HUMITRAN-RHT & RH

RELATIVE HUMIDITY/TEMPERATURE TRANSMITTER
RELATIVE HUMIDITY TRANSMITTER

A. GENERAL DESCRIPTION

The Tegam Model RH is a relative humidity transmitter; the Model RHT includes a temperature output. A thin film polymer capacitor senses relative humidity while a platinum RTD senses temperature. The sensors are protected by a stainless filter, easily removable for cleaning. The gasketed case and special feed-throughs provide weathertight protection. Mounting is accomplished via provided screws through internal holes. An unusually low compliance voltage (minimum 6 volts) permits the use of large impedances for long wire runs.

B. UNPACKING

Upon receipt of the shipment, inspect the container and equipment for any signs of damage. Take particular note of any rough handling in transit. Immediately report any damage to the shipping agent.

NOTE:

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

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This owner's manual was as current as possible when this product was manufactured. However, products are constantly being updated and improved. Because of this, some differences may occur between the description in this manual and the product you received.

THEORY OF OPERATION

A 4 to 20 milliamp loop is a series current loop in which a transmitter will vary the current flow depending on the input to the transmitter. In the RHT-20C and RH-20C the amount of current allowed to flow will vary depending on the relative humidity. Some of the advantages of a current output over a voltage output is that it is less susceptible to noise interference and it allows the connection of more than one meter or recorder to the loop as long as the maximum resistance is not exceeded.

The typical current loop will consist of a power supply, a transmitter and a meter to measure the current flow. The loop resistance is the sum of the impedance of the meter(s) and the lead wire.

The maximum allowable loop impedance is found by the formula:
Rmax=(power supply voltage-6 volts)/.02 amps
EXAMPLE: When using a 24 VDC power supply:
Rmax=(24-6)/.02=900 ohms

If the meter or recorder being used accepts only voltage, then the current can be converted to a voltage using a shunt resistor and Ohm's law (voltage=current x resistance). By installing a 250 ohm resistor across the input terminals of the recorder, the input voltage would equal 1-5 volts.

TERMINAL CONNECTORS FOR RHT UNIT

(Refer to Figure 1)

RHT-20C TERMINAL CONNECTIONS

1 RH Negative
2 RH Positive
3 Temperature Negative
4 Temperature Positive

RHT-10V TERMINAL CONNECTIONS

1 RH Voltage Output
2 Temperature Voltage Output
3 Negative Power Supply
4 Positive Power Supply

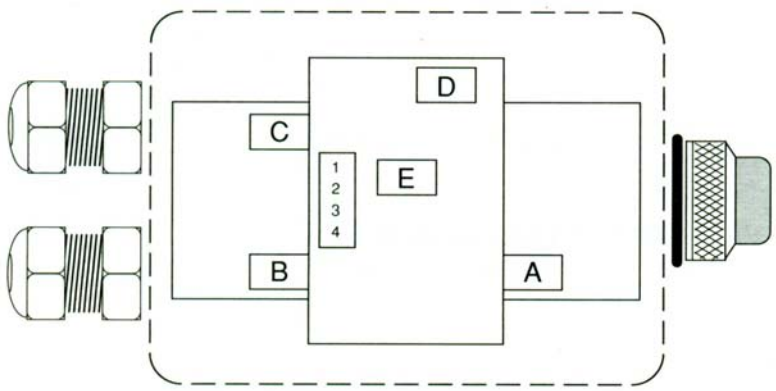

Figure 1. RHT Terminal Connections/Trim Pot Locations

TRIM POTS

A RH Zero
B RH Full Scale
C RH (factory adjustment only). Not present on RH-10V.
D TEMP (factory adjustment only)
E TEMP (factory Adjustment only)

WIRING EXAMPLES FOR RHT UNITS

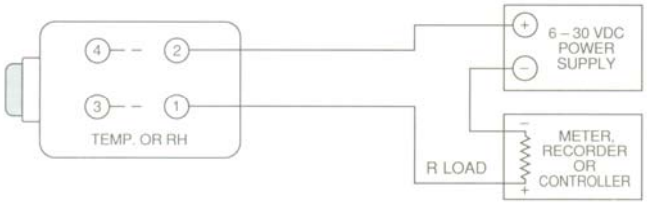

Figure 2. Typical 2-Wire RHT-20C
(Use twisted pairs to reduce noise interference)

