

® RHCN-1 and RHCN-2

®  Relative Humidity/
®  Temperature Controller



Operator's Manual
M1312/1191



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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, patient connected applications.

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RHCN-1/2 RELATIVE HUMIDITY/TEMPERATURE
CONTROLLER

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SECTION 1 INTRODUCTION

1.1 GENERAL DESCRIPTION

The RHCN-1 and RHCN-2 are economical panel-mounted instruments designed to monitor and control both relative humidity and temperature of air. There are four versions of this instrument which includes models for degrees F and degrees C temperature display and models for 115 VAC and 230 VAC operation. A calibration kit is available as an option.

The RHCN-1 and 2 feature two integral relay contacts that provide simple on/off control - one for humidity, the other for temperature. Independent set points (SP) for humidity and temperature are screwdriver selectable within the entire measuring range. The control dead bands (DB) are also screwdriver adjustable.

Two standard recorder outputs of 10 mV/%RH and 10 mV/degree enable interfacing with a computer or datalogging device.

The solid state humidity sensor and thin-film platinum RTD temperature sensor are enclosed in a compact probe which may be mounted virtually any distance away from the controller. Signal transmission from the probe to the instrument is via a current loop technique eliminating RFI errors.

An adjustable/removable duct flange on the sensing probe allows for mounting the probe at any depth between 1 inch and 8.5 inches. A "C" bracket is also provided to allow for mounting the probe onto a wall or other surfaces.

1.2 AVAILABLE MODELS

MODEL NUMBER	DESCRIPTION
RHCN-1F	Relative Humidity/Temperature Controller with Probe, °F, 120 VAC
RHCN-1C	Relative Humidity/Temperature Controller with Probe, °C, 120 VAC
RHCN-2F	Relative Humidity/Temperature Controller with Probe, °F, 230 VAC
RHCN-2C	Relative Humidity/Temperature Controller with Probe, °C, 230 VAC
HX92A-CAL	Calibration Kit, 11% and 75% Standards

SECTION 2 INSTALLATION

2.1 UNPACKING

Remove the packing list and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

Upon receipt of the shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

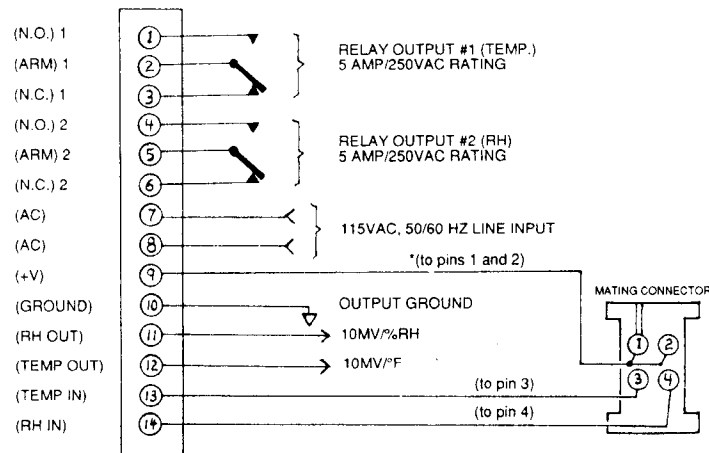
NOTE

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

2.2 TERMINAL CONNECTIONS AND WIRING

Each probe assembly is factory matched and calibrated with its companion instrument. PROBE ASSEMBLIES MUST BE USED WITH THEIR ORIGINALLY SUPPLIED INSTRUMENTS. If you have more than one instrument/probe assembly pair, appropriately mark each pair to avoid mis-matching.

Wire up your system using Figure 2-1 as a guide.



*Use separate wires to pin 1 and pin 2
for very long cables.

NOTE: Recorder output devices should share the same ground as Terminal No. 10.

Figure 2-1. Terminals and Connections

2.3 MOUNTING THE CONTROLLER AND PROBE

2.3.1 Mounting the Controller

1. Panel cut-out for 1/8 DIN is 3.62" X 1.77" (92mm X 45mm).
2. Position controller in panel. Place thumbscrew through hole in middle of mounting bracket into threaded hole above terminals at rear of controller. Tighten thumbscrew.

