CRN TECNOPART, S.A.
Sant Roc 30
08340 VILASSAR DE MAR (Barcelona)
Tel 902 404 748 - 937 591 484 Fax 937 591 547
e-mail:crn@crntp.com http:// www.crntecnopart.com

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CO_2 TRANSMITTERS
HD 37BT... HD 37BTV... HD 377BT... HD 37V7TV

The HD37BT… and HD37VBT... series transmitters are mainly employed in air quality control through CO2 (Carbon Dioxide) measurement in ventilation systems.
This allows changing the air change rate per hour according to ASHRAE and IMC norms. The purpose is dual: a good air quality in trafficked spaces and saving energy by increasing or decreasing the air change rate, according to the request. They are used in crowded spaces, in discontinuously crowded areas, kitchens, auditoria, schools, hospitals, greenhouses, livestock holdings, etc.
The HD377BT... and HD37V7BT... models measure, in addition to CO2, also the temperature. The analog outputs, current 4...20mA or voltage 0...10Vdc, should be specified when making the order. All transmitters have an alarm digital output suitable to control, for example, an external relay coil. The alarm switches when the factory preset threshold of 1500ppm is exceeded. This limit that causes discomfort to human beings when exceeded. The sensitive element is a particular infrared sensor (NDIR technology: Non-Dispersive Infrared Technology) that, by using a double filter and a particular measurement technique, compensates its aging effect guaranteeing accurate and stable measurements over a long time. The analysed air passes trough a protection membrane, reducing to the minimum the negative effect of atmospheric agents and dust on the transmitter performance.
On the transmitter's air inlet, there is a filter that can be removed and cleaned.

The installation methods may be:
• Wall mounted – **TV Version**,
• With horizontal air inlet, attached to the case, for ventilation ducts measuremen t**– TO Version**,
• Wall mounted with separate air inlet, connected to the electronics by means of two small tubes, for ventilation ducts measurement **– TC Version**,
In the duct versions and with the air inlet separate from the electronics, the air is transferred inside the measurement chamber. The same flow then returns to the duct through a second tube. The air flow needs to be at least 1m/s.
To mount the air inlet to the duct, you can use the HD9008.31 flange, a 3/8" biconical universal fitting or a PG16 metallic fairlead with a τ 14 mm internal diameter.
The air inlets connected to the transmitter by means of flexible tubes are attached to the ducts in which the air is flowing: 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 lenght should be 1m.

References of models according to types and quantities measured output

MODEL	OUTPUT		MEASURED QUANTITIES	
	4 …20mA	0 …10Vdc	CO_2	Temperature
HD37BT...	**x**		**x**	
HD37VBT...		**x**	**x**	
HD377BT...	**x**		**x**	**x**
HD37V7BT...		**x**	**x**	**x**

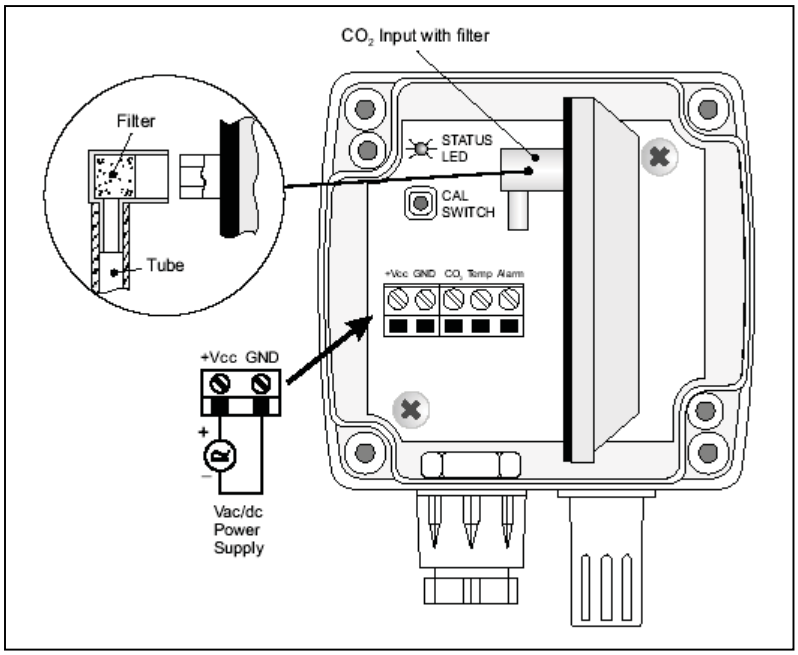
References for the models as probe and measurement range.

