T8148

Programmable indoor transmitter of temperature and CO_2 concentration with 4-20 mA output

T8248

Programmable indoor transmitter of temperature and CO_2 concentration with 0-10 V output

Instruction Manual

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Manufacturer is not responsible for damages caused by using the device in conflict with this manual.
To damages caused by using the device in conflict with this manual can not be provide free repairs during the warranty period.
Read carefully instruction manual before the first device connection.

Contact address of this device's producer:

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Czech Republic
www.cometsystem.com

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General description

The transmitters are designed for online measurement of carbon dioxide concentration and temperature of air in a building interiors.

device type	construction type	output
T8148	ambient air	4 – 20 mA
T8248	ambient air	0 – 10 V

The CO_2 concentration is measured using the dual wavelength NDIR sensor with multiple point adjustment. The dual wavelength NDIR CO_2 sensing procedure compensates aging of the sensing element and offers maintenance free operation and outstanding long term stability. Measured values can be read in „SLOW mode“ (filtered, averaged) or in „FAST mode“ (current values without averaging). SLOW mode has advantages in applications like climate control because of filtering short time peaks. As an example exhaled air from an employee passing the sensor could affect the climate control negatively with a short response time because the control would trigger a change of the ventilation based on this one-time measurement. On the contrary in „FAST mode“ no software filter is used for calculating the output value. This fact adds a noise of typ. ±30ppm which has to be considered in terms of accuracy.

Measured values are displayed on dual line LCD display. The visual indication of CO_2 concentration is provided by three-color LED.

After power up of the device starts internal test. During this time (about 20s) LCD display shows (----) instead of CO_2 concentration value.

Devices with 4-20 mA outputs can be connected to circuitry by means of galvanically isolated or galvanically non-isolated current loop. Outputs 0 - 10 V are galvanically non-isolated.

All transmitter setting is performed by means of the PC connected via the optional SP003 communication cable (not included in delivery). Program ***TSensor*** for transmitter setting is available to download free at www.cometsystem.com

Models marked Txxxx**Z** are non-standard versions of the transmitters. Description is not included in this manual.

Please read instruction manual before the first device connection.

Device setting from the manufacturer

output 1:	T8148 - range 4 to 20 mA corresponds 0 to 5000 ppm
	T8248 - range 0 to 10 V corresponds 0 to 5000 ppm
output 2:	T8148 - range 4 to 20 mA corresponds -10 to 50ºC
	T8248 - range 0 to 10 V corresponds -10 to 50ºC
measurement mode:	SLOW
display:	switched on
LED indication:	up to 1000 ppm lights green LED, between 1000 and 1200 ppm lights yellow LED and over 1200 ppm lights red LED

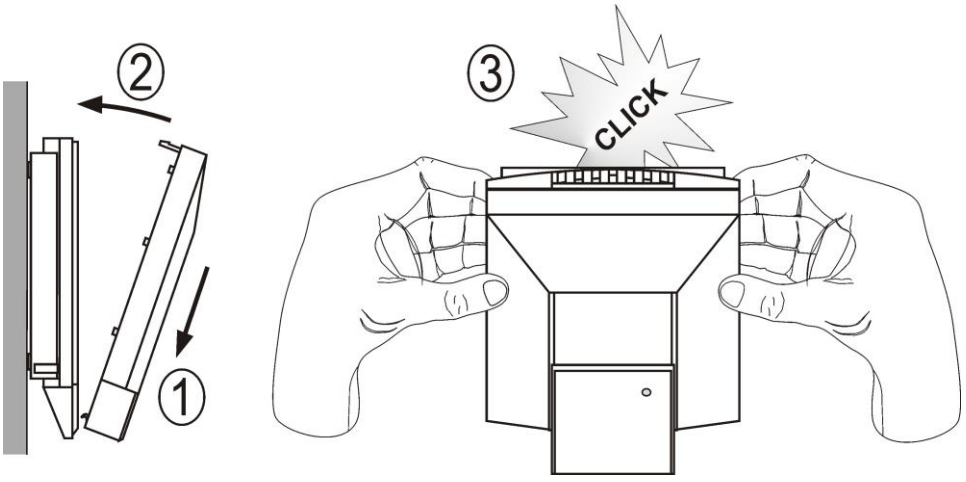
Modification of the setting is possible to do by means of the PC and TSensor program.

