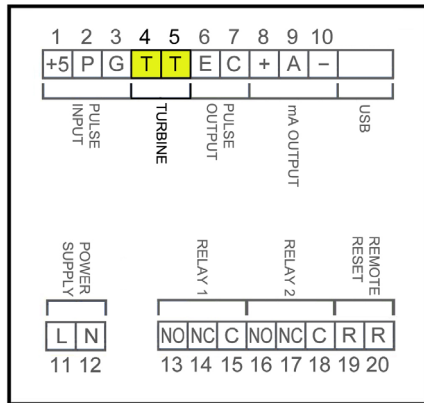


5V ... 24V pulses



5V power supply

3.2.3 Pickup (turbine) input wiring



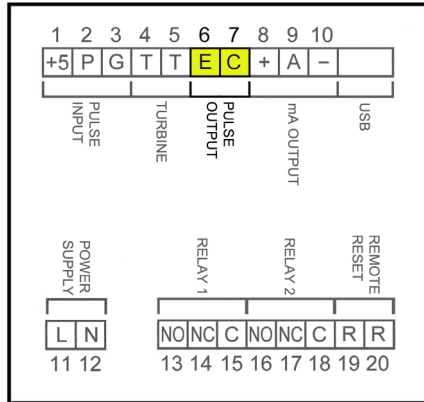
Terminal

- 4 Turbine
- 5 Turbine

This input is compatible with all turbine flowmeters series TM and those instruments that provide a magnetic pickup type output whose voltage is between 30 mVpp and 10 Vpp. Higher values can damage the equipment.

The input impedance is 2 kΩ. It has a protection for limiting the voltage applied to the circuit consisting of two diodes in parallel and two 100 Ω resistors.

3.2.4 Pulse output wiring



Terminal

6

Emitter

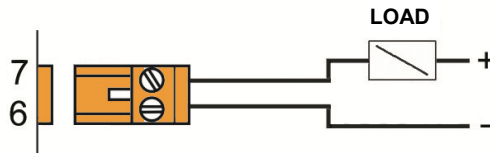
7

Collector

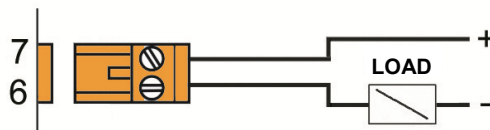
The pulse output operates in repeater mode. It gives a pulse for every input pulse or for each turbine signal period.

The pulse output is opto-isolated. The terminals are the collector and emitter of a NPN bipolar transistor.

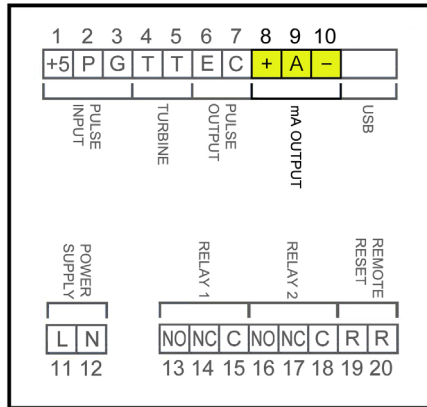
Example. Connection with the load at the collector



Example. Connection with the load at the emitter



3.2.5 Analog output wiring



Terminal

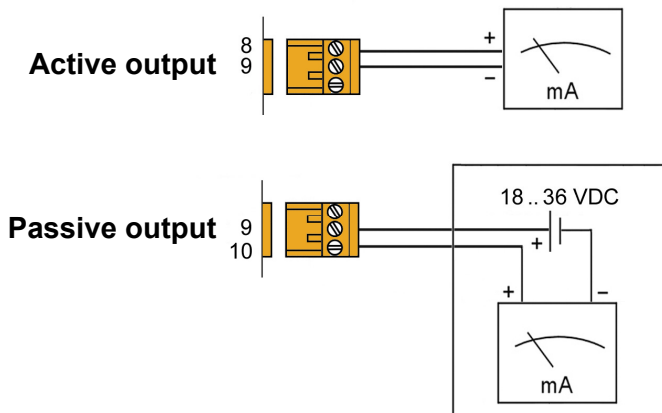
- 8** mA (positive, active output)
- 9** mA
- 10** mA (negative, passive output)

The analog output is galvanically isolated. It can be either active (which means that the receiving device must be passive) or passive (which means that the receiver must supply the power for the current loop). It is recommended to use a receptor with an input resistance of less than 700 Ω to guarantee correct operation.

The configuration of the analog output mode (active or passive) is done by means of the connection to the terminal strip. For active mode, terminals 8 and 9 are connected. For passive mode, terminals 9 and 10 are connected.

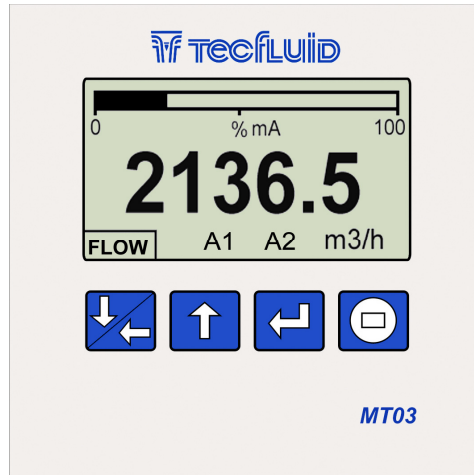


NOTE: The analog output has protection against reversed polarity. Due to another protection against over voltages, if a loop supply voltage of more than 32 V is connected the equipment may be damaged.

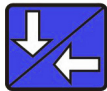


4 OPERATION

The MT03F converters have a graphic LCD and a keyboard with 4 push buttons.



The following figure shows the functionality of the converter keys.



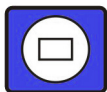
(Down / Left) To enter the preset values for a batching.
To switch between flow rate, totalizer and fluid velocity screens.
To change to the digit on the left.
Into the menu, to scroll down.



(Up) To switch between the different screens. To change the decimal point.
To increase the digit.
Into the menu, to scroll up.



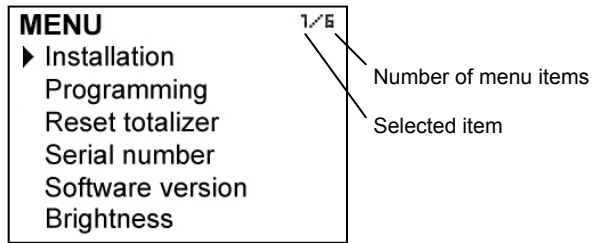
(Enter) To validate the data.
To enter into installation and programming modes of the converter.
To exit from an informative text.



(Escape) To start a batching process.
To return to the previous menu. To exit from a screen without validating data.

5 MAIN MENU

To access the main menu of the converter, press the key (Enter). The following screen appears:



The "Installation" option allows the basic configuration of the instrument, as explained in Chapter 6 of this manual.

The "Programming" option allows to program all parameters of the converter, as explained in Chapter 7 of this manual.

From the "Reset totalizer" option, the user can return the totalizer to zero. When exiting the menu, the totalizer will begin to accumulate again.

Note: The "Reset totalizer" operation requires the program password input (see section 5.1).

The options "Software Version" and "Serial Number" are informative and are discussed in Chapters 9 and 10 of this manual.

