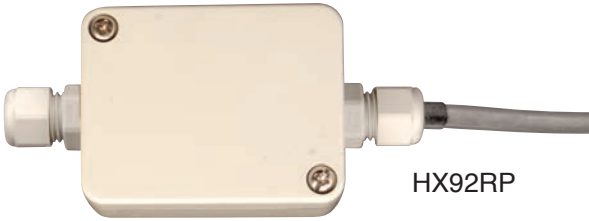


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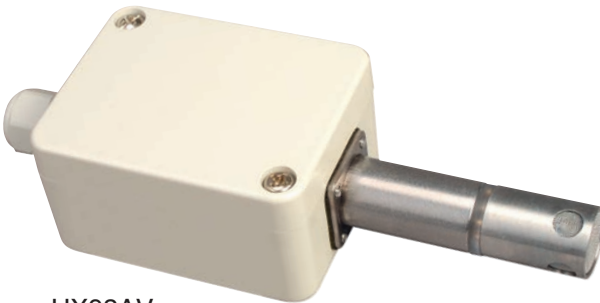
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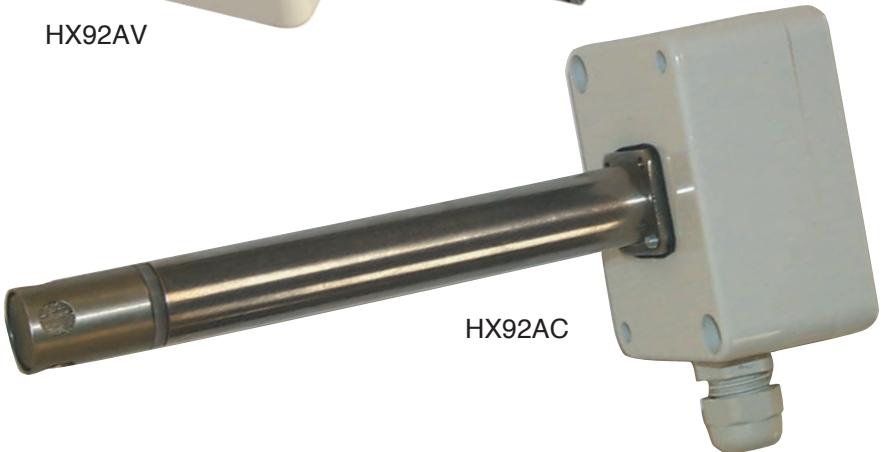
# OMEGA<sup>®</sup> User's Guide



HX92RP



HX92AV



HX92AC

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## **HX92A SERIES** **RELATIVE HUMIDITY TRANSMITTER**



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

**HX92A SERIES**  
**Relative Humidity Transmitter**

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# HX92A SERIES

## Relative Humidity Transmitter

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### General Description

The OMEGA® HX92A Series Relative Humidity Transmitter provides a linearized and temperature compensated output signal of 4 to 20 mA or 0 to 1 Vdc depending upon model selected. The output signal has been calibrated to follow a 0 to 100% Relative Humidity output scale. A thin film polymer capacitor senses relative humidity and is protected by a stainless steel filter that is easily removed for cleaning. The NEMA rated polycarbonate enclosure and cable entry connection provides weathertight protection. Screws are provided for mounting via internal holes inside the enclosure.

### 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:

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e-mail: [cservice@omega.com](mailto: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

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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 HX92A transmitter.

- This Manual, # M-1019A (1 ea.)
- #6 Wall Anchor and #6 Mounting Screw (2 ea.)