Installation of the transmitter

Devices are designed for indoor applications. It is recommended to mount them on universal wiring box (common installation box KU68) with using two enclosed mounting screws. For correct function there is necessary to find proper device place. It shouldn't be placed at places where it can be affected by sunshine, near radiators, heating elements and other heat sources, air handlers, windows, doors, into racks and shelves and similar places. For buildings with less thermal insulation there is not suitable to place them on external walls of building. If there are communication conductors placed into conduit, there is strongly recommended make it caulk, to restrict air flow around device.

For transmitter connection it is recommended to use a shielded cable. Maximum cable lenght of the current loop is 1200 m, maximum voltage output cable lenght is 15 m. The cable should not be led in parallel along power cabling. Safety distance is up to 0.5 m otherwise undesirable induction of interference signals can appear.

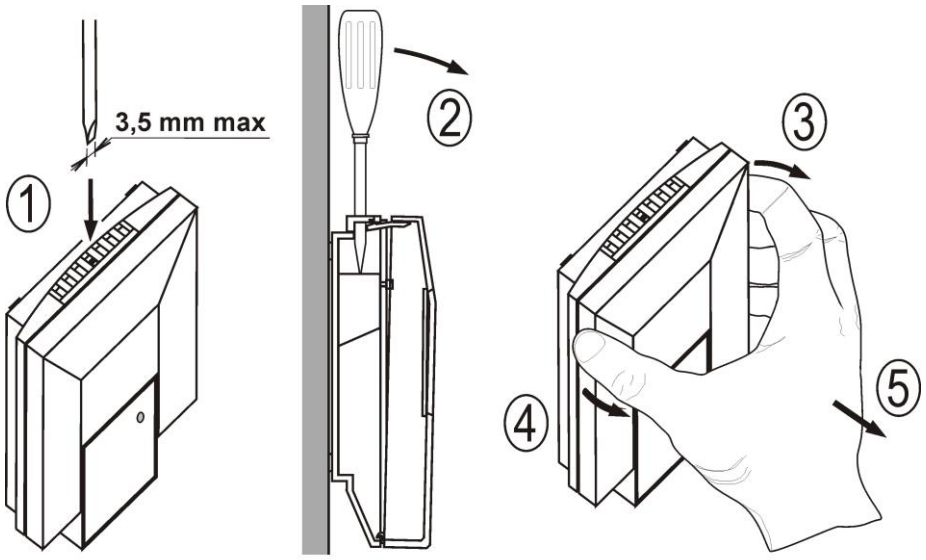
Firstly mount the rear part of the device on the wiring box with two screws. Connect cables to terminals (terminals are self-clamping and can be opened by a suitable screwdriver). By jumpers J1 and J2 select galvanically or non-galvanically isolated current output (T8148), see „Typical application wiring". Finish the installation by inserting the front part of the unit.