2.3.2 Mounting the Probe

1. Duct Mounting: See Figure 2-2. Duct insertion hole is 1.062" (27 mm) diameter minimum. The four mounting screws are evenly spaced on a 2.25" (57 mm) circle. Unscrew sensor screen cap from probe in order to assemble locknuts and gasketed flange as shown in Figure 2-2. Figure 2-3 shows a fully assembled probe.

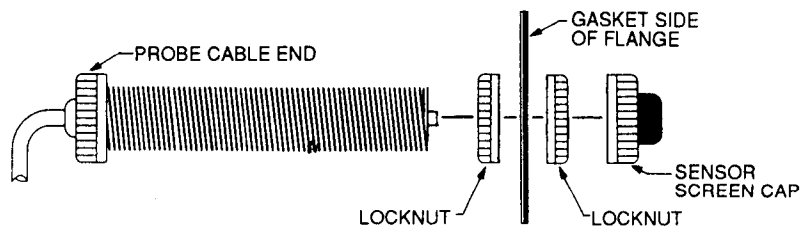


Figure 2-2. Probe and Flange Disassembled

2. Wall Mounting: Mount the supplied "C"-shaped PVC bracket using the provided self-taping screw.

NOTES

- a) The supplied mating connector crimping pins will accept No. 26 to 18 AWG gauge wire.
- b) Maximum current loop wire resistance is 200 ohms (1000 ft. 24 gage annealed copper wire= 25.7 ohms).

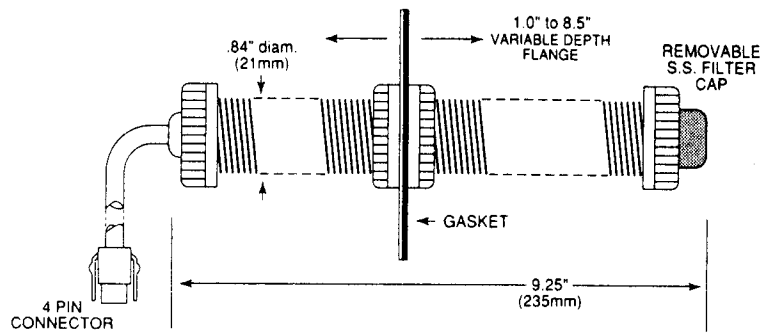


Figure 2-3. Probe and Flange Assembly

SECTION 3 OPERATION

Figure 3-1 below shows the front face of the controller. The right side front panel switch toggles the large LED display between a continuous reading of either relative humidity or air temperature. The left side mode switch is used for the initial controller set-up and is explained below.

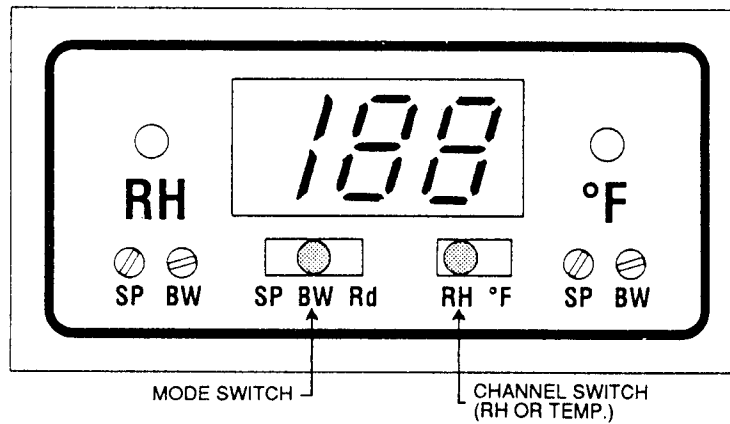


Figure 3-1. Display and Controls

The independent set points (SP) for both humidity and temperature are screwdriver selectable within the entire measuring range. The control dead bands (DB) are also screwdriver adjustable.