5.1 Passwords to access the menus

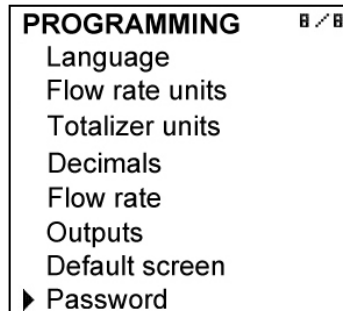
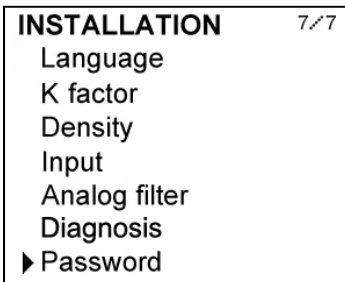
The password for the installation menu may be different from the password for the program menu.

By default, the equipment is factory configured with the password disabled.

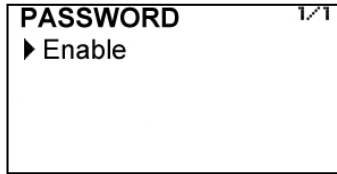
If you want to change any of these passwords, you must enter the corresponding menu and once inside, access the submenu "Password".

To change the access password of the installation menu, select "Installation" on the main menu and then "Password".

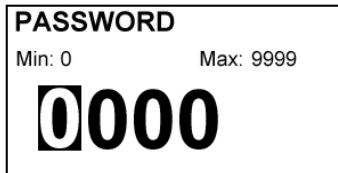
To change the access password of the programming menu, select "Programming" in the main menu and then "Password".



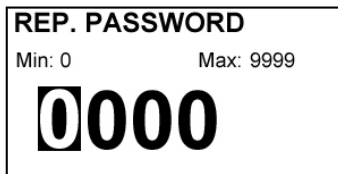
When the "Password" option is selected, a screen that indicates the password status for this menu appears.



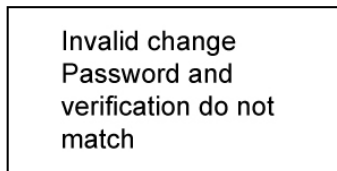
Selecting "enable", the screen to enter the new password appears.



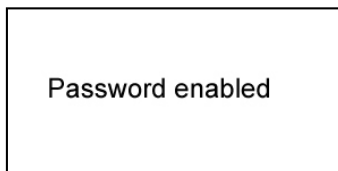
Once entered, the new password is asked again to avoid possible inadvertent error.



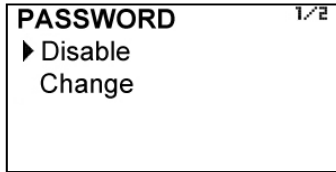
If the re-entered password does not match the first one, the following error message appears and the process should be carried out again.



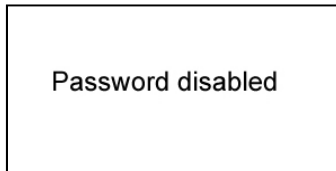
If both passwords match, the following information message is displayed:



If the password needs to be changed or disabled, the procedure is the same. Once entered the "Password" menu, the following screen appears:



If change is selected, the equipment will ask for a password again. If Disable is selected, the following message will appear:



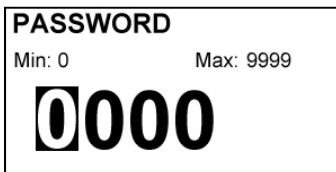
6 INSTALLATION PARAMETERS

Power on the electronic converter with the voltage indicated on the label.

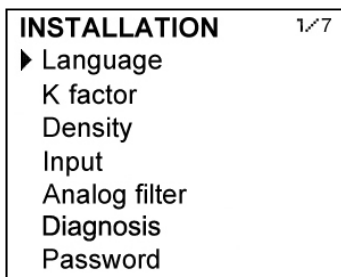
Press the (Enter) key in order to enter the main menu.

With the keys (Down / Left) and (Up), select "Installation", and then validate with the key (Enter).

If the converter has the password option enabled, a password must be entered. For more details about the password see section 5.1 on page 14.

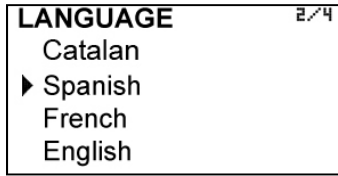


Once in the installation menu, the first screen allows to choose between the different options.



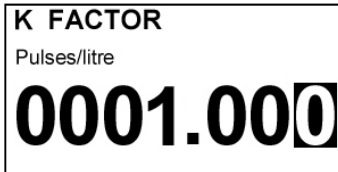
6.1 Language

You can choose the language in which all the menus will be displayed.



6.2 K factor

In this screen the K factor from the pulse transmitter (COVOL, TM44 or other) must be entered. This value should be found on the label of the counter or turbine.



The introduction of numerical values is performed as follows:

By default, the value to enter has 4 digits and 3 decimals.

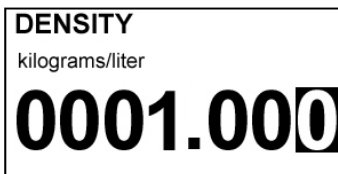
Although for most cases with this format is enough, if the location of the decimal point is needed to be changed, for example to have 5 integers and 2 decimals, the method for doing this is the following:

- Scroll to the number where the decimal point will be placed
- Press the key (Up) and hold (about 3 seconds) until the decimal point change to the desired position.
- Enter the desired numerical value using the keys (Lower / Left) and (Up).

If this operation is performed on the least significant digit (first from right), the decimal point will disappear and will have 8 integers to enter the numeric value.

6.3 Density

If an indication of mass flow rate is preferred, density value of the liquid can be entered in kg / liter.



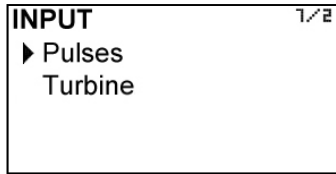
Measurement units are selected in the programming menu (see page 20).



NOTE: The change in density value affects only the mass flow rate indication and mass totalization, when the corresponding units are selected.

6.4 Input

In this screen the type of signal from the sensor connected to the MT03F can be chosen.



Pulse input is compatible with all flowmeters series COVOL, and with any instrument that has an pulse output of one of the following types:

- De 0 a VCC, where $VCC < 24V$
- NPN open collector
- Potential free contact

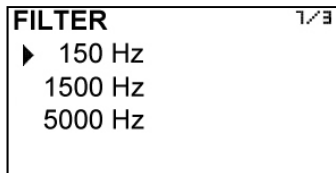
Turbine input is compatible with all turbines series TM and with any instrument that has a pickup type output with a voltage between 30 mVpp and 10 Vpp.



IMPORTANT NOTE: If the input pulse is chosen, the associated sensor must be connected to terminals 1, 2 and 3, as indicated in section 3.2.2 on page 7. In the same way, if turbine input is selected, the connection must be performed at terminals 4 and 5 as in section 3.2.3 on page 8.

6.5 Analog filter

The input signal can be filtered in order to cancel high frequency non desired signals.

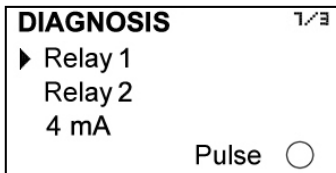


For flowmeters series COVOL, a selection of 150 Hz filter is recommended.

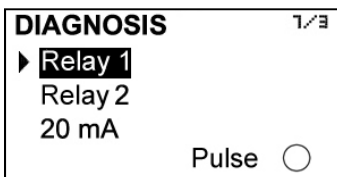
For turbine flowmeters series TM, a selection of 1500 Hz filter is recommended.

