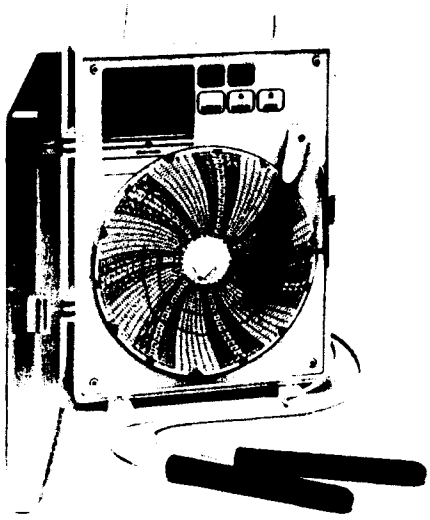
CE

# User's Guide



OMEGA®
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# CT82 Series
## Dual Temperature Chart Recorder

# INSTRUCTION MANUAL

## CT82 RECORDER FEATURES:

The CT82 is a precision two temperature recorder with a digital display. The recorder was designed with the user in mind. No special knowledge is required to operate the CT82 . The menu driven setup is logically simple and user friendly. All parameters are shown on a two line alpha-numeric LCD display. The backlighting of the display enhances visibility under marginal lighting conditions.

The CT82 uses two independent pens and records information on a six inch circular chart. Each pen is uniquely colored to maximize chart readability. The rotation of the chart may be set to single turn or continuous.

In addition, a full function alarm feature is provided. The alarm of the CT82 can be set to sound an audible signal when the temperature 1 and/or temperature 2 has exceeded an upper or lower limit. Each limit is individually set from the front panel. A delay time before the alarm is activated may be set by the user to prevent nuisance alarms. Low power normally open relay contacts are provided to allow activation of a remote alarm, phone dialer or annunciator.

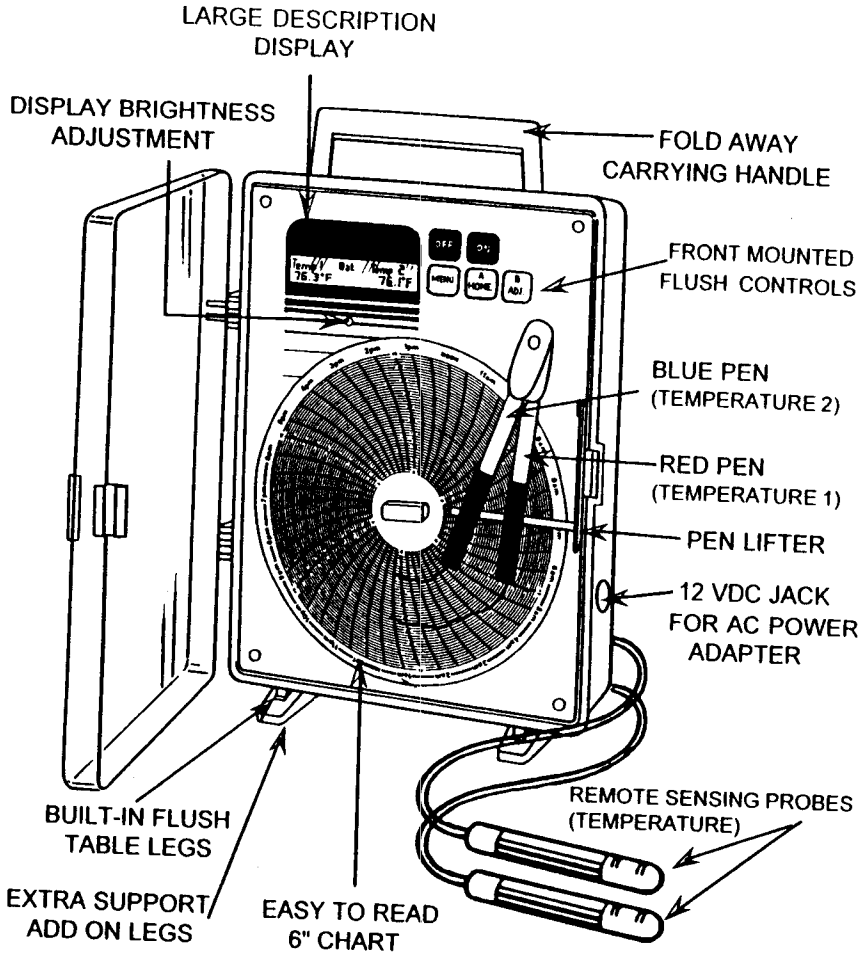
Power is supplied through a 120 VAC 50/60 Hz plug in adapter. External power may be supplied from any 12 VDC source such as automotive, marine, or other battery. Battery backup for 48 hours is featured to provide operation during temporary power loss.

