Sontay®
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Features & Benefits

- Self-detecting 0-10Vdc or 4-20mA (3-wire) output
- Fully configurable LCD Display
- Resistive temperature output option
- No jumpers or DIP-switches to select output type
- CO_2 self-calibration over full sensor lifetime achieved by ABC logic

Technical Overview

The GS-CO2-x-UN range offers a cost-effective single output for CO2 measurement. These can also include a combination of familiar passive options such as temperature, set point adjustment, momentary switch and fan speed, plus an LCD display.

A unique feature of the sensor is its ability to automatically detect what sort of controller input it is connected to, 4-20mA or 0-10Vdc, removing the requirement for output jumpers which can be inadvertently set incorrectly. Just connect it to the controller input and it does the rest. PCB LED indication of which output type is in operation is provided, with diagnostic LED patterns for determining faults.

Product Codes

GS-CO2-S-UN	Space CO_2 transmitter, 0-2000ppm
GS-CO2-D-UN	Duct CO_2 transmitter, 0-2000ppm

Suffixes (add to part code)

-T   Direct resistive temperature output select one of the following options: *

Thermistor types:

A (10K3A1)	**B** (10K4A1)	**C** (20K6A1)
H (SAT1)	**K** (STA1)	**L** (TAC1)
M (2.2K3A1)	**N** (3K3A1)	**P** (30K6A1)
Q (50K6A1)	**S** (SAT2)	**T** (SAT3)
W (SIE1)	**Y** (STA2)	**Z** (10K NTC)

Platinum types:

D (PT100a)	**E** (PT1000a)

Nickel types:

F (NI1000a)	**G** (NI1000a/TCR (LAN1))

-SP	Resistive set point †
-MS	Momentary switch †
-FS3	Resistive 3-speed fan switch †
-FS4	Resistive 4-speed fan switch †
-FS5	Resistive 5-speed fan switch †
-LCD	Integral LCD display
-LED	3-colour LED CO_2 indication

† Only available on Space Sensor types (interface restrictions)

- SP only
- MS only
- SP-MS only
- SP-FS only

Specification

Outputs	0-10Vdc or 4-20mA self-detecting (not loop powered)
Power supply	24Vac/dc
Country of origin	UK

Space Sensor type:

Ambient:		
	Temperature	0 to 50°C
	RH	0 to 95% RH, non-condensing
Housing:		
	Material	ABS (flame retardant)
	Colour	Polished white finish
Dimensions		115 x 85 x 30mm
Protection		IP30

Duct Sensor type:

Environmental:		
	Housing	-30 to 60°C
		0 to 95% non-condensing
	Media	-10 to 50°C
Housing:		
	Material	PC/GF (Halogen free, flame retardant & UV stabilized)
	Dimensions	125 x 105 x 85mm
Probe:		
	Material	Probe, PVC - End cap, Delrin
	Dimensions	210 x 19mm dia.
Protection		IP65

Note*:
When using the -T option, they are not compensated for internal heating.

CE

The products referred to in this data sheet meet the requirements of EU Directive 2014/30/EU

Sensor Characteristics

CO₂

Measurement range	0 to 2000ppm
Accuracy	400-2000ppm ±25ppm ±5% of scale
Type	NDIR
Long term stability	<2% of FS over sensor life
Temperature dependency	5ppm per °C or 0.5% of the reading per °, whichever is greater
Response time	90 seconds (90%)
Pressure dependency	0.13% of reading per mm H
Sampling interval	3 seconds

Optional Passive Output

Type	Resistive PTC & NTC types
Accuracy:	
Thermistor	±0.2°C 0 to 70°C
Platinum types	±0.2°C @ 25°C
Nickle types	±0.4°C @ 25°C

Display & LED Options

LCD	To show measured value
CO₂ LED	3-Colour "Traffic light" LED for CO₂ levels:
	Green < 1000ppm
	Amber 1000 to 1500ppm
	Red > 1500ppm
Set point	Resistive 1-11kΩ ±30%
Fan speed	Resistive, see page 3
Momentary switch	VFC 24Vac/dc 50mA max.

