SPACE CO2 AND T SENSOR

TYPE BARCSTCO2LCDSP

BARCOL-AIR
AIR DISTRIBUTION

Application

The BARC-S-T-CO2-LCD-SP uses a high accuracy thermistor element standard equipped which set point and LCD display. Using a NDIR (non-dispersive infrared) sensor for measuring CO_2 concentrations and utilizing ABC (Automatic Baseline Correction) ensures accurate and maintenance free operation.

Options such as momentary switch and fan speed selection are available together with a 0-5Vdc override status input is also available as option, allowing occupancy indication on the display.

A valuable feature of this sensor is, when in 3-wire mode, it automatically detects the controller input type, 4-20mA or 0-5Vdc. This removes the requirement for output jumpers. 2-wire loop powered is selectable via a DIP switch. It also provides on-board LED indication for power up status and set output mode. The terminal blocks are pluggable and allow tool free installation (ferrules required).

Features

- Slim design for room applications
- Easy installation with LED indication, test button and auto-output mode detection (3-wire)
- Pluggable terminal blocks and tool free installation
- Optional set point wheel, fan speed slider, momentary button and LCD available
- Energy saving by ventilating at the optimum CO_2 levels

Product Codes

BARCSTLCDSP	Space T Sensor 0-5V with LCD and SP
BARCSTCO2LCDSP	Standard CO_2 + Space T Sensor 0-5V with LCD and SP

Other options are available on request

CE

Technical Specifications

Outputs	0-5Vdc or 4-20mA, 3-wire self detecting
Power Supply	24Vac/dc ±10%
Supply current	
Average	30mA
Peak	390mA
Electrical connections	Pluggable spring loaded terminal block, min. 0.2mm^2, max. 1.5mm^2
Output ranges	
CO₂	0-2000ppm
Temperature	0 to 40°C
Enviromental / Storage	-25 to 60°C
Working ambient conditions	
Temperature	-10 to 60°C
Humidity	0 to 95% non-condensing
Housing	
Material	ABS (flame retardant)
Colour	RAL 9003 polished white finish
Dimensions	115 x 85 x 30mm
Protection	IP30
Country of origin	UK

Sensor Characteristics

Carbon Dioxide	
Measurement interval	2 seconds
Accuracy	±70ppm ±3% of reading
Pressure dependency deviation	+1.6% reading per kPa from normal pressure
Response rate	2 minutes by 90%
Temperature	
Measurement range	0 to 40°C
Accuracy (20 to 40°C)	±0.5°C
Long term stability	<0.02°C p.a.
Response time	5 to 30 seconds (↺63%)

Set point	Resistive 0-10kΩ or 11-1kΩ ±30% For 1-11kΩ use the 0-10kΩ and add an inline 1kΩ resistor on the controller input side
LCD	Shows only temperature values

Installation instructions

⚠️ Antistatic precautions must be observed when handling these sensors. The PCB contains circuitry that can be damaged by static discharge.

Note: Barcol-Air range of CO₂ sensors are not suitable for use in swimming pool & spa applications. Sensors used in these types of applications are not covered under Barcol-Air warranty terms. Chemicals used in swimming pool & spas can contaminate the electrochromic components, which results in a reduced service life.

1. Select a location on a wall of the controlled space which will give a representative sample of the prevailing room condition.
    Avoid sitting the sensor in direct sunlight, on an outside wall or near heat sources. An idea mounting height is 1.5m from the floor.

2. Undo the tamperproof screw at the bottom of the housing and remove the front panel from the base.

3. Using the base as a template mark the hole centres and fix to the wall with suitable screws. Alternatively the base plate can be mounted on to a conduit box or standard recessed back box. The base plate is suitable for EU & North America fixings.

4. Feed cable through the hole in the base plate of the housing, unplug the terminal block from the PCB and terminate the cores at the loose terminal block. Leave some slack inside the unit as required.

5. Plug the terminal block on the pins header on the PCB. Check polarity and orientation. Replace the housing to the base plate and tighten the tamperproof screw (if required) through the lug at the bottom of the base plate.

IMPORTANT! Make sure the Terminal Block is fitted the correct position and direction. The cable entry faces the centre of the sensor.

6. Connect all sensor outputs to the controller inputs or to the device, the sensor output(s) are connected to.

7. Before powering the sensor, ensure that the supply voltage is within the specified tolerances

IMPORTANT! It is important to make all electrical output connections before applying the supply voltage. If the sensor is not connected in this sequence, damage may be caused to the input circuitry of the controller or device the sensor output(s) are connected to.

8. Allow 3 minutes before checking functionality, and at least 30 minutes before carrying out pre-commissioning checks. This will allow the electronics time to stabilise. In normal building management applications, accuracy is defined after a minimum of 3 ABC periods (72h) of continuous operation. Automatic Background Logic (ABC) is designed to be used in HVAC applications where CO₂ concentrations will drop to outside ambient condition (400ppm) in a 7-day period.

