

# GM70

Hand-held Carbon Dioxide Meter



Versatile CO<sub>2</sub> Meter for Professional Use

# GM70 CO<sub>2</sub> Meter For Spot Measurements

The **Vaisala GM70 Hand-held Carbon Dioxide Meter** is a versatile meter for measuring carbon dioxide gas concentration.



**Wide selection of measurement ranges**

**Compact, small and light**

**Short warm-up time**

**Data-logging and transferring capabilities**

*Due to advanced silicon-based CARBOCAP® technology, the GM70 Hand-held Carbon Dioxide Meter offers superior long-term stability and fast measurement. It is suitable for demanding spot measurements in laboratories, greenhouses and mushroom farms.*

The GM70 Hand-held Carbon Dioxide Meter incorporates Vaisala's CARBOCAP® technology, which enables stable and reliable measurement. GM70 has a versatile menu based user interface, a clear graphical backlit LCD display and a data-logger function. GM70 is configurable and it has a wide selection of measurement ranges, from low

concentrations up to 20% of CO<sub>2</sub>.

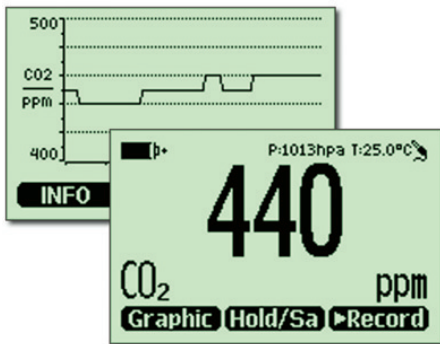
Due to its short warm-up time, GM70 is ideal for spot-checking measurements. The meter can also be used as a tool for checking Vaisala's fixed GM20 and GM220 Series CO<sub>2</sub> transmitters. In addition, the GM220 Series transmitters can be

adjusted by using GM70. Optional, ready-to-use Windows® software provides an easy way to handle measurement data in the PC environment.

A built-in power saving feature extends battery operation time during data-logging, making it possible to collect CO<sub>2</sub> data at locations without main power.

### Flexible measurement Interchangeable probes

The GM70 Meter uses the same interchangeable probes as Vaisala's GM220 Series industrial transmitters. By plugging different probes into the GMH70 Handle the user can easily change the measurement range from low concentrations to high concentrations. This feature makes GM70 extremely suitable for various CO<sub>2</sub> measurement applications.



*GM70 displays CO<sub>2</sub> concentration both numerically and graphically.*

### One or two probes

GM70 can be used with one probe or two probes. One probe can be used for normal spot checking. Two probes allow differences to be measured. GM70 with two probes can be also used for calibration by checking probes against a calibrated probe.

### Both numerical and graphical measurement data

The GM70 Meter displays carbon dioxide concentration as both parts per million (ppm) and percentage (%). Measurement data can be displayed either

numerically or graphically in the LCD display. One key press changes the readout to a real time graphics display.

The HOLD/SAVE function enables the user to freeze a reading and save it in the meter's memory. Graphic history displays the data trend from the time the meter is turned on. In addition, the graph is easily scalable in the display.

### User friendly meter

The GM70 Hand-held Carbon Dioxide Meter has an easy-to-use user interface. The default shortcut keys refer to the functions GRAPHIC, HOLD/SAVE and RECORD. If desired, the functions behind the shortcut keys can easily be changed by the user.

### Data-logging and data transferring capability

The GM70 Meter can also be used to log measurement data in the field. Depending on the settings, GM70 can log data in a power saving mode. The logged data can be transferred to a Windows® based PC with the optional MI70 Link software.

### Lightweight construction

Due to its small size and rugged construction, GM70 is extremely suitable for demanding applications.

*The GM70 Meter consists of MI70 Indicator, GMH70 Handle and GMP221/2 Probe.*



# Easy Measurement in the Field

## Long-term stability

The CARBOCAP® based IR sensor in GM70 provides for excellent reliability and long-term stability. With a two year recommended calibration interval, GM70 is practically maintenance free. Both the indicator and the probes can be sent to Vaisala Service for calibration.

## Various applications

### Spot-checking instrument

Due to its short warm-up time GM70 is ready for use almost immediately. This feature makes the meter suitable and convenient to use for various spot-checking applications.

Typical applications for GM70 include laboratories, greenhouses and mushroom farms. GM70 can also be used in HVAC applications and industrial health investigations.

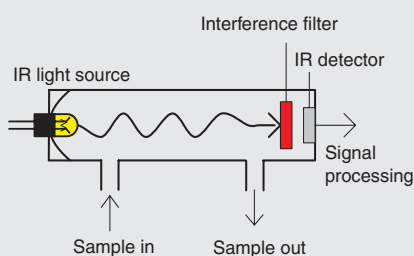
### Calibration and adjustment of fixed CO<sub>2</sub> instruments

GM70 can be used for checking the calibration of Vaisala's GM20 and GM220 Series fixed CO<sub>2</sub> transmitters. The interchangeable probes of the GM220 Series can also be adjusted by using the GM70 Meter.



