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User's Guide

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EWS-RH
Relative Humidity/Temperature Transmitter

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Page

EWS-RH
Relative Humidity/Temperature Transmitter

Figure **Page**

General Description

The OMEGA® Model EWS-RH is a combination dual output, relative humidity/temperature transmitter. A thin film temperature compensated, polymer capacitor senses relative humidity while a solid state temperature sensor measures ambient temperature. Independent user selectable 4-20 mA or 1-5 Vdc outputs are provided for both measured parameters via a terminal strip connection.

Unpacking

Remove the packing list and verify that you have received all your equipment. If you have any questions about the shipment, please call our Customer Service Department at

1-800-622-2378 or 203-359-1660. On the web you can find us at:

www.omega.com e-mail: cservice@omega.com

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

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

The following items are supplied in the box with your transmitter.

This Manual, # M-3501	(1 ea.)
Dewpoint Card	(1 ea.)
#6 Wall Anchor	(2 ea.)
#6 Mounting Screw	(2 ea.)

Additional EWS Series Models Available

Model	Description
EWS-TC-(*)	Wall mount thermocouple sensor (* = insert type,J, K, T, E)
EWS-RTD	Wall mount RTD sensor (100 Pt., .00385)
EWS-TX	Wall mount solid state temperature transmitter
EWS-BP-A	Wall mount barometric pressure transmitter

Theory of Operation

A 4-20 mA loop is a series loop in which a transmitter will vary the current flow depending on the input to the transmitter. In the EWS-RH the amount of current allowed to flow in the loop will vary depending on the relative humidity or temperature being measured by the sensor. Some advantages of a current output over a voltage output is that the signal measured is less susceptible to electrical noise interference and the loop can support more than one measuring instrument as long as the maximum loop resistance is not exceeded.

A typical application utilizing a current loop will normally consist of a power supply, the transmitter and a meter, recorder or controller to measure the current flow. The loop resistance in the sum of the measuring instruments and wire used. The maximum allowable loop resistance for the EWS-RH to function properly is found by using the following formula:

R_{max} = (power supply voltage - 8 volts)/.02 amps

For applications that require a voltage output signal the EWS-RH has a built-in 250 Ohm shunt resistor that will convert the transmitters output to a 1-5 Vdc signal when wired correctly. See "*Transmitter Wiring Examples*" in this manual.

Recommended Accessories

Power Supply, OMEGA® Part No.: PSU-93

Shielded 4-conductor cable, OMEGA® Part No.: TX4-100

Conduit Box Mounting Kit, OMEGA® Part No.: EWS-MB

NOTE

Note: These units are not designed, nor recommended for medical, Explosive Environment or outdoor applications.

Mounting

OMEGA's EWS Series of sensors and transmitters are designed for wall mounting in locations that are free from dirt, grease, food particles and condensing moisture such as manufacturing clean rooms, computer rooms and laboratory type environments. Plastic wall anchors and mounting screws are included for mounting to standard wallboard. A conduit box mounting bracket/wall plate adapter kit is also available as an option that will allow the transmitter to be mounted to a standard electrical conduit box.

Order OMEGA® Model No.: EWS-MB.