Dimensions
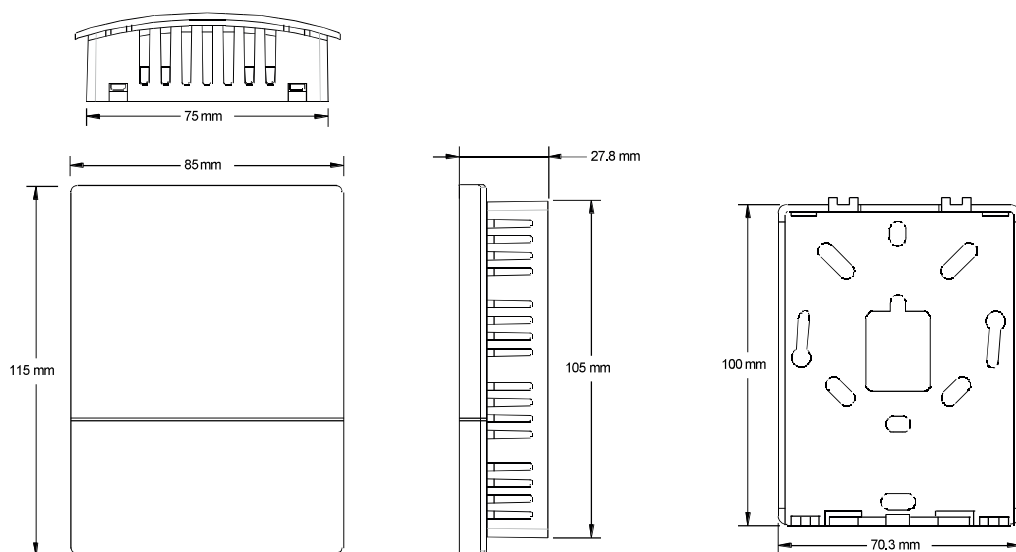
Wiring details

24V	Supply 24Vac/dc	**FS1**	Not used (if fitted)
0V	Supply 0V (Common 0V)	**FS2**	Not used (if fitted)
OP1	Temperature output	**P5**	Set point
OP2	Not used (if fitted)	**P6**	Set point, wiper
OP3	CO_2 output	**P7**	Set point
0V	Common 0V (if fitted)	**MS1**	Not used (if fitted)
TH1	Not used (if fitted)	**MS2**	Not used (if fitted)
TH2	Not used (if fitted)	**OVR**	Not used (if fitted)

Terminal Block

For easier installation, the terminal block can be detached from the PCB. When used with ferrules it doesn't require any tools to release the spring loaded terminal block. When used with stranded cable, push in the orange latch to compress the spring load. Feed in the wire and release the spring to secure the wire connection.

IMPORTANT! Make sure the Terminal Block is fitted the correct position and direction. The cable entry faces the centre of the sensor.

Settings

Selecting output mode and LED indication:

IMPORTANT! Do not alter the switch position while sensor is powered up. Do not select 2-wire if a 0v connection (3-wire) is made. Permanent damage to the sensor or BMS controller may result.

3-wire connection:
The sensor automatically sets the outputs to 0-5V or 4-20mA based on the resistive load on the outputs. All outputs MUST be connected to the same type of load:
- If ALL the loads are >2k2Ω, all the outputs will be set to 0-5Vdc and the green 0-10V LED will light.
- If ALL the loads are >50Ω and <550Ω, all the outputs will be set to 4-20mA and the orange 4-20mA LED will light.
- If ANY of the loads are <50Ω or >550 and < 2k2Ω, all the outputs will be switched off and the red ERROR LED will light.

Output 1 is checked first, and if it has determined what this output is set to it will assume that all other enabled outputs are connected to similar loads. The LEDs will switch off after 15 minutes.

Self-Test Button
The self-test button helps the installer to validate the wiring for each output and helps to commission the system. When the self-test button is pushed it cycles all outputs as follows: 0%, 50%, 100%, normal operation. After 30 seconds in any mode the system resets to normal operation. When the self-test button is held for more than 3 seconds, it sets all outputs to 50%, when released the outputs return to normal operation.

PCB Layout
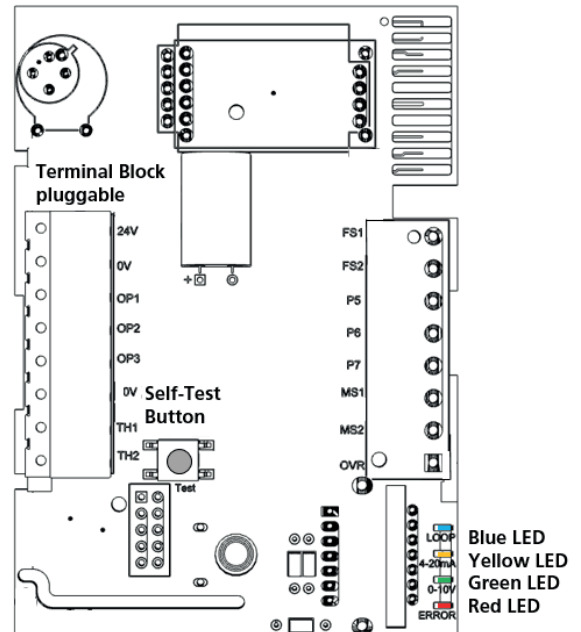
Connection
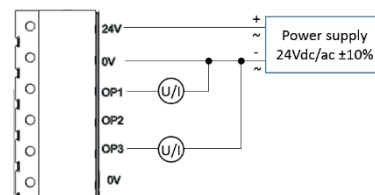
Set point (-SP):
For 1-11kΩ use the 0-10kΩ and add an inline 1kΩ resistor on the controller input side

	-	**+**
P5/P6	0kΩ	10kΩ
P7/P6	11kΩ	1kΩ

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BARCOL-AIR | AIR DISTRIBUTION
Cantekoogweg 10-12 - 1442 LG Purmerend, The Netherlands
T +31 (0)299 689 300 | **E** export@barcol-air.nl

WWW.BARCOL-AIR.NL