



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
- CO₂ self-calibration over full sensor lifetime achieved by ABC logic

Technical Overview

The UN-S range offers a cost-effective single output based on the sensing element required. This can be IAQ, CO₂ or RH but can also include a combination of familiar passive options such as temperature, setpoint 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-AQ-S-UN Space air quality transmitter
GS-CO2-S-UN Space CO₂ transmitter
RH-S-UN Space RH transmitter

Suffixes (add to part code)

-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)
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Nickel types:

F (NI1000a)	G (NI1000a/TCR (LAN1))
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Interface Options (add to part code)**

-SP	Resistive set point
-FS3	Resistive 3-speed fan switch
-FS4	Resistive 4-speed fan switch
-FS5	Resistive 5-speed fan switch
-MS	Momentary switch
-LCD	Integral LCD display
-LED	3-colour LED CO ₂ indication (CO ₂ only)

Accessories

DECOR	Decorators trim plate
GASKET	Insulating gasket (pack of 10)

** 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	24Vdc
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
Country of origin	UK


Note*:

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



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

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.

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Sensor Characteristics

IAQ (air quality)

Measurement range	0 to 100%
	(0 = good air quality - 100% = bad air quality)
	<15% no action needed
	15 to 60% start to open dampers
	>60% fully open dampers
Type	Tin oxide
Warm up period	15 minutes approx.
Conditioning period	7 days
Life expectancy	5 years

CO₂

Measurement range	0 to 2000ppm
Accuracy	400-2000ppm $\pm 25\text{ppm} \pm 5\%$ 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

Humidity

Measurement range	0 to 100% RH
Accuracy	$\pm 3\%$ RH
Type	Capacitive
Long term stability	<0.5% RH p.a.
Response time ³	8 seconds (τ 63%)

Optional Passive Output

Type	Resistive PTC & NTC types
Accuracy:	
Thermistor	$\pm 0.2^\circ\text{C}$ 0 to 70°C
Platinum types	$\pm 0.2^\circ\text{C}$ @ 25°C
Nickle types	$\pm 0.4^\circ\text{C}$ @ 25°C

Display & LED Options

LCD	To show measured value
CO₂ LED	3-Colour "Traffic light" LED for CO ₂ levels:
	Green < 1000ppm
	Amber 1000 to 1500ppm
	Red > 1500ppm

Set point	Resistive 1-11k Ω $\pm 30\%$
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.

Note: Sontays range of RH sensors are not suitable for use in swimming pool & spa applications. Sensors used in these types of applications are not covered under Sontays warranty terms. Chemicals used in swimming pool & spas can contaminate the humidity element, 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 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.

To perform an accurate comparison between a transmitter output and a portable reference, it is essential that the two probes are held adjacent for a minimum of 30 minutes in a stable RH environment. Only in this way can speed of response and temperature factors be eliminated. It is not uncommon for test instruments and transmitters to disagree by 10% RH or more when site measurements are taken incorrectly. 'Slings' or other mechanical hygrometer should not be used as a reference.

Contact Details:

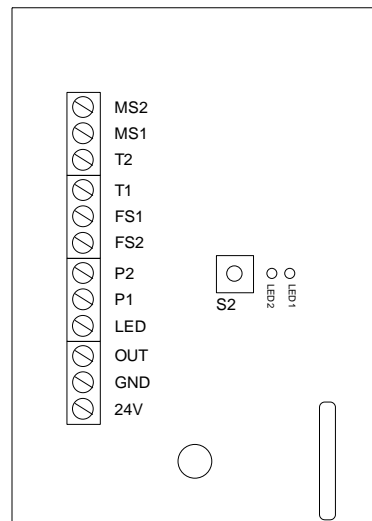
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Connections

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	Auto-selecting 0-10Vdc or 4-20mA (3-wire) output
GND	Common 0V
24V	Supply + 24Vac or Vdc



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 as shown below.

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 values: - +
1kΩ 11kΩ

Momentary switch (if fitted)

Rated at 24Vac/dc @ 500mA max.

LCD (if fitted)

The display will show the main sensor type.

- GS-AQ-S-UN Air quality
- GS-CO2-S-UN CO2
- RH-S-UN Humidity

The display will not show the optional suffixes, temperature, set point & fan speed.

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**

Currently an 'Error Halt' will occur if:-

- Temperature, RH, Dewpoint, Absolute Humidity or Enthalpy is selected and the appropriate sensor not fitted.
- In CO₂ mode a CO₂ sensor element is not fitted or is faulty.
- In IAQ mode a sensor is not fitted.

In all 3 cases above, both LEDs are on and the output is set to zero.

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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).

0-10Vdc input:

0-4.9V Override Off, 5-10V Override On

Notes

IAQ option: Sensor element responds to a broad range of contaminants, such as Ammonia (NH₃) and Hydrogen Sulphide (H₂S), generated from waste materials in office and home environments. It also has high sensitivity to low concentrations of VOCs such as toluene emitted from wood finishing and construction products.

The sensor has a heated element with a nominal resistance in clean air. This resistance decreases in the presence of detectable VOCs. This is a nominal resistance, is different for each sensor element and will change during the life of the sensor. To allow for this, on powering the sensor a period of time is required before the sensor achieves thermal equilibrium (about ten minutes). During this process the system determines the resistance for the sensor element fitted, with this value being used for air quality calculations. While in operation this reference value is constantly monitored and adjusted as necessary.

During the ten-minute warm-up after power is applied, the sensor not be exposed to strong VOCs. During this period the output will register zero or GOOD air quality. During warm-up period the unit calibrates itself, it is important that the environment around it is clean uncontaminated air and free from odours, cigarette smoke and low occupancy. If exposed to VOCs during this time the calibration will be wrong, though it will correct itself after a couple of hours in clean air.

CO₂ option: 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. The sensor will reach its operational accuracy after 24 hours of continuous operation. CO₂ 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.

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

For pricing or any further information, please contact Omni Instruments Ltd.

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