6.6 Diagnosis

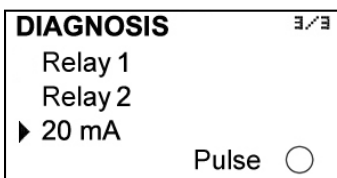
It allows to check some parameters of the equipment.



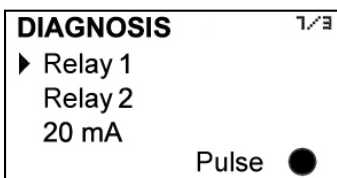
Pressing the key (Enter) while selecting Relay 1 or Relay 2 will activate or deactivate this output. When the relay is ON, the word is shown in reverse text.



If 4mA is selected, pressing the key (Enter) toggles between 4, 8, 12, 16 and 20 mA, allowing to check the adjustment of the analog output.



In either case, the circle next to the word "Pulse" is shown in black every time the equipment receives a pulse.

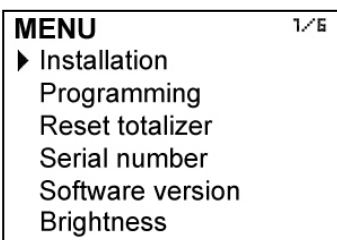


NOTE: To make the diagnosis of pulse input the frequency should be less than 2 Hz.

7 PROGRAMMING PARAMETERS

By programming the converter the visualization and the outputs of the instrument can be configured.

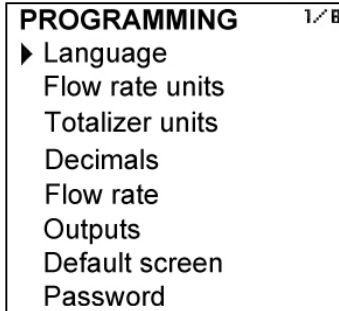
Turn on the converter and press (Enter) to enter the main menu. The following screen appears:



With the keys (Down / Left) and (Up), select Programming, and then validate with the key (Enter).

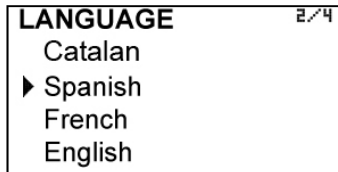
If the converter has the password option enabled, a password must be entered. For more details about the password,, see section 5.1 on page 14.

Once in the programming menu, the first screen allows to choose between the different options.



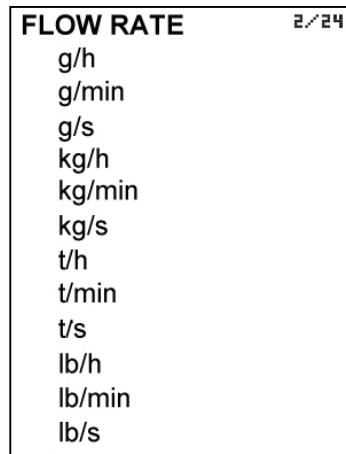
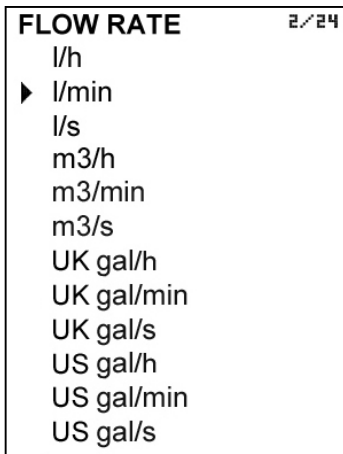
7.1 Language

You can choose the language in which all the menus will be displayed.



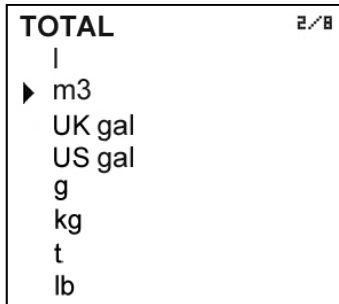
7.2 Flow rate units

In this screen the units for the flow rate indication can be chosen.



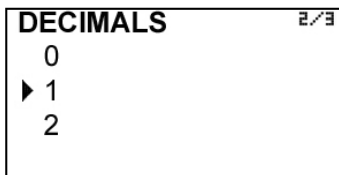
7.3 Totalizer units

The units for the totalizer and accumulated total can be chosen.



7.4 Flow rate decimals

In this screen the number of decimals for the flow rate indication can be selected.



To select the number of decimals it must be taken into account that the instrument has 5 digits for flow rate indication. If two decimals have been selected, these will be seen whilst the flow rate is not higher than 999.99. Above this value the indication will automatically change to one decimal, and when the flow rate is higher than 9999.9 the indication will be done without decimals.

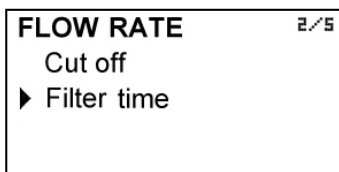
If one decimal is selected, the flow rate indication will have a maximum of one decimal until 9999.9. Above this value the indication will be done without decimals.

If indication without decimals is selected, the flow rate will always be shown without decimals.

For the selection of the flow rate units and the number of decimals it must be taken into account that an indication with an excess of decimals may give the sensation of instability of the reading. As a general rule it can be considered that the reading should not have more than a total of 5 digits (integer + decimals).

7.5 Flow rate

This screen displays a submenu to modify different aspects related to flow reading, such as cut off and filtering.



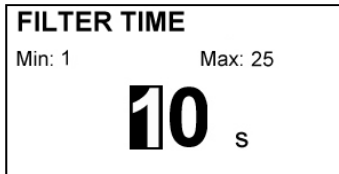
7.5.1 Cut off

A cut off flow rate can be programmed, that means, the flow rate below which the flow rate indication will be zero. This can avoid reading errors in the lower zone of the working range.



7.5.2 Damping

The converter has an adaptive filter (damping) to provide stable flow rate and analog output readings in the presence of continuous flow rate fluctuations.



The configuration of this filter can be very useful in the cases where the flow rate readings have some instability (due to air bubbles, solids in suspension, etc).

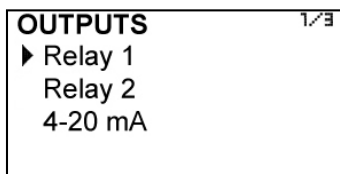
Only the flow rate indication of the display and the analog output are affected by the filter. The relay output and the totalizer act according to the instant flow rate. Selecting a filter with a longer or shorter integration time will provide more or less stable readings and will also affect the response time to small variations of flow rate.

The integration time is selected in seconds, with a minimum value of 0 and a maximum value of 25 seconds. For example, with an integration time of 15 seconds, the display will indicate the flow rate reading of the average flow rate over the last 15 seconds from the last update of the display. This does not mean that the display is refreshing its data every 15 seconds. The display shows a new value several times per second, indicating an average of the flow rate values of the last 15 seconds.

When there is a sudden variation of the flow rate then the filter should react as fast as possible to give a correct reading of the new value. For this, the filter controls the deviation of the instant flow rate with respect to a reference for each reading. If this deviation exceeds the 25%, the filter will stop acting, indicating the instant value, and will start again the filtering process.

