Installation and Operation Instructions
RH Duct and Outside Series

Combination Units and NEMA Rated Enclosures

PLEASE READ INSTRUCTIONS CAREFULLY BEFORE INSTALLATION!

GENERAL INFORMATION

The RH Duct and Outside transmitter is a Relative Humidity transmitter that can be powered with either an AC or DC supply voltage. The transmitter can also include an optional temperature sensor for monitoring the space temperature.

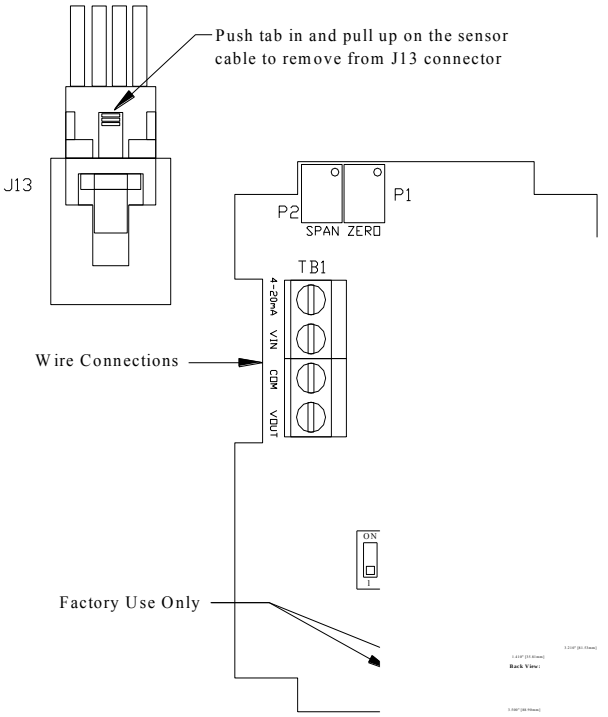
MOUNTING INSTRUCTIONS

IMPORTANT: RH Stainless Plates and some NEMA 4X configurations include a Black Rubber Cap that fits over the sensor filter. This Cap should be placed on the sensor filter during wet/wash down processes. The Cap must be removed for normal

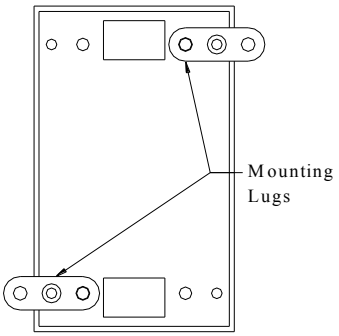
ıtion
ıe aluminum
mounting lugs
ɾfer to **Figure**

ameter hole in
ounted. Insert
ısmitter to the
provided.

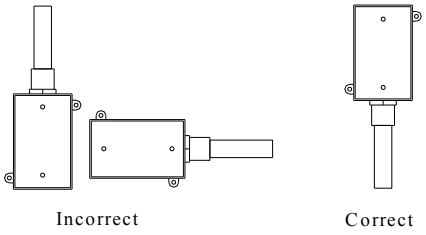
ıtter should be
rea out of the



F



gure #2



e #3

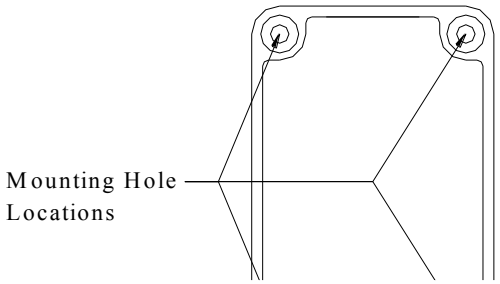
Figure #3

MOUNTING INSTRUCTIONS CONTINUED

NEMA 4X Mounting Configuration

The NEMA 4X enclosure can be mounted using the knockout holes molded in the base or the corner mounting holes. Corner hole mounting is required to maintain the NEMA 4X rating. The corner mounting holes are located behind the screws that hold the cover on. Refer to **Figure #4** for the corner mounting hole locations.

For a Duct configuration, drill a 1 1/4" diameter hole in the duct where the transmitter is to be mounted. Remove the cover and insert the probe into the hole. Attach the



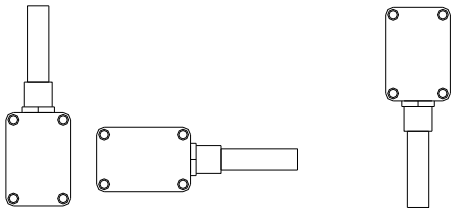


Figure #5

Stainless Steel Plate Co
The RH stainless steel p
areas of excessive moist
windows and direct sunl
mounted to an inside wall, approximately 4 to 6 feet above the floor. The Stainless Steel plate was designed to mount over a standard 2" x 4" single gang junction box using the mounting hardware provided. Refer to the wiring instructions (***Figure #6)*** to make the necessary connections.

