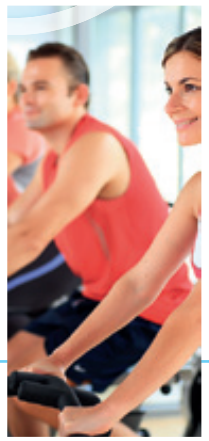


Air Quality - CO - CO_2

HD37AB1347

HD37AB1347
INDOOR AIR QUALITY MONITOR

HD37AB1347 IAQ Monitor is a tool manufactured by Delta Ohm for the analysis of air quality (Indoor Air Quality, IAQ).
The instrument simultaneously measures several parameters: **Carbon Dioxide** CO_2, **Carbon monoxide** CO, **Temperature**, **Relative humidity, atmospheric pressure** and calculates **Dew Point**, **wet bulb temperature**, **absolute humidity**, **mixing ratio**, **enthalpy**. All this is done with the **P37AB147** SICRAM probe. The SICRAM probe **P37B147** does not measure the Carbon Monoxide CO. Also combined **temperature and humidity** SICRAM probes**, Hot wire Air speed** SICRAM probes, **Vane air speed** SICRAM probes and **temperature** SICRAM probes can be connected to the instrument.
The instrument, according to a proper procedure, calculates the percentage of injection of outdoor air **(% Outside Air**) for both carbon dioxide CO_2 and temperature and **Ventilation Rate**.
HD37AB1347 **data logger** has a storage capacity of 67,600 presets for each of the two inputs divided into 64 blocks; it uses the software DeltaLog10 from version 0.1.5.0 for Windows® operating systems.
The instrument is equipped with a large dot matrix graphic display with a resolution of 160x160 points. The Reference Standards: **ASHRAE 62.1-2004, Decree Law 81/2008**. The rules apply to all enclosed spaces that may be occupied by people. Should be considered, depending on air quality, chemical contaminants, physical and biological or outdoor air flow inside inadequately purified (Ventilation Rate).
The typical applications of the instrument with the range of sensors above mentioned are:
- IAQ measure and comfort conditions in schools, offices and indoor environments.
- Analysis and study of sick building syndrome (Sick Building Syndrome) and consequences.
- Verification of HVAC system.
- Investigation of IAQ conditions in factories to optimize the microclimate and improve productivity.
- Audits in Building Automation.

*Example of an immediate printout obtained using the **HD40.1** printer*

```
========================
  Model HD37AB1347 IAQ
========================
Firm.Ver.=01.00
Firm.Date=2010/01/15
SN=12345678
ID=0000000000000000
------------------------
Probe ch.1 description
Type: CO2-CO Fw.V0R0
Data cal.:2010/01/15
Serial N.:10010060
------------------------
Probe ch.2 description
Type: Hot wire
Data cal.:2010/01/15
Serial N.: 10010100
========================
Date=2010/01/15 15:00:00
CO2            850   ppm
CO               0   ppm
RH            39.1   %
T1            22.0  °C
Patm          1010   hPa
Va            0.00  m/s
========================
```

Instrument model

Instrument firmware version
Instrument firmware date
Instrument serial number
Identification Code

Description of the probe connected to input 1

Description of the probe connected to input 2

Date and time
Carbon Dioxide
Carbon Monoxide
Relative Humidity
Temperature
Atmospheric Pressure
Air Speed

HD37AB1347 Technical specifications

Instrument	
Dimensions (Length x Width x Height)	185x90x40 mm
Weight	470 g (batteries included)
Materials	ABS, rubber
Display	Backlit, Dot Matrix 160x160 dots, visible area 52x42 mm
Operating conditions	
Operating temperature	-5…50°C
Storage temperature	-25…65°C
Working relative humidity	0 … 85% RH without condensation
Protection degree	**IP65**
Instrument uncertainty	± 1 digit @ 20°C
Power supply	
Mains adapter (code SWD10)	12Vdc/1A
Rechargeable batteries	4 1.2V type AA batteries Ni-MH
Autonomy	20 hours with 1800mAh Ni-MH batteries (with P37AB147 probe connected)
Power absorbed with instrument off	< 45µA
Security of stored data	Unlimited
Connections	
Input for probes with SICRAM module	Two 8-pole male DIN45326 connectors
You can connect the following probes to the **Indoor Air Quality** input:	- **P37AB147** - **P37B147** - **Temperature** probes equipped with SICRAM module - **Temperature** and **Humidity** combined probes with SICRAM module
You can connect the following probes to the **Temp - Air Velocity** input:	- **Hot-Wire Sensor Air Speed** probes with SICRAM module - **Vane Air Speed** probes with SICRAM module - **Temperature** probes equipped with SICRAM module
Serial interface:	
Socket:	8-pole M12
Type:	RS232C (EIA/TIA574) or USB 1.1 or 2.0 not insulated
Baud rate:	From 1200 to 38400 baud.
Data bits:	8
Parity:	None
Stop bits:	1

Flow control:	Xon-Xoff
Cable length:	Max 15 m

USB interface

Type	1.2 or 2.0 non insulated
Connection	MiniUSB B-Type

Memory	Divided into 64 blocks.
Storage capacity	67600 recordings per each of the 2 inputs.
Logging interval	Selectable among: 15, 30 seconds, 1, 2, 5, 10, 15, 20, 30 minutes and 1 hour.

Logging interval	Storage capacity	Logging interval	Storage capacity
15 seconds	About 11 days and 17 hours	10 minutes	About 1 year and 104 days
30 seconds	About 23 days and 11 hours	15 minutes	About 1 year and 339 days
1 minute	About 46 days and 22 hours	20 minutes	About 2 years and 208 days
2 minutes	About 93 days and 21 hours	30 minutes	About 3 years and 313 days
5 minutes	About 234 days and 17 hours	1 hour	About 7 years and 261 days

Technical specifications of the probes that can be connected to the HD37AB1347 instrument

P37AB147 and P37B147 SICRAM probes

- **P37AB147:** Measurement of CO_2 - CO - Relative Humidity - Temperature - Atmospheric Pressure.
- **P37B147:** Measurement of CO_2 - Relative Humidity - Temperature - Atmospheric Pressure.

CO_2 Carbon Dioxide

Sensor	NDIR Dual Wavelength
Measurement range	0 … 5000ppm
Sensor working range	-5 … 50°C
Accuracy	±50ppm±3% of measurement
Resolution	1ppm
Temperature dependence	0.1%f.s./°C
Response time (T_{90})	< 120 sec (air speed = 2m/sec)
Long-term stability	5% of measurement/5 years

CO Carbon Monoxide (only P37AB147)

Sensor	Electrochemical cell
Measurement range	0 … 500ppm
Sensor working range	-5 … 50°C
Accuracy	±3ppm±3% of measurement
Resolution	1ppm
Response time (T_{90})	< 50 sec
Long-term stability	5% of measurement/year
Service life	> 5 years in normal environment conditions

Relative Humidity RH

Type of sensor	Capacitive
Sensor protection	Stainless steel grid filter (upon request 10µm sintered filter P6 in AISI 316 or 20µm sintered filter P7 in PTFE)
Measurement range	0 … 100 % RH
Sensor working range	-20 … +60°C
Accuracy	±1.5%RH (0÷90% RH) ±2%RH (elsewhere) for T=15…35°C ±(1.5+1.5% of the measure)%RH for T= -20…+60°C
Resolution	0.1°C
Temperature dependence	±2% on all temperature range
Hysteresis and repeatability	1% RH
Response time (T_{90})	< 20 sec (air speed = 2m/sec) without filter
Long-term stability	1%/year

Temperature T

Type of sensor	NTC 10kΩ
Measurement range	-20 … +60°C
Accuracy	±0.2°C ±0.15% of measurement
Resolution	0.1°C
Response time (T_{90})	< 30 sec (air speed = 2m/sec)
Long-term stability	0.1°C/year

Atmospheric Pressure Patm

Type of sensor	Piezo-resistive
Measurement range	750 … 1100 hPa
Accuracy	±1.5 hPa @ 25°C
Resolution	1 hPa
Long-term stability	2hPa/year
Temperature drift	±3hPa with temperature -20 … +60°C

Relative humidity and temperature probes using SICRAM module

Model	Temp. sensor	Application range		Accuracy	
		%RH	Temperature	%RH	Temp.
HP472ACR	Pt100	0…100%RH	-20°C…+80°C	±1.5%RH (0…90% RH) ±2%RH (elsewhere) For T=15…35°C --- ±(1.5+1.5% of the measure)%RH in the remaining temperature range	±0.3°C
HP572ACR	K TC	0…100%RH	-20°C…+80°C		±0.5°C
HP473ACR	Pt100	0…100%RH	-20°C…+80°C		±0.3°C
HP474ACR	Pt100	0…100%RH	-40°C…+150°C		±0.3°C
HP475ACR	Pt100	0…100%RH	-40°C…+150°C		±0.3°C
HP475AC1R	Pt100	0…100%RH	-40°C…+180°C		±0.3°C
HP477DCR	Pt100	0…100%RH	-40°C…+150°C		±0.3°C
HP478ACR	Pt100	0…100%RH	-40°C…+150°C		±0.3°C

Common characteristics

Relative Humidity

Sensor	Capacitive
Sensor operating temperature	-20 … 80°C
Measurement range	0÷100%RH
Resolution	0.1%RH
Temperature drift @20°C	0.02%RH/°C
Response time %RH	10sec (10÷80% RH; air speed=2m/s) at constant temperature

Temperature with sensor Pt100

Resolution	0.1°C
Temperature drift @20°C	0.003%/°C

Hot-Wire Air Speed measurement probes with SICRAM module: AP471 S1 - AP471 S2 - AP471 S3 - AP471 S4

	AP471 S1 - AP471 S3	AP471 S2	AP471 S4
Type of measurements	Air speed, calculated flow rate, air temperature		
Type of sensor			
Speed	NTC thermistor	Omni directional NTC thermistor	
Temperature	NTC thermistor	NTC thermistor	
Measurement range			
Speed	0.1 … 40m/s	0.1 … 5m/s	
Temperature	-25 … +80°C	-25 … +80°C	0 … 80°C
Measurement resolution			
Speed	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot		
Temperature	0.1°C		
Measurement accuracy			
Speed	±0.2 m/s (0…0.99 m/s)	±0.2m/s (0…0.99 m/s)	
	±0.4 m/s (1.00…9.99 m/s)	±0.3m/s (1.00…5.00 m/s)	
	±0.8 m/s (10.00…40.0 m/s)		
Temperature	±0.8°C (-10…+80°C)	±0.8°C (-10…+80°C)	
Minimum speed	0.1 m/s		
Air temperature compensation	0…80°C		
Sensor working conditions	Clean air, RH<80 %		
Battery life	Approx. 20 hours @ 20 m/s with alkaline batteries	Approx. 30 hours @ 5 m/s with alkaline batteries	
Unit of measurement			
Speed	m/s – km/h – ft/min – mph – knot		
Flow rate	l/s - m^3/s - m^3/min - m^3/h - ft^3/s - ft^3/min		
Pipeline section for flow rate calculation	0.0001…1.9999 m^2		
Cable length	~2m		