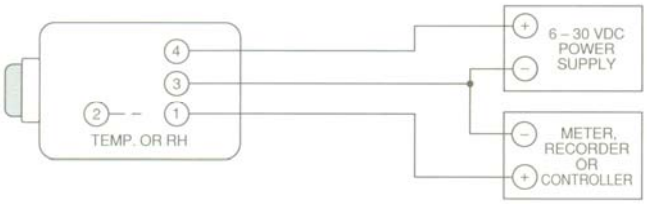

Figure 3. Typical 3-Wire RHT-10V Hookup

RH/TEMPERATURE CALCULATIONS

To find max. loop impedance:
Rmax = (V supply-6)/.02

RHT-20C

To calculate RH by measuring current output in miliamperes (i):
%RH=(i-4)/0.16

To calculate temperature in °C or °F;
°C=(i-4) x (95/16)-20
°F=(i-4) x (171/16)-4

RHT-10V

To calculate temperature in °C or °F from voltage outputs (V):
°C=(V) x (95)-20
°F=(V) x (171)-4

TERMINAL CONNECTORS FOR RH UNITS

(Refer to Figure 4)

RH-20C TERMINAL CONNECTIONS

1 No Connection
2 RH Negative
3 RH Positive

RH-10V TERMINAL CONNECTIONS

1 RH Voltage Output
2 Negative Power Supply
3 Positive Power Supply

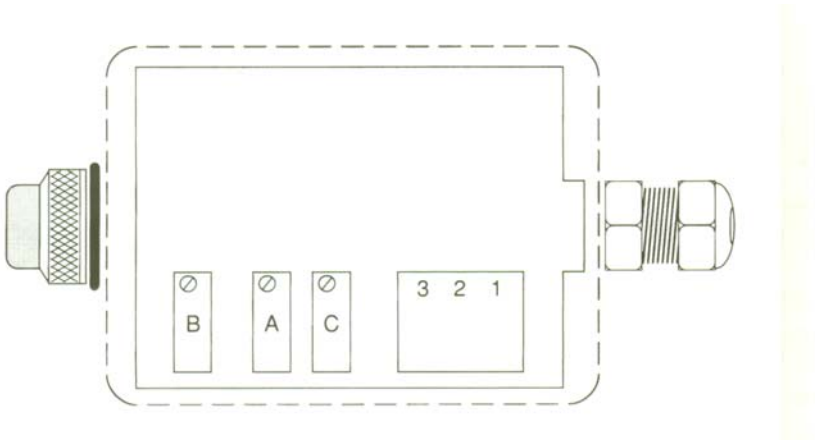

Figure 4. RH Terminal Connections/Trim Pot Locations

TRIM POTS

A RH Zero
B RH Full Scale
C RH (factory adjustment only)
Not present on RH-10V models

WIRING EXAMPLES FOR RH UNITS

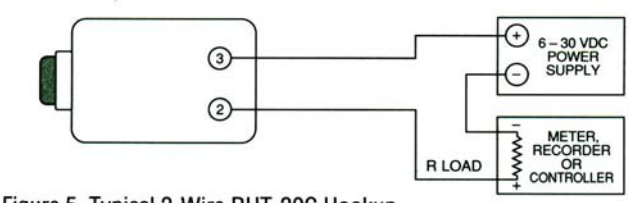

Figure 5. Typical 2-Wire RHT-20C Hookup
(Use twisted pairs to reduce noise interference)

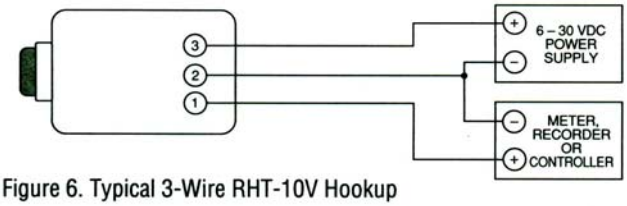

Figure 6. Typical 3-Wire RHT-10V Hookup

RH CALCULATIONS

RH-20C

To find max. loop impedance: Rmax = (V supply-6)/.02

To calculate RH by measuring current output in miliamperes (i):
%RH=(i-4)/0.16

RH-10V

0 to 1 volt represents 0% RH to 100% RH

RH CALIBRATION

Refer to Figures 1 and 4 for the location of trim pots A and B.

