

1 YEAR
WARRANTY

MADE IN
USA



User's Guide

Shop online at

omega.com[®]

Ω OMEGA[®]

www.omega.com

e-mail: info@omega.com

ISO 9001
CERTIFIED
CORPORATE QUALITY
STAMFORD, CT

ISO 9002
CERTIFIED
CORPORATE QUALITY
MANCHESTER, UK



EWS-RH
Relative Humidity/Temperature
Transmitter



OMEGAnet® Online Service www.omega.com	Internet e-mail info@omega.com
---	---

Servicing North America:

USA:
ISO 9001 Certified

One Omega Drive, Box 4047
Stamford CT 06907-0047
Tel: (203) 359-1660 FAX: (203) 359-7700
e-mail: info@omega.com

Canada:

976 Bergar
Laval (Quebec) H7L 5A1, Canada
Tel: (514) 856-6928 FAX: (514) 856-6886
e-mail: info@omega.ca

For immediate technical or application assistance:

USA and Canada: Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA®
Customer Service: 1-800-622-2378 / 1-800-622-BEST®
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

Mexico:

En Español: (001) 203-359-7803 e-mail: espanol@omega.com
FAX: (001) 203-359-7807 info@omega.com.mx

Servicing Europe:

Benelux:

Postbus 8034, 1180 LA Amstelveen, The Netherlands
Tel: +31 (0)20 3472121 FAX: +31 (0)20 6434643
Toll Free in Benelux: 0800 0993344
e-mail: sales@omegaeng.nl

Czech Republic:

Frystatska 184, 733 01 Karviná, Czech Republic
Tel: +420 (0)59 6311899 FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342 e-mail: info@omegashop.cz

France:

11, rue Jacques Cartier, 78280 Guyancourt, France
Tel: +33 (0)1 61 37 2900 FAX: +33 (0)1 30 57 5427
Toll Free in France: 0800 466 342
e-mail: sales@omega.fr

Germany/Austria:

Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
Tel: +49 (0)7056 9398-0 FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom:

ISO 9002 Certified

One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
Tel: +44 (0)161 777 6611 FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk

It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

	Page
General Description	1
Unpacking	1
Theory of Operation	1
Mounting	3
RH/Temperature Calculations	5
Calibration	6
Relative Humidity Calibration Procedure	6
Temperature Calibration Procedure	7
Specifications	8

Figure	Page
Figure 1	Mounting Diagram..... 3
Figure 2	Transmitter Wiring Examples For Current Output..... 4
Figure 3	Transmitter Wiring Examples For Voltage Output 4
Figure 4	Relative Humidity Calibration Procedure 6
Figure 5	Temperature Calibration Procedure 7



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 is 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:

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

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.

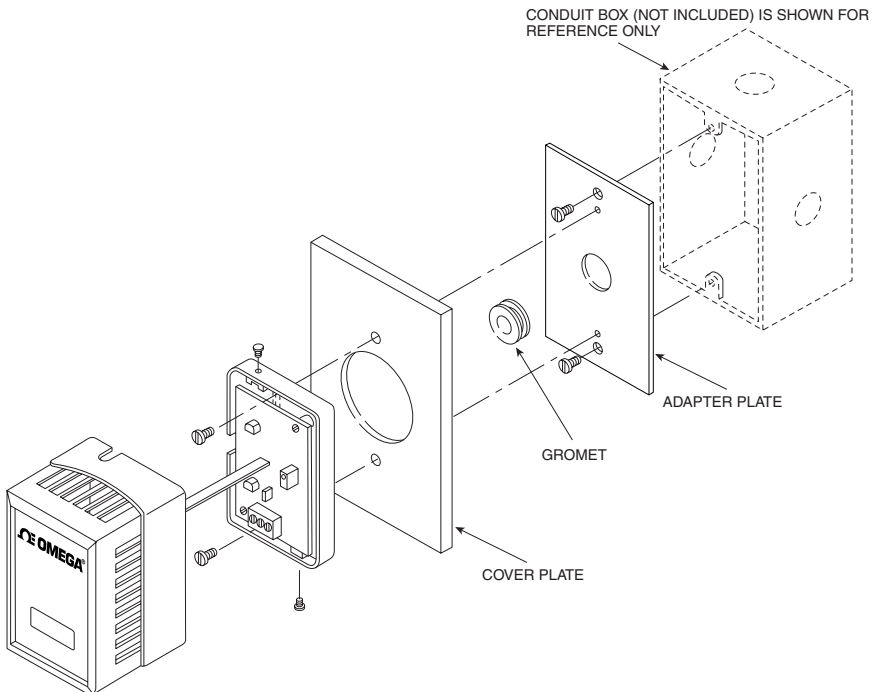
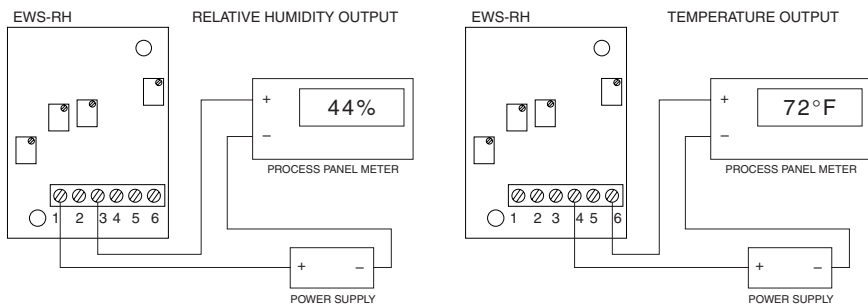