WIRING INSTRUCTIONS

A 16 to 22 AWG shielded cable is recommended for all transmitters. Twisted pair may be used for 2-wire current output transmitters. The connections to the temperature sensor should be made with wire nuts or crimp style connectors. Refer to **Figure #6** for wiring diagram.

Caution:

3.70" [93.98mm]

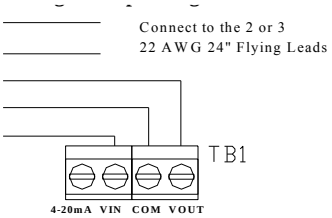


Figure #6

OUTPUT SELECTIONS

Switches 6, 7, and 8 are used to set the output.

Output Selection Switches (SW1)

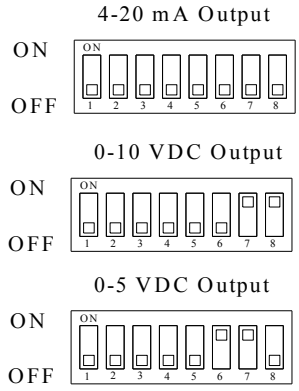


Figure #7

RH CALIBRATION INSTRUCTIONS

Note: This is only a single point calibration. All transmitters are factory calibrated to meet/exceed … Field adjustment should not

…r to calibrate the sensor
…; switch 4 ON will put the
…llowing the increment and
…setup mode, the output will
…V, 5V for 0-10V, 12mA for
… decrement step will cause
…' for 0-5V, 0.2V for 0-10V,
…setup mode. This can be
…ır offset the transmitter is.
…in set switch 1 ON. This
…ain. When the unit is out of
…o back to RH output.

… linearly up in 0.5% steps.
…irst. After switch 4 is on,
… the RH output will
…ıse goes into effect each
… switch 5 is set to ON.

Decrement RH Output

This will shift the RH output linearly down in 0.5% steps. Switch 4 must be set to ON first. After switch 4 is on, each time switch 6 is set ON the RH output will decrease by 0.5%. The decrease goes into effect each time switch 6 is set to ON.

Reset RH Output

This will reset the RH output back to the original calibration. Switch 4 must be set to ON first. After switch 4 is on, toggle switches 5 and 6 ON then OFF. After 5 and 6 are OFF slide switch 4 OFF.

When all calibration is completed, remember to place the switches back into the positions that correspond to the output needed as shown in **Figure #7**.

Note: Potentiometers P1 (Zero) and P2 (Span) in Figure #1 are not used for RH sensor calibration. They are used for factory use only!

TEST INSTRUCTIONS

Test mode will make the transmitter output a fixed 0%, 50%, or 100% value. The sensor will not affect the transmitter output. This is used for troubleshooting or testing only.

Switches 1, 2, and 3 are used for test mode. The output will be a fixed 0%, 50%, or 100% signal that corresponds to the output selected with switches 6, 7, and 8. Refer to **Figure #8** for switch settings.

REVERSE ACTING OUTPUT

The output can be changed to reverse acting mode. The output range stays the same but the corresponding RH value is opposite.

Example: Direct Acting (DA)
0-10V output mode,
0V = 0% RH and 10V = 100% RH
Reverse Acting (RA)
0-10V output mode,
0V = 100% and 10V = 0%

To change the transmitter to reverse acting or back to direct acting, set switch 4 ON to put the unit in setup mode. After switch 4 is on, switch 2 will put the unit in direct/reverse acting mode. When switch 2 is set to ON, the output can be used to show if the unit is in direct or reverse acting mode. For direct acting the output will be 1V for 0-5V, 2V for 0-10V, and 7.2mA for 4-20mA. For reverse acting the output will be 4V for 0-5V, 8V for 0-10V, and 16.8mA for 4-20mA.

With switches 2 and 4 ON, each time switch 5 is set to ON the output will change to reverse acting or direct acting.

To reset the unit to the default setting, toggle both switches 5 and 6 ON then OFF while both switches 2 and 4 are ON.

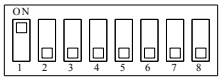
When all calibration is completed, remember to place the switches back into the positions that correspond to the output needed as shown in **Figure #7**.