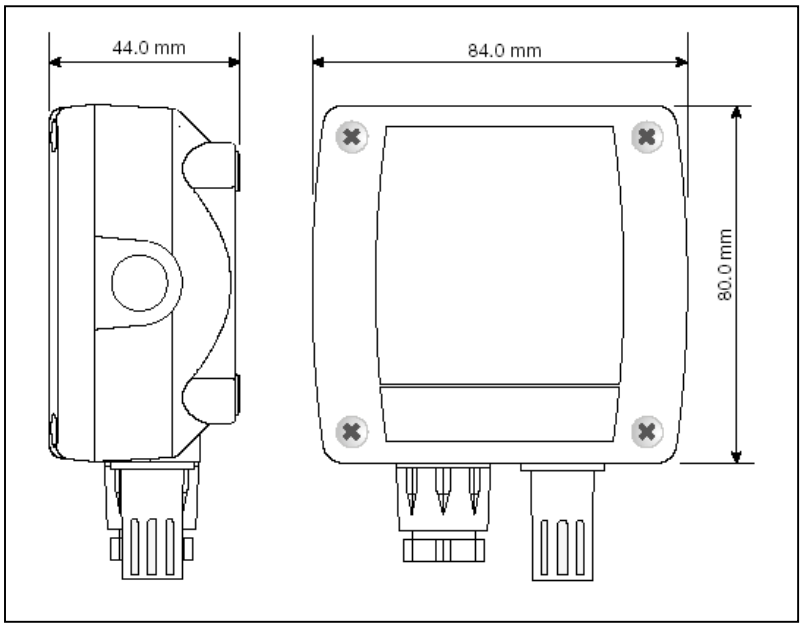
MODEL	PROBE	RANGE CO_2
...BTV	Wall mounted model	0...2000ppm
...BTV.1	Wall mounted model	0...5000ppm
...BTO.1	CO_2 model with horizontal air inlet L=115mm CO_2 /temperature model with horizontal air inlet L=120mm	0...2000ppm
...BTO.11	CO_2 model with horizontal air inlet L=115mm CO_2 /temperature model with horizontal air inlet L=120mm	0...5000ppm
...BTO.2	CO_2 model with horizontal air inlet L=315mm CO_2 /temperature model with horizontal air inlet L=320mm	0...2000ppm
...BTO.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

Technical characteristics			**Notes**
CO_2 Measurement Principle		Double wave lenght infrared technology (NDIR)	
CO_2 Measurement Range		0 … 2000ppm 0 … 5000ppm	
CO_2 Accuracy	f.s. 2000ppm	±(50ppm+3% of measurement	at 20ºC, 50% HR and 1013hPa
	f.s. 5000ppm	±(50ppm+4% of measurement	
Temperature range		0 …+50 ºC	HD377BT… and HD37V7BT… models
Temperature Accuracy		±0.3 ºC	
Analog Outputs (according to the models)		4…20mA 0…10Vdc	RL < 500Ω RL > 10kΩ
Digital Output (all models)	Type	colector a canal abierto (N.O.)	(*) Factory preset
	CO_2 Threshold	1500ppm (*)	
	Vmax	40Vdc	
	Pmax	400mW	
Power supply		16…40Vdc or 24Vac ±10%	
Absortion		<2W	
Startup Stabilization Time		15 minutes	To guarantee the stated accuracy.
Response Time T63%		120s	Wind speed of at least 1m/s.
Temperature effect		0.2%/ºC CO2	Typical value
Atmospheric Pressure effect		1.6%/kPa	Deviation compared to the value at 101kPa
Calibration		At one point at 0ppm or 400ppm clear air	Automatic detection of the applied CO2 level.
Working Temperature/ Relative Humidity		- -5 …+50°C, 0 ... 95%RH without condensation	
Storage Temperature/ Relative Humidity		-10 …+60°C, 0 ... 95%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.
Dimensions		80x84x44	Probe excluded.
Case Material		ABS	

