



# VAISALA

## GMW90 Series Carbon Dioxide, Temperature and Humidity Transmitters



### Features

- Measured parameters: carbon dioxide, temperature, and humidity (optional)
- Superior long-term stability with the latest-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 CO<sub>2</sub> calibration (certification included)
- Both analog and field bus communication (Modbus® RTU)

GMW90 series transmitters are available with either a display opening or a solid front. An optional traffic light indication is also available.

GMW90 Series CARBOCAP® Carbon Dioxide, Temperature and Humidity Transmitters for HVAC 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, GMW90 series 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 latest-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

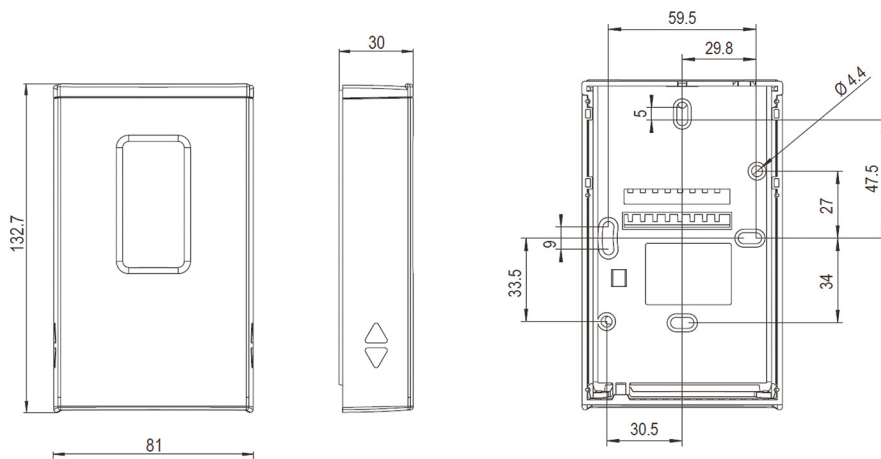
GMW90 series transmitters have been designed for quick and easy installation and maintenance. Every model includes a display for easy startup and convenient maintenance. To protect the sensor from dust and dirt during construction and installation, the units can be cabled with back-plate only. Electronics 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 handheld meter or reference gas CO<sub>2</sub> 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 top-quality final result.

# GMW90 dimensions and models



Dimensions (in mm) of GMW90 series transmitter cover (left) and mounting base (right)

## Models

| Model   | Measurements          | Output   |
|---------|-----------------------|--|
| GMW93   | CO <sub>2</sub> +T    | 3-wire voltage output  |
| GMW93D  | CO <sub>2</sub> +T    | 3-wire voltage output, with display                                    |
| GMW94   | CO <sub>2</sub> +T    | 3-wire current output  |
| GMW94D  | CO <sub>2</sub> +T    | 3-wire current output, with display                                    |
| GMW93R  | CO <sub>2</sub> +T+RH | 3-wire voltage output  |
| GMW93RD | CO <sub>2</sub> +T+RH | 3-wire voltage output, with display                                    |
| GMW93RA | CO <sub>2</sub> +T+RH | 3-wire voltage output, with display and CO <sub>2</sub> indicator LEDs |
| GMW94R  | CO <sub>2</sub> +T+RH | 3-wire current output  |
| GMW94RD | CO <sub>2</sub> +T+RH | 3-wire current output, with display                                    |
| GMW95   | CO <sub>2</sub> +T    | Modbus RTU output  |
| GMW95D  | CO <sub>2</sub> +T    | Modbus RTU output, with display  |
| GMW95R  | CO <sub>2</sub> +T+RH | Modbus RTU output  |
| GMW95RD | CO <sub>2</sub> +T+RH | Modbus RTU output, with display  |
| GMW90   | CO <sub>2</sub> +T    | Analog or Modbus RTU output (configurable)                             |
| GMW90R  | CO <sub>2</sub> +T+RH | Analog or Modbus RTU output (configurable)                             |



## Technical data

### Measurement performance

#### Carbon dioxide

|  |  |
|--|--|
| Measurement range                      | 0 ... 5000 ppm   |
| Stability in typical HVAC applications | Total accuracy at room temperature<br>±75 ppm at 600 and 1000 ppm incl.<br>5 years drift |

|                       |                |
|-----------------------|----------------|
| Carbon dioxide sensor | CARBOCAP® GM10 |
|-----------------------|----------------|