HD40.1

Vane Air Speed measurement probes with SICRAM module: AP472 S1 - AP472 S2

	AP472 S1	AP472 S2
Type of measurements	Air speed, calculated flow rate, air temperature	Air speed, calculated flow rate
Diameter	100 mm	60 mm
Type of measurement		
Speed	Vane	Vane
Temperature	Tc K	----
Measurement range		
Speed (m/s)	0.6 … 25	0.5 … 20
Temperature (°C)	-25…+80 (*)	
Resolution		
Speed	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot	
Temperature	0.1°C	----
Accuracy		
Speed	±(0.4 m/s +1.5%f.s.)	±(0.4m/s +1.5%f.s.)
Temperature	±0.8°C	----
Minimum speed	0.6m/s	0.5m/s
Unit of measurement		
Speed	m/s – km/h – ft/min – mph – knot	
Flow rate	l/s - m^3/s - m^3/min - m^3/h - ft^3/s - ft^3/min	
Pipeline section for flow rate calculation	0.0001…1.9999 m^2	
Cable length	~2m	

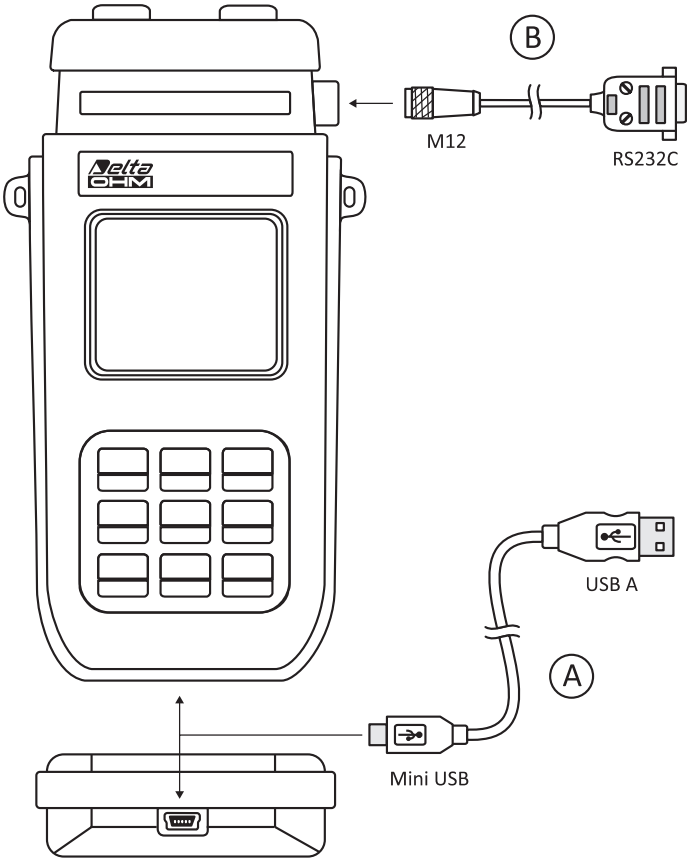
(*) The indicated value refers to the vane's working range.

Temperature probes Pt100 using SICRAM module

Model	Type	App. range	Accuracy
TP472I	Immersion	-196°C…+500°C	±0.25°C (-196°C…+300°C) ±0.5°C (+300°C…+500°C)
TP472I.0 *1/3DIN - Thin film*	Immersion	-50°C…+300°C	±0.25°C
TP473P.I	Penetration	-50°C…+400°C	±0.25°C (-50°C…+300°C) ± 0.5°C (+300°C…+400°C)
TP473P.0 *1/3DIN - Thin film*	Penetration	-50°C…+300°C	±0.25°C
TP474C.I	Contact	-50°C…+400°C	±0.3°C (-50°C…+300°C) ±0.5°C (+300°C…+400°C)
TP474C.0 *1/3DIN - Thin film*	Contact	-50°C…+300°C	±0.3°C
TP475A.0 *1/3DIN - Thin film*	Air	-50°C…+250°C	±0.3°C
TP472I.5	Penetration	-50°C…+400°C	±0.3°C (-50°C…+300°C) ±0.6°C (+300°C…+400°C)
TP472I.10	Penetration	-50°C…+400°C	±0.30°C (-50°C…+300°C) ±0.6°C (+300°C…+400°C)
TP49A.0 *Class A - Thin film*	Immersion	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP49AC.0 *Class A - Thin film*	Contact	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP49AP.0 *Class A - Thin film*	Penetration	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP875.I	Globethermometer Ø150mm	-30°C…+120°C	±0.25°C
TP876.I	Globethermometer Ø 50mm	-30°C…+120°C	±0.25°C
TP87.0 *1/3DIN - Thin film*	Immersion	-50°C…+200°C	±0.25°C
TP878.0 *1/3DIN - Thin film* TP878.1.0 *1/3DIN - Thin film*	For solar panel	+4°C…+85°C	±0.25°C
TP879.0 *1/3DIN - Thin film*	For compost	-20°C…+120°C	±0.25°C

Common characteristics

Temperature drift @20°C	0.003%/°C



A The HD37AB1347 uses a new serial miniUSB port HD type (Human Interface Device). **It is not necessary to install any driver** for making the connection to the PC with the USB cable type A – MiniUSB type B coded CP23**.**

B The port equipped with the M12 connector is an RS232C type that can be used for the connection to the PC or to the HD40.1 printer by using the cable HD2110RS.

ORDERING CODES

HD37AB1347: IAQ Monitor datalogger instrument complete with: **DeltaLog10** software (**from version 0.1.5.0**) for data download, monitor, and data processing on Personal Computer, BAT-40 4x1.2V type AA Ni-MH rechargeable batteries, operating manual, case. **Probes and cables have to be ordered separately.**

Carbon dioxide, carbon monoxide, relative humidity, temperature and atmospheric pressure probes with SICRAM module

P37AB147: CO_2 Carbon Dioxide, CO Carbon Monoxide, Relative Humidity RH, Temperature T and Atmospheric Pressure Patm combined probe. Dimensions 275 mm x 45 mm x 40 mm. Connection cable 2 meters long.

P37B147: CO_2 Carbon Dioxide, Relative Humidity RH, Temperature T and Atmospheric Pressure Patm combined probe. Dimensions 275 mm x 45 mm x 40 mm. Connection cable 2 meters long.

Relative humidity and temperature probes equipped with SICRAM module

HP472ACR: Combined probe %RH and temperature, dimensions Ø 26x170 mm. Connection cable 2 meters long.

HP473ACR: Combined probe %RH and temperature. Handle size Ø 26x130 mm, probe Ø 14x120 mm. Connection cable 2 meters long.

HP474ACR: Combined probe %RH and temperature. Handle size Ø 26x130 mm, probe Ø 14x215 mm. Connection cable 2 meters long.

HP475ACR: Combined probe %RH and temperature. Connection cable 2 meters long. Handle Ø 26x110mm. Stainless steel stem Ø 12x560mm. Tip Ø 14x75 mm.

HP475AC1R: Combined probe %RH and temperature. Connection cable 2 meters long. Handle Ø 26x80 mm. Stainless steel stem Ø 14x480 mm.

HP477DCR: Combined sword probe %RH and temperature. Connection cable 2 meters long. Handle Ø 26x110mm. Probe's stem 18x4mm, length 520 mm.

HP478ACR: Combined probe %RH and temperature. Dimensions Ø 14x130 mm. Connection cable 5 meters long.

Hot-wire wind speed measurement probes equipped with SICRAM module

AP471 S1: Hot-wire telescopic probe, measuring range: 0.1…40m/s. Cable 2 meters long.

AP471 S2: Omni directional hot-wire telescopic probe, measuring range: 0.1 … 5m/s. Cable 2 meters long.

AP471 S3: Hot-wire telescopic probe with terminal tip for easy position, measuring range: 0.1 … 40m/s. Cable 2 meters long.

AP471 S4: Omni directional hot-wire telescopic probe with base, measuring range: 0.1 … 5m/s. Cable 2 meters long.

Vane wind speed measurement probes with SICRAM module

AP472 S1: Vane probe with thermocouple K, Ø 100 mm. Speed from 0.6 to 20 m/s; temperature from -25 to 80°C. Cable 2 meters long.

AP472 S2: Vane probe, Ø 60mm. Measurement range: 0.5…20m/s. Cable 2 meters long.

Temperature measurement probes equipped with SICRAM module

TP472I: Wire wound Pt100 sensor immersion probe. Stem Ø 3 mm, length 300 mm. Cable 2 meters long.

TP472I.0: Thin film Pt100 sensor immersion probe. Stem Ø 3 mm, length 230 mm. Cable 2 meters long.

TP473P.I: Wire wound Pt100 sensor penetration probe. Stem Ø 4 mm, length 150 mm. Cable 2 meters long.

TP473P.0: Thin film Pt100 sensor penetration probe. Stem Ø 4 mm, length 150 mm. Cable 2 meters long.

TP474C.I: Wire wound Pt100 sensor contact probe. Stem Ø 4 mm, length 230 mm, contact surface Ø 5 mm. Cable 2 meters long.

TP474C.0: Thin film Pt100 sensor contact probe. Stem Ø 4 mm, length 230 mm, contact surface Ø 5 mm. Cable 2 meters long.

TP475A.0: Thin film Pt100 sensor air probe. Stem Ø 4 mm, length 230 mm. Cable 2 meters long.

TP472I.5: Thin film Pt100 sensor penetration probe. Stem Ø 6 mm, length 500 mm. Cable 2 meters long.

TP472I.10: Thin film Pt100 sensor penetration probe. Stem Ø 6 mm, length 1000 mm. Cable 2 meters long.

TP49A.0: Thin film Pt100 sensor immersion probe. Stem Ø 2.7 mm, length 150 mm. Cable 2 meters long. Aluminium handle.

TP49AC.0: Thin film Pt100 sensor contact probe. Stem Ø 4 mm, length 150 mm. Cable 2 meters long. Aluminium handle.

TP49AP.0: Thin film Pt100 sensor penetration probe. Stem Ø 2.7 mm, length 150 mm. Cable 2 meters long. Aluminium handle.

TP875.I: Wire wound Globe thermometer Ø 150 mm with handle. Cable 2 meters long.

TP876.I: Wire wound Globe thermometer Ø 50 mm with handle. Cable 2 meters long.

TP87.0: Thin film Pt100 sensor immersion probe. Stem Ø 3 mm with handle, length 70mm. Cable 2 meters long.

TP878.0: Thin film Contact probe for solar panels. Cable 2 meters long.

TP878.1.0: Thin film Contact probe for solar panels. Cable 5 meters long.

TP879.0: Thin film penetration probe for compost. Stem Ø 8 mm, length 1 meter. Cable 2 meters long.

Accessories:

SWD10: Stabilized power supply at 100-240Vac/12Vdc-1A mains voltage.

VTRAP20: Tripod to be fixed to the instrument, maximum height 270 mm.

HD2110/RS: Connection cable with M12 connector on instrument's side and sub D 9-pole female connector for RS232C on PC's side.

CP23: Connection cable with type B MiniUSB connector on instrument's side and USB 2.0 connector on PC's side.

HD40.1: Printer (it uses the **HD2110/RS** cable).

Accessories for HD40.1 printer:

BAT-40: Spare batteries for the HD40.1 printer with built-in temperature sensor.

RCT: Kit of four thermo-paper rolls, width 57 mm, diameter 32 mm.

Accessories for P37AB147 and P37B147 SICRAM probes:

MINICAN.12A: Nitrogen bottle for CO and CO_2 sensor calibration at 0ppm. Volume 12 liters. **With adjustment valve.**

MINICAN.12A1: Nitrogen bottle for CO and CO_2 sensor calibration at 0ppm. Volume 12 liters. **Without adjustment valve.**

ECO-SURE-2E CO: CO spare sensor (only P37AB147)

HD37.36: Kit connection tube between instrument and MINICAN.12A for CO calibration (only P37AB147).

