Quick Guide

Vaisala HMW90 and GMW90 Series Transmitters with Digital Output

Temperature
25.2 °C
Humidity
43.5 %
CO2
494 ppm

Temperature
24.6 °C

Humidity
11.0 %

CO₂
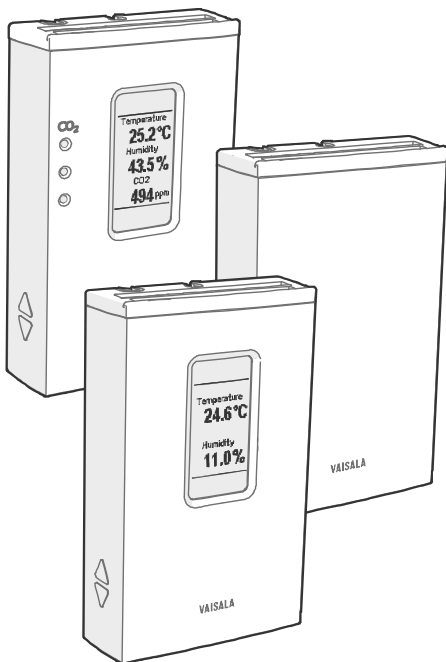
VAISALA

VAISALA

English

Deutsch

Français

Português

日本語

中文

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Industrial Electronics

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ENGLISH

HMW90 and GMW90 Series Digital Models

Measurement type 　HMW95/D, HMW90* 　GMW95, GMW95D 　GMW95R, GMW95RD, 　GMW90*	Humidity, temperature Carbon dioxide, temperature Carbon dioxide, humidity, and temperature
Output type	RS-485 (isolated, 1.5 kV)
Output protocols	BACnet MS/TP, Modbus
Supply voltage	18 ... 35 VDC 24 VAC ±20 % 50/60 Hz
Current consumption (with 120 Ω termination) 　HMW90 series 　　Average 　　Maximum 　　Power consumption 　GMW90 series 　　Average 　　Maximum 　　Power consumption	 10 mA at 24 VDC 30 mA at 24 VDC < 0.3 W 20 mA at 24 VDC 50 mA at 24 VDC < 0.6 W
Dimensions (h × w × d)	132.7 × 81 × 30 mm
Setpoints for CO_2 LEDs	Green 0 ... 800 ppm Yellow 800 ... 1200 ppm Red 1200 ... 5000 ppm Red (blinking) > 5000 ppm

* Configurable model, see Order Form for options.

> **i** Datasheets and user's guides (in English) are available on product pages at
> www.vaisala.com/hmw90
> www.vaisala.com/gmw90.

Product Safety Information

When installing the transmitter, do not touch exposed contacts on the component board.

When opening or closing the transmitter, avoid damaging the transmitter electronics with the two plastic supports on the bottom of the mounting base.

Wire the transmitter according to the terminal label on the mounting base. Terminal layout depends on transmitter model, so do not mix mounting bases from different transmitter models.
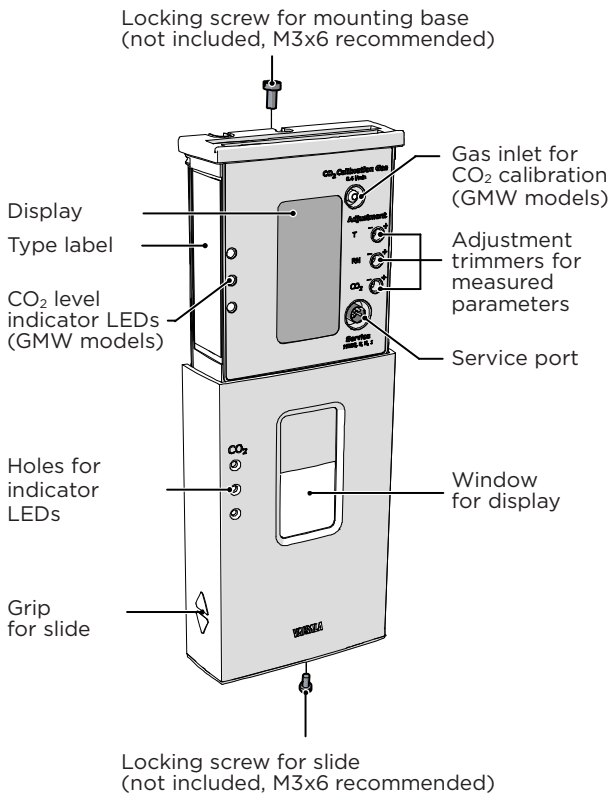
If you connect more than one transmitter to a single 24 VAC transformer, always connect the phase (~) to the +Vs connector in each transmitter.
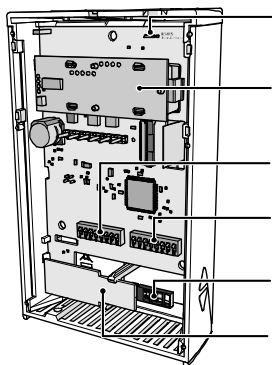
The trimmers only turn 135 degrees each way, less than half a rotation. Do not force the trimmer past the stopping point.