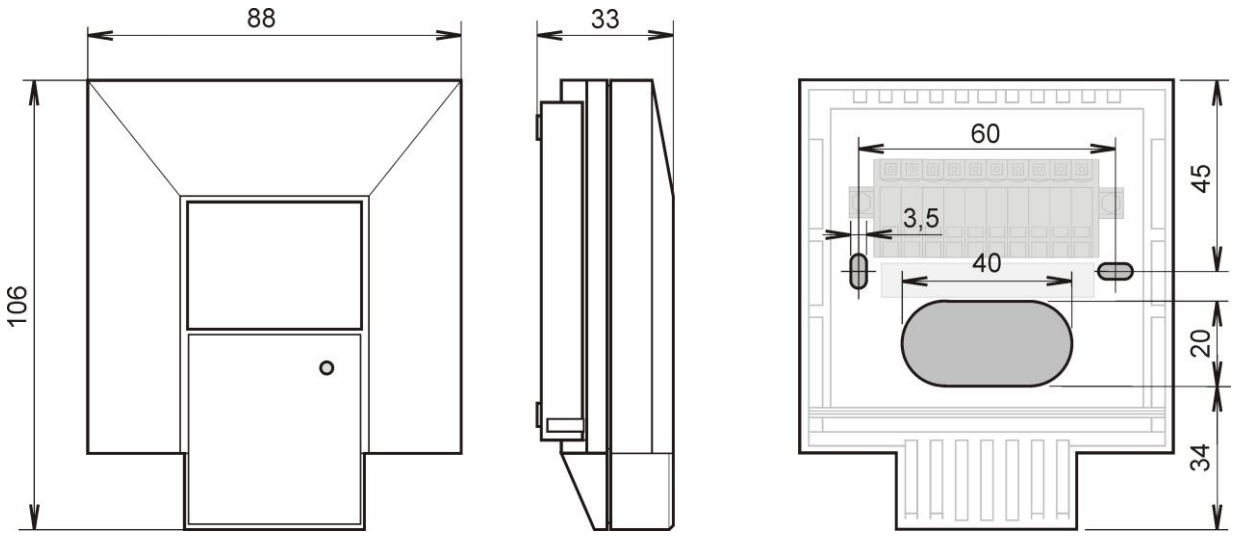
Installation and electrical wiring should be performed by qualified personal only.

Device demounting

If there is necessary demount the device, insert flat bladed screwdriver max. 3.5 mm wide from top side into middle device's air hole. There is fastening member placed, insert screwdriver beyond the fastening member about 2 cm deep. Then slightly move screwdriver in arrow direction, it unlock fastening member and the device is partially opened. Remove the screwdriver and take front part of device at top.Pull front part with pendulum motion and remove front cover. If there is necessary remove rear part of the device, please disconnect cables and unscrew two holding screws.