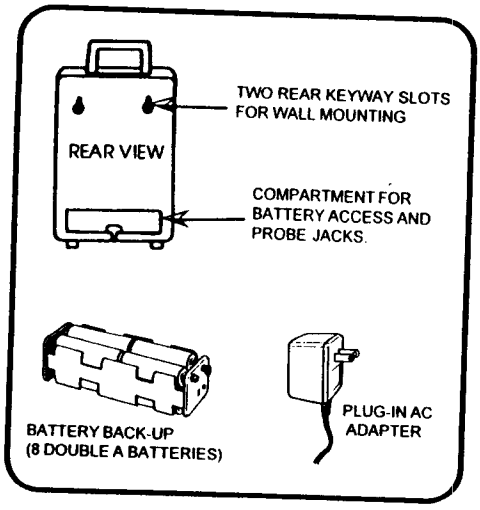
All functions of the CT82 are accessed through five pushbuttons located on the front panel. Selectable functions are retained in memory to avoid re-entering settings in the event of a power failure.

## QUICK START

1. Connect power supply adapter to CT82 through jack on right side of unit.
2. Plug power supply adapter into 120 VAC outlet.
3. Press **ON** button.
4. Pens will move to the **"Home"** position (The outermost part of the chart).
5. Pens will then go to a position on the chart according to the display reading. This is called the **RUN** Mode. (Unit is always in the **ON** or **RUN** mode when display is showing temperature readings.)

## FRONT VIEW

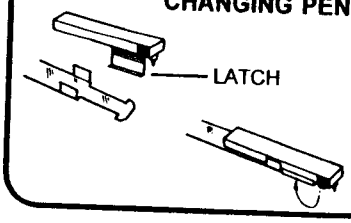



### PEN ARM DATA

The pen arm acts like a flat spring in order to insure the proper pen-to-chart pressure. The pen arm is fastened to the shaft with a set screw. It does not normally require removal. If removal becomes necessary, use an Allen .035 Hex Wrench.

### CHANGING PENS



## MENU OR RUN?

The CT82 has two basic modes of operation.

**MENU** Mode. To review or change settings.

**RUN** Mode. To display present conditions and record them.

When **MENU** Mode is selected the user can:

- ❒ Turn off Alarm Beeper if Alarm is activated.
- ❒ Set Chart Range.
- ❒ Set Chart Speed and show proper Chart usage.
- ❒ Set Single or Continuous Chart Rotation.
- ❒ Set Alarm Status Condition.
  - Alarm Delay = 0
  - Alarm Delay = 10 Minutes
  - Alarm Delay = 20 Minutes
  - Alarm Delay = 1 Hour
  - Alarm Delay = 2 Hours
  - Alarm Disabled

If **ALARM** is Enabled:

- ❒ Set Temperature 1 High Limit.
- ❒ Set Temperature 1 Low Limit.
- ❒ Set Temperature 2 High Limit.
- ❒ Set Temperature 2 Low Limit.
- ❒ Set Blue Pen position
- ❒ Set Red Pen position

If **RUN** Mode is selected:

The display shows Temperature 1 and Temperature 2.