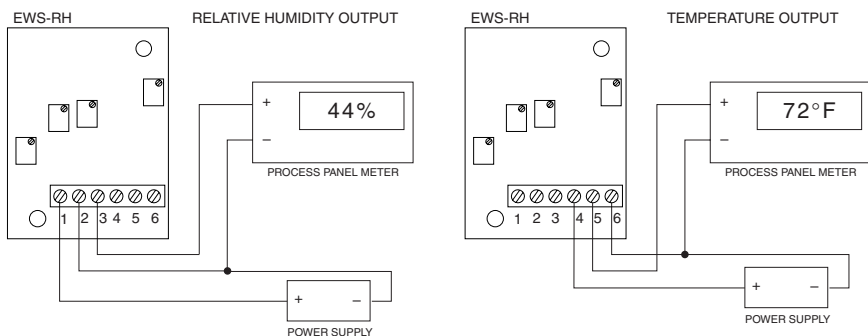
Figure 1: Mounting Diagram



EWS-RH Relative Humidity/Temperature Transmitter



**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.

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

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 recalibrated 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.

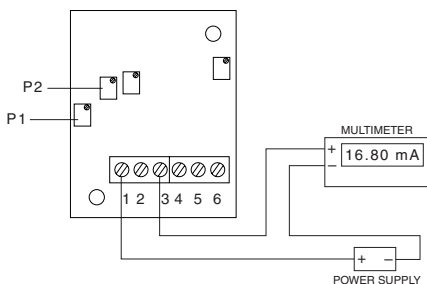


Figure 4: Relative Humidity Calibration Procedure



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.

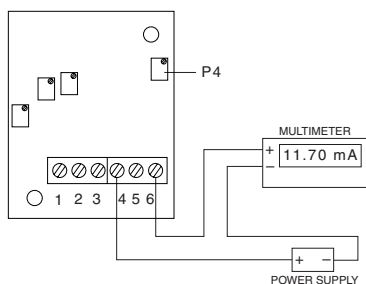


Figure 5: Temperature Calibration Procedure



Relative Humidity Specifications

Range:	5-95% (non-condensing)
Accuracy @ 25°C:	From 5-20%, $\pm 4\%$ RH From 20-80%, $\pm 3\%$ RH From 80-95%, $\pm 4\%$ RH
Repeatability:	$\pm 1\%$ 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 = $(V \text{ supply} - 8V) / .02 \text{ A}$
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:	$\pm 1.2^\circ\text{F}$ (0.7°C) @ 25°C $\pm 2.5^\circ\text{F}$ (1.4°C) across full range
In Moving Air:	$\pm 2.5^\circ\text{F}$ (1.4°C) @ 25°C $\pm 3^\circ\text{F}$ (1.7°C) across full range
Note: Not recommended for fast moving air applications.	
Repeatability:	$\pm 0.5^\circ\text{F}$ (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 = $(V \text{ supply} - 8V) / .02 \text{ A}$
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:



EWS-RH

Relative Humidity/Temperature Transmitter

NOTES:



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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2003 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? **OMEGA...Of Course!**

Shop online at www.omega.com

TEMPERATURE

- ☑ Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- ☑ Wire: Thermocouple, RTD & Thermistor
- ☑ Calibrators & Ice Point References
- ☑ Recorders, Controllers & Process Monitors
- ☑ Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- ☑ Transducers & Strain Gages
- ☑ Load Cells & Pressure Gages
- ☑ Displacement Transducers
- ☑ Instrumentation & Accessories

FLOW/LEVEL

- ☑ Rotameters, Gas Mass Flowmeters & Flow Computers
- ☑ Air Velocity Indicators
- ☑ Turbine/Paddlewheel Systems
- ☑ Totalizers & Batch Controllers

pH/CONDUCTIVITY

- ☑ pH Electrodes, Testers & Accessories
- ☑ Benchtop/Laboratory Meters
- ☑ Controllers, Calibrators, Simulators & Pumps
- ☑ Industrial pH & Conductivity Equipment

DATA ACQUISITION

- ☑ Data Acquisition & Engineering Software
- ☑ Communications-Based Acquisition Systems
- ☑ Plug-in Cards for Apple, IBM & Compatibles
- ☑ Datalogging Systems
- ☑ Recorders, Printers & Plotters

HEATERS

- ☑ Heating Cable
- ☑ Cartridge & Strip Heaters
- ☑ Immersion & Band Heaters
- ☑ Flexible Heaters
- ☑ Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- ☑ Metering & Control Instrumentation
- ☑ Refractometers
- ☑ Pumps & Tubing
- ☑ Air, Soil & Water Monitors
- ☑ Industrial Water & Wastewater Treatment
- ☑ pH, Conductivity & Dissolved Oxygen Instruments