HD37.37: Kit connection tube between instrument and MINICAN.12A for CO_2 calibration.

Accessories for Wind Speed SICRAM probes:

AST.1: Telescopic rod (fully closed 210 mm, fully open 870 mm) for AP472S1 and AP472S2 vanes.

AP 471S1.23.6: Fixed telescopic element ∅ 16 x 300 mm, M10 male thread on one side, female thread on the other side. For AP472S1, AP472S2 vanes.

AP 471S1.23.7: Fixed telescopic element ∅ 16 x 300 mm, M10 female thread on one side only. For AP472S1, AP472S2 vanes.

Accessories for Temperature-Humidity SICRAM probes:

HD33: Saturated solution at 33.0%RH@20°C for calibration of relative humidity probes, ring M24x1.5, M12x1.

HD75: Saturated solution at 75.4%RH@20°C for calibration of relative humidity probes, ring M24x1.5, M12x1.

P6: Complete protection in 10µm sintered AISI 316 for Ø 14mm probes.

P7: Complete protection in 20µm sintered PTFE for Ø 14mm probes.

P8: 20µm protection grid in stainless steel and Pocan for Ø 14mm probes, thread M12x1.

HD37AB17D
HD37B17D

HD 37AB17D, HD 37B17D
DATALOGGER
RELATIVE HUMIDITY - TEMPERATURE - CO - CO_2

HD37AB17D and **HD37B17D** instruments are **data loggers** able to measure and memorize simultaneously the following parameters:

- Relative Humidity **RH**
- Environment temperature **T**
- Carbon monoxide **CO** (**only HD37AB17D**)
- Carbon dioxide **CO_2**

HD37AB17D and **HD37B17D** instruments have the ability to investigate and monitor the indoor air quality.
Typical applications include checking air quality inside buildings occupied by people (schools, hospitals, auditoria, canteens, etc.); and work places to optimize the comfort and to generally check for small leaks of CO with danger of explosions or fire. This analysis allows the management of conditioning plants (temperature and humidity) and ventilation (recycle air/hour) in order to reach a double purpose: getting a good quality of the air in accordance with ASHRAE and IMC regulations and energy saving.
HD37AB17D and **HD37B17D** are instruments which are very useful to fight the so-called syndrome of sick building.
RH (Relative Humidity) measurement is obtained with a capacitive sensor.
T temperature is measured with a high precision NTC sensor.
The **CO** measurement (Carbon monoxide, only for **HD37AB17D**) is made by an electrochemical cell with two electrodes indicated to detect the presence of Carbon monoxide, lethal for men, in his living or working environment.
The **CO_2** measurement (Carbon dioxide) is obtained with a special infrared sensor (NDIR technology: Non-Dispersive Infrared Technology) that, thanks to the use of double filter and a special measurement techniques, guarantees accurate and stable measurements over time. The infrared sensor is equipped with a protection membrane which provides protection from dust particles and aggressive air agents to assure the sensor's long life.
HD37AB17D and **HD37B17D** are **data loggers** able to memorize the detected measurements at an interval set by the user.
HD37AB17D and **HD37B17D** are connected to the PC by ***USB*** input.
DeltaLog13 communication **software** via the USB port, designed to perform data transfer, data collection and recording and printing of all the instrument parameters and stored measurements. In addition the software allows the calibration adjustments of the RH, CO (only HD37B17D) and CO_2 sensors.
Using appropriate procedure, the Software DeltaLog13 can evaluate the parameter **% OA** (percentage of external air), according to the following formula:.

$$\%OA = \frac{X_r - X_s}{X_r - X_0} \cdot 100$$

whereas:
X_r = CO_2 in return air
X_S = CO_2 in the outlet air
X_0 = CO_2 in the external air
The power supply of the instrument is provided by a 2 Ni-MH **rechargeable** batteries package (code BAT-20), that allows 8 hours of continuous working in acquisition mode.

Acquisition frequency :

Frequency	samples per minute	maximum duration of logging limited
3 sec.	20 samples per minute	16 hours
6 sec	10 samples per minute	1 day, 9 hours
12 sec	5 samples per minute	2 days, 12 hours
15 sec	4 samples per minute	3 days, 12 hours
30 sec	2 samples per minute	6 days, 12 hours
60 sec. = 1 min.	1 samples per minute	13 days, 12 hours
120 sec. = 2 min.	1 sample every 2 minutes	27 days, 12 hours
180 sec. = 3 min.	1 sample every 3 minutes	41 days, 12 hours
240 sec. = 4 min.	1 sample every 4 minutes	55 days, 12 hours
300 sec.= 5 min.	1 sample every 5 minutes	69 days

Technical Features

Dimensions	275 mm x 45 mm x 40 mm
Weight	230 g (batteries included)
Materials	ABS
Mains power supply	Batteries charger **100-240Vac/6Vdc-1A (code SWD06)**
Batteries	Package with 2 rechargeable batteries 1.2V type AA (NiMH)
Autonomy	8 hours of continuous working in measurement mode
Current absorbed with instrument off	200µA
CO_2 temperature compensation	0°C…50°C
Operating conditions	
Working temperature	-20°C…+60°C
Storage temperature	-25°C…+65°C
Working relative humidity	0%RH ... 90%RH no condensation
Protection degree	IP30
Safety of the stored data	Unlimited
Connections	
USB interface	USB 2.0 cable B type Baudrate 460800
Batteries charger power supply (code SWD06)	2 - poles connector (positive at the centre) Output voltage: **6Vdc** Maximum current: 1600mA (9, 60 VA Max).
Measuring rate	1 sample every three seconds
Storage capacity	20000 Records Every record includes the following: - date and time - measurement of the carbon dioxide (CO_2) - measurement of the carbon monoxide CO (only HD37AB17D) - measurement of the relative humidity (RH) - measurement of the temperature (T)

Logging interval	selectable within: 3,6,12,15,30,60 seconds, 2,3,4,5 minutes The stored values represent the average value of the samples that are stored every three seconds.
Printing interval	selectable within: 3,6,12,15,30,60 seconds, 2,3,4,5 minutes The printed values represent the average value of the samples that are stored every three seconds.

Sensor Features

Relative Humidity RH

Sensor	Capacitive sensor
Sensor protection	Net filter made of stainless steel (on request filter P6 in AISI316 sintered 10µm or filter P7 in PTFE sintered 20µm)
Measurement range	0...100 % RH
Sensor working range	-20...+60°C
Accuracy	±1.5%RH (0÷90%RH) ±2%RH in the remaining range, for T=15…35°C ±(1,5+1.5%of the measured value)%RH for T= -20…+60°C
Resolution	0,1%
Thermal effects	±2% on whole temperature range
Hysteresis and repeatability	1% RH
Response time (T_{90})	< 20 sec. (air speed = 2m/sec) without filter
Long term stability	1%/year

Temperature T

Sensor type	NTC 10kΩ
Measurement range	-20...+60°C
Accuracy	±0.2°C ±0.15% of the measure
Resolution	0,1°C
Response time (T_{90})	< 30 sec. (air speed = 2m/sec)
Long term stability	0.1°C/year

Carbon monoxide CO (only HD37AB17D)

Sensor	Electro chemical cell
Measurement range	0…500ppm
Sensor working range	-5…50°C
Accuracy	±3ppm±3% of the measured value
Resolution	1ppm
Response time (T_{90})	< 50 sec.
Long term stability	5% of the measure/year
Expected life	> 5 years in normal environmental conditions

Carbon dioxide CO_2

Sensor	NDIR with a double wave length
Measurement range	0…5000 ppm
Sensor working range	-5…50°C
Accuracy	±50ppm±3% of the measurement
Resolution	1ppm
Thermal effects	0,1%f.s./°C
Response time (T_{90})	< 120 sec. (air speed = 2m/sec)
Long term stability	5% of the measure/ 5 years

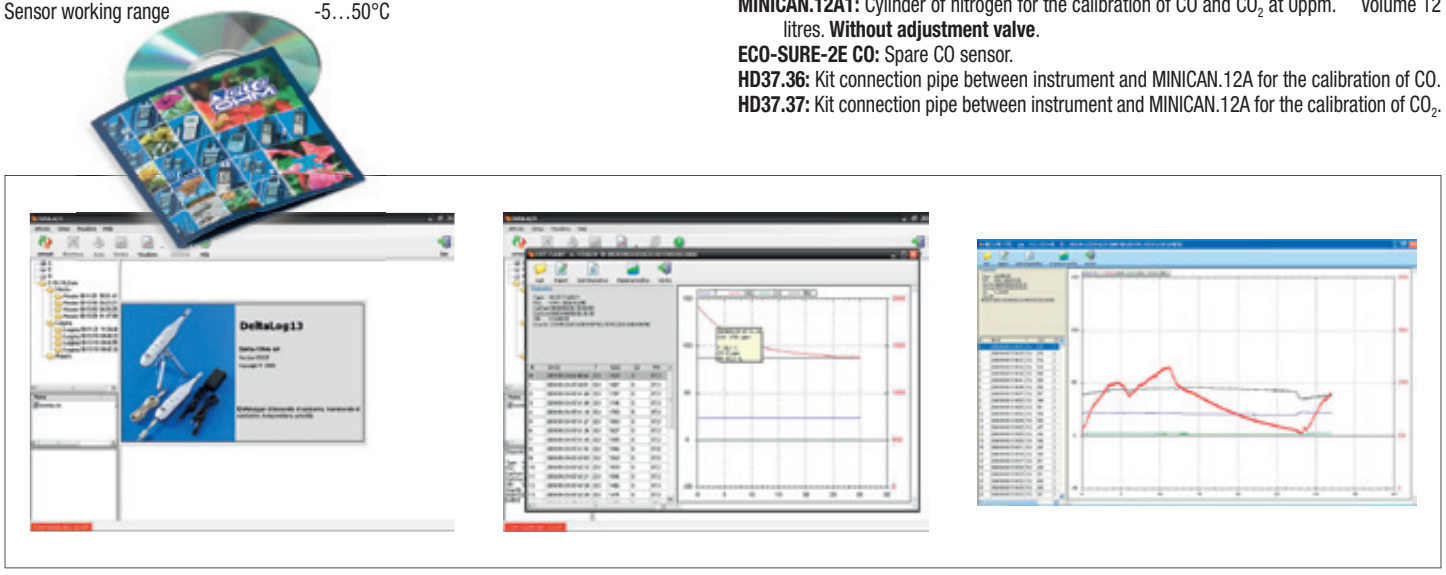
Ordering codes

HD37AB17D: The kit consists of: **HD37AB17D** instrument to measure CO (Carbon monoxide), CO_2 (Carbon dioxide), RH (Relative Humidity), T (Temperature), **DeltaLog13** Software, USB cable code **CP22**, **SWD06** power supply, **BAT-2** batteries pack, instruction manual, carrying case.

HD37B17D: The kit consists of **HD37B17D** instrument to measure CO_2 (Carbon dioxide), RH (Relative Humidity), T (Temperature), **DeltaLog13** Software, USB cable code **CP22**, **SWD06** power supply, **BAT-2** batteries pack, instruction manual, carrying case.

