Duct Mount RH & T Sensors

Features

- High stability and reliability
- No loss of accuracy up to 100% RH
- Built-in circuitry diagnostics
- ±2% and ±3% Accuracy versions
- 4-20mA or 0-10Vdc outputs (link selectable)
- Direct thermistor temperature options available

Specification

RH accuracy:		
	RH-DT01	±2%
	RH-DT02	±3%
Long term stability		< 2% RH p.a.
Temp. accuracy		±0.3°C
Outputs		4-20mA or 0-10Vdc Thermistor option for temp. output
Output ranges:		
	RH	0 to 100%RH
	Temperature	-20 to +50°C (others on request -TR)
	Enthalpy	-20 to +269kJ/kg (optional)
	Dewpoint	-40 to +60°C (optional)
Power supply:		
	4-20mA	20 - 35Vdc for 500Ω loop resistance
	0-10Vdc	17 - 34Vdc, or 14 to 26Vac (4.7KΩ min)
Connections		0.5 - 2.5mm² cable
Dimensions:		
	Housing	55 x 90mm dia.
	Probe	215 x 19mm dia.
Materials:		
	Housing	ABS
	Probe	PVC
	End cap	Delrin
Protection		IP65
Ambient range		-10 to +50°C
Country of origin		EU

Product Codes

RH-DT01
Duct RH & T transmitter, ±2% accuracy

RH-DT01-T
Duct RH & T transmitter, ±2% accuracy with direct temperature

RH-DT02
Duct RH & T transmitter, ±3% accuracy

RH-DT02-T
Duct RH & T transmitter, ±3% accuracy with direct temperature

-EN
Enthalpy & dewpoint outputs (Only available with the RH-DT01)

-TR
Custom temperature range (available on request)

-T
Direct output temperature element

Thermistor types:

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

Platinum types:
D (PT100a)
E (PT1000a)

Nickel types:
F (NI1000a)
G (NI1000a/TCR (LAN1))

Technical Overview

The RH-DT duct mounted humidity & temperature sensors offer the latest technology for high accuracy RH measurement. Units can be ordered with an optional direct resistive temperature output (where this option is required, the type of temperature element MUST be specified at the time of ordering). The RH-DT01 is also available with additional outputs for enthalpy and dewpoint (RH-DT01-EN). Non-standard temperature output ranges can be specified at time of order.

Installation

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

Transmitters should only be fitted to a system after airflow calibration has been carried out and preferably following full fan running of at least several days, in order that the main contaminants have been removed from the stagnant system.

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. 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.

3. Drill two holes at 85mm centres, fix the IP65 housing to the duct with appropriate screws. Making sure to align the holes in the probe so they point into the air flow. The housing is designed to make it easy for an electric screwdriver to be used if desired.

4. Remove the front cover by twisting the lid and separating from the main body.

5. 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.

6. Replace the lid after the electrical connections have been made.

Installation (continued)

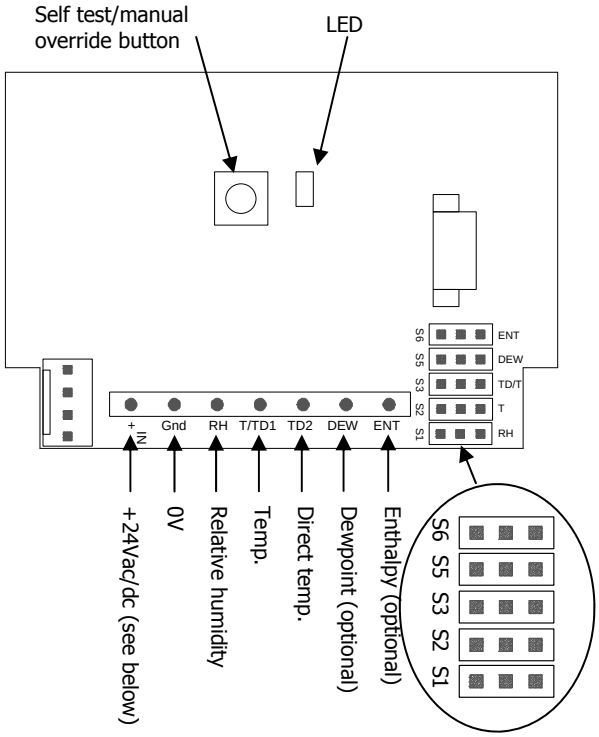
7. Ensure that the supply voltage is within the specified tolerances.