Transmitter Parts - Outside

Locking screw for mounting base
(not included, M3x6 recommended)

Gas inlet for
CO_2 calibration
(GMW models)

Display

Type label

CO_2 level
indicator LEDs
(GMW models)

Adjustment
trimmers for
measured
parameters

Service port

Holes for
indicator
LEDs

Window
for display

Grip
for slide

Locking screw for slide
(not included, M3x6 recommended)

Transmitter Body

RS-485 termination jumper (connects a 120 Ω resistor)

GM10 module (CO_2 measurement)

DIP switches for protocol and serial line settings

DIP switches for transmitter address

HUMICAP® 180R sensor (humidity measurement)

HTM10 module (temperature measurement)

Mounting Base

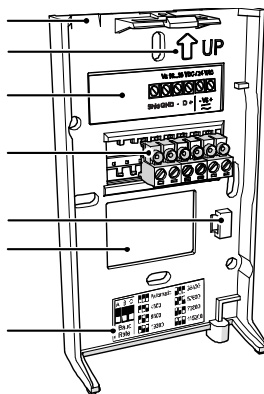Opening for cable

Orientation arrow

Terminal label

Screw terminals

Place for zip tie

Opening for cable

Label for RS-485 baud rate DIP switch settings

UP

Selecting the Location

The conditions at the location should represent well the area of interest. Do not install the transmitter on the ceiling. Avoid placing the transmitter near heat and moisture sources, close to the discharge of the supply air ducts, and in direct sunlight.
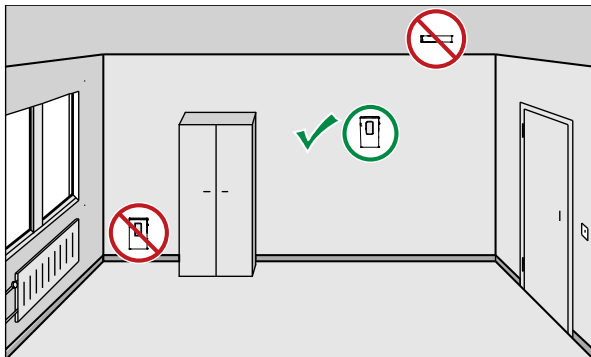
Plan the routing of the cable when selecting the location. You can bring the cable to the transmitter from above, or from the center opening of the mounting base.

> **i** When bringing a cable through the wall, note that the hole may also supply air from outside the room into the transmitter. This may affect the measurement readings. For example, fresh concrete binds CO_2 and may cause low readings, especially in new buildings. Seal the cable opening if necessary.

Opening and Closing

To open, use a screwdriver to push down the tab that holds the transmitter cover and mounting base together. Pull the mounting base away from the cover, starting from the top.

