ThermoFisher
SCIENTIFIC

GC accessories

GFM Pro Gas Flowmeter

Product manual

thermo scientific

Safety and special notices

Make sure you follow the precautionary statements presented in this guide.
Safety and other special notices appear in boxes.

Safety and special notices defined	
	**Warning** Indicates a potentially hazardous situation which, if not avoided, could result in damage to devices.
	**Caution** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Also used to identify a situation or practice that may seriously damage the devices, but will not cause injury.
	**Note** Indicates information of general interest.
	**Note** Calibration must be performed at the Thermo Fisher Scientific facility.

Contents

Introduction

Thermo Scientific™ GFM Pro Gas Flowmeter is specifically designed for use with gas chromatography (GC) systems. The probe is applied directly to the gas flow stream, and the measured flow rate is presented on the LCD screen. Units of flow are measured in mL/min.

This unit provides continuous real-time measurements of gas streams ranging from 0.50 mL/min to 500 mL/min. Because the technology uses volumetric flow measurement, the unit is compatible with all laboratory gases.

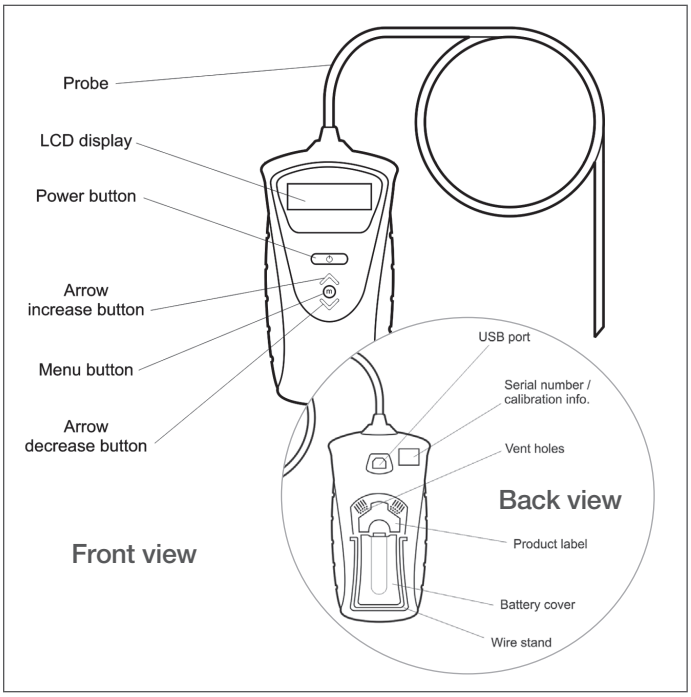


Figure 1. Product diagrams

Caution

- Do not exceed maximum operating flow rates. Recalibration may be required if the unit has been subjected to extreme flow rates.
- Always use appropriate laboratory safety practices when operating this device. Wear laboratory safety goggles when operating this unit.

Note

- **There are no serviceable parts in this unit. Opening the device–other than to change the batteries–or tampering with the internal parts will void the factory warranty.**
- To ensure accurate measurements and effective clearance of the flow gas from the unit, **do not** obstruct the vent holes on the back of the unit.
- Modifying the length of tubing can cause a shift in calibration.

Volumetric vs. mass flow measurements

The GFM Pro Gas Flowmeter is a volumetric flow measurement device. Volumetric flow is the measurement of the volume of gas through a conveyance per quantity of time. Standard units of measure for this parameter are given in mL/min. The advantage of measuring volumetric flow is its independence to the composition of the flow gas. It is not necessary to correct the flow values based on the gas composition, as is required for mass flow devices.

Mass flow measures the weight of the gas flowing through the instrument per quantity of time. Mass flow units of measure are commonly g/sec.

Bubble flowmeter measurements

If you employ bubble flowmeters in your laboratory, you may find they give slightly different flow rate values than the GFM Pro Gas Flowmeter. This error is due to technology limitations inherent in the bubble flowmeter device, error from variances in air humidity within the bubble chamber, and its direct contribution to the measured flow rate. In the event a bubble flowmeter is used to measure flow gas where the gas is at elevated temperatures, the error due to humidity contributions can be extreme. For the most accurate measurement of laboratory gas flow rates, we recommend using the GFM Pro Gas Flowmeter over bubble flowmeters.

