

GMW90 Series Carbon Dioxide, Humidity, and Temperature Transmitters for DCV



Features

- Measured parameters: carbon dioxide, temperature, and humidity (optional)
- Superior long-term stability with the next generation Vaisala CARBOCAP® sensor
- Accurate temperature and humidity measurements due to the low-power microglow infrared source
- Quick and easy installation and maintenance
- Calibrated, user-exchangeable measurement modules
- 3-point traceable CO₂ calibration (certification included)
- Both analog and digital communication (BACnet®/Modbus®)

GMW90 Series Carbon Dioxide, Temperature and Humidity Transmitters for HVAC are available with either a display opening or a solid front. An optional traffic light indication can also be selected.

GMW90 Series CARBOCAP® Carbon Dioxide, Temperature, and Humidity Transmitters are based on new measurement technology for improved reliability and stability. With the new technology the transmitter's inspection interval is extended to five years. Designed for demand controlled ventilation, these transmitters measure carbon dioxide and temperature, with the option for humidity measurements. The instruments come with a calibration certificate that meets traceability and compliance requirements.

Reliability from Unique Measurement Technology

GMW90 series transmitters use advanced Micro-Electro-Mechanical System (MEMS) technology for measuring carbon dioxide. The CARBOCAP® carbon dioxide

sensor's continuous reference measurement enables reliable and accurate readings and outstanding long-term stability also in buildings with round-the-clock occupancy.

The new generation CARBOCAP® sensor no longer uses an incandescent light bulb, which limits sensor lifetime. This unique sensor consumes very little power compared to other sensors on the market. As a result, instrument self-heating is low and humidity and temperature can be measured correctly.

Convenient Installation

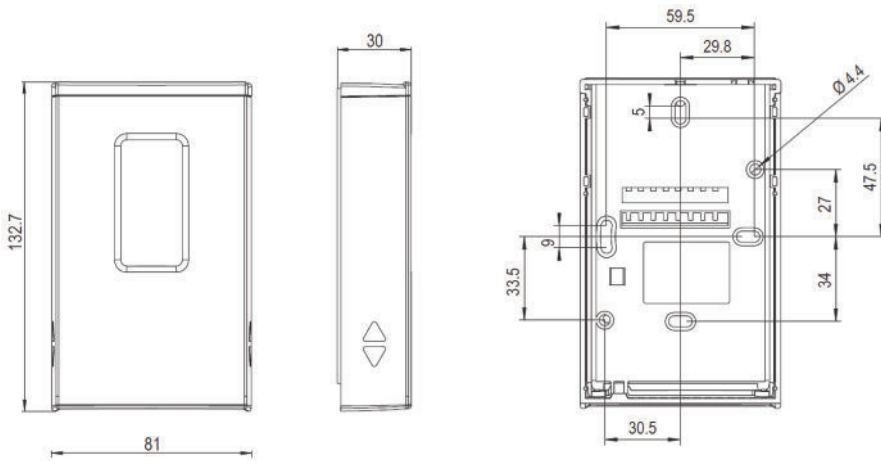
GMW90 series transmitters have been designed for quick and easy installation and maintenance. Every model includes a display for easy startup and convenient maintenance. To protect the sensor from dust and dirt during construction and installation, the units can be cabled with

back-plate only. Electronics can be snapped on later at an appropriate phase in the construction project. DIP switches make it quick and easy to configure the transmitters.

Easy Calibration

Regular instrument maintenance guarantees a long product lifetime. Calibration is easiest done with the exchangeable measurement modules. Sensor traceability and measurement quality is easily maintained by snapping on a new module calibrated at Vaisala factory. The instrument can also be calibrated using a hand-held meter or reference gas CO₂ bottle. The service interfaces are easy to reach by simply sliding the cover down. The closed cover keeps the measurement environment stable during calibration and ensures a top-quality final result.

Technical Data



Dimensions in mm

Models

Model	Measurements	Output
GMW93	CO ₂ +T	3-wire, voltage output
GMW93D	CO ₂ +T	3-wire, voltage output with display
GMW94	CO ₂ +T	3-wire, current output
GMW94D	CO ₂ +T	3-wire, current output with display
GMW93R	CO ₂ +T+RH	3-wire, voltage output
GMW93RD	CO ₂ +T+RH	3-wire, voltage output with display
GMW93RA	CO ₂ +T+RH	3-wire, voltage output with display and CO ₂ indicator LEDs
GMW94R	CO ₂ +T+RH	3-wire, current output
GMW94RD	CO ₂ +T+RH	3-wire, current output with display
GMW95	CO ₂ +T	Digital (BACnet/Modbus) model
GMW95D	CO ₂ +T	Digital (BACnet/Modbus) model with display
GMW95R	CO ₂ +T+RH	Digital (BACnet/Modbus) model
GMW95RD	CO ₂ +T+RH	Digital (BACnet/Modbus) model with display
GMW90	CO ₂ +T	Configurable analog/digital models
GMW90R	CO ₂ +T+RH	Configurable analog/digital models