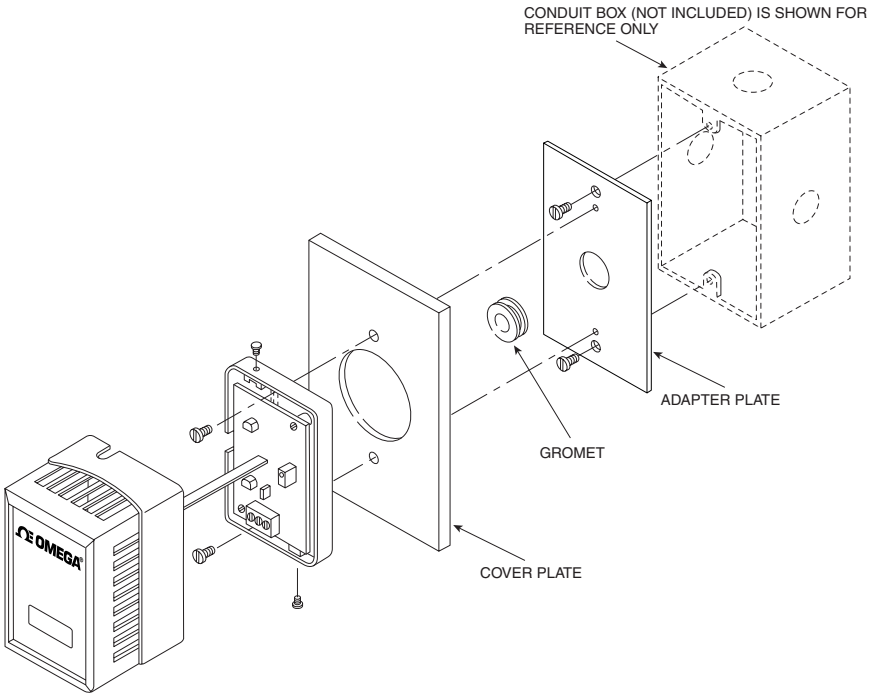

Figure 1: Mounting Diagram

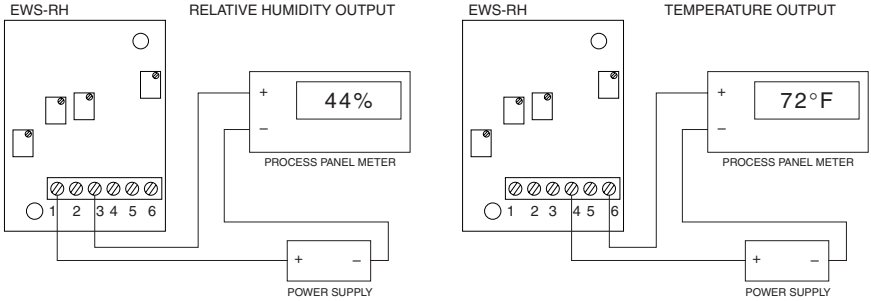

Figure 2: Transmitter Wiring Examples For Current Output (4-20 mA)

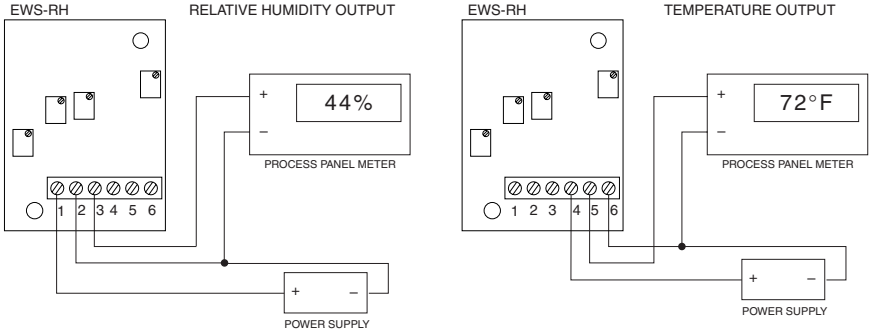

Figure 3: Transmitter Wiring Examples For Voltage Output (1-5 Vdc)

RH/Temperature Calculations

To calculate % Relative Humidity by measuring current output in milliamperes.

$$\left(\frac{\text{Current output - 4}}{.16}\right) = \%\ \text{RH}$$

To calculate Temperature by measuring current output in milliamperes.

$$\left(\frac{\text{Current output - 4}}{16} \times 135\right) + 5 = \text{Temp (°F)}$$

RH Measured Vs Output Reading

% Relative Humidity	Output	
	Current(mA)	Voltage(Vdc)
5	4.8	1.2
10	5.6	1.4
15	6.4	1.6
20	7.2	1.8
25	8	2
30	8.8	2.2
35	9.6	2.4
40	10.4	2.6
45	11.2	2.8
50	12	3
55	12.8	3.2
60	13.6	3.4
65	14.4	3.6
70	15.2	3.8
75	16	4
80	16.8	4.2
85	17.6	4.4
90	18.4	4.6
95	19.2	4.8

Temperature Measured Vs Output Reading

Temperature °C (°F)	Output	
	Current(mA)	Voltage(Vdc)
-15 (5)	4	1
-10 (14)	5.07	1.27
0 (32)	7.20	1.80
10 (50)	9.33	2.33
20 (72)	11.94	2.99
30 (86)	13.60	3.40
40 (104)	15.73	3.93
50 (122)	17.87	4.47
60 (140)	20	5

Calibration

Your transmitter has been factory calibrated to meet or exceed the specifications outlined in this manual. To maintain original specifications it is generally recommended that your transmitter be re-calibrated on an annual basis depending on operating conditions.

Relative Humidity Calibration Procedure

Recommended equipment:

Humidity Generator/Calibrator Kit, OMEGA® Model No.: RHCL-KIT
Handheld Digital Multimeter, OMEGA® Model No.: HHM29

NOTE

Note: Do not make adjustments to potentiometer "P3", this is a factory setting and is not field adjustable. If "P3" is disturbed the transmitter will need to be returned to the factory for service.