Accessories:

VTRAP20: Instrument tripod, maximum height 270mm.
SWD06: 100-240Vac/6Vdc-1A mains voltage power supply.
BAT-20: Replacement batteries pack for HD37AB17D and HD37B17D instruments with integrated temperature sensor.
P6: Sintered stainless steel 10µ grid protection, for probes diameter 14, thread M12×1.
P7: 20µ, PTFE protection for probes diameter 14, thread M12×1.
P8: Stainless steel and Pocan 20µ protection for probes diameter 14, thread M12×1.
HD75: Saturated solution for testing the Relative Humidity with 75% HR, complete with adapter for probes diameter 14, thread M12×1.
HD33: Saturated solution for testing the Relative Humidity with 33% HR, complete with adapter for probes diameter 14, thread M12×1.
MINICAN.12A: Cylinder of nitrogen for the calibration of CO and CO_2 at 0ppm. Volume 12 litres. **With adjustment valve**.
MINICAN.12A1: Cylinder of nitrogen for the calibration of CO and CO_2 at 0ppm. Volume 12 litres. **Without adjustment valve**.
ECO-SURE-2E CO: Spare CO sensor.
HD37.36: Kit connection pipe between instrument and MINICAN.12A for the calibration of CO.
HD37.37: Kit connection pipe between instrument and MINICAN.12A for the calibration of CO_2.



HD21AB
HD21AB17

HD21AB, HD21AB17
INDOOR AIR QUALITY MONITORS

HD21AB and **HD21AB17** IAQ Monitors are bench-top/portable instruments manufactured by **Delta Ohm** for the analysis of indoor air quality (IAQ, Indoor Air Quality).
The instruments simultaneously measure the parameters:
- **Carbon Dioxide** CO_2
- **Carbon Monoxide** CO
- **Atmospheric Pressure**

The **HD21AB17** instrument also measures:
- **Temperature**
- **Relative Humidity**

and it calculates:
- **Dew Point**
- **Wet Bulb Temperature**
- **Absolute Humidity**
- **Mixing Ratio**
- **Enthalpy**

HD21AB and **HD21AB17** are dataloggers with a memory capacity of 67600 recordings, divided in 64 blocks. They use the **DeltaLog10 software from version 0.1.5.3**.
Reference Standards: **ASHRAE 62.1 – 2004**, **Italian Legislative Decree 81/2008**. These regulations apply to all confined spaces that could be used by people. Kitchens, baths, changing rooms and swimming pools are included, due to their high humidity. You should take into account, in regard to air quality, possible chemical, physical and biological contaminants.
The instruments have a wide Dot Matrix graphic display with a resolution of 160x160 dots.
The instruments typical applications are:
- Measurement of IAQ (*Indoor Air Quality*) and comfort conditions in schools, offices and indoor spaces.
- Analysis and study of the Sick Building Syndrome, and of the resulting consequences.
- Checking the HVAC (*Heating, Ventilation and Air Conditioning*) system efficiency.
- Examination of IAQ conditions in factories to optimize microclimate and improve productivity.
- Building Automation checks.

Instrument Technical Data

Instrument	
Dimensions (Length x Width x Height)	210x90x40 mm (HD21AB) 300x90x40 mm (HD21AB17 with probe)
Weight	470 g (batteries included)
Materials	ABS, rubber
Display	Backlit, Dot Matrix 160x160 dots, visible area 52x42 mm
Operating conditions	
Operating temperature	-5…50°C
Warehouse temperature	-25…65°C
Working relative humidity	0 … 85% RH without condensation
Protection degree	IP30
Instrument uncertainty	± 1 digit @ 20°C
Power supply	
Mains adapter (code SWD10)	12Vdc/1A
Batteries	4 x 1.2V Ni-MH rechargeable batteries AA type
Autonomy	8 hours of continuous use in measure mode
Power absorbed with instrument off	< 45μA
Security of stored data	Unlimited
Serial interface:	
Socket:	mini-USB
Type:	USB 1.1 or 2.0 not insulated
Baud rate:	460800
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	Xon-Xoff
Cable length:	Max 5 m
Memory	Divided in 64 blocks.
Storage capacity	67600 recordings.
Logging interval	Selectable among: 15, 30 seconds, 1, 2, 5, 10, 15, 20, 30 minutes and 1 hour.

HD21AB17

Logging interval	Storage capacity	Logging interval	Storage capacity
15 seconds	About 11 days and 17 hours	10 minutes	About 1 year and 104 days
30 seconds	About 23 days and 11 hours	15 minutes	About 1 year and 339 days
1 minute	About 46 days and 22 hours	20 minutes	About 2 years and 208 days
2 minutes	About 93 days and 21 hours	30 minutes	About 3 years and 313 days
5 minutes	About 234 days and 17 hours	1 hour	About 7 years and 261 days

Technical data of the sensors

CO_2 Carbon Dioxide

Sensor	NDIR Dual Wavelength
Measurement range	0 … 5000ppm
Sensor working range	-5 … 50°C
Accuracy	±50ppm±3% of measurement
Resolution	1ppm
Temperature dependence	0.1%f.s./°C
Response time (T_{90})	< 120 sec (air speed = 2m/sec)
Long-term stability	5% of measurement/5 years

CO Carbon Monoxide

Sensor	Electrochemical cell
Measurement range	0 … 500ppm
Sensor working range	-5 … 50°C
Accuracy	±3ppm±3% of measurement
Resolution	1ppm
Response time (T_{90})	< 50 sec
Long-term stability	5% of measurement/year
Service life	> 5 years in normal environment conditions

Atmospheric Pressure Patm

Type of sensor	Piezo-resistive
Measurement range	750 … 1100 hPa
Accuracy	±1.5 hPa @ 25°C
Resolution	1 hPa
Long-term stability	2hPa/year
Temperature drift	±3hPa with temperature -20 … +60°C

Relative Humidity RH (HD21AB17 only)

Type of sensor	Capacitive
Sensor protection	Stainless steel grid filter (on request 10µm sintered filter P6 in AISI 316 or 20µm sintered filter P7 in PTFE)
Measurement range	0 … 100 % RH
Sensor working range	-20 … +60°C
Accuracy	±1.5%RH (0..90% RH) ±2%RH (elsewhere) for T=15…35°C ±(1.5+1.5% of the measure)%RH for T= -20…+60°C
Resolution	0.1°C
Temperature dependence	±2% on all temperature range
Hysteresis and repeatability	1% RH
Response time (T_{90})	< 20 sec (air speed = 2m/sec) without filter
Long-term stability	1%/year

Temperature T (HD21AB17 only)

Type of sensor	NTC 10kΩ
Measurement range	-20 … +60°C
Accuracy	±0.2°C ±0.15% of measurement
Resolution	0.1°C
Response time (T_{90})	< 30 sec (air speed = 2m/sec)
Long-term stability	0.1°C/year

ORDERING CODES

HD21AB: IAQ Monitor datalogger kit. It measures CO, CO_2 and atmospheric pressure. Complete with: **DeltaLog10** software (**version 0.1.5.3 and later**) for data download, monitor, and data processing on Personal Computer, 4 x 1.2V NiMH rechargeable batteries, operating manual, case. **The cables must be ordered separately.**

HD21AB17: IAQ Monitor datalogger kit. It measures CO, CO_2, atmospheric pressure, temperature and relative humidity. Complete with: **DeltaLog10** software (**version 0.1.5.3 and later**) for data download, monitor, and data processing on Personal Computer, 4 x 1.2V NiMH rechargeable batteries, operating manual, case. **The cables must be ordered separately.**

Accessories:

SWD10: Stabilized power supply at 100-240Vac/12Vdc-1A mains voltage.
CP23: Connection cable with type B MiniUSB connector on instrument's side and USB 2.0 connector on PC's side.
BAT-40: Spare batteries with built-in temperature sensor.

Accessories for CO and CO_2 sensors:

MINICAN.12A: Nitrogen bottle for CO and CO_2 sensor calibration at 0ppm. Volume 12 liters. **With adjustment valve.**
MINICAN.12A1: Nitrogen bottle for CO and CO_2 sensor calibration at 0ppm. Volume 12 liters. **Without adjustment valve.**
ECO-SURE-2E CO: CO spare sensor
HD37.36: Kit connection tube between instrument and MINICAN.12A for CO calibration.
HD37.37: Kit connection tube between instrument and MINICAN.12A for CO_2 calibration.

Accessories for Humidity sensor:

HD75: Saturated solution at 75.4%RH@20°C for calibration of relative humidity probes, ring M24x1.5 and M12x1.
HD33: Saturated solution at 33.0%RH@20°C for calibration of relative humidity probes, ring M24x1.5 and M12x1.
P6: Complete protection in 10µm sintered AISI 316 for Ø 14mm probes.
P7: Complete protection in 20µm sintered PTFE for Ø 14mm probes.
P8: 20µm protection grid in stainless steel and Pocan for Ø 14mm probes, thread M12x1.

HD21AB

HD37BT…
HD37VBT...
HD377BT…
HD 37V7BT...

HD 37BT…, HD 37VBT..., HD 377BT…, HD 37V7BT...
CO_2, CO_2 AND TEMPERATURE TRANSMITTERS

The series of transmitters HD37BT… and HD37VBT... are used mainly in air quality control by measuring CO_2 (carbon dioxide) in the ventilation systems. This allows you to vary the number of air change per hour according to ASHRAE and IMC norms.

The purpose is twofold: have a good air quality in the presence of people and save energy, increasing or decreasing parts of air per hour, depending on the air quality set.

Their use is for environments where there is overcrowding of people, discontinuous crowding, cafeterias, auditoriums, schools, hospitals, greenhouses, livestock breeding, etc.

The models HD377BT... and HD37V7BT... measure, in addition to CO_2, also the temperature. ***The analog outputs, current 4...20mA or voltage 0...10Vdc, should be specified when ordering***.

All transmitters have an alarm digital output suitable to control, for example, an external relay coil. All transmitters have a digital alarm suitable to control, for example, an external relay coil. The alarm is activated to pass a threshold set at the factory to 1500ppm, the threshold beyond which a man feels uncomfortable.

The sensing element is made of a particular infrared sensor (NDIR technology: Non-Dispersive Infrared Technology) that compensates the effect of its aging thus ensuring accurate and stable measurements for a long time, by the use of a double filter and a particular measurement technique.

The use of a protective membrane, through which the air to be analyze is diffused, minimizes the negative effect of atmospheric agents and dust on the performance of the transmitter. A removable and washable filter is placed at the air flow transmitter inlet.

The installation methods may be:

- Wall mounted – ***TV Version***,
- With power flow horizontally fixed to the container, to be extent ventilation duct – ***TO Version***,
- Wall outlet with flow separate with two tubes, connected to the electronics to the extent ventilation duet – **TC Version**,

In versions with power flow channel and separate electronics, the air is drawn into the measurement chamber. The same flow then returns to the channel through a second tube. **The air flow needs to be at least 1m/s.**

To fix the air inlet to the duct, you can use the HD9008.31 flange, a 3/8" universal biconical fitting or a PG16 metallic fairlead with a Ø 14 mm internal diameter.

The air inlets connected to the transmitter by means of flexible tubes are attached to the channels flowing air: we supply air inlets for square or rectangular ducts (code HD3719) and for circular ducts (code HD3721). In order to maintain the specified accuracy, the cable length should be 1m.