Technical Data

Measurement Performance

Carbon Dioxide

Measurement range	0 ... 5000 ppm
Stability in typical HVAC applications	Total accuracy at room temperature ±75 ppm at 600 and 1000 ppm incl. 5 years drift
Carbon dioxide sensor	Vaisala CARBOCAP® GM10
Accuracy:	
+20 ... +30 °C (+68 ... +86 °F)	±(30 ppm + 2 % of reading)
+10 ... +20 °C, +30 ... +40 °C (+50 ... +68 °F, +86 ... +104 °F)	±(35 ppm + 2.7 % of reading)
-5 ... +10 °C, +40 ... +55 °C (+23 ... +50 °F, +104 ... +131 °F)	±(45 ppm + 3.8 % of reading)

Temperature

Measurement range	-5 ... +55 °C (+23 ... +131 °F)
Temperature sensor	Digital temperature sensor
Accuracy:	
+20 ... +30 °C (+68 ... +86 °F)	±0.5 °C (±0.9 °F)
+10 ... +20 °C, +30 ... +40 °C (+50 ... +68 °F, +86 ... +104 °F)	±0.6 °C (±1.08 °F)
-5 ... +10 °C, +40 ... +55 °C (+23 ... +50 °F, +104 ... +131 °F)	±0.8 °C (±1.44 °F)

Relative Humidity

Measurement range	0 ... 95 %RH
Stability in typical HVAC applications	±0.5 %RH/year
Humidity sensor	Vaisala HUMICAP® 180R
Accuracy at temperature range +10 ... +40 °C (+50 ... +104 °F):	
0 ... 60 %RH	±2.5 %RH
60 ... 80 %RH	±3.0 %RH
80 ... 95 %RH	±4.0 %RH
Accuracy at temperature range -5 ... +10 °C, +40 ... +55 °C (+23 ... +50 °F, +104 ... +131 °F):	
0 ... 60 %RH	±3.5 %RH
60 ... 80 %RH	±4.0 %RH
80 ... 95 %RH	±5.0 %RH

1) Complies with CEC-400-2008-001-CMF

Operating Environment

Operating temperature	-5 ... +55 °C (+23 ... +131 °F)
Storage temperature	-30 ... +60 °C (-22 ... +140 °F)
Operating humidity	0 ... 95 %RH Dew point < +30 °C (+86 °F)



Optional decorative cover blends the transmitter into your interior design.

Inputs and Outputs

Supply voltage	18 ... 35 VDC, 24 VAC ± 20% 50/60 Hz
Service port	RS-485 line for temporary service use

Current Output Models

Outputs	0/4 ... 20 mA, 2 and 3 channel models
Loop resistance	0 ... 600 Ω
Power consumption	< 2 W

Voltage Output Models

Outputs	0 ... 5/10 V, 2 and 3 channel models
Load resistance	10 kΩ min.
Power consumption	< 1 W

Default Analog Scales

CO ₂	0 ... 2000 ppm
T	-5 ... +55 °C
RH	0 ... 100 %RH

Digital Models

Power consumption	< 1.5 W
Output type	RS-485 (galvanic isolation, 1.5 kV)
RS-485 end of line termination	Enable with jumper, 120 Ω

Supported protocols (selectable by DIP switch):

BACnet® MS/TP (selectable Master/Slave)	Address range, master mode: 0 ... 127 Address range, slave mode: 128 ... 255
Modbus® RTU	Address range: 0 ... 247

Mechanical Specifications

Standard housing color	White (RAL9003)
Housing material	ABS/PC, UL-V0 approved
Output connector	Screw terminals Max. wire size 2 mm ² (AWG14)
Service port connector	4-pin M8
Weight	163 g (5.75 oz)

1) RAL code is only indicative with potential small variations in color shade

Spare Parts and Accessories

CO ₂ module	GM10SP
Temperature Module (CO ₂ +T models)	TM10SP
Humidity and Temperature Module (CO ₂ +T+RH models)	HTM10SP
Decorative cover set (10 pcs)	236285
Connection cable for MI70	219980
USB cable for PC connection	219690

Compliance

EMC compliance	EN61326-1, Industrial Environment
IP rating	IP30

VAISALA

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GMW80 Series Carbon Dioxide, Humidity, and Temperature Transmitters for DCV



Features

- Superior stability due to 2nd-generation proprietary CARBOCAP® technology
- Improved accuracy due to low self-heating of microglow light source

Vaisala CARBOCAP® Carbon Dioxide, Humidity and Temperature Transmitter Series GMW80 is based on 2nd-generation technology for improved reliability and stability.