To close, connect the bottom of the transmitter first, and tilt the top forward to close the tab. Closing the transmitter starts it up if power is supplied to the screw terminals.
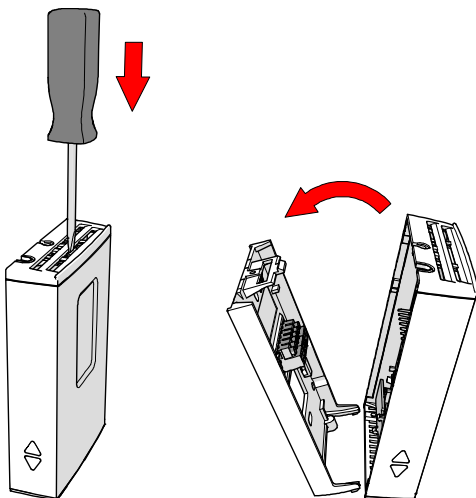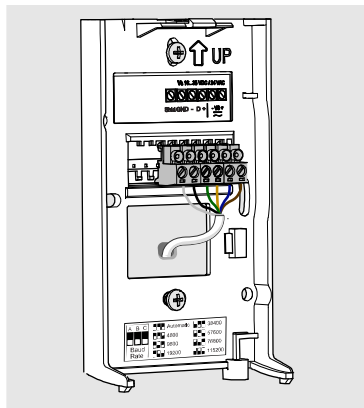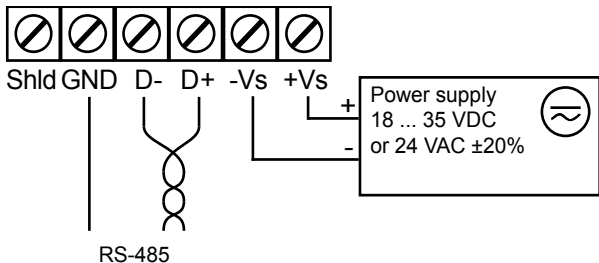
Installing the Mounting Base

Use the mounting holes to attach the mounting base securely. Use at least two screws (not included). The arrow on the mounting base must point straight up after installation. **Proper orientation is important**: air must flow through the vents on the bottom and top.
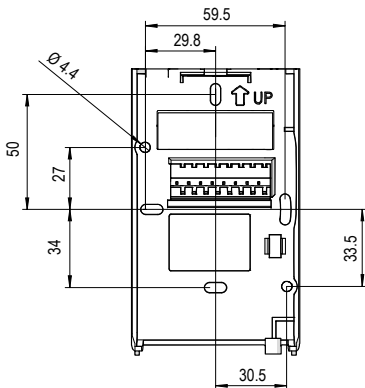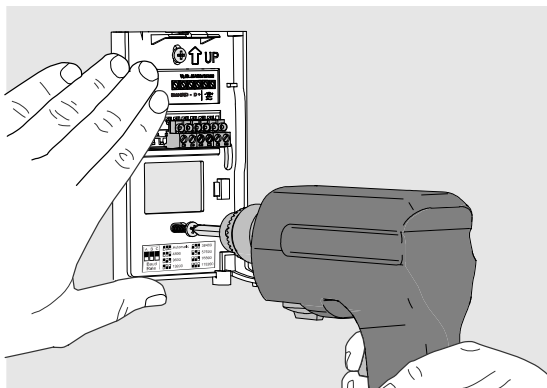
Wiring

When wiring, observe the terminal labels on the mounting base. Maximum wire size is 2 mm^2 (AWG14). The RS-485 line of the transmitter is isolated from the power supply. A separate ground reference terminal (**GND**) is provided for the RS-485 connection.

If you are using a shielded cable, you can use the **Shld** terminal to hold the exposed part of the shield. The Shld terminal is floating (not electrically connected).
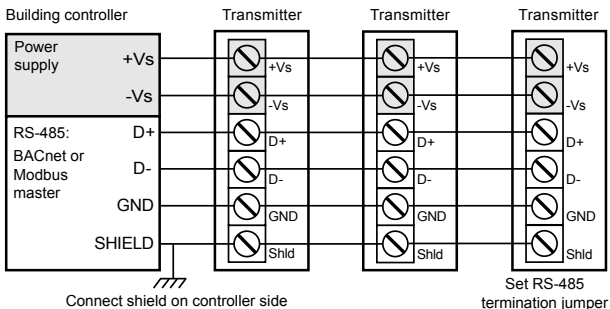

You can bring the cable to the housing from above or from behind (recommended).