Test Selection Switches (SW1)

0% RH Output

ON

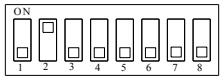
OFF



50% RH Output

ON

OFF



100% RH Output

ON

OFF

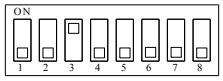


Figure #8

(VDC signal) / 0.05 = percent RH
Example: 1.25vdc output signal
1.25 / 0.05 = 25% RH

0-10 VDC
(VDC signal) / 0.10 = percent RH
Example: 7.50vdc output signal
7.50 / 0.10 = 75% RH

- If you suspect that the transmitter is not reading within the specified tolerance, please contact the factory for further assistance.

PRODUCT SPECIFICATIONS

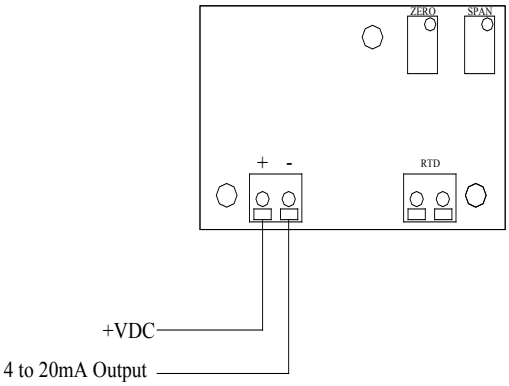
Supply Voltage	4-20mA Output: 250 Ohm Load 15 - 40 VDC / 18 - 28 VAC	**RH Measurement Range**	0 - 100% RH
	4-20mA Output: 500 Ohm Load 18 - 40 VDC / 18 - 28 VAC (500 Ohm Load Max)	**RH Accuracy @ 77°F (25°C)**	± 1% over 20% span (between 20 to 90%) ± 2%, 3%, or 5% from 10 to 95%
	0-5 VDC Output: 12 - 40 VDC / 18 - 28 VAC (4K Load Minimum)	**Repeatability**	0.5% RH
	0-10 VDC Output: 18 - 40 VDC / 18 - 28 VAC (4K Load Minimum)	**Operating Humidity Environment**	0 to 100% RH
Supply Current	Voltage Output: 8mA Max Current Output: 24mA Max	**Operating Temp. Environment**	-40 to 140°F (-40 to 60°C)
RH Output	2-Wire, 4 - 20 mA	**Storage Temp. Range**	-40 to 160°F (-40 to 71°C)
	3-Wire, 0 - 5VDC, 0 - 10VDC, or 4-20mA		

Installation and Operation Instructions
A/TT100, A/TT1K
A/TTM100, A/TTM1K

READ THESE INSTRUCTIONS BEFORE YOU BEGIN INSTALLATION

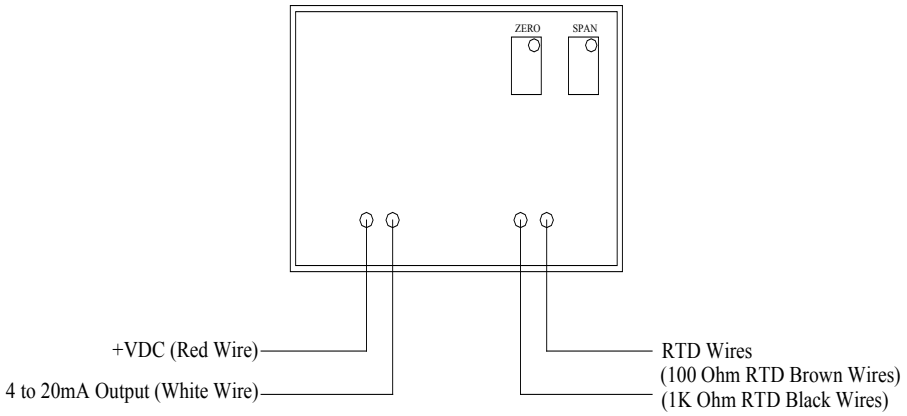
Standard Units

Current Output
(4 to 20 mA)

