Sontay®
Four Elms Road - Edenbridge
Kent - TN8 6AB - UK

GS-CO2-AQ-D
Duct Mounted CO_2 IAQ & Temp. Sensors

Issue Number 7.2
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Features and Benefits

- Robust enclosure
- Easy installation with LED indication
- Built-in circuitry diagnostics

Technical Overview

Using a NDIR (non-dispersive infrared) sensor for measuring CO_2 concentrations and utilizing ABC (Automatic Baseline Correction) ensures accurate and maintenance free operation.

Air quality is determine though measurement of Total Volatile Organic Compounds (TVOC's). This signal can be used to control fresh air fans and dampers according to the ventilation load.

A feature of this sensor is when in 3-wire mode it automatically detects the controller input type, 4-20mA or 0-10Vdc. This can be overridden via a DIP switch if required. Sensors have on-board LED indication for power up status, output mode type and useful self-test feature.

Product Codes

GS-CO2-AQ-D	Space CO_2 IAQ and Temperature Sensor 0-2000ppm

Suffixes (replace -T with type)

-T Direct resistive temperature output *

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))

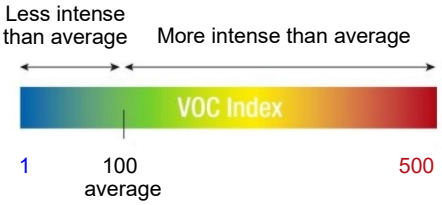
Interface Options (add to part code)

-HR	0-5000ppm CO_2 range
-TR	Custom temperature range between -20 & +50°C
-LCD	LCD Display
-5V	Output 0-5Vdc (instead of 0-10Vdc)

Specification

Outputs:	
Voltage	0-10Vdc (0-5Vdc for -5V version)
Current:	4-20mA (3-wire)
(optional -T)	PTC/NTC resistive sensing element
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:	
CO_2	0-2000ppm (optional 0-5000ppm)
IAQ	0 to 460 TVOC Index
Temperature	0 to 40°C
Environmental:	
Housing:	-30 to 60°C 5 to 95% non-condensing
Media:	-10 to +50°C
Housing:	
Material	PC/GF (Halogen free, flame retardant & UV stabilized)
Dimensions	123 x 103 x 54mm
Probe:	
Material	Probe PVC - End cap Delrin
Dimensions	200 x 20mm dia.
Protection	IP65
Country of origin	UK
Conformity	EMC, CE & UKCA Marked

Please note:
Sontay air quality sensors sold after the 19th of May 2025 now use the VOC index for TVOC levels. Previous products were 0 to 1,000ppb range. More information on page 3 of this data sheet.



WEEE Directive:

At the end of the products useful life please dispose as per the local regulations.
Do not dispose of with normal household waste.
Do not burn.

CE UKCA

Tel: +44 (0)1732 861200 - E-mail: sales@sontay.com - Web: www.sontay.com
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Sensor Characteristics

Carbon Dioxide

Measurement interval	2 seconds
Accuracy	±70ppm ±3% of reading
Pressure dependency	+1.6% reading per kPa deviation 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	8 sec. (t 63%) @ 25°C 1 m/s air flow

Air Quality

Type	MEMS Siloxane, TVOC (Total Volatile Organic Compounds)
Accuracy	Typical ±15% of measured value
Measurement range	0 to 460 TVOC Index

Optional Passive Output

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

Installation



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

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, or by using the optional duct mounting flange.

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

4. 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.

5. Set the switch on the PCB to the 3-wire position (default). Snap shut the lid after the connections have been made.

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 4 minutes before checking functionality, and at least 30 minutes before carrying out pre-commissioning checks. This will allow the auto detection to complete and electronics time to stabilise. The electronics require at least 24h continues operation in clean air before any accuracy tests can be performed.

Electrical Connections

24V	Supply 24Vac/dc
0V	Supply 0V (Common 0V)
OP1	CO_2 output
OP2	IAQ output
OP3	Temperature output
0V	Not used
TH1	Direct Thermistor output (-T only)
TH2	Direct Thermistor output (-T only)

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Selecting Output Mode & LED Indication

IMPORTANT! Do not alter the switch position while sensor is powered up. Do not select 2-wire, permanent damage to the sensor or BMS controller may result.

3-wire connection:
Ensure there is no power to the sensor before changing the switch. Set the switch in the left hand position (default). The sensor automatically sets the outputs to 0-10V 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 0-10Vdc 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 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 self-test button is held for more than 3 seconds, it sets all outputs to 50%, when released the outputs return to normal operation.

Recommended TVOC Monitoring Levels

The GS-AQ-D incorporates a highly sensitive VOC sensor for air pollution measurement. Gases that can be detected by the VOC sensor include: Volatile Organic Compounds (VOCs) from paints (such as formaldehyde), lacquers, paint strippers, cleaning supplies, furnishings, office equipment, glues, adhesives and alcohol.

The table below illustrates the IAQ Index parameter with a description of the air quality, its impact and suggested action for that level / banding.