While in **RUN** Mode, the user can:

Home the Pens by pressing the **HOME** switch. (Allows for easy changing of charts and pens.)

Advance the chart by pressing the **ADV** button. (To match present time with chart.)

### How to Change the Chart.

1. Press the **HOME** button to move the pens to the outer edge of the chart.
2. Lift the pens with the lever (just enough to lift the pens from the chart).
3. Remove the old chart.
4. Install the new chart on to the spindle.
5. Rotate the chart to the starting point with the **ADV** button.
6. Lower the pens.
7. Press the **HOME** button again. This will put Recorder in the **RUN** Mode.
8. If the pen(s) position needs adjustment, see Pen Adjustment section below.

## CHART SPEED AND RANGE

The CT82 offers 18 combinations of Chart ranges and Chart speeds to match a wide variety of applications. All functions of Chart Speed and Chart Range have been combined in one menu to make the necessary selections as easy and as fast as possible. As a further aid to the user the Omega Chart number is shown on the display for any combination of Chart Range and Chart Speed.

Chart Speed is the term used to describe the time it takes for the recording chart to make one complete revolution. Different applications will require different chart speeds. For example, the 7 Day Chart would generally be used where long term monitoring is required and frequent changing of the charts would be undesirable. The main disadvantage of this is that short term variations in temperature will record as a single line or step on the chart. In applications that have wide short term temperature or variations the user may prefer a faster chart speed for more accurate analysis.

The fastest chart completes one revolution in 1 1/2 hours. This allows the user to record short term variations in temperature in great detail. An example of this would be to test the defrost cycle in a frost free freezer or to observe the settling time of a temperature control system.

Chart Range can be selected by the user for °F or °C. Recorder will retain this information even when the power is disconnected or the unit turned off.

If the measured Temperature is out of range (for the chart selection), the display will read the actual temperature, but the pen will not go beyond limit of the chart.

### How to Set the Chart Speed and Range.

1. While in the **RUN** Mode, press the **MENU** button until the display shows the present setting for speed or range.
2. To change the chart speed, press the **A** button. Each time the **A** button is pressed, the speed will change. Whatever speed is on the display will become the chart speed.

| | | |
|---|---|---|
| 7 Day | 12 Hr. | 3 Hr. |
| 24 Hr. | 6 Hr. | 1.5 Hr. |

3. After setting the speed, press **MENU** then **B** to return to **RUN** Mode. **TO SET RANGE, PRESS MENU UNTIL RANGE DISPLAY APPEARS.** To change chart range, press the **B** button. Each time the **B** button is pressed, the range will change. Whatever range is on the display will become the chart range.

| | |
|---|---|
| -20/+120...-20/+50°F | +5/+45...-30/+10°C |
| -20/+50...+40/+110°F | -30/+10...-30/+50°C |
| +40/+110..-20/+120°F | -30/+50...+50/+45°C |

## TEMPERATURE 1 AND TEMPERATURE 2 LIMITS

The Temperature 1 and Temperature 2 Upper and Lower limits allow the user to customize the alarm settings of the CT82 to provide the greatest degree of protection while at the same time preventing unnecessary alarms. Since each application is unique, careful selection of the temperature thresholds are required to provide the maximum degree of protection. Both Temperature high and low limits may be set. If the Alarm is enabled, and any of these limits are exceeded, the display will blink the reading that went out of limit. An audible alarm (Beeper) will sound and the relay contacts will close after the set delay time. This delay time can be set as follows:

0 Delay
10 Min. Delay
20 Min. Delay
1 Hr. Delay
2 Hr. Delay

If the Alarm is not disabled, any of the four limits could trip the alarm, therefore all four must be set or the alarm must be disabled if it is not being used.

