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RH-x-UN

Relative Humidity Single Output Sensors

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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

Technical Overview

The RH-x-UN range offers a cost-effective single output for relative humidity 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

RH-S-UN	Space Relative Humidity Transmitter
RH-D-UN	Duct Relative Humidity Transmitter

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

† Only available on Space Sensor types (interface restrictions)

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

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

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.

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	
RH-D-UN	210 x 19mm dia.
RH-W-UN	90 x 19mm dia.
RH-O-UN	200 x 118mm dia. (Shield)
Protection:	IP65

CE

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

Sensor Characteristics

Humidity	
Measurement range	0 to 100% RH
Accuracy	±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	±0.2°C 0 to 70°C
	Platinum types	±0.2°C @ 25°C
	Nickle types	±0.4°C @ 25°C
LCD		To show measured value
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.

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.

RH-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.

RH-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, or by using the optional duct mounting flange.

RH-W-UN:

1. Select a location in the occupied space, or externally where contaminants are at a minimum, and which will give a representative sample of the prevailing room condition.
2. Fix the housing to the wall with appropriate screws.

RH-O-UN:

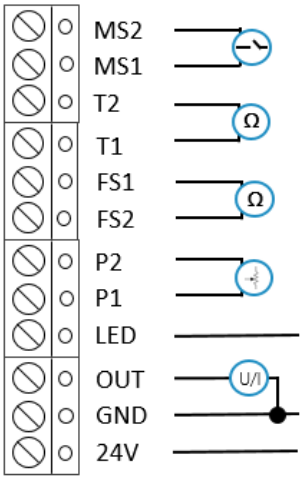
1. Fix the radiation shield to a suitable mast using the U bolts supplied.
2. Insert the probe into the shield and tighten the gland (please see notes on the shield).

Common installation;

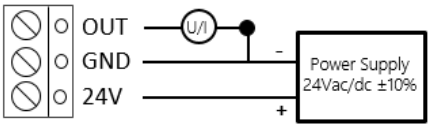
3. Release the snap-fit lid by gently squeezing the locking tab.
4. Feed the cable through the waterproof gland and terminate the cores at the terminal block. Leaving some slack inside the unit, tighten the cable gland onto the cable to ensure water tightness.
5. If the sensor is to be mounted outside, 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) RH output
GND	Common 0V
24V	Supply + 24Vac/dc



Example connection for RH 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 RH measurement only. It will not show the optional suffixes (temperature, set point & fan speed).

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.

Notes

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.

Radiation shield: The plate profiles are shaped to allow the minimum restriction of airflow while providing the necessary shielding from solar radiation and precipitation.

All sensor shields produce an error due to temperature rise during high solar radiation; the error is reduced with higher wind speeds which provide ventilation. The figures given below are based on a radiation intensity of 1000W/m²; typical errors for the specified wind speeds would be:
0.4°C @ 3 m/s, 0.65°C @ 2 m/s, 1.4°C @ 1 m/s or slower.