**Additional Transmitter Models Available**

<b>Model</b>	<b>Description</b>
HX93AC	Wall mount RH and Temperature transmitter (dual 4 to 20 mA Output)
HX93AV	Wall mount RH and Temperature transmitter (dual 0 to 1 Vdc Output)
HX93AC-D	Duct mount RH/Temperature transmitter (dual 4 to 20 mA Output)
HX93AV-D	Duct mount RH/Temperature transmitter (dual 0 to 1 Vdc Output)
HX15AV-W	Wall mount "High Ambient Temperature" application RH/Temperature transmitter (dual 0 to 1 Vdc Output)
HX15AC-W	Wall mount "High Ambient Temperature" application RH/Temperature transmitter (dual 4 to 20 mA Output)
HX15AV-D	Duct mount "High Ambient Temperature" application RH/Temperature transmitter (dual 0 to 1 Vdc Output)
HX15AC-D	Duct mount "High Ambient Temperature" application RH/Temperature transmitter (dual 4 to 20 mA Output)
HX93AC-RP1	Remote probe RH and Temperature transmitter (dual 4 to 20 mA Output)
HX93AV-RP1	Remote probe RH and Temperature transmitter (dual 0 to 1 Vdc Output)
HX93DAC-C	Wall mount, dual display RH and Temperature transmitter / indicator (Temperature display in °C)
HX93DAC-F	Wall mount, dual display RH and Temperature transmitter / indicator (Temperature display in °F)
HX93DAC-D-C	Duct mount, dual display RH and Temperature transmitter / indicator (Temperature display in °C)
HX93DAC-D-F	Duct mount, dual display RH and Temperature transmitter / indicator (Temperature display in °F)
HX93DAC-RP1-C	Remote probe, dual display RH and Temperature transmitter / indicator (Temperature display in °C)
HX93DAC-RP1-F	Remote probe, dual display RH and Temperature transmitter / indicator (Temperature display in °F)



## 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 HX92A the amount of current allowed to flow in the loop will vary depending on the relative humidity 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 HX92A to function properly is found by using the following formula:

$$R_{\max} = (\text{power supply voltage} - 6 \text{ volts}) \div .02 \text{ amps}$$

EXAMPLE: (When using a 24 Vdc power supply).

$$R_{\max} = (24 - 6) \div .02 \text{ amps} = 900 \text{ ohms max loop resistance}$$

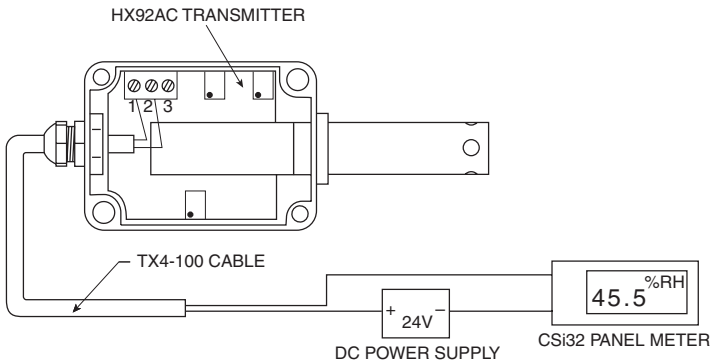


Figure 1: Basic Transmitter Set-up With Current Loop Output.

### Complimentary Instruments

Power Supply, OMEGA Model No.: PSU-93

Csi32 Series Panel Meters and Controllers

### Recommended Accessories

Shielded Transmitter Cable, OMEGA Model No.: TX4-100 (100 ft)

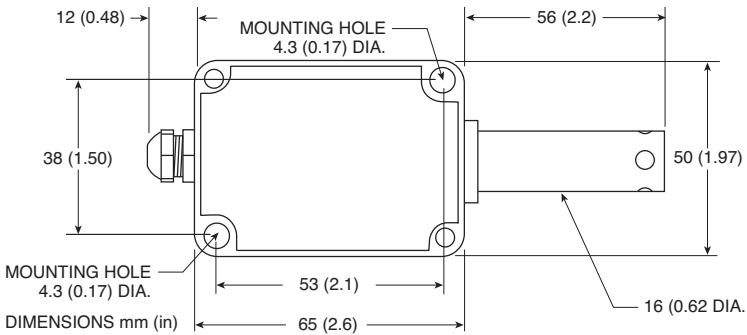
RH Calibration Kit, OMEGA Model No.: HX92-CAL