## SETTING THE LIMITS.

*Temperature Limit part of MENU will not show if alarm is disabled.*

### How to Set the Temperature 1 High Limit

1. Press **MENU** until **"Temp1 High Limit"** appears.
2. Press: **A** to increase limit, **B** to decrease limit, or **MENU** to go to **TEMPERATURE 1 LOW LIMIT.** A or B button can be held down if moving temperature limit several degrees.

### How to Set the Temperature 1 Low Limit

1. Press **MENU** until **"Temp1 Low Limit"** appears.
2. Press: **A** to increase limit, **B** to decrease limit or **MENU** to go to **SET TEMPERATURE 2 HIGH LIMIT.**

### How to Set the Temperature 2 High Limit

1. Press **MENU** until **"Temperature 2 High Limit"** appears.
2. Press: **A** to increase limit, **B** to decrease limit or **MENU** to go to **SET TEMPERATURE 2 LOW LIMIT.**

### How to Set the Temperature 2 Low Limit

1. Press **MENU** until **"Temperature 2 Low Limit"** appears.
2. Press: **A** to increase limit, or **B** to decrease limit **MENU** to continue in **MENU** Mode.

## PEN POSITION ADJUSTMENT

NOTE: The blue pen has a longer arm to allow it to move over the red pen. Therefore one pen will record at real time and the other will lag or lead by 3/16".

In the normal course of operation charts and eventually, pens will have to be changed on the CT82 . When this occurs it may be necessary to adjust the pen position to match exactly the reading of the display. This is most likely to occur when changing a pen.

**How to Adjust the Blue Pen Position the chart.(Temp. 2)**

1. Press the **MENU** button until the display reads **"Adjust Blue Pen".**
2. Press button **A** to move pen out (toward outer edge).
3. Press button **B** to move pen in (toward hub).
4. Press **MENU** to continue in **MENU** Mode.

**How to Adjust the Red Pen Position on the chart.(Temp. 1)**

1. Press the **MENU** button until the display reads **"Adjust Red Pen".**
2. Press button **A** to move pen out (toward outer edge).
3. Press button **B** to move pen in (toward hub).
4. Press **MENU** to continue in **MENU** Mode.

## PROBES

- ❒ Each probe contains the sensors to convert Temperature to electrical signals that the recorder uses to record and display .
- ❒ Each probe will measure Temperature from -20°F to +120°F (-30° to +50°C)
- ❒ The probe must not be immersed in any liquid, and must not be subjected to temperatures outside the -20 to +120°F range.
- ❒ Probes are interchangeable
- ❒ Calibration by Omega to NIST traceable standards is available as an option.

4. After setting chart range, press **MENU** to show chart number.
5. Press **MENU** to Proceed in **MENU** Mode. **If no button is pressed for 30 seconds the recorder will automaticly return to the RUN Mode or to go to RUN Mode from here, press MENU once, then press B for RUN.**

### How to Set Single Turn or Continuous Rotation

The recorder can be set to rotate chart continuously or stop after one revolution.

1. Press **MENU** until **"Single Turn or Continuous"** message appears.
2. Press **A** to toggle between Single and Continuous.
3. Press **B** to go to **RUN** Mode.
4. Press **MENU** to continue in **MENU** Mode.

## ALARM AND DELAY

When temperature 1, temperature 2 or both measurements pass above or below the thresholds set in the menu function, the CT82 will execute a preset operation. This operation is described as an Alarm condition or a Delay condition and is referred to simply as Alarm or Delay.

**Alarm** indicates that one or both measurements are above or below the preset thresholds and the CT82 is sounding the audible alarm and has closed the relay contacts. The display will also be flashing the parameter which has caused the Alarm condition.

**Delay** is a condition in which one or both thresholds have been passed, but the audible alarm and relay contacts are not activated for a preset delay time. Delay is used to prevent nuisance and false alarms.

*For Example:*
In the normal operation of a frost free freezer an automatic defrost cycle takes place periodically. Without the Delay function this would cause a false alarm indicating a freezer failure when in fact no failure has occurred.