#### Accuracy:

|                                 |                            |
|---------------------------------|----------------------------|
| +20 ... +30 °C (+68 ... +86 °F) | ±(30 ppm + 2 % of reading) |
|---------------------------------|----------------------------|

|   |                              |
|---|------------------------------|
| +10 ... +20 °C, +30 ... +40 °C<br>(+50 ... +68 °F, +86 ... +104 °F) | ±(35 ppm + 2.7 % of reading) |
|---|------------------------------|

|   |                              |
|---|------------------------------|
| -5 ... +10 °C, +40 ... +55 °C<br>(+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<br>(+50 ... +68 °F, +86 ... +104 °F) | ±0.6 °C (±1.08 °F) |
|---|--------------------|

|   |                     |
|---|---------------------|
| -5 ... +10 °C, +40 ... +55 °C<br>(+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 | 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 |
|---------------|----------|

<sup>1)</sup> Complies with CEC-400-2008-001-CMF

### Operating environment

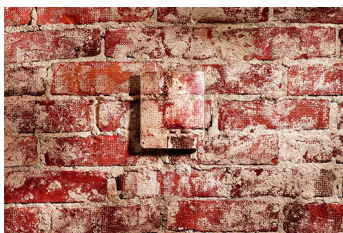
|                       |                                 |
|-----------------------|---------------------------------|
| Operating temperature | -5 ... +55 °C (+23 ... +131 °F) |
|-----------------------|---------------------------------|

|                     |                                  |
|---------------------|----------------------------------|
| Storage temperature | -30 ... +60 °C (-22 ... +140 °F) |
|---------------------|----------------------------------|

|                    |              |
|--------------------|--------------|
| Operating humidity | 0 ... 95 %RH |
|--------------------|--------------|

|           |                   |
|-----------|-------------------|
| Dew point | < +30 °C (+86 °F) |
|-----------|-------------------|

|           |      |
|-----------|------|
| IP rating | IP30 |
|-----------|------|



Optional decorative cover blends the transmitter into your interior design.

### Inputs and outputs

|                |   |
|----------------|---|
| Supply voltage | 18 ... 35 V DC, 24 V AC ± 20%<br>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 <sub>2</sub> | 0 ... 2000 ppm |
|-----------------|----------------|

|   |               |
|---|---------------|
| T | -5 ... +55 °C |
|---|---------------|

|    |               |
|----|---------------|
| RH | 0 ... 100 %RH |
|----|---------------|

#### Field bus 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 |
|--------------------------------|---------------------------|

|                          |           |
|--------------------------|-----------|
| Modbus RTU address range | 0 ... 247 |
|--------------------------|-----------|

### Mechanical specifications

|                        |                 |
|------------------------|-----------------|
| Standard housing color | White (RAL9003) |
|------------------------|-----------------|

|                  |                        |
|------------------|------------------------|
| Housing material | ABS/PC, UL-V0 approved |
|------------------|------------------------|

|                  |   |
|------------------|---|
| Output connector | Screw terminals<br>Max. wire size 2 mm <sup>2</sup> (AWG14) |
|------------------|---|

|                        |          |
|------------------------|----------|
| Service port connector | 4-pin M8 |
|------------------------|----------|

|        |                 |
|--------|-----------------|
| Weight | 163 g (5.75 oz) |
|--------|-----------------|

<sup>1)</sup> RAL code is only indicative with potential small variations in color shade

### Spare parts and accessories

|                        |        |
|------------------------|--------|
| CO <sub>2</sub> module | GM10SP |
|------------------------|--------|

|  |        |
|--|--------|
| Temperature module (CO <sub>2</sub> +T models) | TM10SP |
|--|--------|

|   |         |
|---|---------|
| Humidity and temperature module<br>(CO <sub>2</sub> +T+RH models) | HTM10SP |
|---|---------|

|                               |        |
|-------------------------------|--------|
| Decorative cover set (10 pcs) | 236285 |
|-------------------------------|--------|

|                           |        |
|---------------------------|--------|
| Connection cable for MI70 | 219980 |
|---------------------------|--------|

|                             |        |
|-----------------------------|--------|
| USB cable for PC connection | 219690 |
|-----------------------------|--------|

|                           |        |
|---------------------------|--------|
| Universal AC power supply | 245866 |
|---------------------------|--------|

### Compliance

|               |           |
|---------------|-----------|
| EU directives | EMC, RoHS |
|---------------|-----------|

|                   |                                    |
|-------------------|------------------------------------|
| EMC compatibility | EN 61326-1, industrial environment |
|-------------------|------------------------------------|

|               |                              |
|---------------|------------------------------|
| EMC emissions | CISPR 22 / EN 55022, Class B |
|---------------|------------------------------|

|                  |         |
|------------------|---------|
| Compliance marks | CE, RCM |
|------------------|---------|