GMW80 series transmitters are designed to fulfill the needs for CO₂ measurements in standard demand-controlled ventilation applications. Temperature measurement is always included in the GMW80 series transmitters. Combined with humidity measurement, relay, and LED CO₂ level indication, GMW80 series provides you the flexibility needed for a variety of projects.

The CARBOCAP sensors measure CO₂ accurately immediately when powered on. As they have a built-in reference measurement they do not need a lengthy learning phase before the measured values are correct. Proper operation can be verified immediately after snapping on the device cover.

Easy Installation

With modern buildings often having hundreds of sensors, installation time per unit can be a significant cost factor. Returning to the building site to check sensor operation adds further costs.

The GMW80 series transmitters include a number of subtle design features that have been introduced to make installation and commissioning quick and easy.

The pull-out tab makes opening the transmitter faster than before, while also doubling as a quality check slip and holder for the anti-tamper screw. The backplate can be twisted onto pre-mounted screws, and the wiring can be done easily on the clearly marked backplate. The electronics can be snapped on later when the building automation system is commissioned.

For measurements in more demanding conditions (for example, dusty or humid installation locations), the GMW88 model provides an IP64-rated enclosure with a cable gland.

Reliable Operation

The GMW80 series transmitters are optimized for low maintenance. The 2nd-generation, low-power CARBOCAP technology enables a longer lifetime and superior stability than ever before. As the power consumption is low, the heat generated by the electronics does not distort the temperature inside the sensor. The internal reference in the CO₂ sensor guarantees the best stability and operation even in constantly occupied buildings without frequent readjustments.

The reliable operation and accurate measurement values of the GMW80 series transmitters contribute to the significant cost savings brought by demand-controlled ventilation.

Benefits

- Cost-efficient, affordable
- Reliable and maintenance-free operation for up to 15 years
- Easy to install, easy to use
- Versatile – works well in buildings occupied 24/7
- Ideal for demand-controlled ventilation

Technical Data

Models

GMW86P	CO ₂	CO ₂ current and voltage output, Pt1000
GMW83RP ¹⁾	CO ₂ +RH+T	Voltage outputs, Pt1000
GMW83DRP ¹⁾	CO ₂ +RH+T	Voltage outputs, Pt1000, Display
GMW83	CO ₂	Voltage outputs
GMW83A	CO ₂	Voltage outputs, CO ₂ indicator LEDs
GMW83D	CO ₂	Voltage outputs, Display
GMW84	CO ₂	CO ₂ current output
GMW84S	CO ₂	CO ₂ current output, Relay
GMW88	CO ₂	CO ₂ current and voltage output

¹⁾ Models with calibration certificate available (GMW83RPC/GMW83DRPC)

Measurement Performance

Carbon Dioxide

Measurement range	0 ... 2000 ppm
Accuracy across temperature range	
+20 ... +30 °C (+68 ... +86 °F)	±(30 ppm +3 % of reading)
+10 ... +20 °C (+50 ... +68 °F), +30 ... +40 °C (+86 ... +104 °F)	±(35 ppm +3.7 % of reading)
+0 ... +10 °C (+32 ... +50 °F), +40 ... +50 °C (+104 ... +122 °F)	±(40 ppm +4.8 % of reading)
Stability in typical HVAC applications	±(15 ppm + 2 % of reading) over five years
Warm-up time	1 min 10 min for full specification
Response time (63 %)	60 s GMW88 model: 7 min
Carbon dioxide sensor	Vaisala CARBOCAP® GM10

Temperature

Measurement range	0 ... +50 °C (+32 ... +122 °F)
Temperature sensor	On P models: Pt1000 RTD Class F0.15 IEC 60751 For analog outputs: Digital temperature sensor
Accuracy (GMW83, GMW84)	
+10 ... +30 °C (+50 ... +86 °F)	±0.5 °C (0.9 °F)
+0 ... +10 °C (+32 ... +50 °F), +30 ... 50 °C (+86 ... +122 °F)	±1 °C (1.8 °F)

Humidity

Measurement range	0 ... 95 %RH
Accuracy for temperature range +10 ... +30 °C (+50 ... +86 °F)	
0 ... 80 %RH	±3 %RH
80 ... 95 %RH	±5 %RH
Accuracy for temperature ranges 0 ... +10 °C (+32 ... +50 °F), +30 ... +50 °C (+86 ... +122 °F)	
0 ... 95 %RH	±7 %RH
Stability in typical HVAC applications	±2 %RH over 2 years
Product lifetime	> 15 years