Technical characteristics			Notes
CO_2 Measurement Principle		Double wave length infrared technology (NDIR)	
CO_2 Measurement Range		0 … 2000ppm 0 … 5000ppm	
CO_2 Accuracy	f.s. 2000ppm	±(50ppm+3% of measurement)	at 20°C, 50%RH and 1013hPa
	f.s. 5000ppm	±(50ppm+4% of measurement)	
Temperature Measurement Range		0 …+50°C	Models HD377BT… and HD37V7BT…
Temperature Accuracy		±0.3°C	
Analog Outputs (according to the models)		4 …20mA 0 …10VDC	R_L < 500Ω R_L > 10kΩ
Digital Output (all models)	Type	Open-collector (N.O.)	(*) Factory Preset
	CO_2 Threshold	1500ppm (*)	
	Vmax	40VDC	
	Pmax	400mW	
Power supply		16…40Vdc or 24Vac ±10%	
Absorption		<2W	
Startup Stabilization Time		15 minutes	To guarantee the stated accuracy.
Response Time $\tau_{63\%}$		120s	Wind speed of at least 1m/s.
Temperature effect %		0.2%/°C CO_2	Typical value
Atmospheric Pressure effect		1.6%/kPa	Deviation compared to the value at 101kPa
Long-term Stability		5% of the range / 5 years	Typical value
Calibration		At one point at 0ppm or 400ppm clear air	Automatic detection of the applied CO_2 level.
Working Temperature/ Relative Humidity		-5 …+50°C, 0 ... 90%RH without condensation	
Storage Temperature/Relative Humidity		-10 …+60°C, 0 ... 90%RH without condensation	
Electronics Protection Degree		IP21	Wall mounted models (TV).
		IP65	Horizontal probe models (TO), probe excluded.
		IP65	Separate probe models (TC), probe excluded.
Case size		80x84x44	Probe excluded.
Case material		ABS	

Model description

Model	Type of output	Measured quantities		
	4 … 20mA	0 …10Vdc	CO_2	Temperature
HD37BT...	✓		✓	
HD37VBT...		✓	✓	
HD377BT...	✓		✓	✓
HD37V7BT...		✓	✓	✓

Model	Probe	CO_2 Measurement Range
...BTV	Wall mounted model	0...2000ppm
...BTV.1	Wall mounted model	0...5000ppm
...BT0.1	CO_2 model with horizontal air inlet L=115mm CO_2 /temperature model with horizontal air inlet L=120mm	0...2000ppm
...BT0.11	CO_2 model with horizontal air inlet L=115mm CO_2 /temperature model with horizontal air inlet L=120mm	0...5000ppm
...BT0.2	CO_2 model with horizontal air inlet L=315mm CO_2 /temperature model with horizontal air inlet L=320mm	0...2000ppm
...BT0.21	CO_2 model with horizontal air inlet L=315mm CO_2 /temperature model with horizontal air inlet L=320mm	0...5000ppm
...BTC	Wall mounted model with attachments for an air inlet separate from the duct	0...2000ppm
...BTC.1	Wall mounted model with attachments for an air inlet separate from the duct	0...5000ppm

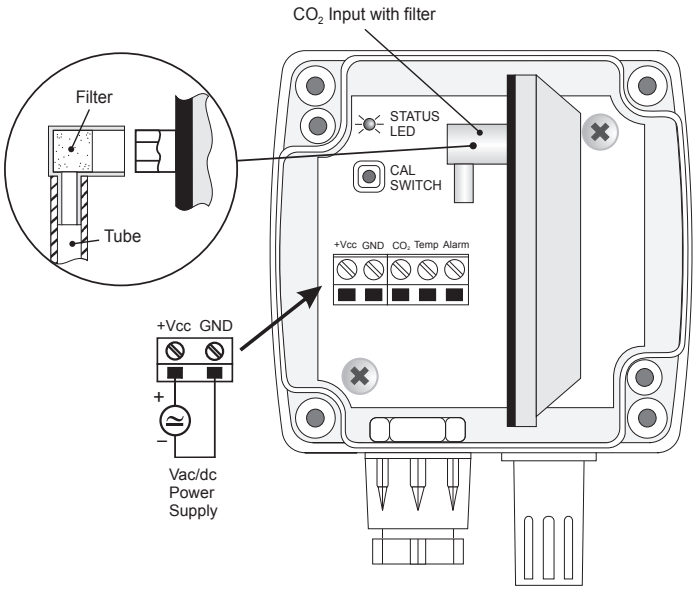
Calibration

The instruments are calibrated at the factory and do not usually require further action by the user.

However, it is possible to perform a new calibration that corrects the sensor offset:

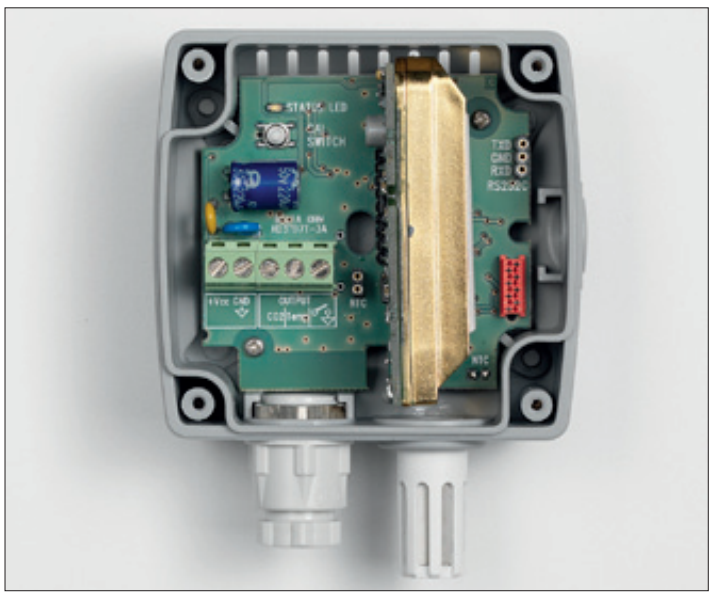
• (approx. 400ppm) in clean air
• to 0ppm with nitrogen bottles (code MINICAN.20A).
The instrument can automatically recognize the calibration methods used: whether 400ppm or 0ppm. The calibration should be performed on one point only: each new calibration cancels the previous one.

Proceed as follows:



Open the instrument top cover to discover the CAL SWITCH calibration key on the board and the calibration gas inlet.

1. If you need to make a calibration around 400ppm, leave the entrance open: in this case, make sure to apply clean air to the instrument.
2. For a calibration at 0ppm, connect the tube of the nitrogen cylinder to the CO_2 input. Adjust the bottle flow meter on a flow between 0.3 and 0.5l/min.
3. Power up the instrument according to specifications and wait at least 15 minutes before proceeding.
4. Supply CO_2 for at least 2 minutes so as to stabilize the measurement.
5. By continuing providing CO_2 to the instrument, keep the CAL SWITCH key pressed for at least 5 seconds until the STATUS LED starts flashing: the two-minutes calibration starts. At this stage, the instrument measures CO_2 and is calibrated at a value closed to 0ppm, if you use the nitrogen cylinder, or to 400ppm, if the calibration is performed at clean air.
6. Wait the **two minutes** necessary for calibration without changing the working conditions.
7. When the LED turns off, the calibration is completed.



HD37VBTV

Installation Notes

The choice of the number of CO_2 transmitters to be used in a typical installation and location should be based on the fact that the distribution of CO_2 in the atmosphere is influenced by the same factors that determine temperature distribution. Among these factors are convection, diffusion and forced air movement in the environment.
For an accurate control, you should use a CO_2 transmitter (TV model) in each place where a temperature controller is installed. You can also opt for a single device (TO or TC model) installed in the control point of the air quality.

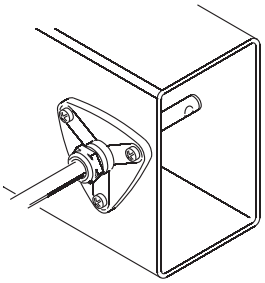
For the wall mounted TV models

The transmitter has to be installed into a location with good air circulation, away from doors, windows or entry points of fresh air from outside.
The height from the floor should be at least 1.5 meters.

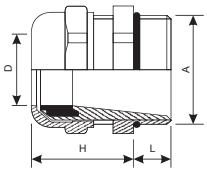
For the TO models with horizontal air inlet from the duct

- The transmitter should be installed so that the air inlet is correctly oriented with the flow into the channel. In the probe head there is an arrow indicating the correct direction of airflow. To facilitate the installation, on the left side of the container, **at the flow inlet that goes to the sensor**, the following symbol is printed.

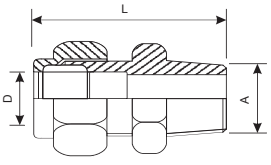
- To fix the probe into a duct with a flat surface (square or rectangular), use the HD9008.31.12 flange, a PG16 metallic fairlead with Ø 14 mm internal hole or a 3/8" biconical universal fitting with Ø 14 mm internal hole.



HD9008.31 flange



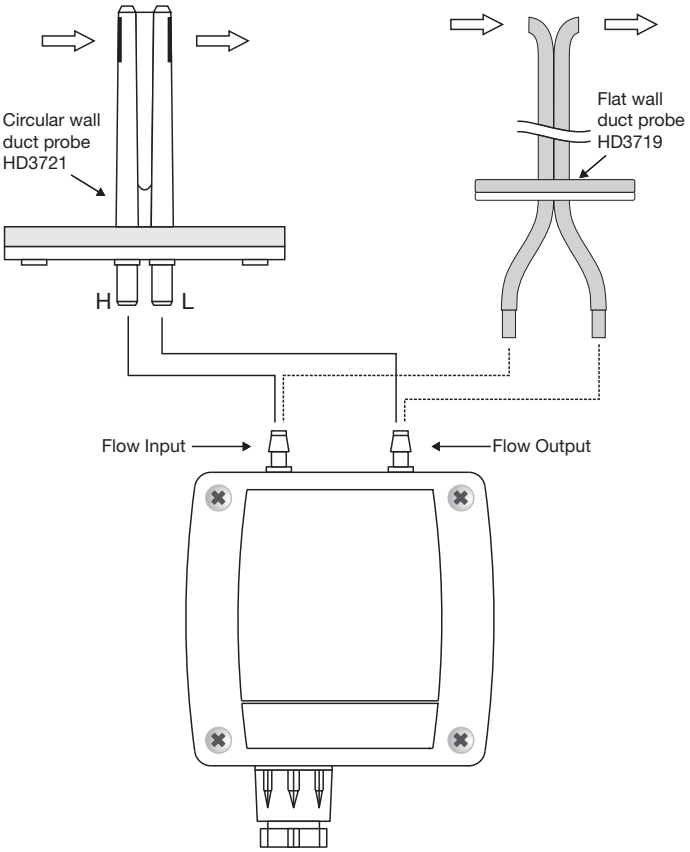
PG16 metallic fairlead
D = 10…14mm
L = 6.5mm
H = 23 mm
A = PG16



Biconical universal fitting
L = 35 mm
D = 14 mm
A = 3/8"

For the TC models with air inlet separated from electronics

There are two probes available: one coded HD3719, for flat walls ducts (square or rectangular section), the other coded HD3721, for circular section ducts. Please see the following figures.



The outlet channel should be oriented so that the flow enters from the inlet connected to the junction on the left side of the housing and exits from the right side.

Electrical connections

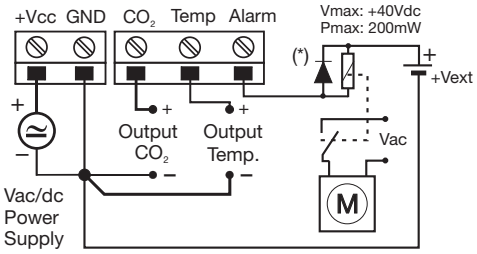
Power supply

Supply the instrument with the voltage reported on the technical specifications: the power terminals are indicated by +Vdc and GND.