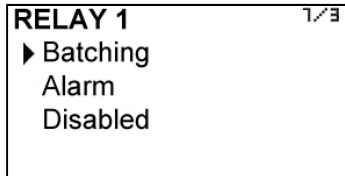
7.6 Outputs

This screen allows to program the three outputs of the instrument: Relay 1, Relay 2 and analog output (4-20 mA).



7.6.1 Relay 1 and relay 2

By selecting one of the two relay outputs, next screen appears with the options which allow to assign the relay to a function.



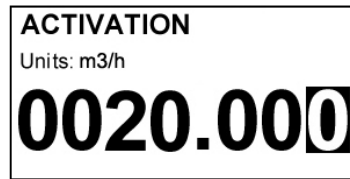
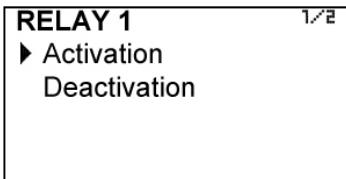
7.6.1.1 Batching

If batching option is selected, the relay will change its state at the start or end of a batching process.

For detailed information about batching, see section 12 on page 26

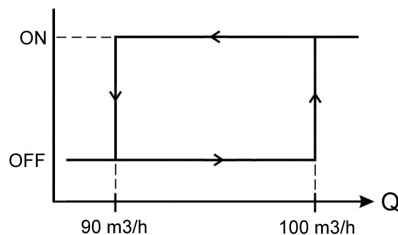
7.6.1.2 Alarm

If Alarm is selected, we have access to program the flow rate at which the relays will change its status and to the level of hysteresis. By level of hysteresis we understand the difference between activation and deactivation of the output. To avoid that an alarm output is continuously moving from activate to deactivate status, we must program the points of connection and disconnection.



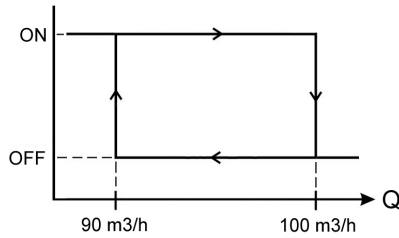
Example 1

If the activation point is programmed to 100 m³/h and the deactivation point is programmed to 90 m³/h, when the flow rate is zero the output will be deactivated. When the flow rate reaches a value of 100 m³/h the output will be activated until the level falls below 90 m³/h.



Example 2

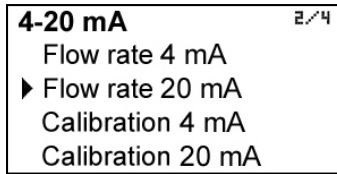
If we program an activation point of 90 m³/h and a deactivation point of 100 m³/h, when the level is zero the output will be activated. When the flow rate reaches a value of 100 m³/h the output will be deactivated until the flow rate falls below 90 m³/h.



7.6.1.3 Deactivation

The relay will be always at rest.

7.6.2 Analog output

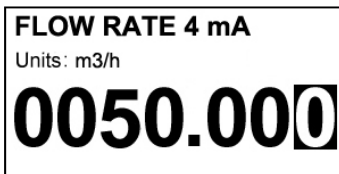


The flow rate corresponding to 4 mA and 20 mA can be programmed and the calibration for these two values can be made as well.

7.6.2.1 Programming of the 4-20 mA output

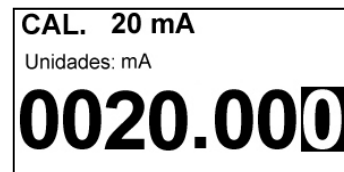
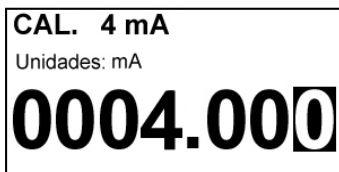
Flow rate values equivalent to each current are entered directly.

The flow rate programmed for 20 mA must be higher than the programmed for 4 mA. Otherwise, the current loop will always give 4 mA.



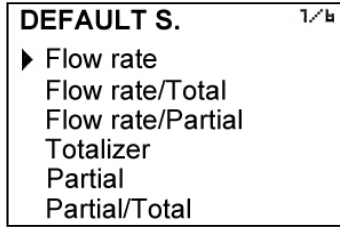
7.6.2.2 Current calibration for 4 and 20 mA

The MT03F converter is delivered with the current output already calibrated. If you want to correct a derive of the 4 or 20 mA current values because they do not coincide with the ammeter used, it can be done by entering de ammeter value and pressing the key (Enter). The ammeter will adjust its value and the MT03F screen will show the values of 4 or 20 mA again in the event the operation needs to be done again. More than one adjustment can be necessary to do a complete calibration.



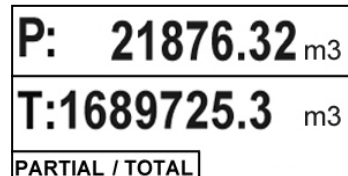
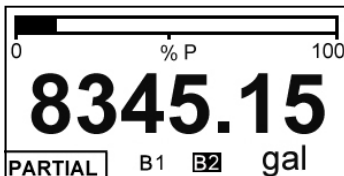
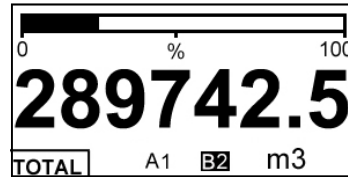
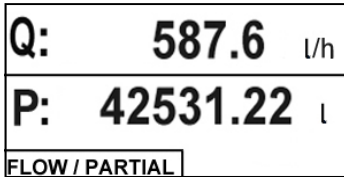
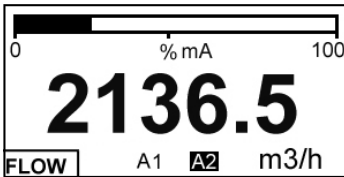
Before making a current calibration, be sure that the ammeter used for that is showing a correct value.

7.7 Default screen



The converter presents the selected screen when a power failure occurs. the following default screens can be programmed:

- Flow rate
- Flow rate + Totalizer
- Flow rate + Accumulated total
- Totalizer
- Accumulated total
- Accumulated total + Totalizer



The first three screens show the relay output status, if they are activated.

If the relay is in alarm mode, an “A” will appear in normal or inverse format depending on the relay status.

If the relay is in batching mode, a “B” will appear in normal or inverse format depending on the relay status.

The two relay outputs are independent. It can be programmed one as alarm and the other as batching.

8 TOTALIZER

It has 8 digits and 2 decimals. Decimals are lost as more integer digits are needed.
To reset the totalizer, see the section 5 on page 14.

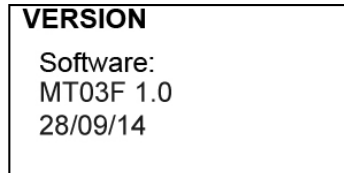
9 SERIAL NUMBER



In this section the converter serial number is shown.

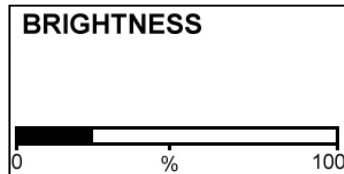
10 SOFTWARE VERSION

From the main menu, if "Software version" is selected, the screen will show this data and the corresponding date.



11 BRIGHTNESS

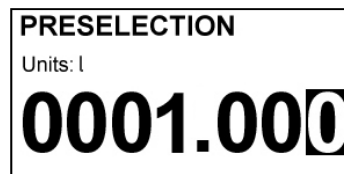
With this option the screen backlight can be adjusted.