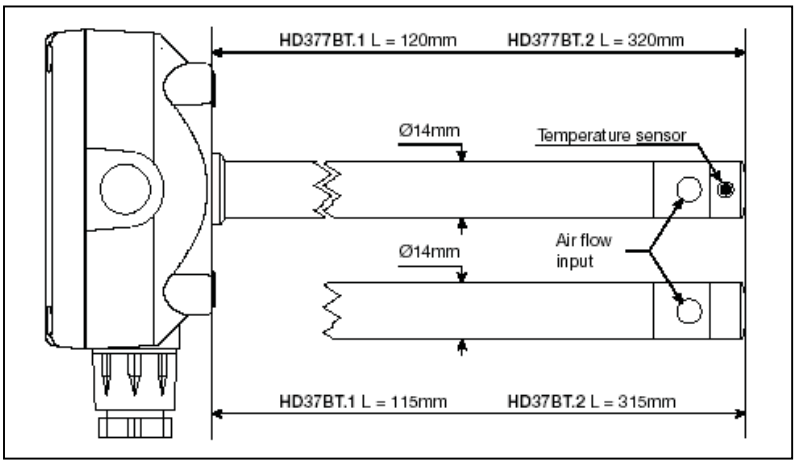
Calibration
The instruments are calibrated in the factory; no calibration is usually required by the user.
However, you can perform a new calibration to correct the sensor offset:
• (approx. 400ppm) in clean air
• at 0ppm with nitrogen bottles (code MINICAN.20A).
The instrument can automatically detect the calibration methods used: whether 400ppm or 0ppm. The calibration should be performed at one point only: each new

Calibration process
Open the instrument upper cover to expose the CAL SWITCH calibration key on
the card and the calibration gas inlet.
1. Let the inlet open if you want to perform a calibration at 400ppm: in such case,
ensure clean air is applied to the instrument.
2. For a calibration at 0ppm, connect the tube from the nitrogen bottle to the CO2
input. Regulate the bottle flow meter at a flow from 0.3 to 0.5l/min.
3. Apply power to the instrument according to specifications and wait at least 15
minutes before continuing.
4. Supply CO2 for at least 2 minutes so as to stabilize the measurement.
5. Continue to supply CO2 to the instrument, keep the CAL SWITCH key pressed
for at least 5 seconds until the STATUS LED starts blinking: The calibration will
start and last two minutes. In this phase the instrument measures the CO2 and
calibrates at a point near 0ppm if you use a nitrogen bottle, or 400ppm if you
calibrate it in clean air.
6. Wait the two minutes necessary for calibration without changing the working
conditions.
7. When the LED turns off, the calibration is complete.