Product specifications

Table 1. Specifications

Description	
Type of measurement	Volumetric flow
Accuracy of measurements	Accuracy of ± 2.00% of flow reading or ± 0.200 mL/min, whichever is greater
Power requirements	2 AA alkaline batteries 1.5 V DC each/3 V DC 200 ma
Operating flow range	0.50 to 500 mL/min
Operating temperature range	32°-120°F (0°- 48°C)
Available communication	USB type B data port
Warranty	One year (excludes recalibration)
Calibration	National Institute of Standards and Technology (NIST) traceable. Yearly recalibration is recommended
Certification/compliance	CE, Ex, Canadian ICES-003, WEEE, RoHS 2, China RoHS 2, UKCA. See Product label legend section.

Batteries

Installing the batteries

- This unit uses 2 AA alkaline batteries.
- To install batteries, extend the wire stand. Open the cover. Insert the batteries with the polarity (⊕ and ⊖) correctly aligned. Close the cover. (Figures 2 and 3.)

Precautions for battery replacement:

- Load the new batteries with their polarity (⊕ and ⊖) aligned correctly.
- **Do not use rechargeable batteries.**

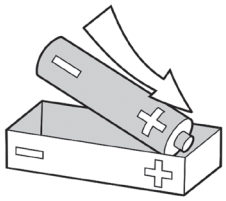


Figure 2. Extend the wire stand before opening battery door.

Figure 3. Insert the batteries as marked.

Battery charge indicator

- The unit includes a battery charge indicator. Replace batteries as needed.

Battery lifetime

- The battery lifetime is dependent on the number of options the user has enabled.
- The unit is shipped with the most energy-demanding options disabled (Table 2).
- The power saving functions can be changed. See GFM Pro Gas Flowmeter menu structure section.

Table 2. Default settings for the GFM Pro Gas Flowmeter

Description	
Auto shutoff duration	6 minutes
LCD backlight	0 (off)
USB port	Disabled

Note

- Store your GFM Pro Gas Flowmeter in its protective storage case following use.
- Do not store this manual or any other items on top of the GFM Pro Gas Flowmeter or the unit may turn on when the storage case lid is closed.

Operating instructions

Caution

- Do not exceed maximum operating flow rates.
- Recalibration may be required if the unit has been subjected to extreme flow rates.

Connect the white probe end tip to the output of the gas flow line to be measured. Be sure the probe tip connection is completely sealed around the flow source outlet and is free of leaks (Figure 4). (White tubing ID 0.125"; OD 0.250")

Figure 4. Probe connected to a GC gas outlet.

Press and hold the ⏻ (Power) button until the unit responds with a regular clicking sound. The GFM Pro Flowmeter will immediately begin to provide flow measurements (Figure 5). Wait for the measured values to stabilize. It takes a few seconds for the unit to reach a steady state with the gas flow line.

To power down the unit, press and hold the ⏻ (Power) button until the unit stops clicking.

The unit is equipped with a timed auto shutoff option. (Default: 6 minutes.)

Figure 5. LED displays the measured flow value.

Interpreting results

The unit has an operating range of 0.50 mL/min to 500 mL/min (Figure 7). If the flow is less than 0.50 mL/min, the display will read “under range”.

If the flow exceeds 515 mL/min, the display will read “over range”. Excessively high flow rates may damage this unit.

Note

- Units of mL/min are equivalent to cc/min.

Figure 6. Example flow value.

Flow range display

The unit automatically adjusts the resolution of the display depending on the flow range being measured. Table 3 shows the resolution of the flow ranges.

Table 3. Display resolution vs. flow range

Flow range	Display resolution (mL/min)
0.50 – 9.99	0.01
10.0 – 99.9	0.1
100 – 500	1

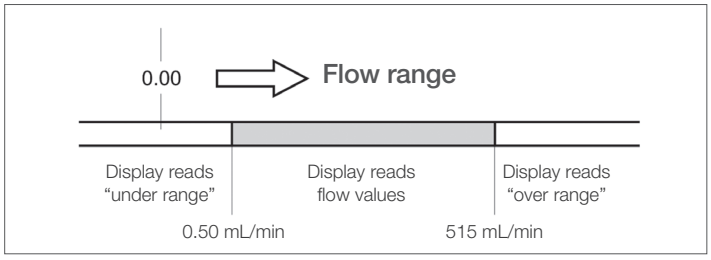


Figure 7. Description of flow ranges.

Data collection on the PC

Warning

- Only connect USB cable to USB port while unit is off.