The Delay can also be used to prevent nuisance alarms on coolers or similar devices which have frequent door openings. Without the Delay function an alarm would be started as a result of a short term increase in temperature caused by the door being opened and again no failure of the system has occurred.

The CT82 allows the user to select one of five Delay times, zero Delay, 10 minutes, 20 minutes, 1 hour or 2 hours. The delay time selected will depend on the application and will vary from installation to

installation. It is up to the judgment of the user to determine the best Delay time for a given application. When a Delay time of zero is selected the Delay function is disabled. When a temperature threshold is passed the audible alarm and relay contacts will close immediately. When a Delay time other than zero is selected the audible alarm and relay contacts will not activate until one or both temperature thresholds have been exceeded continuously for the period of the Delay Time. The display will flash the parameter which has caused the Delay condition to alert the user that one or more thresholds have been passed. At the end of the Delay time the audible alarm will sound and the relay contacts will close.

## HOW TO SILENCE THE ALARM: (Relay contacts remain closed.)

1. Press **MENU**... display will show **"Beeper ON/OFF "** message.
2. Press **A** to turn off alarm (only sound will be turned off, relay will be closed).
3. Press **B** to turn alarm (sound) on.
4. Press **MENU** to continue in **MENU** Mode.

In **RUN** Mode:

If temperature 1 limit caused alarm, the temperature 1 reading will blink until the condition returns to normal.

If a temperature 2 limit caused the alarm, the temperature 2 reading will blink until the condition returns to normal.

When condition that caused alarm is no longer present, the alarm and relay will be reset, blinking will stop and the alarm will automatically reset. To disable the relay contacts and the blinking parameter(s), the alarm must be disabled. See How to Set Alarm and Delay below.

**How to Set the Alarm & Delay.**

1. Press **MENU** button until alarm status message appears.
2. Press button **A** to scroll through options:
   Alarm Disabled
   Zero Delay
   10 Min. Delay
   20 Min. Delay
   1 Hour Delay
   2 Hour
3. Press **B** to go to **RUN** Mode,
   **MENU** to continue in **MENU** Mode.

## CT82 SPECIFICATIONS

| | |
|---|---|
| Operating ambient temperature range | 32° to 120°F (0° to 50°C) |
| Storage temperature | 0° to 120°F (-18° to 50°C) |
| Primary power | 115 VAC, 50/60 Hz Adapter<br>(220-240 VAC, 50/60 Hz. optional) |
| Backup power | 8 AA alkaline (Approx. 48Hrs.)<br>or rechargeable batteries<br>(not supplied) |
| Alternative power | 12 Volt vehicle operation with<br>optional adapter |
| Temperature Accuracy | +/- 2°F (+/- 1°C) |
| Probe | Omega # CT82-RP.<br>Temperature with 6' cable<br>(extended cable length is available) |
| Chart | 6" Circular chart (see following<br>table) |
| Chart Rotation Speeds | User Selectable: 7 Days, 24 Hrs,<br>12Hrs., 6Hrs., 3Hrs., and 1.5 Hrs. |
| Chart Rotation Mode | User Selectable Single Turn or<br>Continuous |
| Chart Speed Accuracy | +/- 1% |
| Display | Alphanumeric Backlit LCD<br>16 Characters 2 Line |
| Temperature Alarm Range | -20° to +120°F (-30° to +50°C) |
| Alarm Delay Range | User Selectable:No Delay, 10<br>Min., 30 Min., 1 Hr. or 2 Hr. |
| Remote Alarm Connection | Normally Open Contacts 48 VAC/<br>DC, 0.1 Amp., Dry Contacts |
| Mounting | Vertical or Horizontal<br>Free Standing or Wall Mounted |
| Dimensions | 9.25" x 7.25" x 2.75" |
| Weight | 2.5 lb. |
| Power Consumption | 3.5 Watts Max. |

## BATTERY BACKUP OPERATION

Battery backup allows the CT82 to continue operation in the event of a power loss. Actual operating time on battery will depend upon the condition of the batteries. With fresh alkaline batteries the typical operating time will be 48 hours (when operating on battery only) . Alkaline batteries are essential for this type of application.