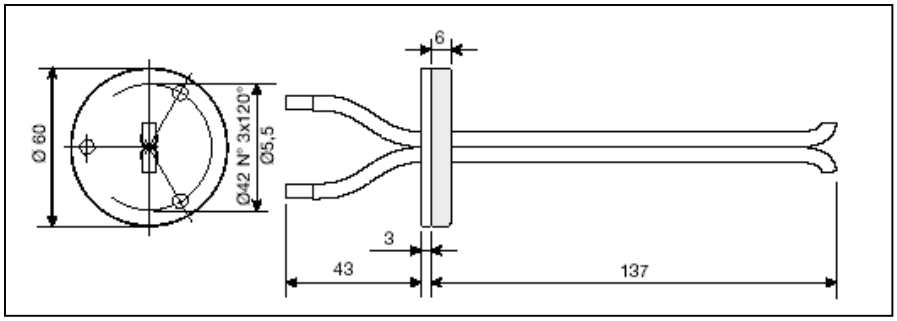


HD37BTV AND HD377BTV SIZES

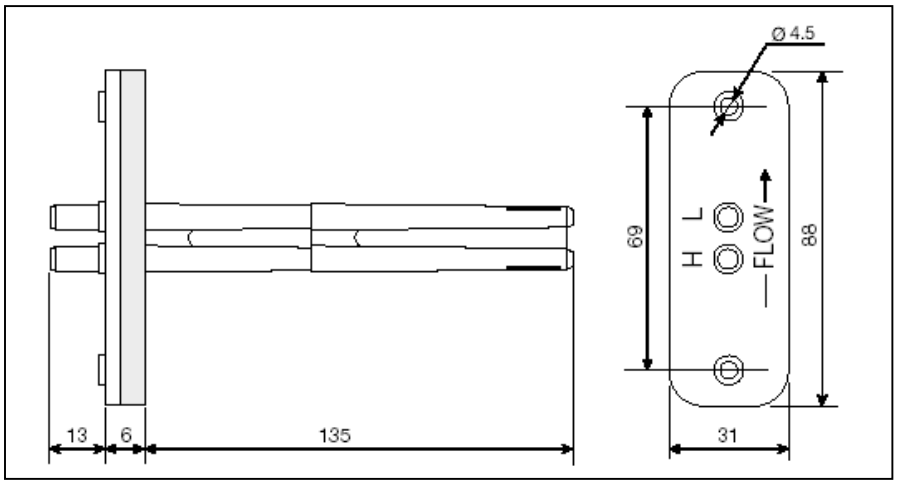


DUCT AIR INLET SIZES

HD3719 DUCT PROBE



HD3721 DUCT PROBE



INSTALLATION NOTES

The choice of the number of CO2 transmitters to be used in a typical installation and their position, should be based on CO2 distribution into a space influenced by the same factors that determine temperature distribution. Among these factors we have air convection, diffusion and forced movement in the environment.

For an accurate control, you should use a CO2 transmitter (TV model) in each place in which a temperature control is mounted. You can also choose a single device (TO or TC model) installed in the air quality control point.

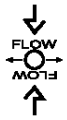
For the wall mounted TV models

The transmitter has to be installed into a position with good air circulation, away from doors, windows or clean air inlets from the outside.

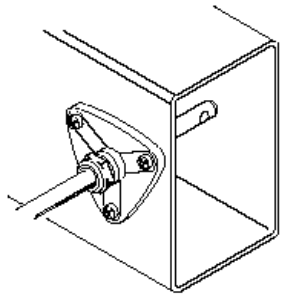
The height from the floor should be at least 1.5 meters.

For the TO models with horizontal air inlet from the duct

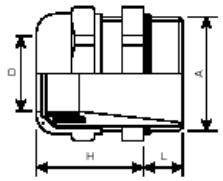
• The transmitter should be installed so that the air inlet is correctly oriented with the flow running in the duct. In the probe's head there is an arrow that indicates the correct air flow direction. To ease installation, on the case left side face, near the air input to the sensor, the following are is engraved.



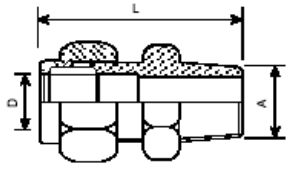
• To set the probe into a duct, with flat surface (square or rectangular), use the HD9008.31.12 flange, a PG16 metallic fairlead with Ø 14 mm internal hole, or a 3/8" biconical universal fitting with Ø 14 mm internal hole.