1. Remove enclosure cover
2. Connect transmitter as shown in figure below.
3. Apply power to transmitter and allow to warm up for 15 min.
4. Place sensor in a 20% RH environment and allow to stabilize for 20 min.
5. Adjust potentiometer "P1" for a output reading of 7.2 mA
6. Place sensor in a 80% RH environment and allow to stabilize for 20 min.
7. Adjust potentiometer "P2" for an output reading of 16.8 mA
8. Repeat steps 4, 5, 6, 7 as necessary until proper readings are maintained.
9. Calibration complete.

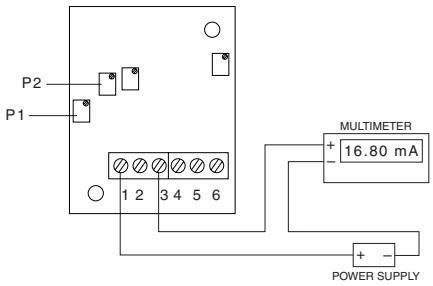

Figure 4: Relative Humidity Calibration Procedure

Temperature Calibration Procedure

Recommended equipment:

Series 860 Thermistor Meter OMEGA® Model No. 865F or 865C

Series 400 Thermistor Probe, OMEGA® Model No.: ON-406-PP

Handheld Digital Multimeter, OMEGA® Model No.: HHM29

1. Remove enclosure cover.
2. Connect transmitter as shown in figure below.
3. Apply power to transmitter and allow to warm up for 10 min.
4. Place unit on workbench with temperature reference probe next to unit.
5. Allow output from transmitter and reference probe to stabilize.
6. Observe the reading on the handheld thermometer coming from the reference probe.
7. Without touching the unit with your hand, adjust potentiometer "P4" for a current output of the transmitter that matches the temperature measured by the reference probe. Note: if you hold the unit with your hand, the unit will sense heat from your hand and cause a bad calibration.

Use this formula:

$$\left(\frac{\text{Ambient} - 5}{135} \times 16\right) + 4$$

Example:

If your reference probe measures 70°F (21.11°C) you need to adjust the transmitter's current output to be 11.70 mA.

8. Calibration complete.

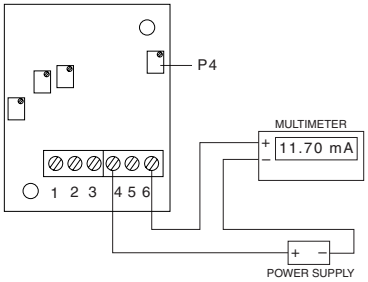

Figure 5: Temperature Calibration Procedure

Relative Humidity Specifications

Range:	5-95% (non-condensing)
Accuracy @ 25°C:	From 5-20%, ± 4% RH From 20-80%, ± 3% RH From 80-95%, ± 4% RH
Repeatability:	± 1% RH
Temp. Compensation Range:	5 to 140°F (-15 to 60°C)
Output:	4-20 mA or 1-5 Vdc (scaled for 0 to 100% RH)
Power:	8-24 Vdc @ 20mA
Max Loop Resistance:	Ohms = (V supply - 8V)/.02 A
RH Time Constant:	100 sec., from 20-90%, 60 sec from 90-20%
Sensor Type:	Thin Film Polymer Capacitor

Temperature Specifications

Range:	5 to 140°F (-15 to 60°C)
Accuracy @ 25°C	
In Still Air:	± 1.2°F (0.7°C) @ 25°C
	± 2.5°F (1.4°C) across full range
In Moving Air:	± 2.5°F (1.4°C) @ 25°C
	± 3°F (1.7°C) across full range
Note: Not recommended for fast moving air applications.	
Repeatability:	± 0.5°F (0.3°C)
Output :	4-20 mA or 1-5 Vdc (scaled across range)
Temp. Time Constant:	(for 63.2% response)
	9 sec. in moving air (1 M/sec.), 30 sec. in still air
Power:	8-24 Vdc @ 20 mA
Max Loop Resistance:	Ohms = (V supply - 8V)/.02 A
Sensor Type:	Solid State

General Specifications

Enclosure Material:	Acrylonitrile Butadiene
Dimensions:	79 x 54 x 45mm (3.12 L x 2.12 W x 1.78" H)
Weight:	54 g(.12 lb)

NOTES:

NOTES:

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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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