12 BATCHING

A batching process is performed using the following parameters:

- Preset value. Is the amount to be dispensed. The MT03F can work with one or two presets.
- Partial counter. Indicates the batching process. Its value is zero at the start of a batch and increases when the MT03F receives signal from a flowmeter.



- Relays. If configured as batching they change its state when the accumulated total reaches the preset value associated with each relay.

From the working screen, pressing the key (Down / Left) the preset input screen is shown.

On this screen, enter the amount to be dispensed. There are 3 possibilities:

- If only relay 1 is programmed as batching (see section 7.6.1 on page 23), only the "Preset 1" appears, and the entered value is the one that when the partial counter reaches this value will produce a change of state in relay 1.
- If only relay 2 is programmed as batching (see section 7.6.1 on page 23), only the "Preset 2" appears, and the entered value is the one that when the partial counter reaches this value will produce a change of state in relay 2.
- If both relays are programmed as batching (see section 7.6.1 on page 23), the "Preset 1" screen appears first, and after the "Preset 2" . The values entered are those that when the partial counter reaches each value will produce a change of state in the relay 1 or relay 2.

NOTE: A zero preset value or the two presets with the same value are not allowed.

12.1 Batching start

To start a batching process, the equipment should be on a screen where the accumulated total appears. Otherwise, the start of the manoeuvre will have no effect.

The batching process can be started by shorting the remote Reset terminals (see section 3.2.7 on page 12) or by pressing the key (Escape).

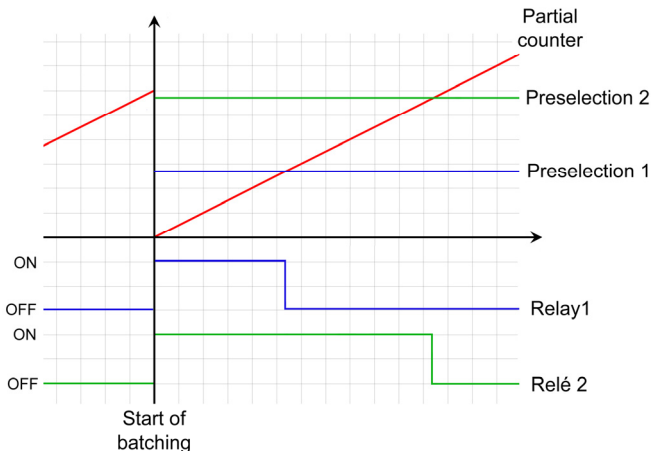
From that moment, the partial counter will reset and relays programmed as batching will change their state to ON.

12.2 Process and end of batching

The accumulated total counter increases when the MT03F receives flow rate signal.

When it reaches the value of each preset, the associated relay changes its state to OFF.

If during the batching process the key (Escape) is pressed the relays are set to OFF and the process is finished despite not having reached the preset value. If the event that it is necessary to complete a batch which was stopped, either by pressing the key (Escape) or by power failure, program the preset value as the difference between the initial preset value and the partial counter value shown when the process was stopped.



13 WORKING SCREEN

When exiting the menu, the display shows the working screen. To scroll between the six operating screens, press the key (Down / Left) or (Up).

14 MAINTENANCE

No special maintenance is required .

14.1 Fuse

The device has a Ø5 x 20 mm fuse as a protection at power supply input. The fuse rating depends on the nominal supply voltage.

In the event that the fuse blows, this should be replaced with one of the same value.

15 MEASUREMENT ERROR CORRECTIONS

The obtaining of K factor of the flowmeters is performed by water at 20 °C whereby a factor for a liquid of density 1 kg/l and viscosity of 1 mPa·s is obtained. If a liquid is used with different characteristics from the above specified, measurement errors can be induced.

To correct these errors the K factor can be modified in the installation menu (see page 17).

Example 1 - Shortage of volume

If we have a flowmeter which specifies K (pulses/litre) = 1.985, and when we check the volume of a batch, we find that instead of having 100 litres as programmed, we only have 95 litres (5% less) we have to apply the following correction:

Fk = Original K factor	= 1,985
V = Expected volume	= 100
Vr = Obtained volume	= 95
Fk n = New K factor	= ? (2,089)

$$Fk\ n = Fk \frac{V}{Vr}$$

Example 2 - Excess of volume

If we have a flowmeter body which specifies K (pulses/litre) = 1.985, and when we check the volume of a batch, we find that instead of having 100 litres as programmed, we have 105 litres (5% more) we have to apply the following correction:

Fk = Original K factor	= 1,985
V = Expected Volume	= 100
Vr = Obtained volume	= 105
Fk n = New K factor	= ? (1,887)

$$Fk\ n = Fk \frac{V}{Vr}$$

16 ASSOCIATED SOFTWARE WINSMETER MT03

Most of the steps in the preceding paragraphs can be done by means of the device associated software Winsmeter MT03, which allows working in a more comfortable and intuitive way.

Such software can be downloaded from the "Downloads" section of the Tecfluid S.A. www.tecfluid.com/downloads

16.1 USB cable connection and drivers installation

Extract the files from the winsmeter MT03.zip to a new system folder.

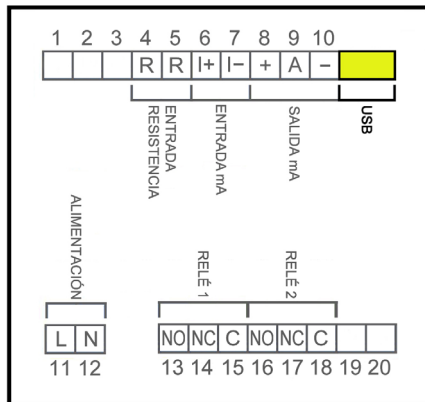
Execute the Setup.exe file and follow the steps for the installation.

In order to connect the converter to a computer an USB cable is required. This cable is type A at one end and type B at the other, and it is readily available on the market.

The ends of the cables can be seen in the picture.



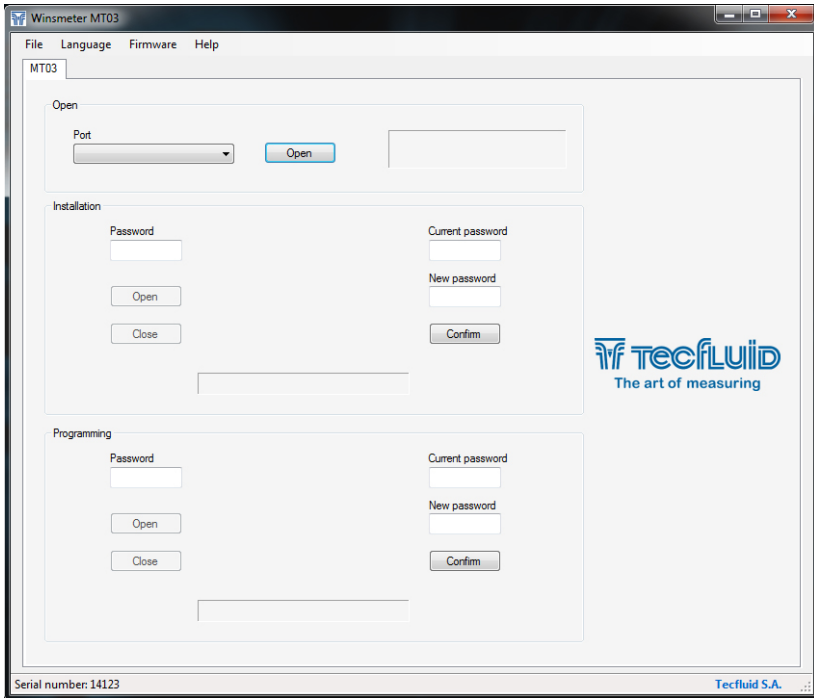
The USB connector is located at the rear side of the converter.