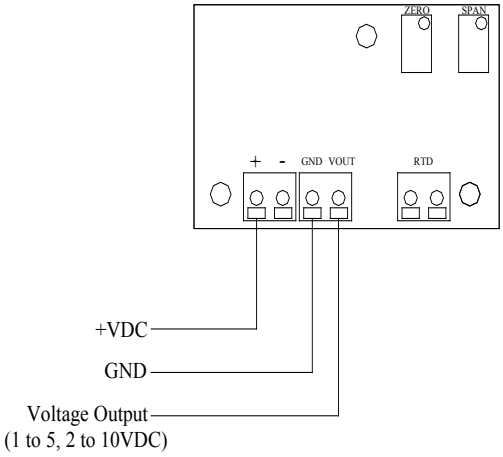


Potted Units

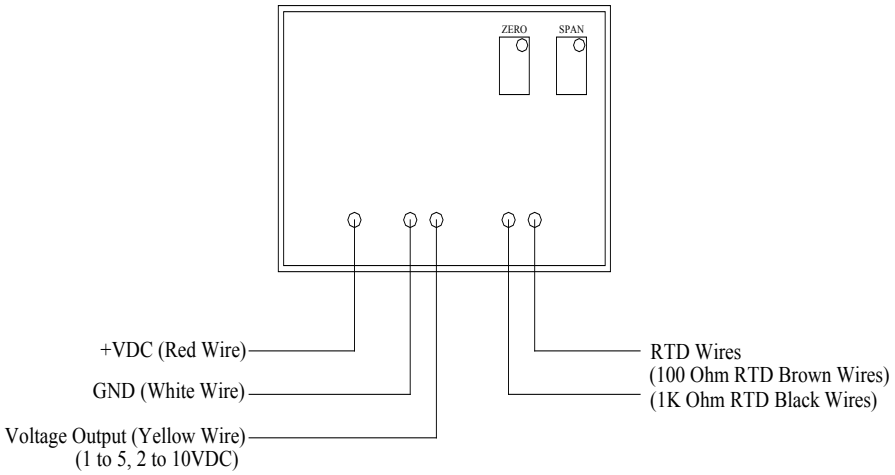
Current Output
(4 to 20 mA)



Voltage Output
(1 to 5, 2 to 10VDC)



Voltage Output
(1 to 5, 2 to 10VDC)



The A/TT and TTM DO NOT support an AC input.
All ACI/TT and TTM temperature transmitters can be powered from either an unregulated or regulated 8.5 to 32VDC power supply**. The minimum voltage at the transmitter power terminal is 8.5V after load resistor voltage drop.**
249 ohm load resistor (1-5VDC output) = 13.5V minimum supply Voltage
499 ohm load resistor (2-10VDC output) = 18.5V minimum supply Voltage
Several transmitters may be powered from the same supply as shown below.

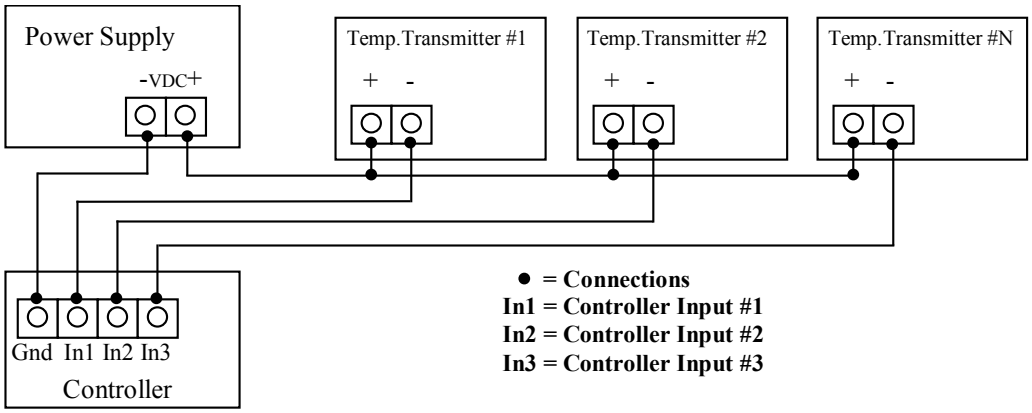
Each transmitter could draw 25mA. To determine the number of transmitters use the following formula:

$$N=I/25mA$$

where: *N* = number of transmitters
I = current available from power supply
25mA = maximum current draw of transmitter

e.g., If I = 1.5A then:
N = 1.5/25mA
N = 60

Therefore a 1.5A power supply will safely power up to 60 transmitters.



All A/TT and TTM temperature transmitters are reverse polarity protected.