Analog Outputs

The output depends on each model:

- for CO_2 transmitters, it is between CO_2 and GND terminals
- for CO_2 and temperature transmitters, it is between CO_2 and GND, Temp and GND terminals



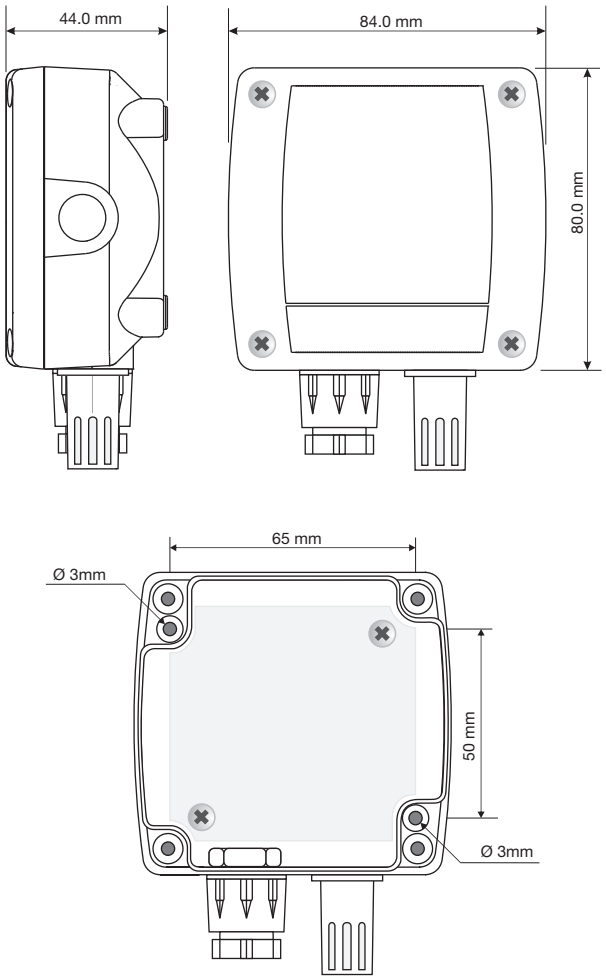
Digital Output

The diagram shows an example of application of digital output that, in this case, controls an ***external relay*** coil. When exceeding the alert threshold (1500ppm), the relay contact closes and activates an adjustment device.

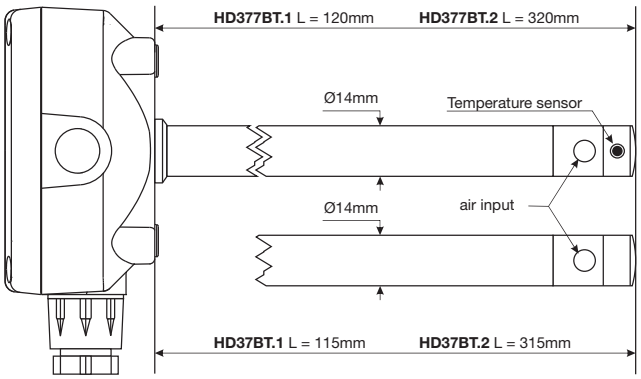
(*) ***Warning***: Protect the digital output by applying a protection diode as shown in the figure.

Do not exceed the maximum reverse voltage and power limits indicated in the technical information.

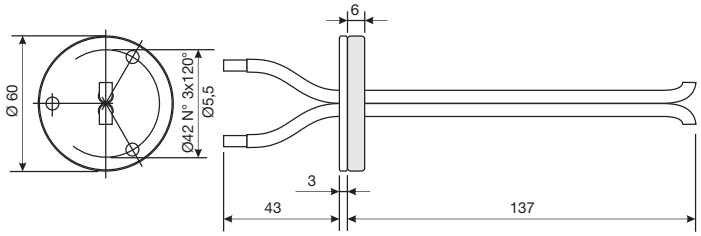
HD37BTV / HD377BTV sizes



Drilling template

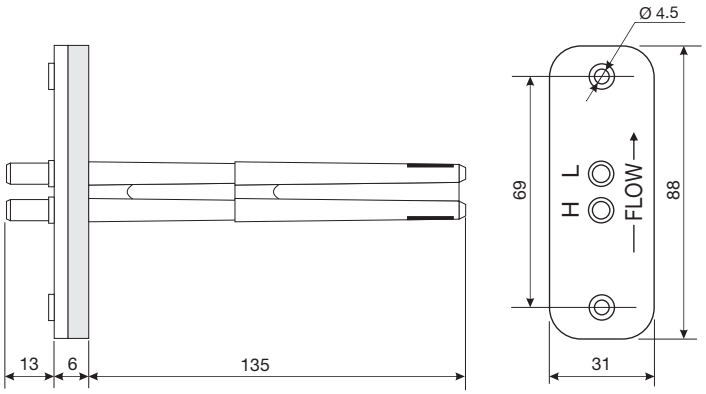


Duct air inlet sizes



HD3719 Duct Probe

HD37BTC



AP3721 Duct Probe

Purchasing codes

HD37BT...: CO_2 active transmitter, analog output 4…20mA.
Power supply 16...40VDC or 24VAC. Functioning temperature -5°C ... +50°C. Alarm digital output for levels of CO_2 > 1500ppm.
HD37BTV: Wall mounted one-piece version. CO_2 Measurement Range 0…2000ppm.
HD37BTV.1: Wall mounted one-piece version. CO_2 Measurement Range 0…5000ppm.
HD37BTO.1: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=115mm. CO_2 Measurement Range 0…2000ppm.
HD37BTO.11: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=115mm. CO_2 Measurement Range 0…5000ppm.
HD37BTO.2: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=315mm. CO_2 Measurement Range 0…2000ppm.
HD37BTO.21: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=315mm. CO_2 Measurement Range 0…5000ppm.
HD37BTC: Wall mounted one-piece version with attachments for an air inlet separate from the duct CO_2 Measurement Range 0…2000ppm.
HD37BTC.1: Wall mounted one-piece version with attachments for an air inlet separate from the duct CO_2 Measurement Range 0…5000ppm.

HD37VBT...: CO_2 active transmitter, analog output 0...10VDC.
Power supply 16...40VDC or 24VAC. Functioning temperature -5°C ... +50°C. Alarm digital output for levels of CO_2 > 1500ppm.
HD37VBTV: Wall mounted one-piece version. CO_2 Measurement Range 0…2000ppm.
HD37VBTV.1: Wall mounted one-piece version. CO_2 Measurement Range 0…5000ppm.
HD37VBTO.1: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=115mm. CO_2 Measurement Range 0…2000ppm.
HD37VBTO.11: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=115mm. CO_2 Measurement Range 0…5000ppm.
HD37VBTO.2: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=315mm. CO_2 Measurement Range 0…2000ppm.
HD37VBTO.21: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=315mm. CO_2 Measurement Range 0…5000ppm.
HD37VBTC: Wall mounted one-piece version with attachments for an air inlet separate from the duct CO_2 Measurement Range 0…2000ppm.
HD37VBTC.1: Wall mounted one-piece version with attachments for an air inlet separate from the duct CO_2 Measurement Range 0…5000ppm.

HD377BT...: CO_2 and temperature active transmitter, analog output 4…20mA. Temperature range 0…+50°C, non-modifiable. Power supply 16...40VDC or 24VAC. Functioning temperature -5°C ... +50°C. Alarm digital output for levels of CO_2 > 1500ppm.
HD377BTV: Wall mounted one-piece version. CO_2 Measurement Range 0…2000ppm.
HD377BTV.1: Wall mounted one-piece version. CO_2 Measurement Range 0…5000ppm.
HD377BTO.1: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=120mm. CO_2 Measurement Range 0…2000ppm.
HD377BTO.11: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=120mm. CO_2 Measurement Range 0…5000ppm.
HD377BTO.2: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=320mm. CO_2 Measurement Range 0…2000ppm.
HD377BTO.21: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=320mm. CO_2 Measurement Range 0…5000ppm.

HD37V7BT...: CO_2 and temperature active transmitter, analog outputs 0...10VDC. Temperature range 0…+50°C, non-modifiable. Power supply 16...40VDC or 24VAC. Functioning temperature -5°C ... +50°C. Alarm digital output for levels of CO_2 > 1500ppm.
HD37V7BTV: Wall mounted one-piece version. CO_2 Measurement Range 0…2000ppm.
HD37V7BTV.1: Wall mounted one-piece version. CO_2 Measurement Range 0…5000ppm.
HD37V7BTO.1: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=120mm. CO_2 Measurement Range 0…2000ppm.
HD37V7BTO.11: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=120mm. CO_2 Measurement Range 0…5000ppm.
HD37V7BTO.2: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=320mm. CO_2 Measurement Range 0…2000ppm.
HD37V7BTO.21: Duct version with horizontal air inlet in AISI 304 steel diameter 14mm, L=320mm. CO_2 Measurement Range 0…5000ppm.

HD9008.31: Wall flange with fairlead for Ø 14mm probe mounting.
PG16: Metallic fairlead for Ø 14mm probes.
HD3719: Air inlet for square or cylindrical ducts. Two 1 m tube segments Ø3.2/Ø6.4. For ...BTC and ...BTC.1 models.
HD3721: Air inlet for cylindrical ducts, in plastic material. Two 1 m tube segments Ø3.2/Ø6.4. For ...BTC and ...BTC.1 models.
MINICAN.20A: Nitrogen bottle for CO_2 at 0ppm calibration. Volume 20 liters. With adjustment valve.
MINICAN.20A1: Nitrogen bottle for CO_2 at 0ppm calibration. Volume 20 liters. Without adjustment valve.
T37…m: PVC Crystal tube Ø int. 3,2mm / Ø ext. 6,4mm, length upon request.

Order codes for CO_2 transmitters

HD37 X B T X . X

- **No sign** = Range CO_2 0…2000ppm. **1** = Range CO_2 0…5000ppm.
- **V** = Wall mounted **0.1** = 115mm air inlet from ducts **0.2** = 315mm air inlet from ducts **C** = Separate probe from ducts
- **B** = CO_2 output
- **No sign** = Analog output 4…20mA **V** = Analog output 0…10Vdc

Order codes for CO_2 and temperature transmitters

HD37 X 7B T X . X

- **No sign** = Range CO_2 0…2000ppm. **1** = Range CO_2 0…5000ppm.
- **V** = Wall mounted **0.1** = 120mm air inlet from ducts **0.2** = 320mm air inlet from ducts
- **B** = CO_2 output **7** = Temperature output
- **No sign** = Analog output 4…20mA **V** = Analog output 0…10Vdc

HD 45…
HD 46…

HD45… AND HD46… SERIES
TRANSMITTERS AND REGULATORS FOR HUMIDITY, TEMPERATURE AND CO_2

The instruments of the series **HD45** and **HD46** are transmitters, indicators and regulators, to measure and control, depending on the model, the following environmental parameters:
- Relative humidity (RH)
- Ambient temperature (T)
- Carbon dioxide (CO_2)
- Dew point temperature (DP, calculated measurement)

They are suitable for monitoring indoor air quality.
A typical application is the examination of air quality in: buildings where there is crowding of people (schools, hospitals, auditoriums, cafeterias, etc.); workplaces to optimize comfort and in general to see if there are small losses CO which may cause explosions or fire. This analysis allows the adjustment of air conditioning (temperature and humidity) and ventilation (changes air/hour) in order to achieve a twofold objective: good air quality according to the ASHRAE and IMC standards and energy savings.
The measurement of RH (Relative Humidity) is obtained with a capacitive sensor. In models **HD46** ... the relative humidity and temperature sensor with their calibration data are contained within an easily replaceable module. The instrument can also calculate the information on the dew point.
The temperature T is measured with a high precision NTC sensor.
The measurement of CO_2 (carbon dioxide) is obtained with a special infrared sensor (**NDIR** technology: Non-Dispersive Infrared Technology), which, by using a double filter and a particular measurement technique, ensures accurate measurements and stable measurements over time. The presence of a protective membrane, which is spread through the air portion, protects the sensor from dust and weather. The instrument can be wall mounted and sensors are internal to the instrument.
The instruments are factory calibrated and require no further adjustment by the installer.