Duct Mounting Kit, OMEGA Model No.: HX90DM-KIT

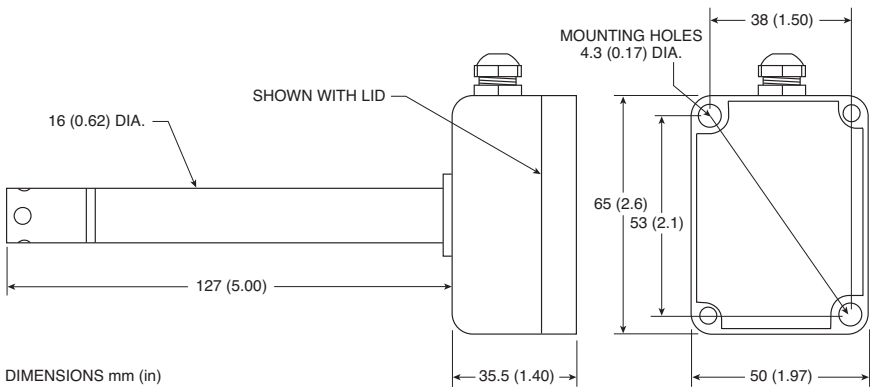


## Mounting

OMEGA's HX92A transmitter is designed for either wall or duct mounting depending upon model. Plastic wall anchors and mounting screws are included for wall mounting. A duct mounting kit is also available for duct mount models. OMEGA Model No.: HX90DM-KIT