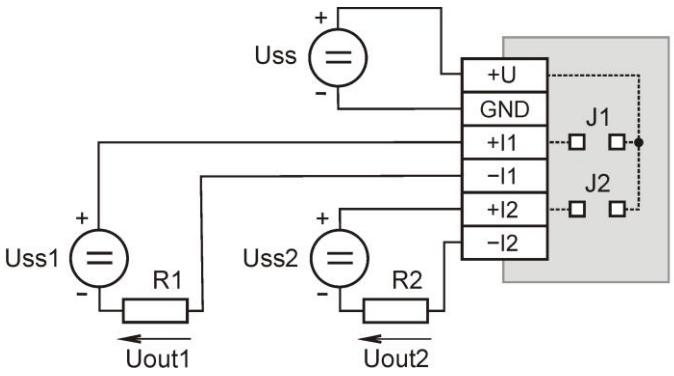


Dimensions

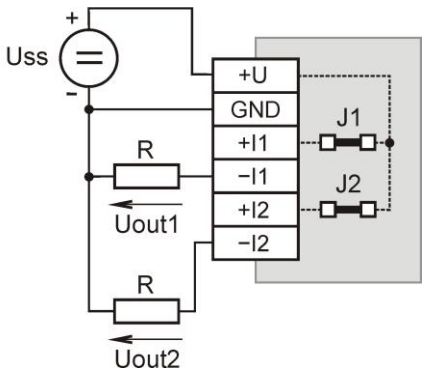


Typical application wiring

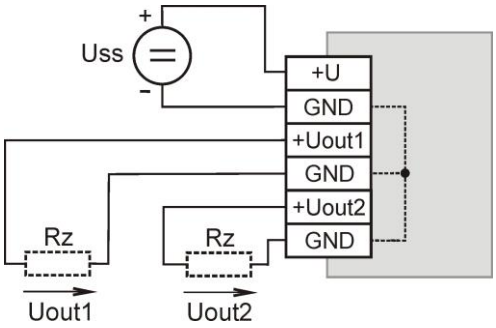
Outputs 4-20 galvanically isolated



Outputs 4-20mA galvanically non-isolated



Outputs 0-10V

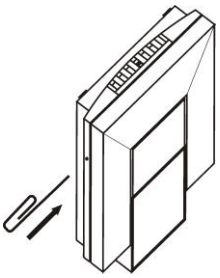


Range of supply voltages and resistor values

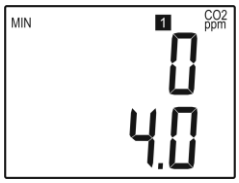
Uss . . . . . 9 to 30Vdc
Uss1 . . . . 9 to 30Vdc
Uss2 . . . . 9 to 30Vdc
R1[Ω] < 50 * Uss1[V] - 450
R2[Ω] < 50 * Uss2[V] - 450
R[Ω] < 50 * Uss[V] - 450
Rz > 20 kΩ

LCD Info mode

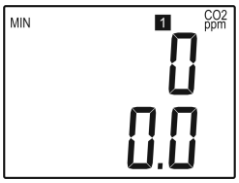
The output range settings can be verified without a use of the computer by pressing the button on the left side of the device (button is placed behind small hole - see picture). For button pressing use thin instrument, for example paper clip.



T8148

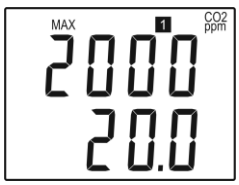


T8248

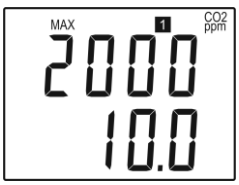


Upper line of the LCD display shows value of CO_2 concentration corresponding to output current 4mA (output voltage 0V).

T8148

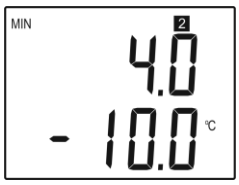


T8248

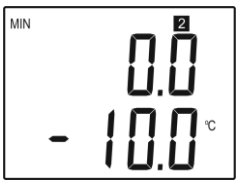


Press the button again and upper line of the LCD display shows value of CO_2 concentration corresponding to output current 20mA (output voltage 10V).

T8148

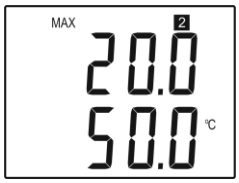


T8248

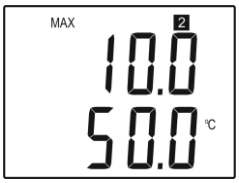


Press the button again to get value of temperature corresponding to output current 4mA (output voltage 0V).

T8148



T8248



After next pressing of the button LCD shows value of temperature corresponding to output current 20mA (output voltage 10V).

Press button again to end info mode and display actual measured value.

Notice: during info mode no measurement and no output current (output voltage) generation proceed. The transmitter stays at info mode 15 s, and then automatically goes back to measuring cycle.

Procedure of modification of transmitter adjustment:

- Device adjustment is performed by means of the optional SP003 communication cable, connected to USB port of the PC.
- It is necessary to have installed configuration program TSensor on the PC. It is free to download at www.cometsystem.com
- During installation please take care about installation of driver for USB communication cable.
- Connect SP003 communication cable to the PC. Installed USB driver detect connected cable and create virtual COM port inside the PC.
- Unscrew four screws of the device lid a remove the lid. If device is already installed to measuring system, disconnect leads from terminals.
- Connect SP003 communication cable to the device. Display must light up, or at least must light up all symbols for one second (if LCD was switched OFF by program before).
- Run installed TSensor program and select corresponding communication COM port (as described above).
- When new setting is saved and finished disconnect the cable from the device and place the lid back to the device.