The instruments are wall mounted and their sensors are installed inside the housing.
There are versions with **analogue output voltage 0÷10V, current output 4÷20mA** or connectable to a PC via **RS485** with **MODBUS RTU** protocol, which allows connection of multiple transmitters on the same network.
The versions with **relay** allow to monitor the environmental parameters measured when exceeding the threshold set by the user. The operation of the relay is very versatile, having modes of activation above and below the threshold, and single or double threshold modes. The thresholds are configurable by the user throughout the whole measurement range.
The LCD display option allows simultaneous viewing of all values measured by the instrument.
The model **HD45 BVR** and the **HD45 BAR** are distinguished by their ability to indicate an immediate level of air quality, through ignition of the LED indicators associated with graphic symbols.
All the functions of the instrument can be configured quickly and intuitively through a PC.
The instruments are easy to use and yet have a complete configuration possibilities, that makes them versatile and able to meet many needs in various application fields. The instruments are supplied with a standard configuration that makes them immediately operational. Upon request, the devices can be supplied with custom configurations.
Models of the series **HD46…** can be equipped with keyboard that allows you to easily configure the instrument even without a PC connection. The models having a keypad are fitted with backlit display, activated by the touch of a button.
Models of the series **HD45…** with relay have a switch hardware that allows quick selection of the threshold between a set of preset values.
All models carry the "logging" of continuous measures, and data can be transferred to the PC.
The instruments work with 24Vac or 15…35Vdc power supply.

Technical data
Characteristics of the sensors

Relative humidity RH *(for models HD45 17…, HD46 17… and HD46 17B…)*	
Sensor	Capacitive
Measuring range	0...100 % RH -40…+85°C Dew point Td
Working range of the sensor	-40...+80°C
Accuracy	±1.5%RH (0..90%RH) ±2%RH (elsewhere) for T=15…35°C ±(1.5+1.5% of the measure)%RH for T=40…+80°C For the dew point please see the relevant table
Resolution	0,1%
Temperature dependence	2% on the whole temperature range
Hysteresis and repeatability	1%RH
Response time (T_{90})	<20 sec. (air speed = 2m/sec and stable temperature)
Long-term stability	1%/year

Temperature T *(for models HD45 17…, HD45 7B…, HD46 17… and HD46 17B…)*	
Sensor type	NTC 10kΩ
Measuring range	-30...+85°C (-22…+185°F)
Accuracy (except for models with current outputs)	±0.2°C ±0.15% of the measured value within 0…70°C ±0.3°C ±0.15% of the measured value within -30…0°C and 70…85°C
Accuracy (for models with 4÷20mA)	±0.5°C ±0.15% of the measured value within -30°C…+85°C
Resolution	0,1°C
Response time (T_{90})	<30 sec. (air speed = 2m/sec)
Long-term stability	0.1°C/year

Carbon dioxide CO_2 *(for models HD45 7B…, HD45 B…and HD46 17B…)*	
Sensor	Dual wavelength NDIR
Measuring range	0…5000 ppm
Working range of the sensor	0…50°C
Accuracy	±(50ppm+3% of the measured value) @ 20°C and 1013hPa
Resolution	1ppm
Temperature dependence	0,1%f.s./°C
Response time (T_{90})	<120 sec. (air speed = 2m/sec and stable temperature)
Long-term stability	5% of the measured value /5years

Accuracy of the dew point Td (°C)

The dew point is a calculated quantity that depends on the accuracy of the calibration of relative humidity and temperature.

Temperature (°C)	Relative humidity(%)					
	10	**30**	**50**	**70**	**90**	**100**
-20	0.92	0.49	0.30	0.22	--	--
0	1.05	0.56	0.35	0.25	0.20	0.18
20	1.18	0.75	0.45	0.34	0.27	0.23
50	1.27	0.88	0.56	0.42	0.33	0.30
100	1.30	1.17	0.76	0.58	0.47	0.42

Characteristics of the instrument

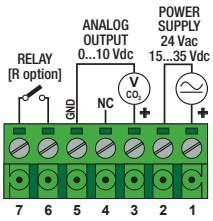
Measuring frequency	1 sample every 3 seconds
Storage capacity	2304 records
Storage interval	Selectable within 30s, 1m, and 5m The stored values represent the average values of samples collected every 3 seconds in selected storage interval.
Serial output	Serial output for USB (mini- USB/USB cable with adapter cod. RS45 or RS45I) RS485 MODBUS-RTU (only HD45…S… and HD46…S…)
Safety of stored data	Unlimited
Analogue output	0…10Vdc (R_L > 10kΩ) *(only HD45…V…and HD46…V)* 11Vdc outside the measuring range 4÷20mA ($R_{L\ MAX}$ = 400Ω) (only HD45_A and HD46_A) 22mA out of the measuring range Active current output
Relay output	Two-state *(only HD45…R and HD46…R)* Contact: max 1A @ 30Vdc resistive load
Power supply	24Vac ± 10% (50…60Hz) or 15…35Vdc
Power consumption	100 mW (except of the models with current output) 400 mW (for the models with current output)
Stabilizing time	15 minutes (to guarantee the declared accuracy)
Working temperature of the instrument	0°C ... 50°C
Working humidity of the instrument	0%RH ... 90%RH no condensate
Dimensions (LxHxW)	80 x 80 x 30 mm *(HD45.17…)* 80 x 80 x 34 mm *(HD45.B… and HD45.7B…)* 120 x 80 x 30 mm *(HD46.17…)* 120 x 80 x 34 mm *(HD46.17B…)*
Housing material	ABS
Weight	50g
Protection degree	IP30

Installation

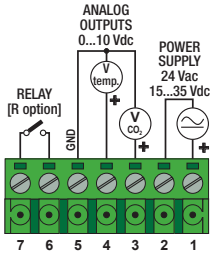
The container is easy and quick to open. Simply press the two tabs of the container to remove the front panel and have immediately available the terminal block connections and fixing holes.

Electrical connections

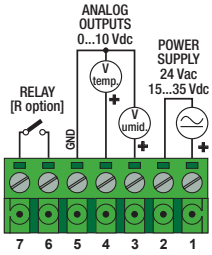
Series HD45...



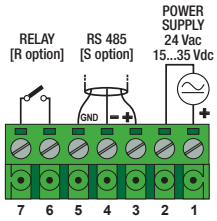
HD45 B...V
HD45 B...VR



HD45 7B...V
HD45 7B...VR

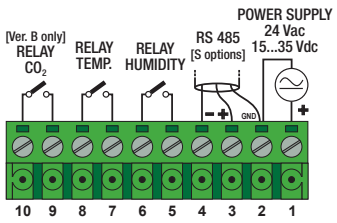


HD45 17...V
HD45 17...VR

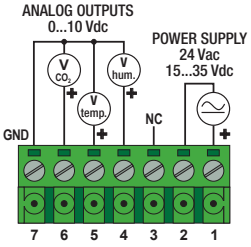


HD45...R
HD45...S
HD45...SR

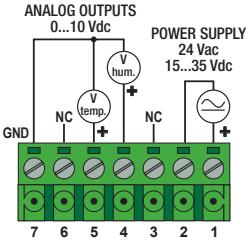
Series HD46...



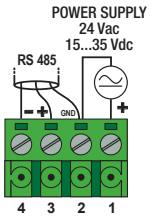
HD46...R
HD46...SR



HD46 17B...V



HD46 17...V



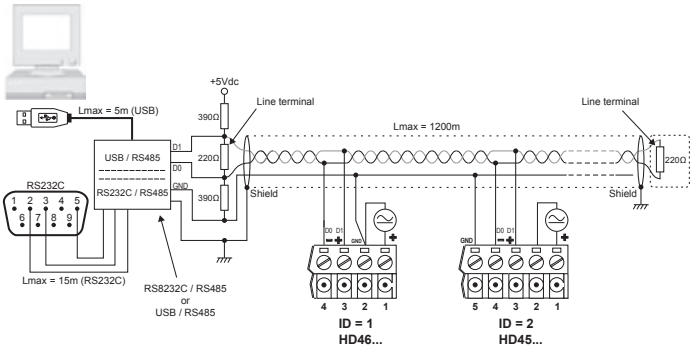
HD46...S

Configuration

The instruments are equipped with serial output easily accessible on the side of the instrument that allows you to connect to the USB port of your PC via the cable **RS45** or **RS45I** with built-in adapter, for custom configurations.
With the **RS45** cable the instrument is powered directly from the USB port of your PC, thus allowing the configuration of the instrument in the field using a laptop before installing fixed.

RS485 Connection

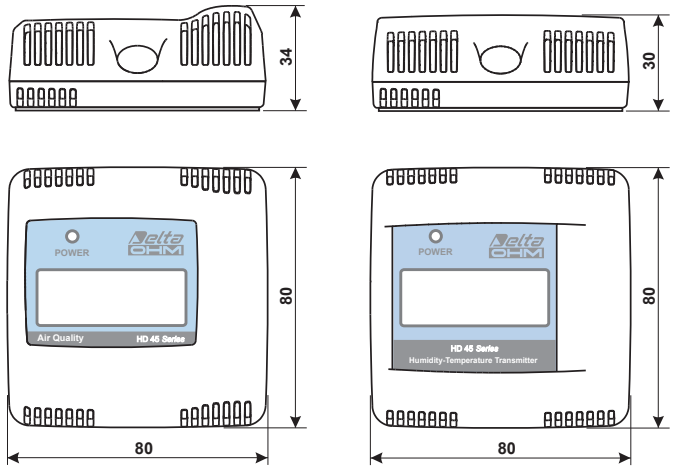
Models with RS485 output function using the **MODBUS RTU** protocol. For PC connection, insert a converter RS232C/RS485 or USB/RS485.



Dimensions of the housing

All dimensions are expressed in mm.

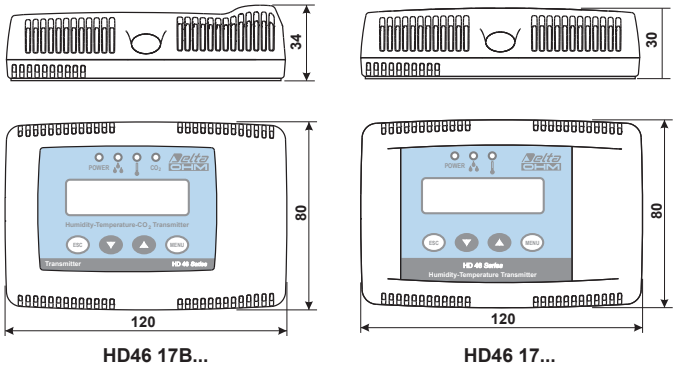
Series HD45...