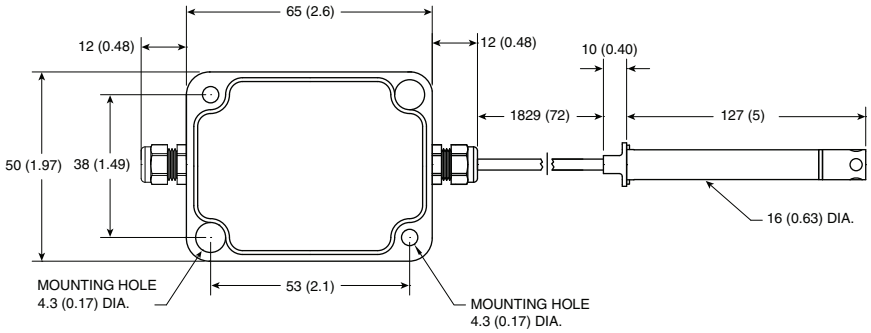


**Figure 2: Wall Mount Model Dimensions**

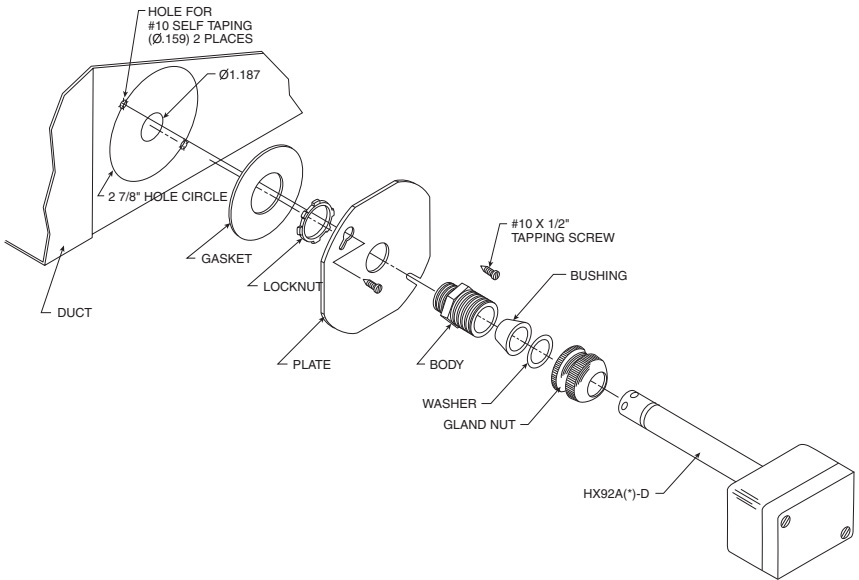


**Figure 3: Duct Mount Model Dimensions**





**Figure 4: Remote Probe Model Dimensions**



**Figure 5: Duct Mounting Kit Installation**



### Terminal Connections

**Models: HX92AC, HX92AC-D, HX92AC-RP1 (Current Output)**

1. + Power Supply
2. 4-20 mA Output
3. No Connection

**Models: HX92AV, HX92AV-D, HX92AC-RP1, (Voltage Output)**

1. + Power Supply
2. - Power Supply
3. 0 - 1 Vdc Output

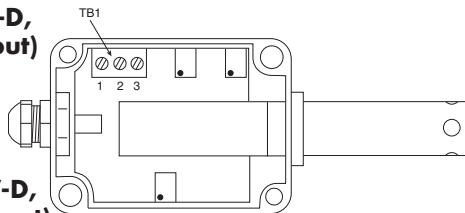


Figure 5: Terminal Connections

### Transmitter Wiring Examples

**For Current Output Models (4 - 20 mA)**

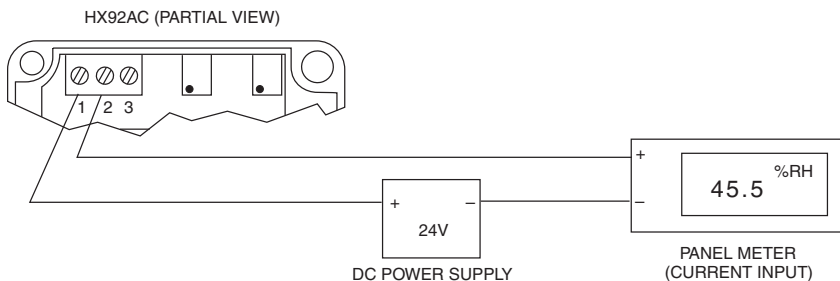


Figure 6: Transmitter Wiring Examples For Current Output Models

**For Voltage Output Models (0 - 1 Vdc)**

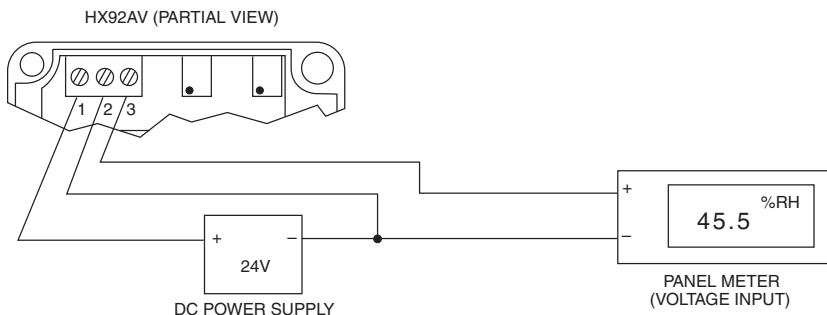


Figure 7: Transmitter Wiring Examples For Voltage Output Models



## RH Output Calculations

To calculate % Relative Humidity by measuring the current or voltage output use the following formulas.

For current output:  $\%RH = (\text{Current measured in miliamps} - 4) \div .16$

**EXAMPLE:**  $(11.04 \text{ mA} - 4) \div .16 = 44 \%RH$

For voltage output:  $\%RH = (\text{Voltage measured in volts} \times 100)$

**EXAMPLE:**  $.44 \times 100 = 44 \%RH$

## RH Measured Vs Output Reading

% Relative Humidity	Output	
	Current(mA)	Voltage(Vdc)
5	4.8	.05
10	5.6	.10
15	6.4	.15
20	7.2	.20
25	8	.25
30	8.8	.30
35	9.6	.35
40	10.4	.40
45	11.2	.45
50	12	.50
55	12.8	.55
60	13.6	.60
65	14.4	.65
70	15.2	.70
75	16	.75
80	16.8	.80
85	17.6	.85
90	18.4	.90
95	19.2	.95