Note: The TEGAM RH-CAL Relative Humidity Calibration Kit is recommended for providing the “low” and “high” RH environments for this procedure. The salt solutions in this kit are prepared according to ASTM standard E104-85 to provide 11.3% and 75.3% relative humidity environments. The containers provided in the kit are designed to fit with these instruments.

1. Turn the span (trim pot B) all the way up (clockwise).
2. Turn the zero (trim pot A) all the way down (counter-clockwise).
3. Place the sensor in the low (11.3%) RH environment. Allow at least one hour for stabilization or until the output stops changing.
4. Verify the output is 4 +/-.02 mA for 20C models or 0 +/-1 mV for 10V models. If it is not, return the unit to TEGAM for repair.
5. Adjust the zero (trim pot A) to the point where it just starts to cause a change in the output.
6. Place the sensor in the high (75.3%) RH environment. Allow at least one hour for stabilization or until the output stops changing.
7. Adjust the span (trim pot B) so the output is equivalent to the difference between low and high RH environments. Example: 75.3% - 11.3% = 64% which is equivalent to 14.24 mA for 20C models or 0.64 V for 10V models.
8. Adjust the zero (trim pot A) so the output is equivalent to the high RH environment. Example: 75.3% is equivalent to 16.05 mA for 20C models or 0.753 V for 10V models.
9. Place the sensor in the low RH environment and allow at least one hour for stabilization or until the output stops changing. Verify the output is equivalent to the low RH environment. Example: 11.3% is equivalent to 5.81 mA for 20C models or 0.113 V for 10V models.

MAINTENANCE

If the unit is operated in a dusty environment, the protective sensor filter, if clogged, may be removed for cleaning. Unscrew filter and gently blow compressed air through screen. If necessary, use a soft brush to remove lint from sensors. If the sensors are subjected to 100% condensation, they must be dried to obtain correct readings. There is no permanent calibration shift, nor is recalibration necessary if 100% condensation occurs. The instrument should not be exposed to high concentrations of ammonia or alcohol vapors. However, any environment that is breathable under normal HVAC applications should not affect the sensors. To maintain original specifications, it is generally recommended that the RH sensor be recalibrated on an annual basis depending upon operating conditions. The temperature sensor does not require recalibration.

SPECIFICATIONS

A. RELATIVE HUMIDITY

INPUT VOLTAGE RANGE:	6 to 30 VDC (polarity protected)
RH RANGE:	3% RH to 95% RH
ACCURACY:	±2% RH
RH TEMPERATURE COMPENSATION RANGE:	-4°F TO +167°F (-20°C to +75°C)
20C RH OUTPUT:	4 to 20 mA for 0 to 100% RH
10V RH OUTPUT:	0 to 1.0 volt for 0 to 100% RH
RH TIME CONSTANT:	(for 90% response at 25°C; in moving air, 1M/sec.) Less than 20 seconds, 10% RH to 90% RH Less than 30 seconds, 90% RH to 10% RH
REPEATABILITY:	±1% RH

B. TEMPERATURE (RHT MODELS ONLY)

INPUT VOLTAGE RANGE:	6 to 30 VDC (polarity protected)
TEMPERATURE RANGE:	-4°F to +167°F (-20°C to +75°C)
ACCURACY:	±1°F (±0.6°C)
20C TEMP. OUTPUT:	4 to 20 mA for –20°C to +75°C
10V TEMP. OUTPUT:	0 to 1.0 volt for –20°C to +75°C
TEMP. TIME CONSTANT:	(for 63.2% response) Less than 5 seconds in moving air (1 M/sec); Less than 10 seconds in still air.
REPEATABILITY:	±. 5°f (±0.3°C)

C. MECHANICAL

HOUSING:	ABS plastic watertight enclosure; meets NEMA 1,2 3, 3R, 4, 4X, 5, 12, and 13 specifications. U.L. File #E66473
CONNECTORS:	Liquid-tight nylon with neoprene gland, for .09” to .265” diameter cables. Internal terminal block accepts #14-22 AWG wires.
RHT BASIC DIMENSIONS:	3.14” (80mm) x 3.22” (82mm) x 2.16” (55mm)
RHT WEIGHT:	8 oz. (227 grams) max.
RH BASIC DIMENSIONS:	1.96” (50mm) x 2.56” (65mm) x 1.37” (35mm)
RH WEIGHT:	5 oz. (142 grams) max.

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