HRD2

Space Mounted RH & T Sensors

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Features & Benefits

- Slim design for room applications
- Easy installation with LED indication, test button and auto-output mode detection (3-wire)
- Supports 2-wire loop powering or 3-wire installation
- Pluggable terminal blocks and tool free installation
- Optional set point wheel, fan speed slider, momentary button and LCD available

Technical Overview

The HRD2 uses the latest high accuracy RH & T element, and offers options such as set point adjust, momentary switch and fan speed selection, together with a multi-line backlit LCD display. It allows effective control strategies to improve indoor environment, save energy and protect building fabric from moisture and condensation. A 0-10Vdc override status input option is also available, 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 0-10Vdc. 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).

Product Codes

HRD2-S-AH	Space RH & T transmitter ±2%
HRD2-S	Space RH & T transmitter ±3%
HRD2-S-EN	Space Enthalpy & Dew point 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)

Nickel types:

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

Interface Options (add to part code)**

-SP	Resistive set point 0-10kΩ or 11-1kΩ
-FS3	Resistive 3-speed fan switch
-FS4	Resistive 4-speed fan switch
-FS5	Resistive 5-speed fan switch
-MS	Momentary switch
-LCD	Integral LCD

-5V Output 0-5Vdc (instead of 0-10Vdc)

Accessories

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

** Interface Restrictions

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

Note*:
When using the -T option, the thermistor is not compensated for internal self heating.

General Specification

Outputs:		
	0-10Vdc (0-5V for -5V version) or 4-20mA	3-wire self detecting
	4-20mA	2-wire, loop powering via DIP switch
	(optional -T)	PTC/NTC resistive sensing element
Power Supply:	24Vac/dc ±10%	(3-wire)
	24Vdc ±10%	(2-wire)
Supply current:	max. 30mA (3-wire)	
Electrical connections:	Pluggable spring loaded terminal block min. 0.2mm^2, max. 1.5mm^2	
Output ranges;		
RH	0 to 100%	
Temperature	0 to 40°C	
Enthalpy	-20 to +250 kj/kg (-EN only)	
Dew point	-50 to +50°C (-EN only)	
Environmental:		
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	

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.

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	
Type	ASIC	
Accuracy (at 25°C)	20 to 60% RH	10 to 90% RH
RH-S-AH	±2% RH	±3% RH
RH-S	±3% RH	±4% RH
Long term stability	<0.5% RH p.a.	
Response time	8 sec. (τ 63%) @ 25°C 1 m/s airflow	
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 (τ 63%)	
Enthalpy		
Measurement range	-20 to +250 kj/kg	
Accuracy	1.8 kJ/kg typical (27 kj/kg max)	

Dew point	
Measurement range	-50 to +50°C
Accuracy	1.2°C typical (4°C max)
Optional Passive Outputs	
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
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
Fan speed	Resistive, see page 3
Momentary switch	VFC 24Vac/dc 50mA max.
Display Option	
LCD	To show T and RH values To show T, RH, DP and H (-EN version)

Installation

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

Note: The 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, 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. Set the switch on the PCB either to the 3-wire or 2-wire position.

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.

6. 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.

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

8. 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.

9. 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.

Electrical Connections:

24V	Supply 24Vac/dc
0V	Supply 0V (Common 0V)
OP1	RH output (Enthalpy for –EN option)
OP2	Temperature output (Dew point for –EN option)
OP3	Not used (if fitted)
0V	Common 0V (if fitted)
TH1	Direct Thermistor output (-T only)
TH2	Direct Thermistor output (-T only)
FS1	Fan speed resistive
FS2	Fan speed resistive
P5	Set point
P6	Set point, wiper
P7	Set point
MS1	Momentary switch
MS2	Momentary switch
OVR	0-10Vdc input to indicate occupancy or override on LCD* (3-wire mode only)

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.

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:
Ensure there is no power to the sensor before changing the switch. Set the switch in the left hand position. 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.

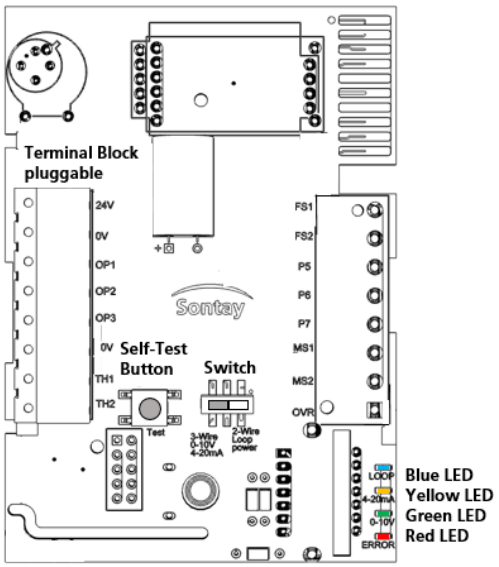
2-wire connection:
Ensure there is no power to the sensor before changing the switch and do not connect 0V. Set the switch in the right hand position. All outputs MUST be connected. The blue LOOP LED will light.

Self-Test Button:

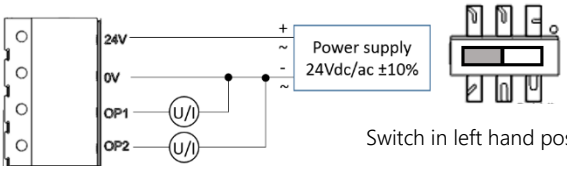
The self-test button helps the installer to validate the wiring for each output and helps to commission the system.
When self-test button is pushed it cycles all outputs as follows: 0%, 50%, 100%, normal operation. After 30 seconds in any mode the system resets to normal operation.

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.

PCB Layout:

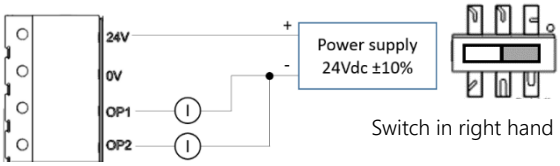


Connection Diagram:



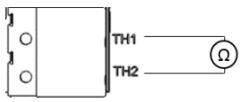
Switch in left hand position!

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

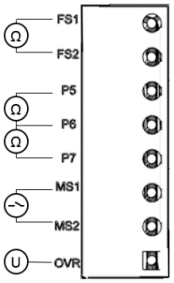


Switch in right hand position!

2-wire, 4-20mA



-T Direct Thermistor only



Fan speed (-FSx):
The position of the selector switch will cause the resistance between the terminals to alter as shown below.

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

Momentary switch (-MS):
max. 500mA @24Vac/dc

Set point (-SP):

	-	+
P5/P6	0kΩ	10kΩ
P7/P6	11kΩ	1kΩ

For 1-11kΩ use the 0-10kΩ and add an inline 1kΩ resistor on the controller input side