## Calibration

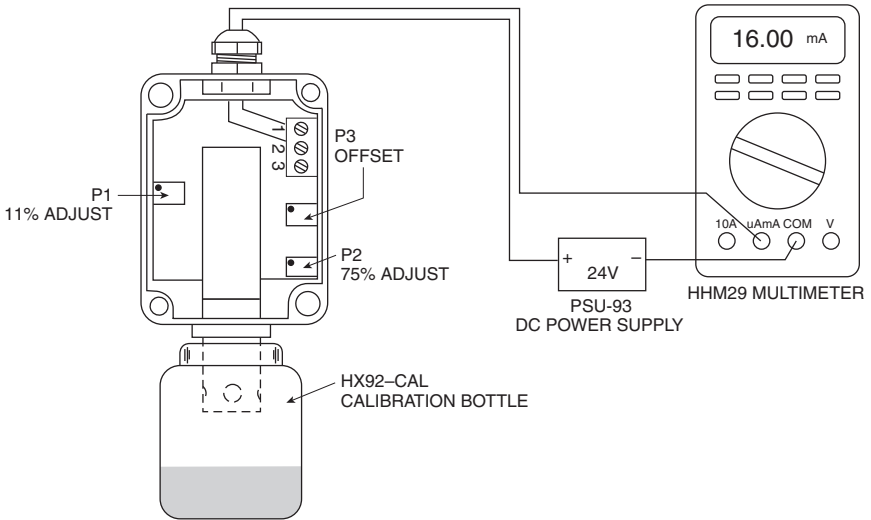
Your transmitter has been factory calibrated to meet or exceed the specifications outlined in this manual. To maintain original specifications it is generally recommended that your transmitter be recalibrated on an annual basis depending on operating conditions.

### Calibration Procedure for HX92AC

#### Recommended equipment:

Humidity Calibration Kit, OMEGA Model No.: HX92-CAL  
Handheld Digital Multimeter, OMEGA Model No.: HHM29  
DC Power Supply, OMEGA Model No.: PSU-93

1. Remove enclosure cover.
2. Connect transmitter as shown in Figure 8.
3. Apply power to transmitter and allow to warm up for 15 min.
4. Place sensor head in a "Low" 11.3% RH environment (eg. Lithium Chloride solution) and allow to stabilize for 10 min.
5. Adjust potentiometer "P3" so that the output decreases to a minimum value and further adjustment produces no change. Output should be about 4.0mA. If output is not at 4.0mA adjust potentiometer "P1" until you have an output reading of 4.0mA.
6. Adjust potentiometer "P3" to the point, but not pass, where the output just starts to increase.
7. Remove the sensor head from the "LOW" RH environment.
8. Place the sensor head in a "HIGH" 73.3% RH environment (eg. Sodium Chloride solution) and allow to stabilize for 10 min.
9. Adjust potentiometer "P2" so that the output reading is measuring 14.24mA, this is equivalent to the difference between the "LOW and "HIGH" RH environment which is 64% RH.
10. Adjust potentiometer "P3" so that the output reading increases to 16.05mA. This is the proper output equivalent to the "HIGH" RH environment.
11. Remove the sensor head from the "HIGH" RH environment.
12. Calibration complete.



**Figure 8: HX92AC Typical Calibration Setup**

## **Calibration procedure for HX92AV**

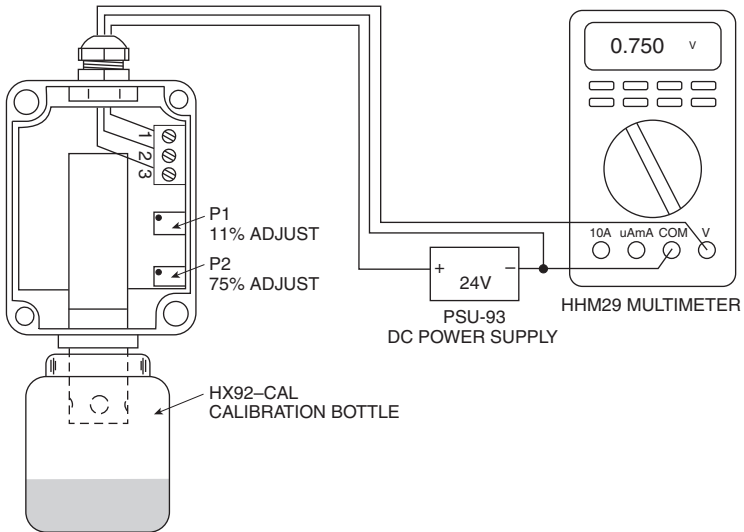
### **Recommended equipment:**

Humidity Calibration Kit, OMEGA Model No.: HX92-CAL  
Handheld Digital Multimeter, OMEGA Model No.: HHM29  
Dc Power Supply, OMEGA Model No.: PSU-93