8. Allow 3 minutes before checking functionality.

9. Allow 30 minutes before carrying out pre-commissioning checks.

Note: Standard units are factory set for 4-20mA outputs.

Connections & Jumper Settings

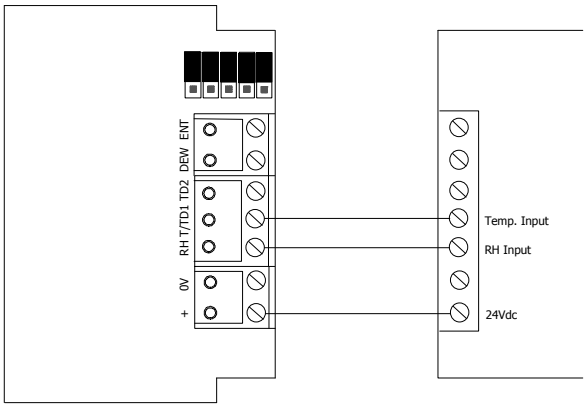


	RH = 4-20mA T = 4-20mA Dew = 4-20mA Ent = 4-20mA	RH = 0-10Vdc T = 0-10Vdc Dew = 0-10Vdc Ent = 0-10Vdc	RH = 4-20mA T = Resistive Dew = 4-20mA Ent = 4-20mA	RH = 0-10Vdc T = Resistive Dew = 0-10Vdc Ent = 0-10Vdc
S1	Right	Left	Right	Left
S2	Right	Left	Right	Left
S3	Right	Right	Left	Left
S5	Right	Left	Right	Left
S6	Right	Left	Right	Left
+24V	24Vdc	24Vac/dc	24Vdc	24Vac/dc
0V	No connection	0V	No connection	0V
RH	RH output	RH output	RH output	RH output
T/TD1	T output	T output	T output	T output
TD2	No connection	No connection	T output	T output
DEW	Dew output	Dew output	Dew output	Dew output
ENT	Ent output	Ent output	Ent output	Ent output

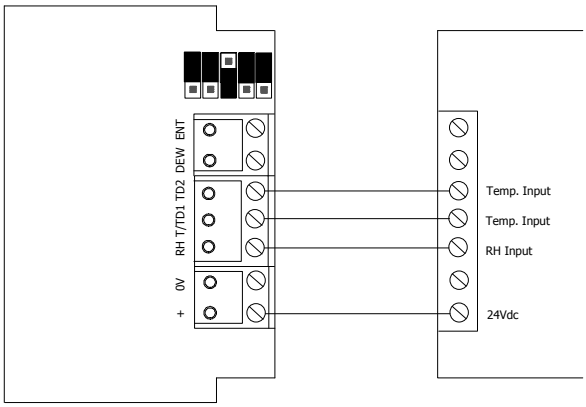
Note Enthalpy & dewpoint outputs are only available with the RH-DT01.

Connection Examples

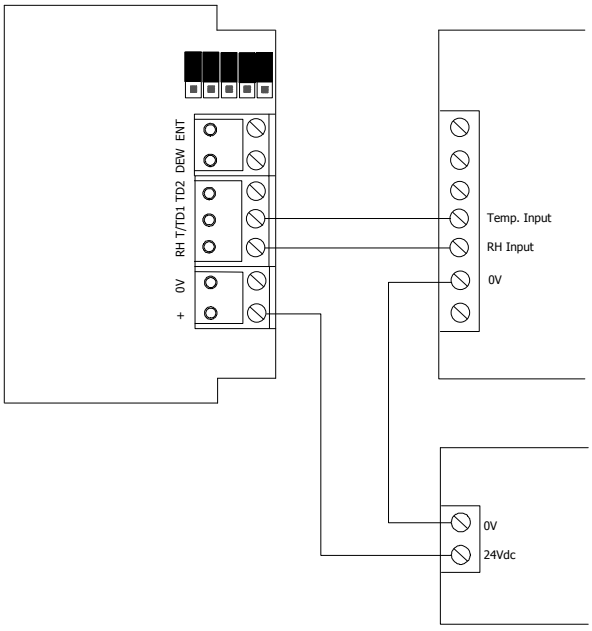
RH and Temp. = 4-20mA Loop powered
24Vdc from controller:



RH = 4-20mA Loop powered, Temp. = resistive
24Vdc from controller:

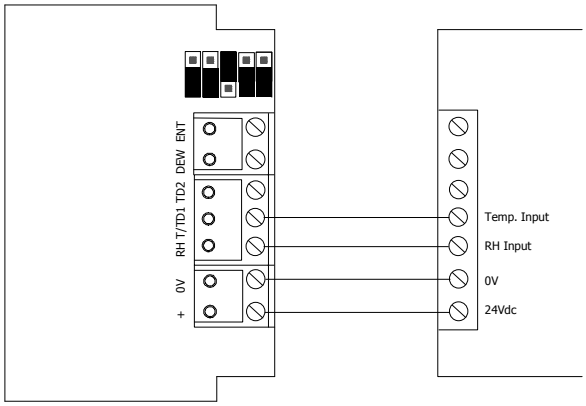


RH and Temp. = 4-20mA Loop powered
24Vdc from external 24Vdc supply:

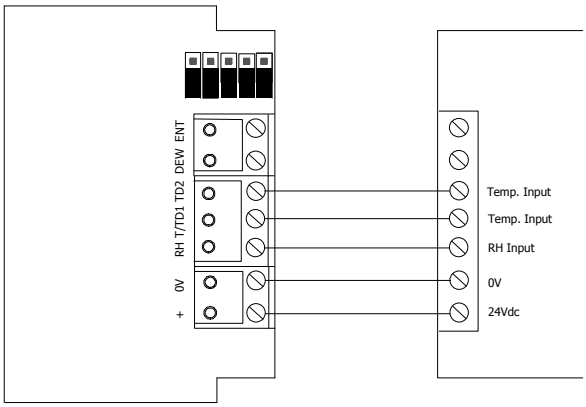


Connection Examples (continued)

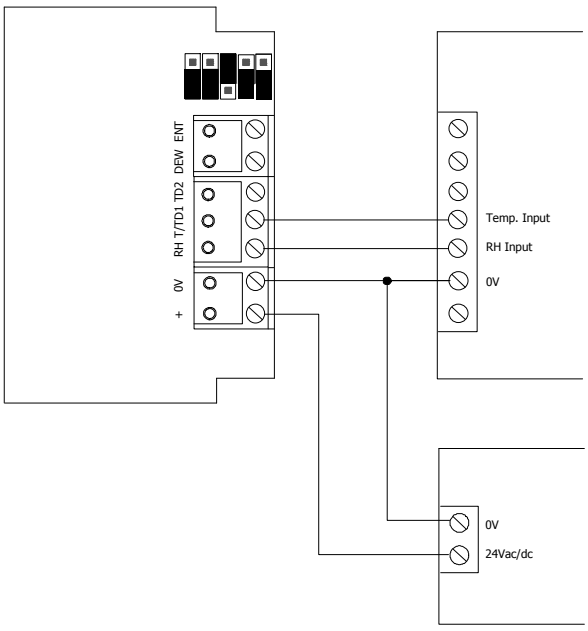
RH and Temp. = 0-10Vdc
24Vdc from controller:



RH = 0-10Vdc, Temp. = resistive
24Vdc from controller:



RH and Temp. = 0-10Vdc
24V from external 24Vac/dc supply:



Self-Test & Manual Override Mode

The outputs of the RH-DT can be manually overridden to one of 3 values by pressing the PCB mounted button. When this button is pressed once, the outputs will change to 0% of the output's range, when pressed again the outputs will change to 50% of the output's range and when pressed a third time will change the outputs to 100% of the outputs range. Pressing again will return the outputs to automatic control.