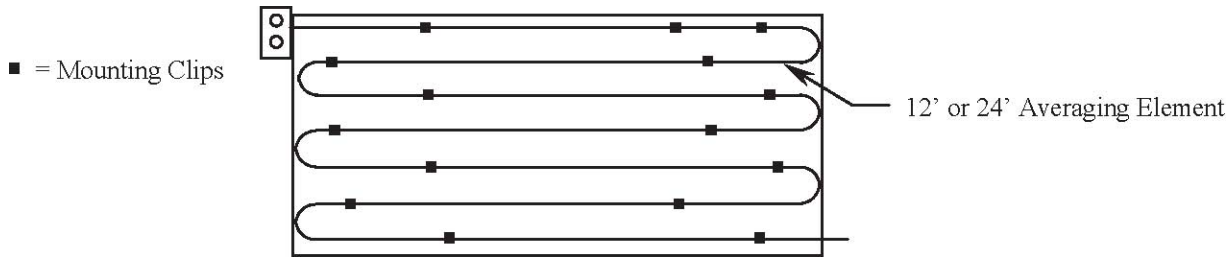
Room Temperature Transmitters

This unit is suitable for either drywall or junction box mounting. First, remove the cover of the housing and mount the base of the Room unit to the wall, using the (2) 6/32" x 1" screws that are provided. Once the base is mounted to the wall, make all of the proper connections and then place the cover back onto the unit. Now tighten the cover down, using the (2) Allen screws located in the bottom of the housing. The Room transmitter is provided with a two pole terminal block for power and a two pole terminal block for the RTD, which allows for easy wiring of the unit.

Duct & Duct Averaging Temperature Transmitters

Duct Temperature Sensors - Drill a 3/8" hole in the duct and insert the probe through the hole until the foam pad is tight to the duct. Now insert (2) screws through the mounting holes in the flange and tighten until the unit is held firmly to the duct.

Duct Averaging Sensors – Drill a 3/8" hole in the duct and insert the averaging element through the hole until the foam pad is tight to the duct. Now insert (2) screws through the mounting holes in the flange and tighten until the unit is held firmly to the duct. The sensor should then be strung in a criss-cross pattern throughout the duct (see Figure #2) using the mounting clips provided, in a pattern that covers the greatest surface area of the duct, to insure that there is no stratification. When bending the copper tubing, be careful that you use a gradual bend and that you DO NOT kink the copper tubing.



Immersion Temperature Transmitters
The ACI Immersion type transmitters are provided with a 2.5", 4" or 8" 304 series stainless steel thermowell. The thermowell has a 1/2" external or process NPT threads and 1/2" internal or instrument NPT threads. All of the ACI thermowells will accept a probe diameter of 0.250".

Strap-On Temperature Transmitters
The ACI Strap-On transmitters are provided in a junction box with an adjustable 2" to 5" pipe clamp. The unit should be mounted on the bottom side of the pipe to ensure good temperature transfer. In hot water applications (over 150^{o}F) it is recommended that the transmitter be remote located so as not to exceed the operating temperature of the transmitter. Extra straps may be ordered for larger diameter pipes.

Outside Air Temperature Transmitters
The ACI Outside Air transmitters are provided in two parts including a weatherproof enclosure and a 2" X 4" junction box. The sensors will be mounted in the weatherproof enclosure and mounting hardware is provided. The transmitter will be provided in the 1 gang junction box and should be mounted on an inside wall so as not to exceed the operating temperature limits of the transmitter. This sensor should be mounted on either the North side of the building or anywhere out of direct sunlight with the sensor probe pointed downward. Weatherproof Aluminum Bell Boxes and NEMA 4X Polycarbonate enclosures are available upon request.

Stainless Plate Temperature Transmitters
The ACI Stainless Plate temperature transmitters are mounted on the back of a 2" x 4" stainless plate. The sensor is covered with a 1/8" foam insulation, which allows the sensor to sense the actual room temperature and ignore any heat produced by the transmitter or drafts from within the wall. All mounting screws are provided.

Troubleshooting

No Reading	No power to board - check voltage at power terminal - should be between +8.5 and 32 VDC.
Reading too Low	RTD wires shorted - check with ohmmeter - should be close to either 100 Ω or 1000 Ω. Improper range of transmitter (too low) - check current - should be between 4 and 20mA.
Reading too High	RTD opened - check with ohmmeter - should be close to either 100 Ω or 1000 Ω. Improper range of transmitter (too high) - check current - should be between 4 and 20mA.
RF Interference	Input power must be clean. Use twisted wires or shielded cable. RF resistant power supply. Use a shielded cable to connect the sensor - connect the shield to ground. Encase the board in a RF shielded enclosure.