1. Remove enclosure cover.
2. Connect transmitter as shown in Figure 9.
3. Apply power to transmitter and allow to warm up for 15 min.
4. Place sensor head in a "Low" 11.3% RH environment (eg. Lithium Chloride solution) and allow to stabilize for 10 min.
5. Adjust potentiometer "P3" so that the output decreases to a minimum value and further adjustment produces no change. Output should be about 0.000 volts.
6. Adjust potentiometer "P3" to the point, but not pass, where the output just starts to increase.
7. Remove the sensor head from the "LOW" RH environment.

**HX92A SERIES**  
**Relative Humidity Transmitter**

8. Place the sensor head in a "HIGH" 73.3% RH environment (eg. Sodium Chloride solution) and allow to stabilize for 10 min.
9. Adjust potentiometer "P2" so that the output reading is measuring 0.640 volts, this is equivalent to the difference between the "LOW" and "HIGH" RH environment which is 64% RH.
10. Adjust potentiometer "P3" so that the output reading increases to 0.753 volts. This is the proper output equivalent to the "HIGH" RH environment.
11. Remove the sensor head from the "HIGH" RH environment.
12. Calibration complete.



**Figure 9: HX92AV Typical Calibration Setup**



## Maintenance

If your Humidity transmitter will be used in a dusty environment, the protective sensor filter, if clogged, may be removed for cleaning. Unscrew the protective cover and gently blow compressed air through the filter screen. A soft brush may also be used to remove dirt particles from the screen.

If the sensor is subjected to 100% condensation, it must be dried to obtain correct readings. There will be no permanent damage or calibration shift to the unit.

Units should not be exposed to high concentrations of ammonia or alcohol vapors.

## Specifications

<b>Measuring Range:</b>	3 – 95% (non-condensing)
<b>Accuracy:</b>	±2.5% @ 22°C (72°F) with an added temperature coefficient error of ±0.10% RH/°F (both increasing and decreasing in temperature from ambient).
<b>Repeatability:</b>	± 1 % RH
<b>Operating Temperature Range:</b>	-20 to 75 °C (-4 to 167°F)
<b>Output:</b>	
<b>Model: HX92AC</b>	4 to 20 mA (Scaled for 0 to 100% RH)
<b>Model : HX92AV</b>	0 to 1 Vdc (Scaled for 0 to 100% RH)
<b>Power:</b>	6 –30 Vdc @ 20mA
<b>Max Loop Resistance:</b>	Ohms = (V supply – 6 V) / .02 A
<b>RH Time Constant</b> <b>(90% response at 25°C, in</b> <b>moving air at 1m/ s):</b>	>10 seconds, 10 to 90% RH >15 seconds, 90 to 10% RH
<b>Sensor Type:</b>	Thin Film Polymer Capacitor
<b>Enclosure Housing:</b>	Gray Polycarbonate, (IP 65, DIN 40050) NEMA rated up to 13, UL Listed.
<b>Connections:</b>	
<b>Cable Strain Relief:</b>	Nylon, Liquid-tight with neoprene gland for .09 to .265" diameter cable.
<b>Wire Connections:</b>	Internal 3-Position Terminal Strip. Accepts from 14 to 22 gage wire.
<b>Dimensions:</b>	See "Mounting" Section



**HX92A SERIES**  
**Relative Humidity Transmitter**

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**Specifications continued**

**Weight:**

**Wall Mount Model:** 82 g. (3 oz)

**Duct Mount Model:** 100 g. (3.5 oz)

**Remote Probe Model:** \_\_\_ g (\_\_\_ oz)





**NOTES:**



**HX92A SERIES**  
**Relative Humidity Transmitter**

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**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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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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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