

Operations Manual

GF500

PN: Z-CSL-100-580
Version 2.0

Digital Gas Flowmeter



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CE Compliance

Marking with the symbol CE indicates compliance of this product system to the following European directives;

89/336/EEC Electromagnetic Compatibility Directive (EMC)

73/23/EEC Electrical equipment designed for use within certain voltage limits. Low Voltage Directive

Declaration of Conformity according to ISO/IEC Guide 22 and EN 45014.

Carl Stuart Ltd T/A Lab Unlimited hereby declares that the GF500 Digital Gas Flowmeter conforms with the following standards and documents.

Safety	EN 61010-1 1993 Part 1	General Requirements
EMC	EN 50082-1 Part 1	Generic Immunity
	IEC 801 Part 2	Immunity to Electrostatic Discharge
	IEC 801 Part 3	Immunity to Radiated Fields
	IEC 801 Part 4	Immunity to Conducted Transients
	EN 55022	Class B Radio Frequency Emission

Supplementary Information: The document relating to this declaration is on file. The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/3.

Safety

Safety Warning

If the instrument is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The safety statements in this manual comply with the requirements of the UK Health and Safety at Work Act 1974.

You must read this section to ensure the safe operation of your instrument.

The instrument is designed to be used by properly trained personnel and a level of knowledge is assumed.

You should adhere to the standard safety conditions in your laboratory, in addition to the advice given in this manual. For the correct and safe use of this instrument it is essential that operating personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

Compressed gases present a hazard. Ensure that the requirements for positioning and use of gas cylinders are met. Use copper tubing for connecting gas supplies and make sure that all connections are gas tight. Test regularly for gas leaks. Ensure that all exits from the system are piped to a fume cupboard.

Hydrogen Warning

Hydrogen is explosive. Do not use hydrogen unless the application makes it essential. If you must use hydrogen, follow the safety information supplied by your gas supplier and use an in-line flow limiter.

Repairing or Modifying a GF500 Gas Flowmeter

Never attempt to repair or modify a GF500 Gas Flowmeter yourself. Disassembling a GF500 Gas Flowmeter may cause damage that is not covered under the warranty. The GF500 Gas Flowmeter does not contain any user-serviceable parts. Service should only be provided by Lab Unlimited or an Lab Unlimited authorised distributor.

Flowmeter Inlet and Outlet pipes

Excessive force should not be applied to the inlet or outlet pipes as this could cause them to become disconnected from the flow sensor. Damage of this type is not covered under warranty.

Flow Sensor

Do not blow into the GF500 Gas Flowmeter this can damage the flow sensor and alter the calibration. Damage to flow sensors caused by this are not covered under warranty.

Battery Replacement

The rechargeable battery in a GF500 Gas Flowmeter should be replaced only by Lab Unlimited.

Charging the GF500 Gas Flowmeter

The flowmeter should only be charged with a rating of 5 V 300 mA DC max.

Storing the GF500 Gas Flowmeter

Store the GF500 Gas Flowmeter in a place where the environment is non-condensing and the temperature is between -20° and 45°C (-4° to 113°F).

Disposal and Recycling

Your GF500 Gas Flowmeter must be disposed of properly according to local laws and regulations. Because it contains a battery, the GF500 Gas Flowmeter must be disposed of separately from household waste. When your GF500 Gas Flowmeter reaches its end of life, contact Lab Unlimited to find out about recycling and disposal options.

Overview



The solid-state flowmeter measures the flow of gases using a fully solid-state sensor, monitored by a microprocessor controlled system.

The flowmeter can display the flow rate of up to eight gases. In addition, it can measure and display a second flow (the split flow), comparing this with the first flow and displaying the ratio of the two. This is particularly useful for measuring split flows in capillary chromatography.

A further feature enables the velocity of the gas in the column to be calculated from the internal diameter and the flow rate so that the user can establish optimal flow conditions for the column in use.



Mass Flow

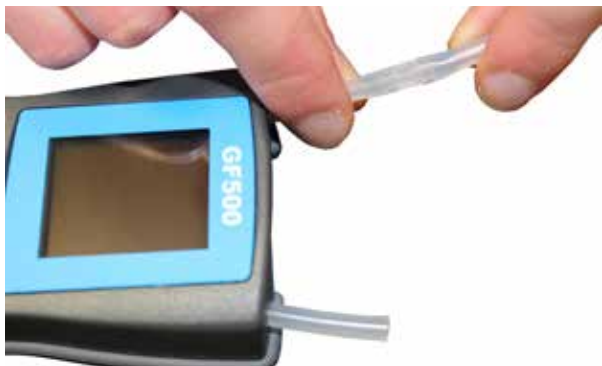
The GF500 Gas Flowmeter uses a Mass Flow Sensor, this measures the mass of the gas flowing through it, this is then converted to give a volumetric reading.