The GFM Pro Gas Flowmeter provides you with a data stream of real-time flow values via the USB port (Figure 1). In order to use this feature, you must first install the appropriate **FTDI Virtual Com Port (VCP) Driver.**

The VCP driver will cause the GFM Pro Gas Flowmeter to appear as a standard RS-232 port. This will work on any operating system for which there is an FTDI VCP driver. After installing the driver, connecting the device, and determining which port it creates, you can access the data stream through any programmatic means, or by using any serial terminal software.

For Windows systems

To determine which port the GFM Pro Gas Flowmeter is using, go to the Control Panel and open System. Go to the Hardware tab and click the Device Manager button. Expand the Ports (COM & LPT) entry. Make sure the VCP driver is installed and then connect a powered GFM Pro Gas Flowmeter to the USB port. You will see the new COM port appear. Open your serial terminal.

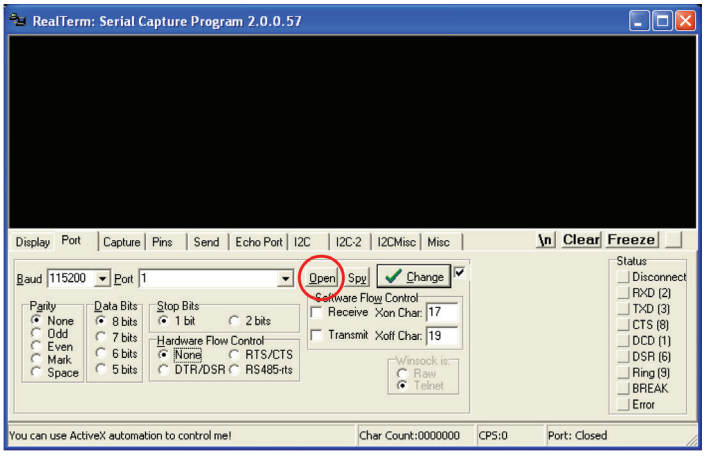


Figure 8. Screen capture of data collection.

If you do not already have serial terminal software, free, open-source options are available online (i.e., RealTerm, etc.). You can download **RealTerm software**.*

After installation, click the Port tab and set the following:

Table 4. Port tab setup

Description	
Baud	115200
Port	The appropriate VCP for your GFM Pro Gas Flowmeter
Parity	None
Data bits	8 bits
Stop bits	1 bit
Flow control	None

Go to the USB menu entry in the GFM Pro flowmeter and turn the transmission on. Finally, click **Open** on the Port tab in RealTerm and you will see the serial data stream begin in the terminal window (Figure 8).

If you would like to log the flow data, this can be done by clicking on the Capture tab. Set File to the name and location of the log file that you would like to save and click either the **Start: Overwrite** or **Start: Append** buttons appropriately (Figure 9).

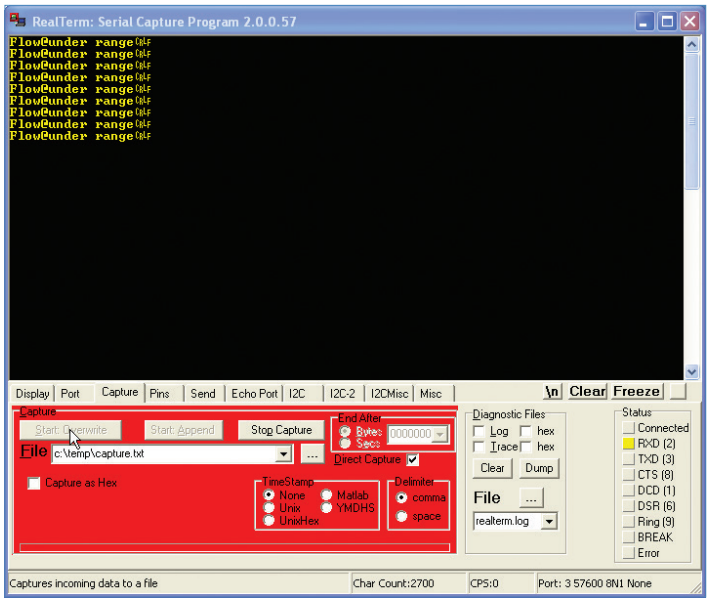


Figure 9. Screen capture of data collection.

*This software is not supplied or supported by Thermo Fisher Scientific. User assumes all responsibility for the downloading and use of the program.