HD45 B...
HD45 7B...

HD45 17...

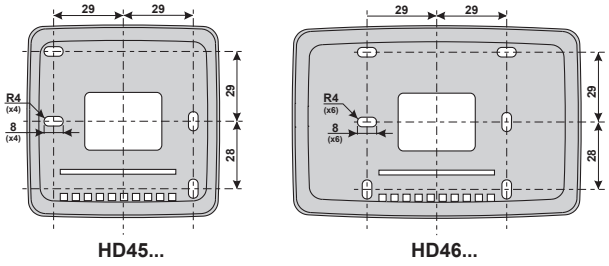
Series HD46...



HD46 17B...

HD46 17...

Fixing holes



HD45...

HD46...

Ordering codes

HD45 ☐☐☐

AVAILABLE OPTIONS

A = Analogue output 4÷20mA
V = Analog output 0÷10Vdc
S = RS485 output
R = Relay output
VR = Analog output 0÷10Vdc + relay
AR = Analog output 4÷20mA + relay
SR = RS485 + relay
It is not possible to have the analogue output when you have the RS485, and vice versa.

D = With display
No character = without display

Sensors
17 = Relative humidity + temperature
7B = Temperature + CO_2
B = CO_2

HD46 ☐☐☐

AVAILABLE OPTIONS

A = Analogue output 4÷20mA
V = Analogue output 0÷10Vdc
S = Output RS485
R = Relay output
SR = RS485 output + relay outputs
It is not possible to have the analogue output when you have the RS485, and vice versa.
Option V includes one analogue output for each measured quantity.
Options R and SR include one analogue output for each measured quantity.

D = With display
DT = With display and keyboard
No character = Without display and without keyboard
Option DT is available only together with option R or SR.

Sensors
17 = Humidity + temperature
17B = Humidity, temperature and CO_2

AVAILABLE MODELS

The instruments are available in the following versions:

HD45 17... Humidity and temperature
HD45 7B... Temperature and CO_2
HD45 B... CO_2
HD46 17B... Humidity, temperature, and CO_2
HD46 17... Humidity and temperature

Upon request it is possible to have the option with 0 ... 10Vdc analogue output (option **V**) or 4÷20mA option (option **A**) for each quantity measured by the instrument or RS485 MODBUS-RTU serial output (option **S**). There are no models with both types of output.

It is available the option with relay only (option **R**). In models **HD46 ...** there is one relay for each quantity measured by the instrument. In models **HD45 ...** there is one relay that can be associated with one of the quantities measured by the instrument.

It is possible to have the relay output (or outputs) together with serial output RS485 MODBUS-RTU (option **SR**).

The relay output together with the analogue output (option **VR** or **AR**) is available only on the models **HD45...**

All models can be supplied with LCD (option **D**).

In the series **HD46 ...** versions with relay outputs are available with display and keyboard (option **DT**)

The following table lists the available models:

Model	RH	T	CO_2	Analog output	RS485 output	Relay output	LCD	LED
HD45 17V	✓	✓		✓ (2 outputs)				Power
HD45 17A	✓	✓		✓ (2 outputs)				Power
HD45 17S	✓	✓			✓			Power
HD45 17R	✓	✓				✓ (1 output)		Power
HD45 17SR	✓	✓			✓	✓ (1 output)		Power
HD45 17VR	✓	✓		✓ (2 outputs)		✓ (1 output)		Power
HD45 17AR	✓	✓		✓ (2 outputs)		✓ (1 output)		Power
HD45 17DV	✓	✓		✓ (2 outputs)			✓	Power
HD45 17DA	✓	✓		✓ (2 outputs)			✓	Power
HD45 17DS	✓	✓			✓		✓	Power
HD45 17DR	✓	✓				✓ (1 output)	✓	Power
HD45 17DSR	✓	✓			✓	✓ (1 output)	✓	Power
HD45 17DVR	✓	✓		✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 17DAR	✓	✓		✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 7BV		✓	✓	✓ (2 outputs)				Power
HD45 7BA		✓	✓	✓ (2 outputs)				Power
HD45 7BS		✓	✓		✓			Power
HD45 7BR		✓	✓			✓ (1 output)		Power
HD45 7BSR		✓	✓		✓	✓ (1 output)		Power
HD45 7BVR		✓	✓	✓ (2 outputs)		✓ (1 output)		Power
HD45 7BAR		✓	✓	✓ (2 outputs)		✓ (1 output)		Power
HD45 7BDV		✓	✓	✓ (2 outputs)			✓	Power
HD45 7BDA		✓	✓	✓ (2 outputs)			✓	Power
HD45 7BDS		✓	✓		✓		✓	Power
HD45 7BDR		✓	✓			✓ (1 output)	✓	Power
HD45 7BDSR		✓	✓		✓	✓ (1 output)	✓	Power
HD45 7BDVR		✓	✓	✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 7BDAR		✓	✓	✓ (2 outputs)		✓ (1 output)	✓	Power
HD45 BV			✓	✓ (1 output)				Power
HD45 BA			✓	✓ (1 output)				Power
HD45 BS			✓		✓			Power
HD45 BR			✓			✓ (1 output)		Power
HD45 BSR			✓		✓	✓ (1 output)		Power
HD45 BVR			✓	✓ (1 output)		✓ (1 output)		4 LED CO_2 level
HD45 BAR			✓	✓ (1 output)		✓ (1 output)		4 LED CO_2 level
HD45 BDV			✓	✓ (1 output)			✓	Power
HD45 BDA			✓	✓ (1 output)			✓	Power
HD45 BDS			✓		✓		✓	Power
HD45 BDR			✓			✓ (1 output)	✓	Power
HD45 BDSR			✓		✓	✓ (1 output)	✓	Power
HD45 BDVR			✓	✓ (1 output)		✓ (1 output)	✓	Power
HD45 BDAR			✓	✓ (1 output)		✓ (1 output)	✓	Power

Model	RH	T	CO_2	Analog output	RS485 output	Relay output	LCD keyboard	LED
HD46 17V	✓	✓		✓ (2 outputs)				Power
HD46 17A	✓	✓		✓ (2 outputs)				Power
HD46 17S	✓	✓			✓			Power
HD46 17R	✓	✓				✓ (2 outputs)		Power UR + T
HD46 17SR	✓	✓			✓	✓ (2 outputs)		Power UR + T
HD46 17DV	✓	✓		✓ (2 outputs)			only LCD	Power
HD46 17DA	✓	✓		✓ (2 outputs)			only LCD	Power
HD46 17DS	✓	✓			✓		only LCD	Power
HD46 17DTR	✓	✓				✓ (2 outputs)	✓	Power UR + T
HD46 17DTSR	✓	✓			✓	✓ (2 outputs)	✓	Power UR + T
HD46 17BV	✓	✓	✓	✓ (3 outputs)				Power
HD46 17BA	✓	✓	✓	✓ (3 outputs)				Power
HD46 17BS	✓	✓	✓		✓			Power
HD46 17BR	✓	✓	✓			✓ (3 outputs)		Power UR +T+ CO_2
HD46 17BSR	✓	✓	✓		✓	✓ (3 outputs)		Power UR +T+ CO_2
HD46 17BDV	✓	✓	✓	✓ (3 outputs)			only LCD	Power
HD46 17BDA	✓	✓	✓	✓ (3 outputs)			only LCD	Power
HD46 17BDS	✓	✓	✓		✓		only LCD	Power
HD46 17BDTR	✓	✓	✓			✓ (3 outputs)	✓	Power UR +T+ CO_2
HD46 17BDTSR	✓	✓	✓		✓	✓ (3 outputs)	✓	Power UR +T+ CO_2

EXAMPLES OF ORDERING CODES

HD45 7BDVR: Transmitter, indicator and regulator for temperature and CO_2. Two analogue outputs 0 ÷ 10V, one configurable relay to control temperature or CO_2.

HD45 BVR: Transmitter, indicator and regulator for CO_2. Without display, with LED indicators of the CO_2 level, with analogue output 0 ÷ 10V, with relay.

HD45 17VR: Transmitter and regulator for humidity and temperature. Without display, with two analogue outputs 0 ÷ 10V, one configurable relay to control the humidity or temperature.

HD45 17AR: Transmitter and regulator for humidity and temperature. Without display, with two analogue outputs 4÷20mA, one configurable relay to control humidity or temperature.

HD45 17DV: Transmitter and indicator for humidity and temperature. With display, two analogue outputs 0 ÷ 10V, without relay.

HD45 7BSR: Transmitter and regulator for temperature and CO_2. Without display, with RS485 output, no analogue output, with one configurable relay to control temperature or CO_2.

HD46 17BDV: Transmitter and indicator for humidity, temperature and CO_2. With display, without keyboard, with three analogue outputs 0 ÷ 10V, without relays and without RS485.

HD46 17BDTSR: Transmitter, indicator and regulator for humidity, temperature and CO_2. Display and keyboard, three relay outputs, RS485 output.

HD46 17S: Humidity and temperature transmitter. No display and no keyboard, no relays, with RS485 output.

ACCESSORIES

DeltaLog14.: Software for connecting to the PC via the serial output, for the configuration of the instrument and data download. For Windows®operating systems.

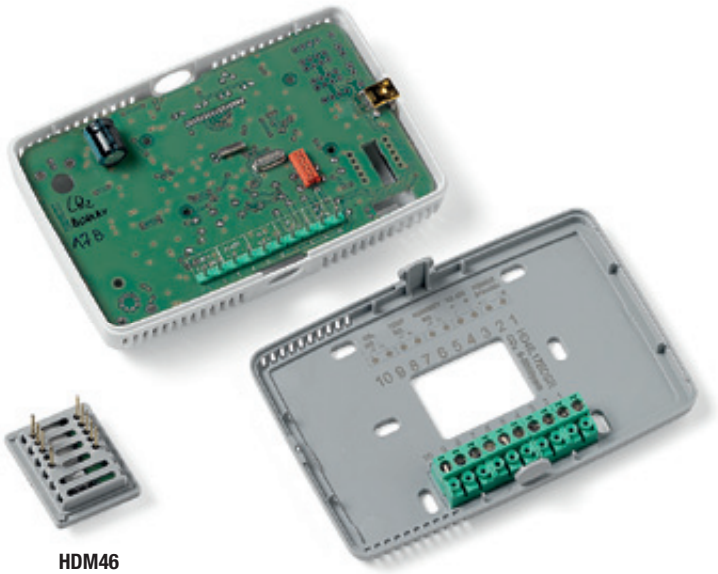
HDM46: Calibrated humidity and temperature replacement module (only for models HD46…)

RS45: Not isolated serial connection cable with built-in adapter. USB connector for PC and mini-USB connector for the serial port of the instrument. The cable powers the instrument.

RS45I: Isolated serial connection cable with built-in adapter. USB connector for PC and mini-USB connector for the serial port of the instrument. The cable does not power the instrument.

HD45TCAL: The Kit includes the **RS45** cable with built-in adapter and the CD-ROM with the **DeltaLog14** software for Windows operating systems. The cable is provided with USB connector on the PC side and mini- USB connector for the serial port of the instrument.

HD45TCALI: The Kit includes the **RS45I** cable with built-in adapter and the CD-ROM with the **DeltaLog14** software for Windows operating systems. The cable is provided with USB connector on the PC side and mini- USB connector for the serial port of the instrument.



HDM46