TEGAM

RDP SERIES

HUMITRAN-DP

Publication Date: April 2005
Document Number: RDP-20-901-01 Rev. C

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.

RELATIVE HUMIDITY/TEMPERATURE PROBE

A. GENERAL DESCRIPTION

The stainless steel probe provides temperature compensated relative humidity as well as temperature outputs. A thin film polymer capacitor senses relative humidity, while temperature is monitored by a 100 ohm platinum RTD. The sensors are protected by a stainless steel filter cap that is easily removable for cleaning. The sealed probe has an end cap that may be removed for access to calibration trimmers when necessary. Signal and power connections are made via a 4 pin connector at the end of a 12" cable. An adjustable, removable duct flange, allows mounting at any depth between 1 and 9 inches. Also provided is a mating cable connector and a clip for wall mounting.

The current output version of the probe is a true 2-wire transmitter with an unusually low compliance voltage (6 volts), allowing for long wire runs. The voltage version has internal voltage regulation so that any low power source (3.5ma) over a wide voltage range (6 to 30 volts) will operate the unit. Both current and voltage versions are polarity protected.

B. UNPACKING

Verify that the following parts have been received.

1. Probe transmitter
2. 2-piece duct flange, with o-ring, (3) flat head screws, and gasket.
3. 4-pin mating connector
4. Wall mounting clip and screw
5. Instruction manual

C. THEORY OF OPERATION

A 4 to 20 milliamp loop is a series current loop in which a transmitter will vary the current flow depending upon the parameter being measured (Relative Humidity or Temperature). Advantages of a current output over a voltage output is that is less susceptible to noise interference and 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:

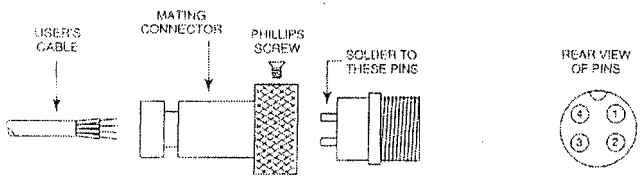
Rmax=(power supply voltage-6 volts)/.02 amps
EXAMPLE: When using a 24 VDC power supply:
Rmax=(24-6)/.02=900 ohms (for total wire length to and from the transmitter).

The following chart shows various resistance of lead wire:

AWG WIRE SIZE	RESISTANCE PER 1000 FEET
24	25 ohms
22	15 ohms
20	10 ohms
18	6 ohms
16	4 ohms

If the meter or recorder being used accepts only voltage, than either the voltage version of the probe (0 to 1 volt) should be used, or convert the current to voltage by installing a 250 ohm resistor across the input terminals of the recorder to obtain a 1 to 5 volts input.

D. TERMINAL CONNECTIONS

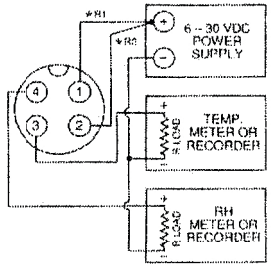


1. Remove small Phillips head screw from mating connector.
2. Pull out pin section from front.
3. Insert cable end thru connector before soldering to solder-cup pins.
4. The terminals will accept No. 26 to 18 AWG wires.

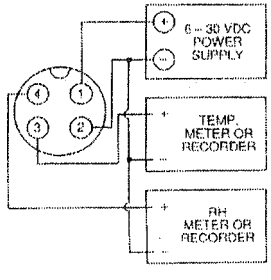
PROBE CABLE WIRE COLOR	CONNECTOR PIN NO.	CURRENT DESIGNATIONS	VOLTAGE DESIGNATIONS
BLACK	1	+V TEMPERATURE	+V POWER SUPPLY
WHITE	2	+V RH	-V GROUND
RED	3	-V TEMPERATURE	VT TEMP. OUTPUT
GREEN	4	-V RH	VRH RH OUTPUT

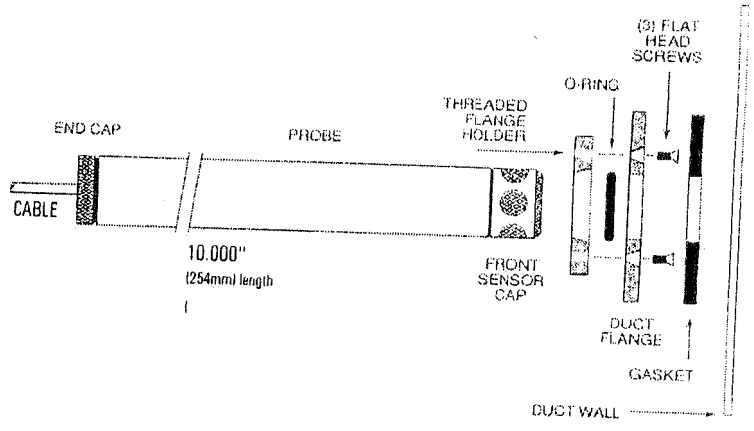
E. WIRING EXAMPLES

1. TYPICAL CURRENT HOOKUP
* Wires R1 and R2 can be combined into one single wire with a jumper at pins (1) and (2). This will mean 3 wires instead of 4.