3.1 TO SET CONTROL POINT FOR RELATIVE HUMIDITY

1. Set Channel to "RH".
2. Set Mode Switch to "SP" (Set-point).
3. Adjust the relative humidity "SP" screw control to show desired % relative humidity set-point on the digital display.
4. Set the Mode Switch to "BW" (Band Width).
5. Adjust the relative humidity "BW" screw control to show the desired band width. For example, if $\pm 5\%$ is desired as a band width (dead band), adjust screw control to show "5" on the digital display.

NOTE

The band width setting is independent of the set point and need not be changed if the set point is altered.

3.2 TO SET CONTROL POINT FOR TEMPERATURE

1. Set the Channel Switch to °F (or °C) and proceed through steps 2 through 5 outlined above.

3.3 TO COMPLETE THE CONTROLLER PROGRAMMING

1. Set the "Mode" switch to "Rd" ("Read"). Next set the "Channel" switch to either "RH" or "°F" (or "°C") depending on which measurement you wish to show on the digital display.

SECTION 4 MAINTENANCE AND TROUBLE-SHOOTING

4.1 MAINTENANCE

If probe is operated in a dusty environment, the protective filter, if clogged, may be removed for cleaning. Unscrew filter and gently blow compressed air through the screen. If necessary, use a soft art-size brush to remove lint from the sensors.

If the sensors are subject to condensation (100% RH), they must be dried to obtain correct readings. There is no permanent calibration shift, nor is recalibration necessary if condensing conditions occur.

The instrument and probe should not be exposed to high concentration of ammonia or alcohol vapors, air pollutants and contaminants. Any environment which is breathable under normal HVAC application should not affect the sensors.

To maintain the original specification, it is generally recommended that the RH sensor be recalibrated on an annual basis. The temperature sensor does not require recalibration.

4.2 TROUBLE-SHOOTING

DISPLAY INDICATIONS	PROBABLE CAUSE
Overrange on RH and normal on temp.	Open RH wire, open RH sensor, or missing sensor
Normal on RH and overrange on temp.	Open temp. wire
"185" °F on temp. & normal on RH	Open temp. sensor
Overrange on RH and temp.	Open (+V) wire or entire cable
100% RH and normal on temp.	RH sensor is wet (it will dry out without damage to sensor), or shorted RH sensor

SECTION 5 CALIBRATION

5.1 SINGLE POINT FIELD CALIBRATION

Calibration trimpots are accessible on the side of the unit as shown in Figure 5-1. See Section 5.2.

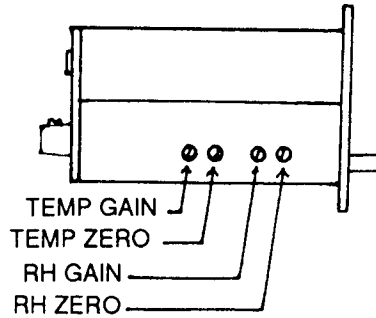


Figure 5-1. Calibration Trimpots Location

NOTE

THE TEMPERATURE CALIBRATION POTS ARE FACTORY SET AND SHOULD NOT BE DISTURBED.

If the RH needs field recalibration, only the "RH Gain" pot needs adjustment. This should be done at the highest available reference value. When using the HX92A-CAL calibration kit, use the 75% Sodium Chloride standard. Detailed calibration instructions are given in Section 5.2.

5.2 REGULAR RH CALIBRATION PROCEDURE

1. With power applied to controller, place probe in known "low" RH environment. Using calibration kit HX92A-CAL, this is the Lithium Chloride standard that generates 11.3% RH.
2. With voltage meter connected to terminal #10 (ground) and #11 (RH RECORDER output), adjust "RH ZERO" trimpot CCW so the output decreases to a minimum value where further adjustment produces no change. Now carefully turn trimpot CW until the voltmeter just starts to increase above minimum value. The minimum value should be "00" on the controller display as well as close to a zero reading on voltage meter. (Note that Step 5 below shifts the "00" reading to "11".)
3. Place probe in a "high" RH environment and allow to stand until controller reading has stabilized. The Sodium Chloride standard in HX92A-CAL calibration kit generates 75.3% RH.
4. Adjust "RH GAIN" trimpot until controller RH reading equals the difference between the "high" and "low" standard. Example: using the HX92A-CAL calibration kit, the difference would be "64". That is $75.3\% - 11.3\% = 64$.
5. Finally, adjust "RH ZERO" trimpot CW to increase output to the "high" RH standard. In the example, "75" on the controller display and ".753" on the voltage meter output.