Example:

- First Press – RH output falls to 0% and temperature output falls to -20°C, LED flashes slowly
- Second Press – RH output rises to 50% and temperature output rises to +15°C, LED flashes slowly
- Third Press – RH output rises to 100% and temperature output rises to +50°C, LED flashes slowly
- Fourth Press – RH and temperature outputs revert to automatic levels. The LED should be permanently on

Failure Mode

If the sensor element assembly fails, the outputs will change to the following fixed default values and the LED will flash rapidly;

RH = 0%
Temperature = 21°C
Dewpoint (optional) = 10°C
Enthalpy (optional) = 50 kJ/kg

NB – When using the RH-DT01-EN enthalpy and dewpoint version in 4-20mA loop powered output mode, at least 2 of the loops must be powered before the unit will operate correctly.

Warning

Relative humidity transmitters are sensitive electronic devices and care should be taken at all times to ensure that they are not exposed to extreme ambient conditions or incorrect electrical connection. Transmitters should not be exposed to direct moisture contact (e.g. rain) and saturation of the transmitter at very high humidity should be avoided wherever possible.

Commissioning

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.

Trend scaling

IQ1xx and early IQ2x series (without type 5, characterise),

4-20mA (-20 to +50°C)		(0 to 100%RH)	
Brange	-125	Brange	-150
Trange	50	Trange	100
Upper	50	Upper	100
Lower	-20	Lower	0
Exp	3	Exp	3

4-20mA (Dewpoint)		(Enthalpy)	
Brange	-190	Brange	-453.5
Trange	60	Trange	269
Upper	60	Upper	269
Lower	-40	Lower	-20
Exp	3	Exp	4

0-10Vdc (-20 to +50°C)		(0 to 100%RH)	
Brange	-90	Brange	-100
Trange	50	Trange	100
Upper	50	Upper	100
Lower	-20	Lower	0
Exp	3	Exp	3

0-10Vdc (Dewpoint)		(Enthalpy)	
Brange	-140	Brange	-309
Trange	60	Trange	269
Upper	60	Upper	269
Lower	-40	Lower	-20
Exp	3	Exp	3

Trend Scaling (continued)

IQ1xx and early IQ2x series (without type 5, characterise),

Thermistor -A (10K3A1) (Scaling Type 2),

Brange	-10
Trange	40
F	8.47
G	7.42
H	6.11
I	4.73
J	3.48

Q2xx and early IQ3 series (with type 5, characterise),

4-20mA			
(-20 to +50°C)		(0 to 100%RH)	
Upper	50	Upper	100
Lower	-20	Lower	0
Exp	3	Exp	3
Points used	2	Points used	2
I1	4	I1	4
O1	-20	O1	0
I2	20	I2	20
O2	50	O2	100

4-20mA			
(Dewpoint)		(Enthalpy)	
Upper	60	Upper	269
Lower	-40	Lower	-20
Exp	3	Exp	3
Points used	2	Points used	2
I1	4	I1	4
O1	-40	O1	-20
I2	20	I2	20
O2	60	O2	269

0-10Vdc			
(-20 to +50°C)		(0 to 100%RH)	
Upper	50	Upper	100
Lower	-20	Lower	0
Exp	3	Exp	3
Points used	2	Points used	2
I1	0	I1	0
O1	-20	O1	0
I2	10	I2	10
O2	50	O2	100

Trend Scaling (continued)

Q2xx and early IQ3 series (with type 5, characterise),

0-10Vdc			
(Dewpoint)		(Enthaply)	
Upper	60	Upper	269
Lower	-40	Lower	-20
Exp	3	Exp	3
Points used	2	Points used	2
I1	0	I1	0
O1	-40	O1	-20
I2	10	I2	10
O2	60	O2	269

Thermistor -A (10K3A1), -10 to +40°C

	Resistance input	Temp. Output
1	5.32	40.0
2	5.89	37.5
3	6.53	35.0
4	7.24	32.5
5	8.05	30.0
6	8.96	27.5
7	10.00	25.0
8	11.16	22.5
9	12.49	20.0
10	14.00	17.5
11	15.71	15.0
12	17.67	12.5
13	19.90	10.0
14	22.47	7.5
15	25.40	5.0
16	28.79	2.5
17	32.66	0.0
18	37.18	-2.5
19	42.35	-5.0
20	55.30	-10.0

Upper	40.0
Lower	-10.0
Exp	3
Points used	20
Input type	3(kohms)