Operating Environment

Operating temperature	0 ... +50 °C (+32 ... +122 °F)
Operating humidity	0 ... 95 %RH Dewpoint < 30 °C (+86 °F)
Storage temperature	Models without display: -40 ... +70 °C (-40 ... +158 °F) Models with display: -30 ... +70 °C (-22 ... +158 °F)
EMC compliance	EN61326-1, Industrial environment

Inputs and Outputs

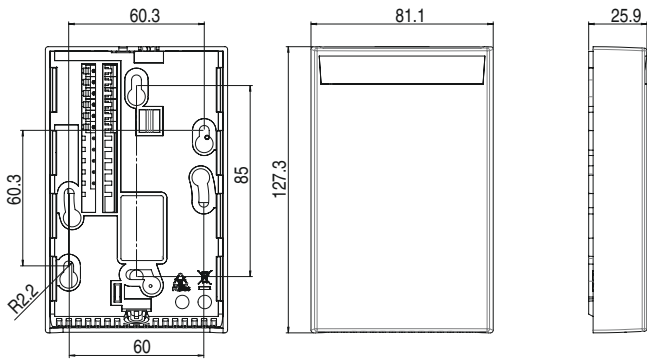
Supply voltage	18 ... 35 VDC 24 VAC ±20 % 50/60 Hz
Max. current consumption at 18 VDC	GMW84 models: 70 mA Other models: 45 mA
Max. power consumption at 30 VAC	GMW83 models: 0.7 W GMW86 models and GMW88: 1 W GMW84 models: 1.2 W
Outputs	4 ... 20 mA and/or 0 ... 10 V
Current loop resistance (4 ... 20 mA)	0 ... 600 Ω
Voltage output load resistance	Min. 10 kΩ
CO ₂ output scale	0 ... 2000 ppm
Temperature output scale	0 ... +50 °C (+32 ... +122 °F)
Humidity output scale	0 ... 100 %RH
Passive temperature sensor (P models)	Pt1000 RTD
Temperature setpoint (T models)	10 kΩ potentiometer
Relay (S models)	1 pc, SPST-NO Max. 50 VDC / 50 VAC, 500 mA
CO ₂ indicator LED levels (A model)	Flashing red: > 2000 ppm Red: 1200 ... 2000 ppm Yellow: 800 ... 1200 ppm Green: < 800 ppm

Mechanical Specifications

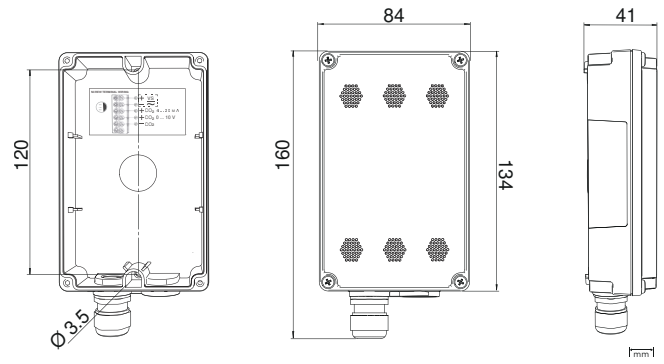
IP rating	IP30 GMW88 model: IP64
Housing material	ABS/PC UL-V0 approved GMW88 model: PC
Housing color	White (RAL9003)
Output connector	Screw terminal
Max. wire size	2 mm ² (AWG14)
Weight	Plain and LED version: 114 g (4.02 oz) Display version: 124 g (4.37 oz) GMW88: 160 g (5.64 oz)

Spare Parts and Accessories

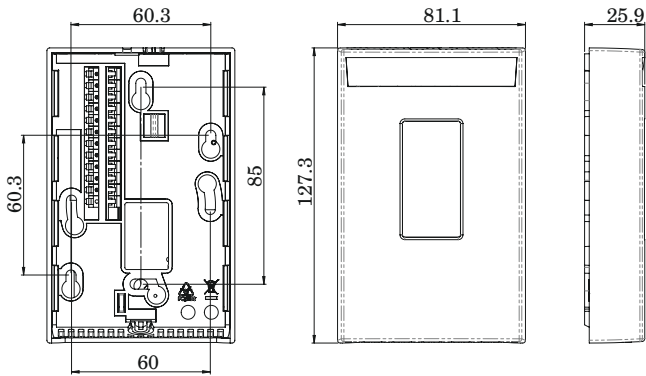
CO ₂ module	GM10SP80
INTERCAP® sensor	15778HM



GMW83, GMW83A, GMW83RP, GMW84, GMW84S and GMW86P Dimensions (in mm)



GMW88 Dimensions (in mm)



GMW83D and GMW83DRP Dimensions (in mm)