Error States of the device

Device continuously checks its state during operation. In case error is found LCD displays corresponding error code:

Error 0 - first line of LCD displays „Err0“. Check sum error of stored setting inside device’s memory. This error appears if incorrect writing procedure to device’s memory occurred or if damage of calibration data appeared. At this state device does not measure and calculate values. It is a serious error, contact distributor of the device to fix.

Error 2 - there is a reading „Err2“ on LCD display. The CO_2 concentration measurement error or temperature error occurred.

Error 3 - there is a reading „Err3“ on LCD display upper line. Error of internal A/D converter appeared (converter does not respond, probably damage of A/D converter). At this state device does not measure temperature and relative humidity. This error does not affect CO_2 concentration measurement. It is a serious error, contact distributor of the device.

Error 4 - there is a reading „Err4“ on LCD display. It is internal device error during initialization of CO_2 sensor. Under this condition device does not measure concentration of CO_2. Value read from device is -9999. CO_2 sensor is probably damaged. It is a serious error, contact distributor of the device. This error message is displayed also in case, when the device is connected to the PC via the optional SP003 communication cable and external power supply is not used.

Technical parameters

T8148 – temperature and CO_2 concentration transmitter

Output:	4 to 20 mA
Power voltage:	9 to 30 V
Power consumption:	1 W during normal operation max. 4 W for 50 ms with 15 s period
Output in case of error:	<3.8 mA or >24 mA
Temperature:	
Accuracy:	± 0,5 °C
Range:	-10 to +50 ºC
Resolution:	0,1 °C
Response time:	t90 < 12 min (air flow approximately 0,3 m/s) t90 < 25 min (no air flow)
Concentration of CO_2:	
Accuracy:	± (50 ppm + 3 % of measuring value) at 25°C (77°F) and 1013 hPa
Range:	0 to 5000 ppm
Temp. dependence:	± (1 + measured value [ppm]/1000) ppm / ºC (-20...45ºC) (-4…113°F)
Long term stability:	typ. 20 ppm / year
Resolution:	1 ppm
Response time:	t90 < 195 s in „SLOW“ measurement mode t90 < 75 s in „FAST“ measurement mode

T8248 – temperature and CO_2 concentration transmitter

Output:	0 to 10 V
Power voltage:	15 to 30 V
Power consumption:	0,5 W during normal operation max. 3 W for 50 ms with 15 s period
Output in case of error:	<-0.1V or >10.5V

Temperature:

Accuracy:	± 0,5 °C
Range:	-10 to +50 ºC
Resolution:	0,1 °C
Response time:	t90 < 12 min (air flow approximately 0,3 m/s) t90 < 25 min (no air flow)

Concentration of CO_2:

Accuracy:	± (50 ppm + 3 % of measuring value) at 25°C (77°F) and 1013 hPa
Range:	0 to 5000 ppm
Temp. dependence:	± (1 + measured value [ppm]/1000) ppm / ºC (-20...45ºC) (-4…113°F)
Long term stability:	typ. 20 ppm / year
Resolution:	1 ppm
Response time:	t90 < 195 s in „SLOW“ measurement mode t90 < 75 s in „FAST“ measurement mode

Operating conditions

Operating temperature range:	-10 to +50°C
Operating humidity range:	5 to 95 %RH (no condensation)
Operating pressure range:	850 to 1100 hPa
Recommended interval of calibration:	5 year (CO_2), 2 years (temperature)
Protection:	IP20
EMC:	EN 61326-1
Storage temperature range:	-40 to +60 °C
Storage relative humidity range:	5 to 95 % RH (no condensation)
Storage atmospheric pressure:	700 až 1100 hPa
Dimensions:	see dimensional drawings
Weight:	approximately 150 g
Material of the case with electronics:	ASA

End of operation

Device itself (after its life) is necessary to liquidate ecologically!

Technical support and service

Technical support and service is provided by distributor. For contact see warranty certificate.