Connect the USB cable at one end to the converter and at the other to the computer where the software is installed.

Power on the electronic converter.

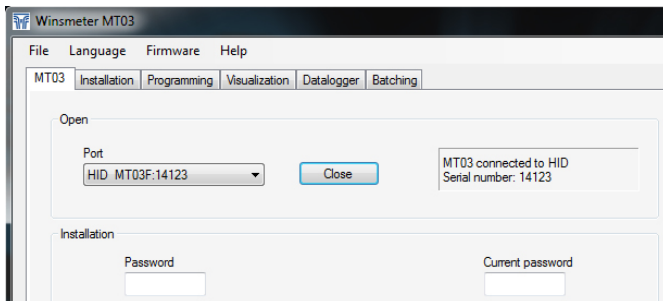
Execute the program WinsmeterMT03 following the sequence Start – Programs – Tecfluid S.A. - WinsmeterMT03.



16.2 Port connection

In the "Port" section, choose the appropriate port for the converter. This will appear with the name of the port followed by MT03F and its serial number. Then click "Open".

Once the port is open, the button "Open" in the "Installation" and "Programming" sections activates.

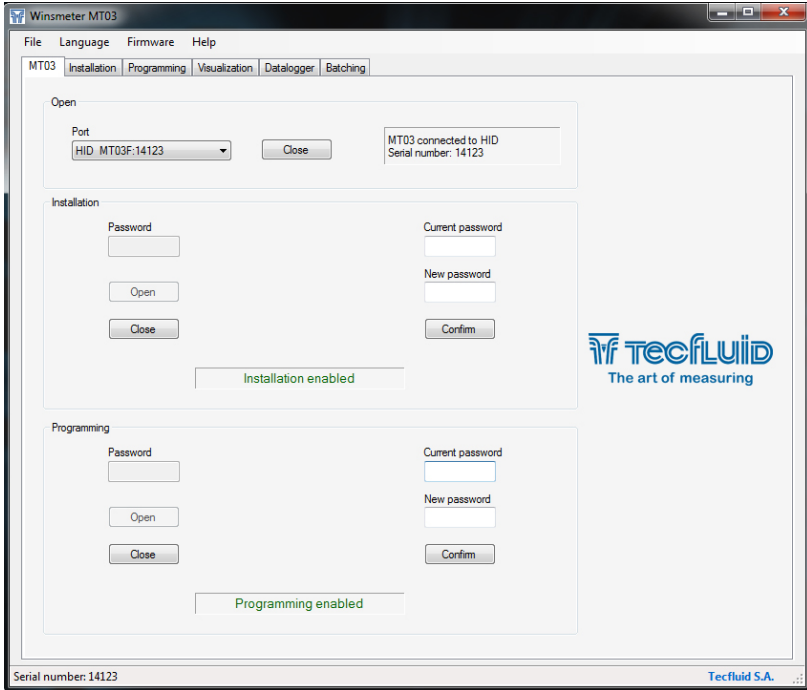


16.3 Access to installation and programming

In order to change the data contained in the "Install" tab, you must enter a password.

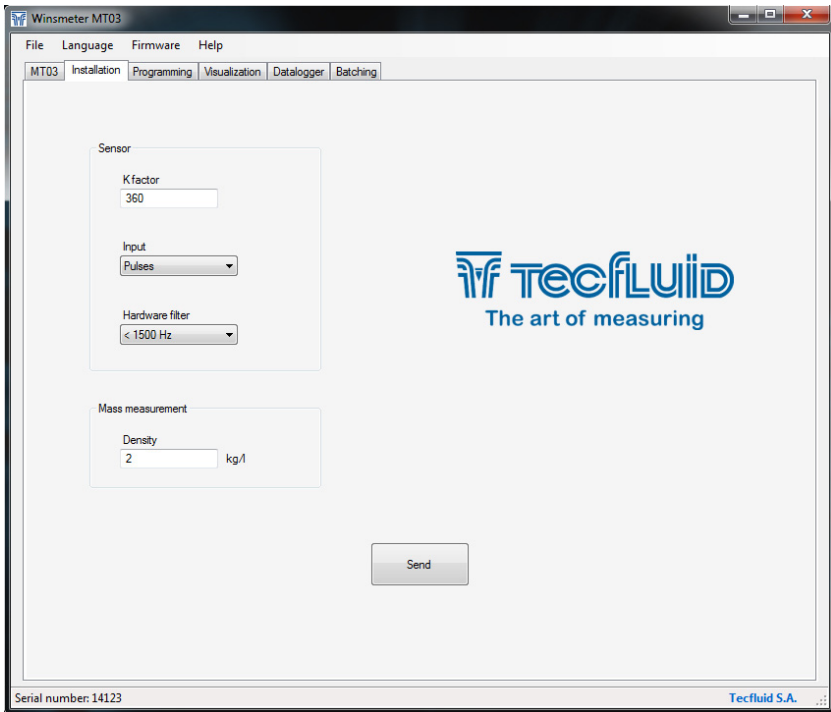
The default password is **install**, and it can be changed using the boxes on the right of the "Installation" section.

Likewise, to change the data contained in the "Programming" tab it is necessary to enter the password which by default is **program**. This can be changed using the boxes on the right of the "Programming" section.



Once the password is written, press "Enter" or "Open", and the installation or programming tab will open. At the bottom of each section the text "Installation tab open" or "Programming tab open" will be displayed

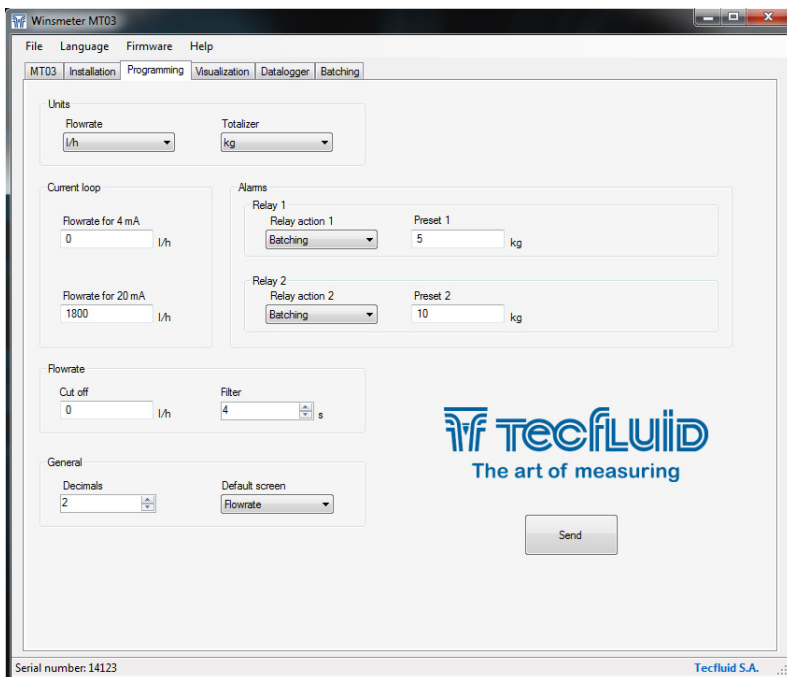
To enter the Installation window, just click the corresponding tab.