GFM Pro Gas Flowmeter menu structure

Unit power up/power down

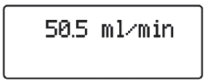
Press the ⏻ (Power) button.

The LCD screen will display the device intro screen:

Followed by calibrated date:

01/10/2025

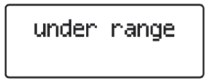
Followed by measured flow data:



To power off, press and hold the ⏻ (Power) button:

Other messages encountered at power up

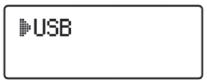
If the unit is hooked up to a flow stream with a flow rate less than 0.50 mL/min, the unit will report an “under range” status for the flow. This message will appear until the flow rate reaches 0.50 mL/min.



USB activation

To enable the USB, press the MENU (Menu) button.

Use the ⌃⌄ (arrow) keys to select the USB menu:



Press the MENU (Menu) button again to enter the value select screen.

Use the ⌃⌄ (arrow) keys to toggle between USB “on” and “off”.

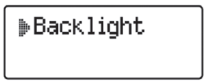
To return to the main menu screen, press the MENU (Menu) button.

To exit and return to measuring flow, press the MENU (Menu) button again.

Adjust LCD image backlight

Press the MENU (Menu) button.

Use the ⌃⌄ (arrow) keys to select the Backlight menu:



Press the MENU (Menu) button again to enter the value select screen.

Use the ⌃⌄ (arrow) keys to select the backlight value.

Backlight Values: 0 (off) and 5 (maximum).

To return to the main menu screen, press the MENU (Menu) button.

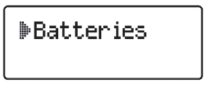
To exit and return to measuring flow, press the MENU (Menu) button again.

GFM Pro Gas Flowmeter menu structure (continued)

Show battery charge indicator

Press the (MENU) (Menu) button.

Use the (arrow) keys to select the Batteries menu:



Press the (MENU) (Menu) button again.

The battery life is displayed.

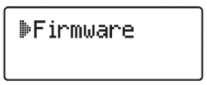
To return to the main menu screen, press the (MENU) (Menu) button.

To exit and return to measuring flow, press the (MENU) (Menu) button again.

Firmware version information

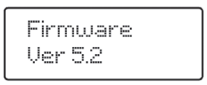
Press the (MENU) (Menu) button.

Use the (arrow) keys to select the Firmware menu:



Press the (MENU) (Menu) button again.

The most recent version of Firmware is displayed.



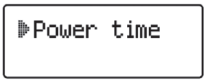
To return to the main menu screen, press the (MENU) (Menu) button.

To exit and return to measuring flow, press the (MENU) (Menu) button again.

Adjust auto shutoff duration

To conserve battery life, the unit automatically turns off after 6 minutes.
To customize the auto shutoff setting, press the (MENU) (Menu) button.

Use the (arrow) keys to select the Power Time menu:



Press the (MENU) (Menu) button again to enter the value select screen.

Use the (arrow) keys to select the auto shutoff setting.

Values: 1–59 minutes or “constant on” (max.)

To return to the main menu screen, press the (MENU) (Menu) button.

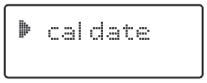
To exit and return to measuring flow, press the (MENU) (Menu) button again.

GFM Pro Gas Flowmeter menu structure (continued)

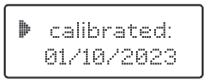
Calibration date

To display the calibration date, press the (MENU) (Menu) button.

Use the (arrow) keys to select the Cal Date menu:



Press the (MENU) (Menu) button again to display the calibration date.



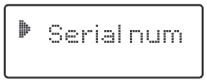
To return to the main menu screen, press the (MENU) (Menu) button.

To exit and return to measuring flow, press the (MENU) (Menu) button again.

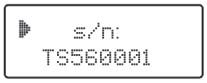
Serial number

To display the GFM Pro flowmeter serial number, press the (MENU) (Menu) button.

Use the (arrow) keys to select the Serial Num menu:



Press the (MENU) (Menu) button again to display the serial number.



To return to the main menu screen, press the (MENU) (Menu) button.

To exit and return to measuring flow, press the (MENU) (Menu) button again.