Installation

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

GS-CO2-S-UN:

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 and terminate the cores at the terminal block as required. Leaving some slack inside the unit.

5. Replace the housing to the base plate and tighten the tamperproof screw (if required) through the lug at the bottom of the base plate.

6. 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.

GS-CO2-D-UN:

1. Select a location in the duct where dust & contaminants are at a minimum (i.e. after filters etc.) and which will give a representative sample of the prevailing air condition.

2. Fix the housing to the duct with appropriate screws.

3. Release the snap-fit lid by gently squeezing the locking tab.

4. Feed the cable through the waterproof gland and terminate the cores at the terminal block. Leaving some slack inside the unit, tighten the cable gland onto the cable to ensure water tightness.

5. If the sensor is to be mounted outside, it is recommended that the unit be mounted with the cable entry at the bottom. If the cable is fed from above then into the cable gland at the bottom, it is recommended that a rain loop be placed in the cable before entry into the sensor.

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

7. 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.

Connections

MS2	Momentary switch output (VFC)	
MS1	Momentary switch output (VFC)	
T2	Direct thermistor output (resistive)	
T1	Direct thermistor output (resistive)	
FS1	Fan speed switch output (resistive)	
FS2	Fan speed switch output (resistive)	
P2	Set point (resistive)	
P1	Set point (resistive)	
LED	Occupied/unoccupied text on LCD	
OUT	0-10Vdc or 4-20mA (3-wire) CO_2 output	
GND	Common 0V	
24V	Supply + 24Vac/dc	

Example connection for CO_2 output with external power supply:
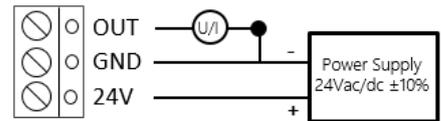
Options

-T *(if fitted)* Direct resistive output is between terminals T1 and T2, polarity is independent. When using the -T option, they are not compensated for internal heating.

Fan Speed *(if fitted)* The position of the selector switch will cause the resistance between the terminals to alter:

Switch position	Output
0	Open circuit
1	22.7kΩ
2	26kΩ
3	29.3kΩ
Auto	32.6kΩ

Set point *(if fitted)* This is available in the following value 1kΩ to 11kΩ

Momentary switch *(if fitted)* Rated at 24Vac/dc @ 500mA max.

LCD *(if fitted)* The display will show CO_2 measurement only. It will not show the optional suffixes (temperature, set point & fan speed).

LED *(if fitted)* Traffic light status of CO_2 levels - Green < 1000ppm - Amber 1000 to 1500ppm - Red > 1500ppm

Status LED's

The LEDs are labelled LED1 and LED2. On power up or when the load resistance is in the "forbidden zone" (550R to 3K) the LEDs will flash alternately. Once the system has established which mode to operate in, the appropriate led will be on and not flashing.

- LED1 **Current output**
- LED2 **Voltage output**

An 'Error Halt' will occur if a CO_2 sensor element is not fitted or is faulty, both LEDs are on and the output is set to zero.

Self-Test

PCB Self Test:
Push button is for 50% output. Press and hold, the output in voltage mode it may take several seconds to settle. The screen displays 50% message when active (if display is fitted).

Occupied/unoccupied text on LCD

When an applied voltage of 0 to 4.9V override text is off and 5 to 10V override text is then displayed.

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Notes

Automatic Background Logic (ABC) is designed to be used in HVAC applications where CO_2 concentrations will drop to outside ambient condition (400ppm) in a 7-day period. The sensor will reach its operational accuracy after 24 hours of continuous operation. CO_2 sensor will maintain accuracy with ABC logic enabled, given that it is at least four times in 21 days exposed to a reference level of 400ppm.

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