In the installation window the parameters that adapts the converter to a sensor can be configured.

To transfer data to the MT03F converter, press the "Send" button. The message "Saving program" will appear for two seconds in the converter screen. The installation data will be stored in the memory of the converter.

Likewise, to enter into the programming window, just click the corresponding tab.



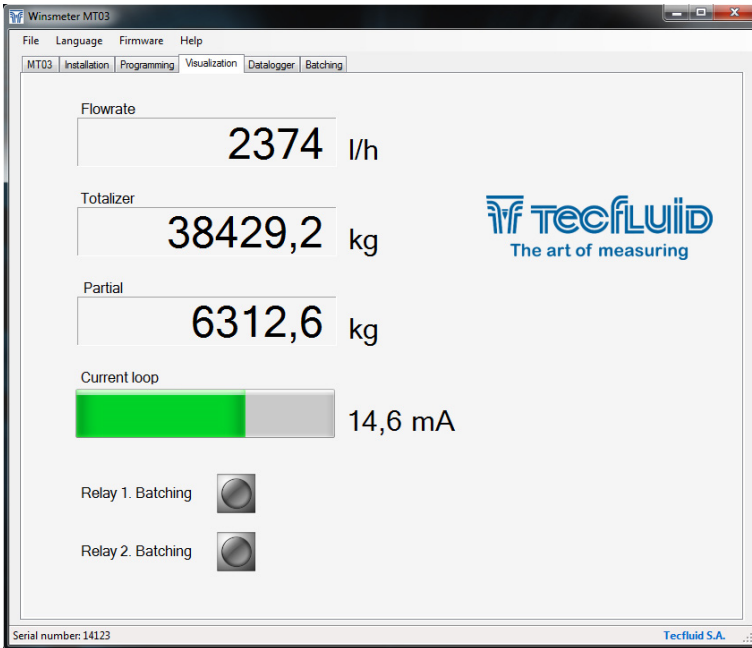
Changing the parameters of this screen you can program the different functions of the equipment.

As in the previous paragraph, to program this data to the MT03F converter, press the “Send” button. The message "Saving program" will appear for two seconds in the converter screen. The programming data will be stored in the memory of the converter.

16.4 Visualization

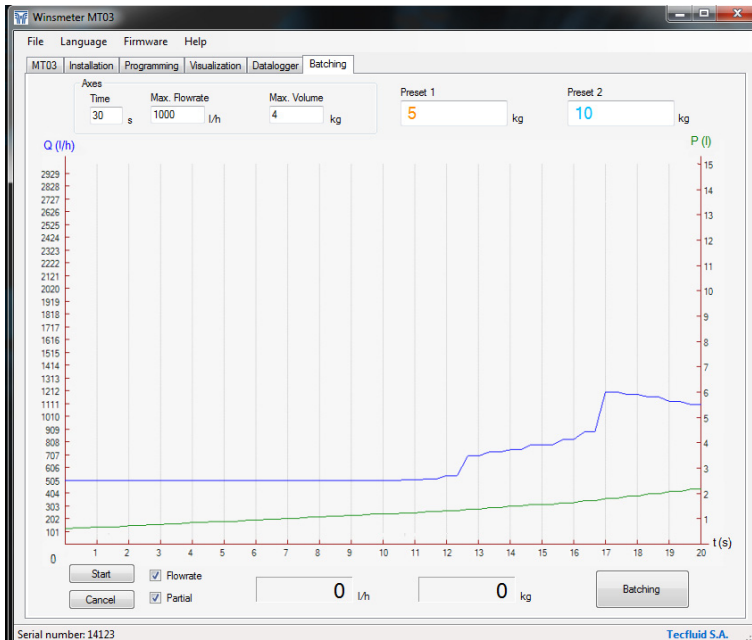
When the communication with the computer port is established (see section 16.2), the tab "Visualization" opens. This tab lets you view real-time flow rate, totalizer and partial counter values, as well as the current value of the analog output and the status of the relay outputs.

It is an intuitive tool to verify that the instrument has been installed and programmed correctly.



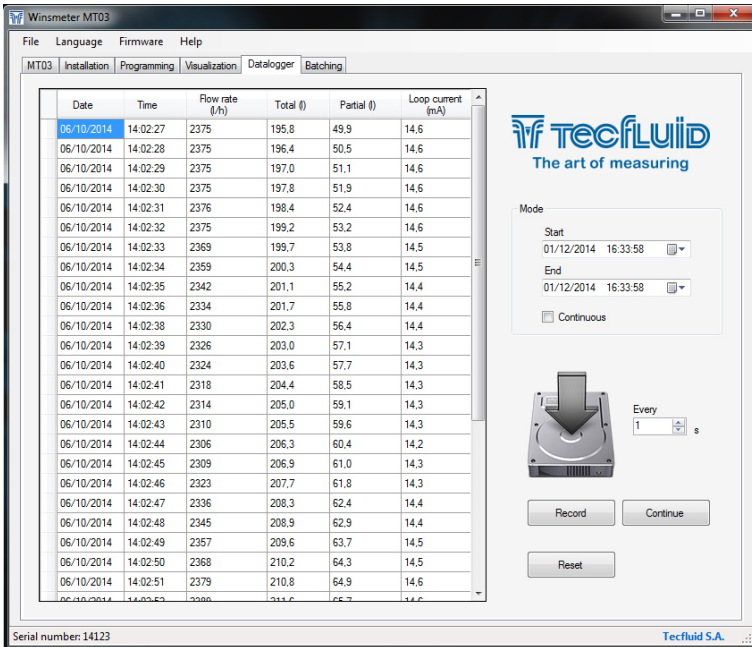
16.5 Graphic

This screen can graphically display the flow rate and partial counter progress. It is intended to be most useful in batching processes. With "Start" and "Cancel" buttons the graphic can be drawn and with the "Batching" button starts or cancels a batching process.

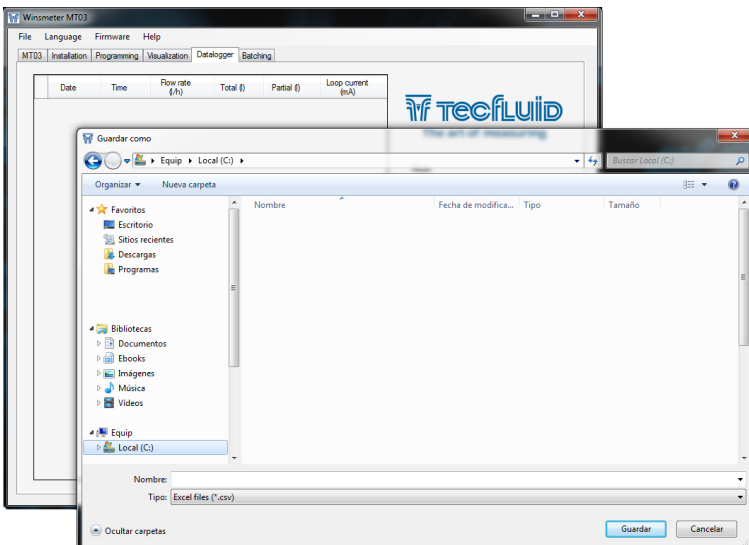


16.6 Datalogger

In this screen the different process variables of the converter can be registered in a file. The time between samples can be set, as well as the start and end of the record.