Troubleshooting

Table 5. Troubleshooting

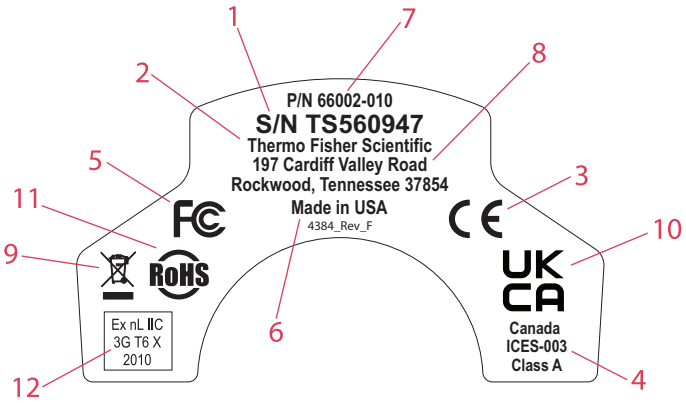
Problem	Possible cause(s)	Suggested solution(s)
Multiple readings are not giving reproducible results	Unit is out of calibration	Return the unit to Thermo Fisher Scientific for recalibration*
	Value is being compared to a bubble flowmeter	See ‘Bubble flowmeter measurements’ section for a discussion of the weaknesses of bubble flowmeters
Unit does not power up	Dead batteries	Replace with 2 new AA alkaline batteries
Flow value display is erratic/jumpy	The GFM Pro Gas Flowmeter is very sensitive to small changes in flow	Allow more time for flow to stabilize
Display showing under range	No flow or flow below 0.5 mL/min applied to the flowmeter	Check that the correct flow below 500 mL/min and above 0.5 mL/min are established before applying the flowmeter
	Batteries have low power	Check the battery level following the instructionsin the ‘Show battery charge indicator’ section
		Charge indicator section and/or change the batteries
Display constantly cycling through the startup sequence	Batteries have low power	Check the battery level following the instructions in the ‘Show battery charge indicator’ section
		Charge indicator section and/or change the batteries

*Contact Thermo Fisher Scientific or your local representative for return instructions for servicing a damaged unit. Additional charges may apply if the warranty has expired, or the unit is damaged due to misuse.

Product label legend

Table 6. Label legend

#		Description
1		Serial number
2		Company name
3		This unit conforms to EU/EMC Directive 2004/108/EC; standards to which conformity is declared include 61326:1997 w/A3 Class A.
4		This Class A digital apparatus complies with Canadian ICES-003.
5		This complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
6		Country of origin
7		Product catalog number
8		Company address
9		This unit is WEEE compliant
10		This unit is UKCA compliant
11		This unit is RoHS 2 and China RoHS 2 compliant
12	**Ex nL**	EN60079-0: 2006; Electrical apparatus for explosive gas atmospheres- Part 0: General requirements. EN60079-15: 2005; Electrical apparatus for explosive gas atmospheres- Part 15: Construction, test and marking of type of protection “nL” energy limited apparatus.
	IIC	Group II applies to areas above ground environment.
	3G	Category 3 relating to gas analysis; normal safety measure. Sufficient safety during normal operation. Normal operation described as measuring flows of flammable or explosive gases in a nonflammable environment.
	T6	During testing neither internal nor external elements exceed 85 °C
	X	Operating range: 32 °F ≤ Tamb ≤ 120 °F 0 °C ≤ Tamb ≤ 48 °C Not intended for outdoor use or wet locations
	2010	Year of product design release.



Calibration and service

The Thermo Scientific GFM Pro Gas Flowmeter comes factory calibrated and carries a one-year warranty (excluding recalibration) from time of purchase. All units are calibrated to NIST traceable standards.

Recommended schedule for recalibration is once every year from time of purchase. Customers will need to return the unit to Thermo Fisher Scientific for recalibration. At that time, preventative maintenance services can also be performed. A fee will be charged for recalibration and servicing of the unit. Prolonged failure to recalibrate the instrument may result in increased error.

Ordering information

Description	Quantity	Cat. no.
Thermo Scientific™ GLD Pro Gas Leak Detector	Each	66002-004
Thermo Scientific™ GFM Pro Gas Flowmeter	Each	66002-010
Thermo Scientific™ Soft-Sided Carry Case	Each	66002-002
Thermo Scientific™ GFM Pro Gas Flowmeter Re-Calibration	Each	66002-GFMCAL
Thermo Scientific™ GFM Pro Gas Flowmeter Re-Calibration (Europe)	Each	66002-GFMCAL-EU

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