2. TYPICAL VOLTAGE HOOKUP





F. MOUNTING

A. DUCT MOUNTING

STEPS

1. Slide flange holder onto probe with countersink hole facing front of probe as shown.
2. Position o-ring on probe at desired position. (for depth into duct).
3. Slide duct flange onto probe with countersink of screw holes facing front of probe as shown.
4. Fasten with (3) 6/32 flat head screws and tighten evenly until secure.
5. Position gasket between duct flange and duct wall and fasten assembly to duct with (4) #6 sheet metal screws (not included).

The duct wall requires a 13/16"d. (.812" or 21mm) hole for probe, with (4) mounting holes (for #6 sheet metal screws) evenly spaced on a 2.0" (51mm) circle. Use duct flange as template.

B. WALL MOUNTING

1. Fasten plastic clip to wall with included screw.
2. Snap probe into clip.

G. RH AND TEMPERATURE CALCULATIONS

1. Max current loop impedance for RH or Temperature
   Rmax=(Vsupply-6 volts)/.02 amps

2. RH current output: (i=current output in milliamperes)
   % RH=(i-4)/.16 ^{I}RH=(%RH) x (.16) + 4

3. Temperature current output
   °C=(i-4) x (100/16) ^{I}C=(°C) x (16/100) + 4
   °F=(i-4) x (180/16) + 32 ^{I}F=(°F-32) x (16/180) + 4

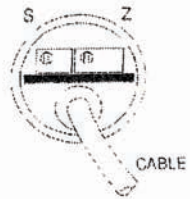
4. RH voltage output: (V = voltage outage in millivolts)
   °RH=V/10 ^{V}RH=(%RH) x (10)

5. Temperature voltage output
   °C=V/10 ^{V}C=(°C) x (10)
   °F=(V/10) x (1.8) + 32 ^{V}F=(°F-32) x (10/1.8)

H. RH CALIBRATION

To expose the two trim pots for adjustment, remove the cable end cap. Refer to figure to the right for the location of trim pots S and Z.

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



1. Turn the span (trim pot S) all the way up (clockwise).
2. Turn the zero (trim pot Z) all the way down (counter-clc ...).
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 evaluation and repair.
5. Adjust the zero (trim pot Z) 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 S) 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 Z) 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 zero (trim pot Z) so the output is equivalent to the high 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.

I. TEMPERATURE CALIBRATION

Temperature is factory calibrated only, and does not require any further calibrations.

J. MAINTENANCE

If the probe 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.

K. SPECIFICATIONS

1.RELATIVE HUMIDITY: Thin film polymer capacitor
INPUT VOLTAGE RANGE: 6 to 30 VDC (Polarity protected)
RANGE/ACCURACY/REPEATABILITY: 3%RH to 95%RH/
±2%RH/±1%RH
TEMPERATURE COMPENSATION: -20°C to 85°C
CURRENT OUTPUT: 4 to 20ma for 0 to 100% RH
VOLTAGE OUTPUT: 0 to 1.0 volt for 0 to 100% RH
TIME CONSTANT: (for 90% responses 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

2.TEMPERATURE: Thin film 100 ohm platinum RTD (DIN 43760)
INPUT VOLTAGE RANGE: 6 to 30 VDC (polarity protected).
RANGE: 0°C TO 100°C (32°F TO 212°F)
ACCURACY/REPEATABILITY: ±0.6°C (±1°F)/±0.3°C (±0.5°F)
CURRENT OUTPUT: 4 to 20ma for 0°C to 100°C
VOLTAGE OUTPUT: 0 to 1.0 volt for 0°C to 100°C
TIME CONSTANT: (for 60% response) less than 2 seconds in moving air (1M/sec): less than 10 seconds in still air.

3. MECHANICAL
HOUSING: Stainless steel watertight enclosure meets NEMA 4 specifications.
DIMENSIONS: PROBE; 10.000" (254mm long), .75" (19mm) diameter, 12" cable. DUCT FLANGE; variable 1" to 9" (25.4 to 227mm) depth. 2.75" (70mm) diameter, duct hole .812" (21mm) diameter, with 4 mounting holes .156" (4mm) diameter (for #6 sheet metal screws) on 2.00" (51mm) circle.
CONNECTIONS: 4 pin mating connector accepts 26 to 18 AWG wires.
WEIGHT: 7 ounces (198 grams) with duct flange.

WARRANTY

Tegam, Inc. warrants this product to be free from defects in material and workmanship for a period of one year from date of shipment. During the warranty period, we will, at our option, either repair or replace any product that proves to defective.

To exercise this warranty, write or call Tegam, Inc. in Geneva, Ohio. You will be given prompt assistance and return instructions. Send the instrument, transportation prepaid, to the indicated service facility. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

LIMITATION OF WARRANTY

This warranty does not apply to defects resulting from unauthorized modification or misuse of any product or part. This warranty also does not apply to fuses, batteries, or damage from battery leakage.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. Tegam, Inc. shall not be liable for any indirect, special or consequential damages.

STATEMENT OF CALIBRATION

This instrument has been inspected and tested in accordance with specifications published by Tegam, Inc.

The accuracy and calibration of this instrument are traceable to the National Bureau of Standards through equipment which is calibrated at planned intervals by comparison to certified standards maintained in the Laboratories of Tegam, Inc.

NOTES

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