When the "Register" button is pressed, the window that allows to give a file name and define its location appears.



The created file has CSV format, which can be viewed directly with a spreadsheet such as Microsoft Excel.

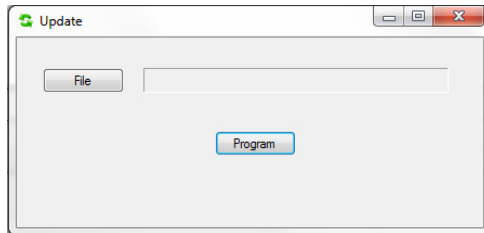
16.7 Firmware updates

New firmware updates can be published in the website. These updates contain improvements or bug fixes that make the equipment operates at best conditions.

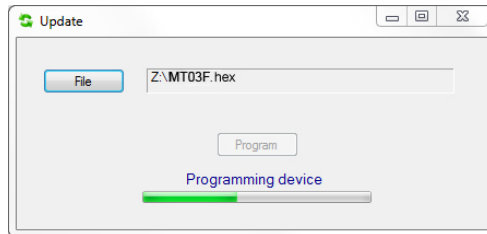
The updates can be downloaded from the following link of Tecfluid S.A. website

www.tecfluid.com/download

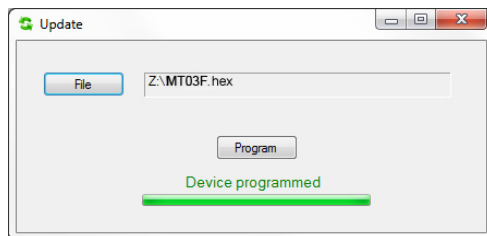
To update the equipment, go to menu "Firmware" - "Update", and a screen with the button "File" will appear. Pressing this button file explorer can be accessed. The downloaded file has to be searched there.



Once the file is selected, press the "Program" button. A message "Programming device" will appear.



The process takes about 90 seconds, after which the message "Device programmed" will appear.



From this moment, the converter MT03F already has the new version of Firmware.

17 TECHNICAL CHARACTERISTICS

Power supply

90 ... 265 VAC 50, 60 Hz

18 ... 36 VDC

Power consumption: ≤ 5 VA

Pulse input

From 0 to VCC, where VCC= 5V ... 24V

NPN open collector

Potential free contact

Pickup input

Peak to peak voltage: 30 mVpp ... 10 Vpp

Analog output

4-20 mA. Active or passive. galvanically isolated from the power supply.

Pulse output

Optoisolated. NPN bipolar transistor. Vmax: 30 VDC. Imax: 30 mA.

Pulse input repeater

Minimum frequency: 1 / 60 Hz

Maximum frequency: 5000 Hz

Relay outputs

2 relay with potential free contacts.

Contact characteristics:

Maximum voltage : 220 VDC, 250 VAC

Maximum current: : 3 A

Totalizer

N° of digits: 8 (2 decimals)**

Digit size: 11 mm

Reset: by means of keyboard

Accumulated total

N° of digits: 8 (2 decimals)**

Digit size:: 11 mm

Flow rate indication

N° of digits: 5 (up to 2 decimals configurable)**

Digit size: 11 mm

** When the available digits are full and the integers overflow a decimal is automatically lost.

Ambient temperature range:

-20 ... +60 °C

Housing

Material:

Box: Noryl SE1, GFN2, 701 black ⁽¹⁾

Front frame: Lexan 920 black ⁽¹⁾

Ingress protection:

Back side: IP30

Front side: IP50

Silicone sleeves for the front side are available. They provide an IP65 ingress protection.

Conforms to Low voltage Directive 2006/95/CE

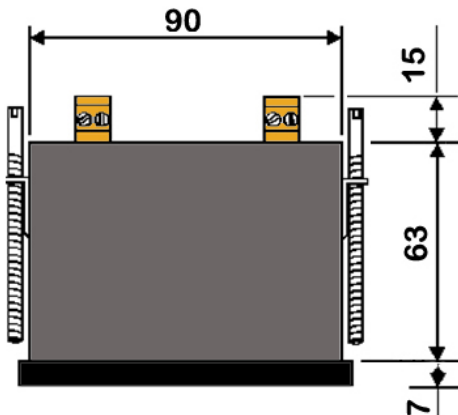
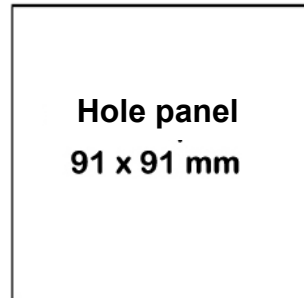
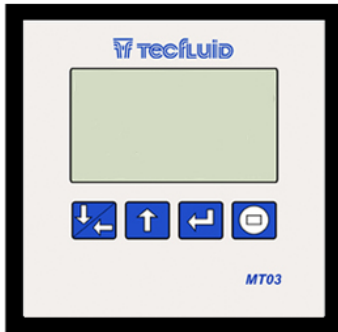
Conforms to Electromagnetic compatibility Directive 2004/108/CE

Conforms to Waste Electrical and Electronic Equipment Directive 2002/96/CE



⁽¹⁾ Noryl and Lexan are trademarks of Saudi Basic Industries Corporation (SABIC).

18 DIMENSIONS



19 TROUBLESHOOTING

Problem	Probable cause	Solution
The flow rate is 0, the accumulated total counter and the totalizer do not increase their value	Incorrect input	Check that the input type programmed in the menu matches the connection made (see page 18)
	Filter too restrictive	Check that the frequency of the input signal is lower than that indicated in the programmed filter (see page 18)
	Cable disconnected	Connect the cable between the pulse transmitter and the MT03F
The flow rate displayed is 0	The flow rate is smaller than programmed as cut off	Decrease the value of the cut off (see page 22)
The display is blank	Blown fuse	Change the fuse
The analog output gives always 4 mA or 20 mA	Current output range not properly programmed	Program the range properly (see page 24)
The analog output gives always 0 mA	Cable disconnected	Check the cable connection

WARRANTY

Tecfluid S.A. guarantees all the products for a period of 24 months from their sale, against all faulty materials, manufacturing or performance. This warranty does not cover failures which might be imputed to misuse, use in an application different to that specified in the order, the result of service or modification carried out by personnel not authorized by Tecfluid S.A., wrong handling or accident.

This warranty is limited to cover the replacement or repair of the defective parts which have not damaged due to misuse, being excluded all responsibility due to any other damage or the effects of wear caused by the normal use of the devices.

Any consignment of devices for repair must observe a procedure which can be consulted in the website www.tecfluid.com, "After-Sales" section.

All materials sent to our factory must be correctly packaged, clean and completely exempt of any liquid, grease or toxic substances.

The devices sent for repair must enclose the corresponding form, which can be filled in via website from the same "After-Sales" section.

Warranty for repaired or replaced components applies 6 months from repair or replacement date. Anyway, the warranty period will last at least until the initial supply warranty period is over.

TRANSPORTATION

All consignments from the Buyer to the Seller's installations for their credit, repair or replacement must always be done at freight cost paid unless previous agreement.

The Seller will not accept any responsibility for possible damages caused on the devices during transportation.



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Quality Management System ISO 9001 certified by **Applus[®]**

Pressure Equipment Directive 97/23/CE certified by **Lloyd's Register**

ATEX European Directive 94/9/CE certified by



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The technical data described in this manual is subject to modification without notification if the technical innovations in the manufacturing processes so require.