When the main power is lost the CT82 will sense this and immediately turn off the backlight on the LCD Display. An asterisk (*) will be present after each reading on the display to advise the operator the CT82 is operating on battery power. No other indication will be visible. The temperature and chart recording will continue until the batteries have been exhausted or the AC power is restored.

The CT82 will monitor the battery power and when the batteries are almost exhausted, a **"Low Battery"** message will appear on the display. The batteries should be replaced as soon as posible to avoid erroneous readings. This prevents possible damage due to battery leakage and also assures that the CT82 will remain in operation in the event of another power failure.

The suggested battery backup consists of eight AA cells, however, a standard nine volt battery could be used to provide approximately one hour of backup.

The following chart shows the life expectancy of various types of batteries.

| | |
|---|---|
| 1. Eight Alkaline AA cells | 48 Hours |
| 2. Eight Rechargeable Nicad AA cells | 24 Hour |
| 3. Standard 9 Volt Alkaline Battery | 1 Hour |

The life expectancy of the batteries is based only on the time when the CT82 is being operated on batteries only.

It is good practice to replace these batteries every year.
Do not keep batteries in CT82 when not in use.

## CAUTIONARY STATEMENT FOR PROBE EXTENSION

If it is desired to extend the probe length of a CT82 the following precautions must be observed.

1. The maximum length of the probe is limited to 25 feet. Longer lengths will result in a decrease in the accuracy of the instrument.

2. When extending the probe it is most important not to change the order of the wires.The wires in the probe cable are color coded and the order of the colors must match (red to red, green to green, etc.) or **PERMANENT DAMAGE** to the probe and instrument will occur. Incorrect extension of the probe will void the warranty of this instrument.

### CHART TEMPERATURE RANGES

| Chart# | Chart speed | Range1 | Range2 |
|---|---|---|---|
| CRTT2-1 | 24 Hours | -20° to +120°F | -20° to +50°F |
| CRTT2-2 | 12 Hours | -20° to +120°F | -20° to +50°F |
| CRTT2-3 | 7 Days | -20° to +120°F | -20° to +50°F |
| CRTT2-4 | 24 Hours | -20° to +50°F | +40° to +110°F |
| CRTT2-5 | 12 Hours | -20° to +50°F | +40° to +110°F |
| CRTT2-6 | 7 Days | -20° to +50°F | +40° to +110°F |
| CRTT2-7 | 24 Hours | +40° to +110°F | -20° to +120°F |
| CRTT2-8 | 12 Hours | +40° to +110°F | -20° to +120°F |
| CRTT2-9 | 7 Days | +40° to +110°F | -20°to +120°F |
| CRTT2-10 | 24 Hours | -30° to + 50°C | +5° to +45°C |
| CRTT2-11 | 12 Hours | -30° to + 50°C | +5° to +45°C |
| CRTT2-12 | 7 Days | -30°to + 50°C | +5° to +45°C |
| CRTT2-13 | 24 Hours | +5° to +45°C | -30° to +10°C |
| CRTT2-14 | 12 Hours | +5° to +45°C | -30° to +10°C |
| CRTT2-15 | 7 Days | +5° to +45°C | -30° to +10°C |
| CRTT2-16 | 24 Hours | -30° to +10°C | -30° to + 50°C |
| CRTT2-17 | 12 Hours | -30° to +10°C | -30° to + 50°C |
| CRTT2-18 | 7 Days | -30° to +10°C | -30° to + 50°C |

*For 1.5Hr., 3Hr. or 6Hr. readings use 12 hour charts.

MADE IN USA

## 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 WAR-RANTIES 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. 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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