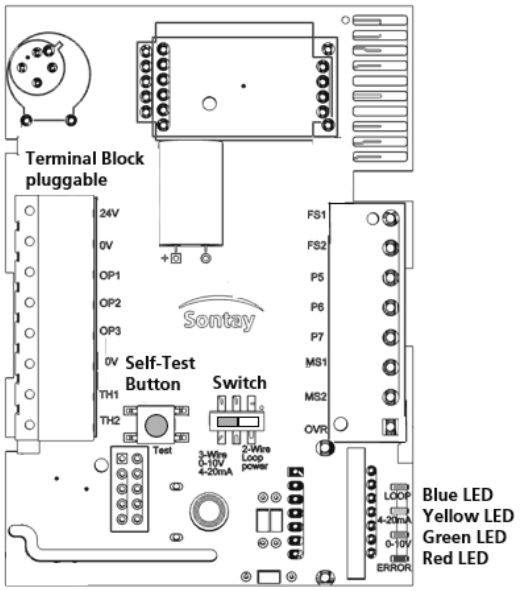
IAQ Index	Air Quality	Impact (long-term exposure)	Suggested action
0 – 50	Excellent	Pure air; best for wellbeing	No measures needed
51 – 100	Good	No irritation or impact on wellbeing	No measures needed
101 – 150	Lightly polluted	Reduction of wellbeing possible	Ventilation suggested
151 – 200	Moderately polluted	More significant irritation possible	Increase ventilation with clean air
201 – 250[1]	Heavily polluted	Exposition might lead to effects like headache depending on type of VOC	Optimise ventilation
251 – 350	Severely polluted	More severe health issue possible if harmful VOC present	Contamination should be identified if level is reached even without the presence of people; maximise ventilation and reduce attendance
> 351	Extremely polluted	Headaches, additional neurotoxic effects possible	Contamination needs to be identified; avoid presence in room and maximise ventilation

Indoor air quality (IAQ) classification and colour coding [1]

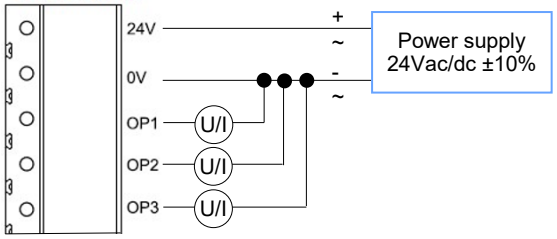
[1] According to the guidelines issued by the German Federal Environmental Agency, exceeding 25 mg/m3 of total VOC leads to headaches and further neurotoxic impact on health.

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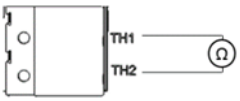
PCB Layout:



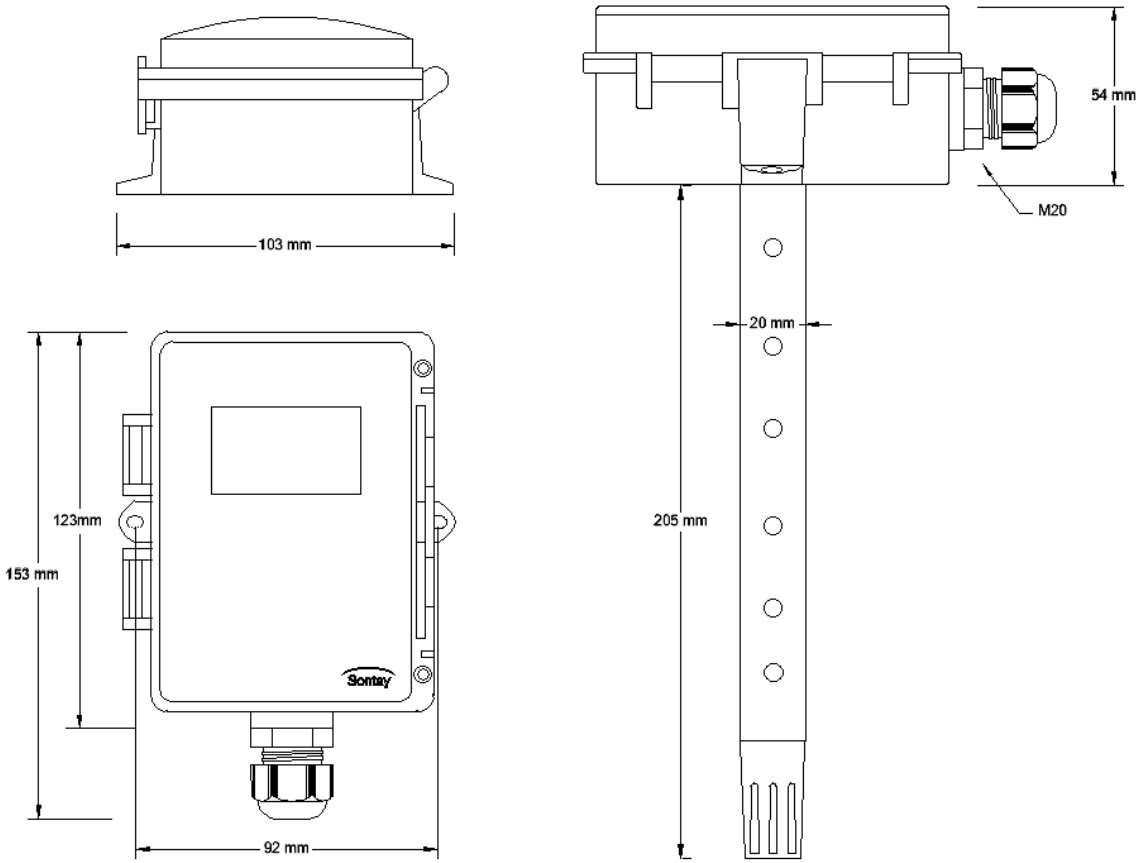
3-wire, 0-10Vdc or 4-20mA



-T Direct Thermistor only



Dimensions



Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense resulting from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.

Tel: +44 (0)1732 861200 - E-mail: sales@sontay.com - Web: www.sontay.com
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