*Vaisala's GM70 (left) and GM220 Series (right) both feature interchangeable probes. As a result, GM70 can be used to adjust the GM220 series probes in the field.*

## Superior Stability due to CARBOCAP Technology



*The operating principle of CARBOCAP® Sensor.*

The microprocessor based GM70 incorporates Vaisala's patented CARBOCAP® Sensor, a Single-Beam, Dual-Wavelength NDIR sensor featuring a solid-state tunable interference filter.

### No mechanical wearing

Since the tunable interference filter is made by silicon micro-

machining, all parts prone to mechanical wear have been eliminated. This overcomes many of the problems frequently encountered in other types of Single-Beam, Dual-Wavelength sensors.

Light from the infrared source enters the sample cell, where any CO<sub>2</sub> gas present absorbs part of the infrared light at its characteristic wavelength. The interference filter is electrically tuned so that its pass band coincides with the absorption wavelength of CO<sub>2</sub>. The detector measures the strength of the signal that gets through. After this the pass band of the filter is

shifted to a wavelength where no absorption occurs. This provides the reference signal. The CO<sub>2</sub> concentration of the sample is then derived from the ratio of the two signals.

### No sensor aging

CARBOCAP® Sensors have excellent stability because the effects of sensor aging are eliminated. CARBOCAP® uses one light beam, sample cell, and detector for both the CO<sub>2</sub> measurement and the reference measurement. This unifies the measurement environment and further adds to the sensors' stability, both in terms of time and temperature.

# Technical Information

## GMH70 Handle with GMP220 Series CO<sub>2</sub> Measurement Probe

### Measured Variables

#### CO<sub>2</sub> volume concentration (% or ppm)

Measurement range	
High concentrations short probe (GMP221)	0...2%CO <sub>2</sub> 0...3%CO <sub>2</sub> 0...5%CO <sub>2</sub> 0...10%CO <sub>2</sub> 0...20%CO <sub>2</sub>
Low concentrations long probe (GMP222)	0...2000 ppm CO <sub>2</sub> 0...3000 ppm CO <sub>2</sub> 0...5000 ppm CO <sub>2</sub> 0...7000 ppm CO <sub>2</sub> 0...10 000 ppm CO <sub>2</sub>
Error at 25 °C against certified factory references (incl. repeatability and calibration uncertainty)	
GMP221	<±[0.02 %CO <sub>2</sub> + 2% of reading]
GMP222	<±[20 ppm CO <sub>2</sub> + 2% of reading]
Non-linearity	<±0.5% of FS
Temperature dependence (typical)	0.1% of FS/°C (excluding the ideal gas law effect)
Pressure dependence (typical)	0.15% of reading/hPa (excluding the ideal gas law effect)
Long-term instability	<±0.5% of FS/2 years
Response time (63%)	
GMP221	20 seconds
GMP222	30 seconds

#### Measurement environment

Temperature	-20...+60 °C
Relative humidity	0...100%RH non-condensing
Operation pressure	700...1300 hPa
Flow range	0...10 m/s

#### Probe general

Sensor	CARBOCAP®
Housing material	
GMP221/2	PC plastic
GMH70	ABS/PC blend
Housing classification	IP65 (NEMA4)
Storage temperature	-30...+70 °C
Storage humidity	0..100%RH non condensing
Weight	230 g

## MI70 Measurement Indicator

### Indicator general

Menu languages	English, German, French, Finnish and Spanish
Display	LCD with backlight Graphic trend display of chosen parameter Character height up to 16 mm
Probe inputs	1 or 2
Power supply	Rechargeable NIMH battery pack with AC-POWER or 4xAA size alkalines, type IEC LR6
Analog output	0...1 VDC
Output resolution	0.6 mV
Data interface	RS232C
Data-logging capacity	up to 2700 time stamped points
Alarm	Audible alarm function
Operating temperature range	-10 ... +40 °C
Operating humidity range	non-condensing
Housing material	ABS/PC blend
Housing classification	IP54
Weight	400 g

### Battery operation time

Continuous use	better than 8 h at +20 °C
Datalogging use	up to 30 days

### Electromagnetic Compatibility

Complies with the following standard:  
EN 61326-1:1997 + Am1:1998, Electrical equipment for measurement, control and laboratory use - EMC requirements - Generic Environment.

### Accessories

Analog output cable for 0..1 VDC analog output	ordering no: 27168ZZ
Windows® software	MI70 Link software with RS cable ordering no: MI70LINK
Field-check adapter	ordering no: 26150GM
Carrying case	MI70CASE
Other measurement ranges	Interchangeable probes. Please use separate order form to define measurement range.

Specifications subject to change without prior notice.  
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# Dimensions

Dimensions in mm (inches).



**MI70 Indicator**



**GMH70 Handle +  
GMP221/2 Probe**

cable length 2 000 (78.74)

## MI70 Indicator - multiple probe options

The MI70 Indicator is a general indicator with multiple probe options. Changing the probe enables the measurement of several different parameters.

Please ask for further information about other probe options for the MI70 Indicator from Your local Vaisala dealer.