5.3 TEMPERATURE CALIBRATION NOTE

The temperature trimpots are factory adjustable only. Incorrect temperature readings indicate a faulty sensor. Contact OMEGA Customer Service at 1-800-622-2378 or (203) 359-1660.

SECTION 6 SPECIFICATIONS

MEASURING RANGES	
RELATIVE HUMIDITY:	3% to 95%, temperature compensated -10 to 175 °F
TEMPERATURE:	0 to 180°F, 0 to 85°C
ACCURACY	
RELATIVE HUMIDITY:	±2% RH
TEMPERATURE:	±1°F, ± 1°C
DISPLAY RESOLUTION:	1% RH, 1°F or 1°C
RESPONSE TIME:	Under 20 seconds
SET POINT CONTROLS:	Digitally adjustable from 0% to 100% RH, 0 to 180°F (0 to 85°C) Deadband adjustable from ±0% RH to ± 50% RH, and ±0°F or C to ± 50° F or C
CONTROL OUTPUTS:	Dual SPDT relays, 5 Amp/250 VAC
RECORDER OUTPUTS:	10 mV/%RH, and 10 mV/degree
DISPLAY:	0.56" high LED, off scale indication for open input, relay "on" LED indication
INPUT POWER:	115 VAC ±15%, 50/60 Hz, 5 watts maximum
CONNECTIONS:	Screw terminals, 14 AWG maximum; probe supplied with 4-pin mating connector, 26 to 18 AWG wires

SPECIFICATIONS (Continued)

MOUNTING

CONTROLLER: Panel mount with adjustable mounting bracket, adjusts up to 3/8 inch (9.5mm) thick panel.
Cut-out: 1.77 inch (45 mm) x 3.62 inch (92 mm)

PROBE: Duct mount with adjustable/removable duct flange; 3.25 inch (83mm) diameter cutout, 1.062 (27mm) diameter flange with 4 evenly spaced 0.156 inch (4 mm) holes on 2.25 inch (57 mm) circle; wall mounting bracket included

DIMENSIONS

CONTROLLER: 1/8 DIN panel x 5.0 inch (127mm deep)

PROBE: CPVC tube, 9.25 inch (235 mm) long x 0.84 inch (21 mm) diameter

WEIGHT

CONTROLLER: 19 oz (539 grams)

PROBE: 5 oz (142 grams)

PROBE HOUSING: CPVC (high temperature PVC) enclosure

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE, OPERATING

PROBE: -20°C to 85°C (-4°F to 185°F)
CONTROLLER: -10°C TO 55°C (14°F TO 131°F)

TEMPERATURE, STORAGE

PROBE: -20°C to 85°C (-4°F to 185°F)
CONTROLLER: -20°C to 70°C (-4°F to 158°F)

HUMIDITY, OPERATING

PROBE: 0 to 99%RH, non-condensing
CONTROLLER: 10% to 90%RH, non-condensing

HUMIDITY, STORAGE

PROBE: 0 to 100%RH
CONTROLLER: 0 to 90%RH non-condensing

PRESSURE, OPERATING AND STORAGE

PROBE: 30 PSI
CONTROLLER: Ambient Pressure

The power input is fused using 1/16A (62.5 mA) for the 230VAC model, and 1/10A (100mA) for the 115VAC model.

The controller conforms to the following directives for the "CE" label under the above conditions.

Emissions EN50081-1(1992); Immunity EN50082-1(1992); 89/336/EEC, Low Voltage Directive EN61010-1(1993) 73/23/EEC.

The controller will be earth grounded using the (thumbscrew) threaded hole in center of rear panel. Do not use terminal block for earth grounding.



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 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 should malfunction, 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 being 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, EXPRESSED 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.

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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. P.O. 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. P.O. number to cover the COST of the repair,
2. Model and serial number of 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.

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- Recorders, Controllers & Process Monitors
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