If you are wiring a GMW90 series transmitter from above, use a < Ø 5 mm cable, and route it from the left side of the mounting base.

Connecting Several Transmitters

Set the RS-485 termination jumper to "ON" on the transmitter that is at the end of the line. This terminates the line with a 120 Ω resistor. For location of the jumper, see section Transmitter Body on page 4.

Connect the cable shield to ground on the building controller side.

Building controller	Transmitter	Transmitter	Transmitter

Power supply +Vs	+Vs	+Vs	+Vs
-Vs	-Vs	-Vs	-Vs
RS-485: BACnet or Modbus master	D+	D+	D+
D-	D-	D-	D-
GND	GND	GND	GND
SHIELD	Shld	Shld	Shld

Connect shield on controller side

Set RS-485 termination jumper

Configuration DIP Switches
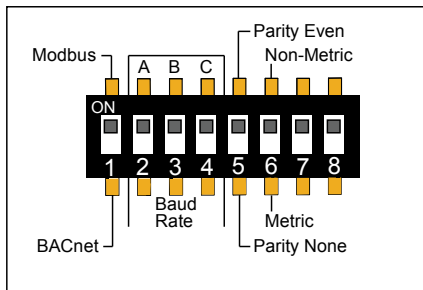
DIP	Position			Setting
1	**Modbus**			Modbus protocol in use.
	BACnet			BACnet protocol in use.
2-4	**A**	**B**	**C**	Serial line baud rate
	Off	Off	Off	Automatic (default)
	Off	Off	On	4800
	Off	On	Off	9600
	Off	On	On	19200
	On	Off	Off	38400
	On	Off	On	57600
	On	On	Off	76800
	On	On	On	115200
5	**Parity Even**			Parity even (8E1). Only affects Modbus protocol.
	Parity None			Parity none (8N2). Only affects Modbus protocol.
6	**Non-Metric**			Use non-metric units (°F). Only affects display and service port.
	Metric			Use metric units (°C). Only affects display and service port.
7	Not used			
8	Not used			

Address DIP Switches

Address
(Binary Weighting)
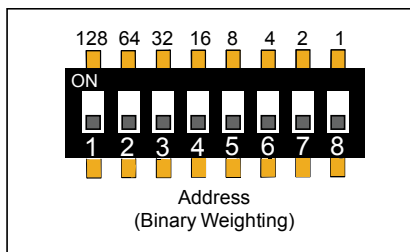
Dip switches marked **Address Binary Weighting** set the MAC address of the transmitter. The address is encoded in eight bit binary form, with each numbered switch representing a single bit. For example:

Binary: 10100001
= Decimal: 161
(128 + 32 + 1)
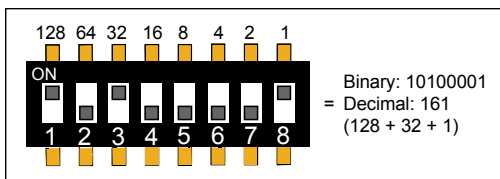
Addressing with BACnet Protocol

BACnet MS/TP MAC address range is 0 ... 255. The address determines if the transmitter is a master or slave:

- Address range 0 ... 127: transmitter is a master.
- Address range 128 ... 255: transmitter is a slave.

Addressing with Modbus Protocol

Transmitter is always a Modbus slave. MAC address range for Modbus slaves is 1 ... 247.

Transmitter Startup

VAISALA
HMW90
SW 1.00.00
H3130007

HTM10
H3130008

Status
OK

VAISALA
GMW95R
SW 1.1.6
J 1510005

HTM10
H3130008

GM10
J15E1008

Status
OK

When the transmitter is powered on, it displays a sequence of information screens. The screens are shown for a few seconds each.

The first screen identifies the transmitter and the connected measurement modules, and shows if the transmitter is operating normally (status OK) or if there is an error (status ERROR).

BACnet
Instance
6
NOT_SET
MAC
7 (07h)
Max_Master
127 (7Fh)
Node type
Master
Baud rate
38400

MODBUS
Address
7 (07h)

Serial line
38400 8N2

The second screen shows configuration information that is relevant to the selected communication protocol (BACnet or Modbus)

Temperature
24.6°C

Humidity
11.0%

Temperature
25.2°C
Humidity
43.5%
CO2
494 ppm

After the startup screens the transmitter shows the measurement screen. It shows the measured parameters and currently active indicators.