In order for this calculation to be accurate the density of the gas must be known. This is why the correct gas must be selected when measuring flows.

It is also important to ensure the correct temperature and pressure are set in the flowmeter as gas density can vary with changes in either.

Gas Inlet Line Connector

A connector is Supplied to allow different lengths of tubing to be attached to the inlet of the GF500 Gas Flowmeter. When removing an additional length of pipe care must be taken to firmly hold the length of tubing attached to the flowmeter to prevent excessive strain on the internal connection to the flow sensor.



Operating Instructions

Turning on the Flowmeter

To turn on the Flowmeter press



The Flowmeter will then start in standard flow mode.



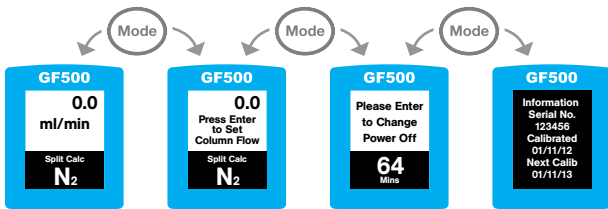
Turning off the Flowmeter

To turn off the Flowmeter
Press and hold for 2 seconds



Changing Modes

To cycle through the various modes (Flow Measurement Mode, Split Calculation Mode, Settings Mode and Information Mode) press the mode button as shown below.



Flow Measurement Mode

When in flow measurement mode, connect the measuring tube from the flowmeter to the gas flow you wish to measure.



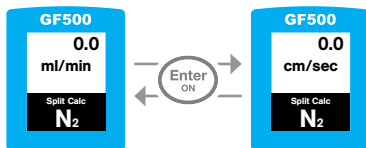
The current flow will be displayed on screen as shown below.



To ensure an accurate reading make sure that the gas displayed on the screen, matches the gas you are measuring. You can cycle through the different gases by pressing



You are able to switch between ml/min and cm/sec by pressing the Enter button as shown below



When in cm/sec to ensure an accurate reading please ensure you have the correct column size selected in the options mode (See Page 14)

Split Measurement Mode

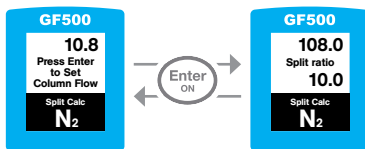
When in split flow mode you will initially see the following screen.



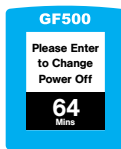
Whilst on this screen, you can measure the column flow as you would in flow measurement mode. Once you have a reading for the column flow, you can store this by pressing



Now measure the split flow. The screen will have changed to show live values for the split flow and split ratio. At any point you can return to the previous screen to reset the column flow by pressing enter.



Options Mode



Options mode allows the user to change a number of settings for the flowmeter. The different settings can be scrolled through by pressing



Each setting can be changed by scrolling through the options by pressing



Settings Available

Power Off Time

Changes the time the flowmeter will remain on before automatically powering off.

Column Diameter

Allows the user to set the diameter of column they are using. This is used to calculate the column velocity in flow measurement mode.

Units

Allows the user to set the units used to set the temperature and pressure.

Temperature

Allows the user to set the ambient temperature. This helps ensure accurate flow measurement.

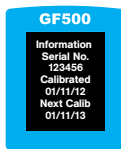
Pressure

Allows the user to set the ambient pressure. This helps ensure accurate flow measurement.

Screen Brightness

Allows the user to change the brightness of the display. Lowering the brightness can increase battery life.

Information Mode



Information mode displays the serial number, date calibrated and date the next calibration is due.

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Low Power and Charging the Flowmeter

When the Flowmeter battery gets too low to operate, the flowmeter will display a low battery message and then turn off after a few seconds. The Flowmeter can be charged using either the supplied charger or by connecting the Flowmeter to a computer with a micro USB cable.

When turned on and charging, the flowmeter will display a battery symbol on the screen this will disappear when the battery is fully charged.

Maintenance

Provided that the cautions shown in the safety section are followed, the unit is maintenance free.

Cleaning

The case may be cleaned with a damp cloth.

Calibration

It is recommended that the instrument is re-calibrated every 12 months.

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Technical Specification

Size	68 x 130 x 30 mm
Weight	150g
Range	0-500 ml/min (0-300 ml/min CO ₂)
Accuracy	0.4 ml/min or $\pm 2.5\%$ of the reading (Whichever is greater)
Resolution	0.1 ml/min
Gases	N ₂ , Air, He, H ₂ , CO ₂ , O ₂ , Ar, CH ₄ /Ar
Operating Temp.	15 - 35°C
Calibration Temp.	21 \pm 2°C
Inlet Pressure	Maximum 175 kpa, 25 psi
Auto Power Off	1, 2, 4, 8, 16, 32, 64 or 128 minutes
Column Diameter	100, 180, 200, 250, 320, 450, 530, 750 μ m

Notes

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