Flange
HD9008.31



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

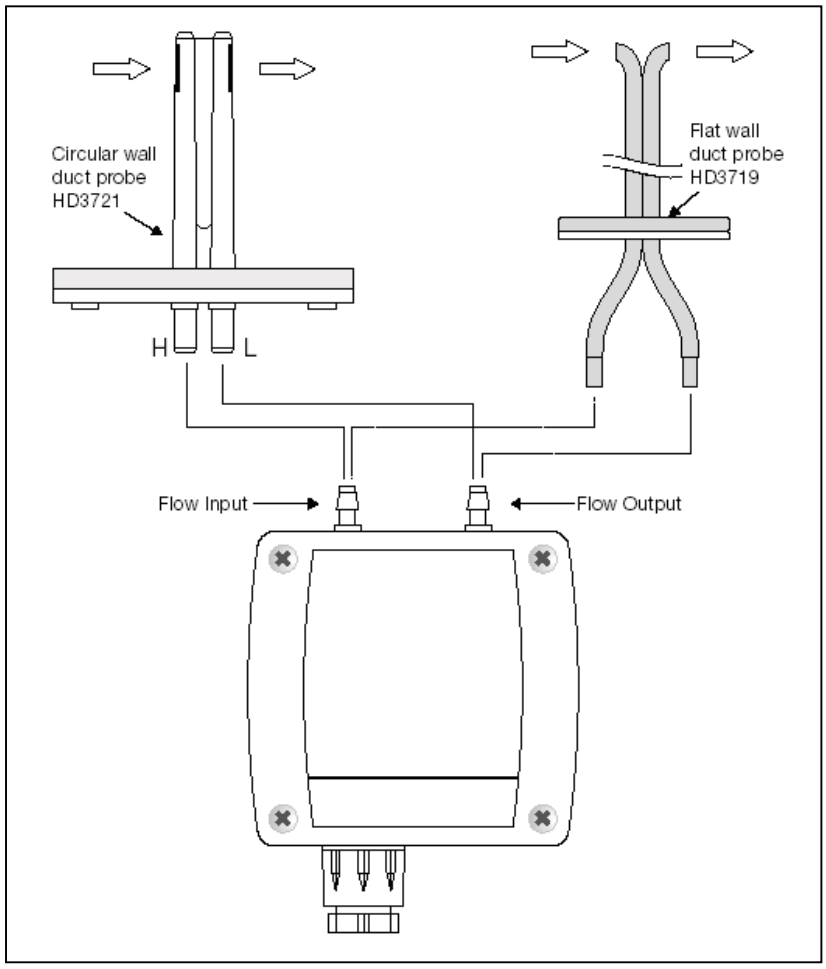


Biconical universal fitting
L = 35 mm
D = 14 mm
A = 3/8"

For the TC models with air inlet separate from electronics

We have two probes: One (code HD3719) for flat walls ducts (square or rectangular section), another (code HD3721) for circular section ducts. Please see the following figure.

The duct air inlet should be oriented so that the flow will enter from the input connected to the left fitting in the case and exit from the right one.



ELECTRICAL CONNECTIONS

Power

Apply power to the instrument according to the voltage indicated in the technical characteristics: The power supply terminals are indicated by +Vcc and GND.

Analog Outputs

The output signal is acquired, according to the model:

• Between the CO2 and GND terminals for CO2 transmitters,

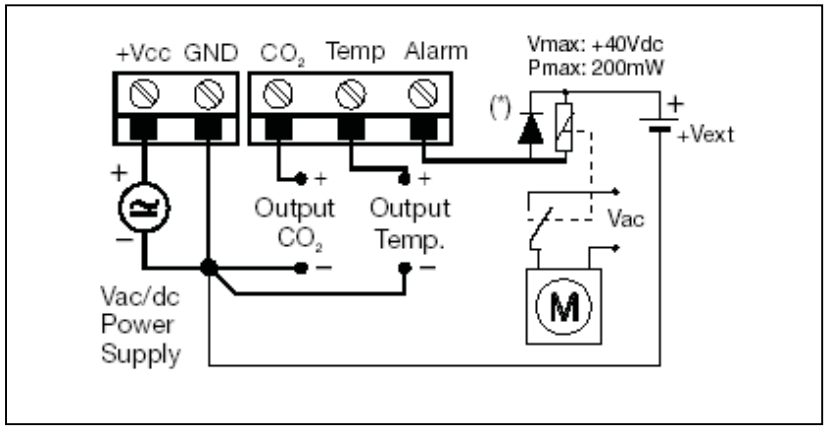
• Between the CO2 and GND, Temp and GND terminals for CO2 and temperature transmitters,

Digital Output

The diagram gives an example of application for a digital output controlling, in this case, an external relay coil. When exceeding the alarm threshold (1500ppm), the relay contact will close and activate an adjustment device.

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

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



Ordering codes

HD37BT...: CO2 active transmitter, analog output 4…20mA. Power supply 16...40VDC or 24VAC.
Functioning temperature -5°C ... +50°C.
Alarm digital output for levels of CO2 > 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 diameter14mm, 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 forlevels 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 digitaloutput 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 CO2 at 0ppm calibration. Volume 20 liters. With adjustment valve.
MINICAN.20A1: Nitrogen bottle for CO2 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.