It is normal for CO_2 measurement to read 0 ppm for a few seconds after the startup.

Trimmer Adjustment (RH and T)

Before starting the adjustment, compare the reading of the transmitter to a calibrated reference instrument so you know how much adjustment is needed. You can use, for example, the HM70 hand-held humidity and temperature meter.

Center
trimmer to
start
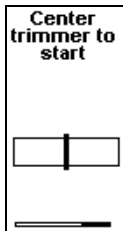
To enter the adjustment screen, select the parameter to adjust, and rotate the RH or T trimmer slightly during normal measurement. If the trimmer is not centered, you see the trimmer centering screen first. Simply turn the trimmer to the center and wait for the progress bar to complete.

Adjust
RH [%]
Current
11.8
Correction
0.5
Result
12.3
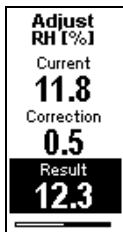
In the adjustment screen, turn the trimmer to set the desired correction. To commit the change, stop turning the trimmer and wait.

If you wish to apply a greater correction than allowed by the trimmer in a single adjustment, re-enter the adjustment screen and apply a new correction. Corrections applied using the trimmers are cumulative.
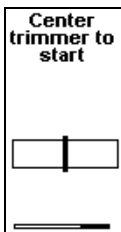
Trimmer Adjustment (CO_2)

Transmitter models with CO_2 measurement have an inlet for calibration gas. Supply the calibration gas with a known concentration (for example, 1000 ppm) to this inlet using a 3 mm inner diameter silicone tube and a 0.4 l/min flow.

Turn on the gas flow and wait for three minutes for measurement to stabilize.
If you are adjusting without calibration gas, avoid breathing on the transmitter.
You should only adjust the transmitter when the CO_2 reading is stable.

Rotate the CO_2 trimmer slightly during normal measurement. If the trimmer is not centered, you see the trimmer centering screen first. Simply turn the trimmer to the center and wait for the progress bar to complete.
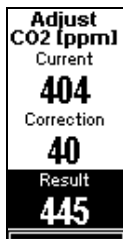
In the adjustment screen, turn the trimmer to set the desired correction. To commit the change, stop turning the trimmer and wait. The transmitter will show with a text screen if the adjustment was successful, or failed due to an unstable CO_2 reading.

As with the RH and T adjustment, repeated trimmer adjustments are cumulative. Wait for a few minutes between adjustments to allow the CO_2 reading to stabilize.

Indicators

Communication arrows

Shown on top right of the screen. Down arrow is shown when transmitter detects valid traffic on the RS-458 line. Up arrow is shown when transmitter is transmitting to the RS-485 line.
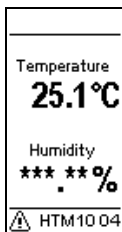
MI70 connection indicator

Shown on top left of the screen if an MI70 Indicator is connected to the service port.

Alert indicator and error text

Shown on bottom of screen if there is an error active. Followed by an error text. If more than one error is active, the error text will cycle through the errors.

When the alert indicator and error text are shown, typically one or more measurement readings are replaced with stars. This means these measurements are affected by the error.

Temperature
25.1 °C

Humidity
*** ** %

⚠ HTM10 04

Errors

Error Type	Cause and Possible Solution
HTM10 error	Problem with HTM10 module. - Check that the module sits firmly in place. Remove and reconnect. - Check for missing or damaged HUMICAP® sensor. - Check for condensation on the HUMICAP® sensor. Wait for the sensor to dry out. - Replace the module if unable to remove the problem.
GM10 error	Problem with GM10 module. - Check that the module sits firmly in place. Remove and reconnect. - Check that supply voltage is in range. - Replace the module if unable to remove the problem.
Internal error	Internal problem with the transmitter. - Restart the transmitter. - Restore the factory settings using service port if reset does not help. - Contact helpdesk@vaisala.com if unable to remove the problem.