ΩE OMEGA®

User's Guide

CL3515R
K/J/T/E/R/S/N/L/U/B/C
Calibrator Thermometer

ΩΞ OMEGA®

INTRODUCTION

This instrument is a 4 1/2 digit, compact-sized portable digital calibrator thermometer designed to use external K/J/T/E/R/S/N/L/U/B/C type thermocouples as temperature sensor. The thermometer features a dual thermocouple input, an adjustable T/C offset. The thermocouples types comply with the (N.I.S.T. Monograph 175 Revised to ITS 90 standard).

SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.

WARNING

To avoid electrical shock, do not use this instrument when working voltages at the measurement surface over 24V AC or DC.

WARNING

To avoid damage or burns, do not make temperature measurement in microwave ovens.

CAUTION

Repeated sharp flexing can break the thermocouple leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.

GENERAL SPECIFICATIONS

Displays:

There are three different display areas, Main Second and Third. The Main and Second display panels are 4 1/2 digit liquid crystal display (LCD) with maximum reading of 19999. The main is used for displaying the value of T1, T2 or output setting. The second displays T1 or T2 readings and the third T1-T2 and groups settings.

Battery:

Standard 9V battery (NEDA 1604, IEC 6F22 006P). Battery life is about 17.5 hours when used with a carbon zinc battery.

Low battery indication:

The "⊞" is displayed when the battery voltage drops below the operating level.

Dimensions: 192mm(H) x 91mm(W) x 52.5mm(D).

Weight: 320g.

EMC:

Through the RS radiation interference test the frequency of 80MHz to1000MHz, the measurement number producing the unsteady flutter, it immediately recover after stop the test.

Accessories:

Two type "K" thermocouple bead wires. Two type "K" thermocouple calibration bead wires. Maximum insulation temperature 260°C (500°F). Wire accuracy ±2.2°C or ±0.75% of reading (whichever is greater) from 0°C to 800°C.

A 9 volts battery.

An instruction manual.

Pc connection software.

Pc interface cable.

ENVIRONMENTAL

Ambient Operating Ranges:

0°C to 50°C (32°F to 122°F) <80% R.H.

Storage Temperature:

-20°C to 60°C (-4°F to 140°F) <70% R.H.

Input Connector:

Accepts standard miniature thermocouple connectors (flat blades spaced 7.9mm, center to center).

SPECIFICATIONS
ELECTRICAL
Temperature Scale:
Celsius or Fahrenheit user-selectable.

Measurement	Range:
K-TYPE(0.1°)	-200°C to 1372°C or -328°F to 2501°F
J-TYPE(0.1°)	-210°C to 1200°C or -346°F to 192°F
T-TYPE(0.1°)	-250°C to 400°C or -418°F to 752°F
E-TYPE(0.1°)	-250°C to 1000°C or -418°F to1832°F
R-TYPE(1°)	0°C to 1767°C or 32°F to 3212°F
S-TYPE(1°)	0°C to 1767°C or 32°F to 3212°F
N-TYPE(0.1°)	-200°C to 1300°C or -328°F to 2372°F
L-TYPE(0.1°)	-200°C to 900°C or -328°F to 1652°F
U-TYPE(0.1°)	-200°C to 600°C or -328°F to 1112°F
B-TYPE(1°)	600°C to 1820°C or 1112°F to 3308°F
C-TYPE(1°)	0°C to 2316°C or 32°F to 4200°F

Based on the ITS-90 temperature standard.

Accuracy:

K/J/T/E/L/U-TYPE
±(0.05% rdg + 0.5°C) -50°C to 1372°C
±(0.05% rdg + 1.0°C) -50°C to -250°C
±(0.05% rdg + 1.0°F) -58°F to 2501°F
±(0.05% rdg + 2.0°F) -58°F to -346°F

N-TYPE
±(0.05% rdg + 1.0°C) -50°C to 0°C
±(0.05% rdg + 0.5°C) 0°C to 1300°C
±(0.05% rdg + 2.0°F) -58°F to 32°F
±(0.05% rdg + 1.0°F) 32°F to 2372°F

R/S/B/C-TYPE
±(0.05% rdg + 2°C) 0°C to 1767°C
±(0.05% rdg + 4°F) 32°F to 3212°F

THERMOCOUPLE SIMULATE RANGE

Resolution: 0.1° (1° for R/S/B/C-TYPE)
Accuracy: ±(0.3°C + 10uV)
Accuracy: Specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year, not including thermocouple error.

mV Range:

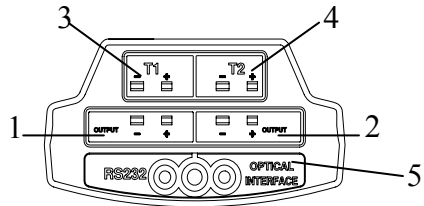Range: -25.00mV to 75.00mV
Resolution: 10uV
Accuracy: ±(0.025% + 1 digit)
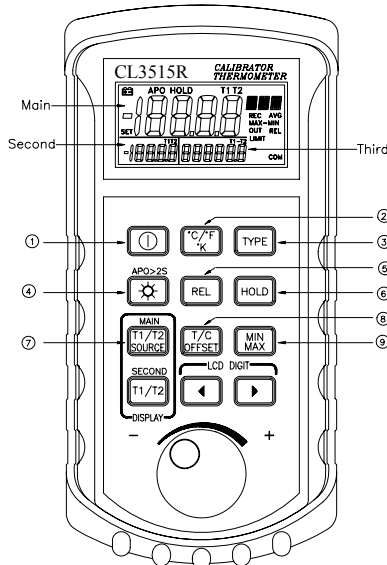
Temperature Coefficient:

0.1 times the applicable accuracy specification per °C from 0°C to 18 and 28°C to 50°C (32°F to 64°F and 82°F to 122°F).

Top Side:

1. Output 1.
2. Output 2.
3. Input T1.
4. Input T2.
5. RS232 optical interface.

OPERATING INSTRUCTIONS

1. Power button " $\bigcirc$ "

The " $\bigcirc$ " button turns the thermometer on or off. When entering REC mode, the power off function is disabled.

> **Remark: The meter will run self calibration when the meter starts. The measuring leads and calibration wires must be removed before taking measurements, and you can get accurate calibration values.**

2. Button "°C/°F/°K"

Press the °C/°F/°K button to cycle through temperature scale, °C, °F and °K.

3. Type Selection (thermocouples)

Press the "type" button and the selected symbol will blink which means in the setting mode.
Press " ▶ " button to make right shifts to cycle through
$$K \rightarrow J \rightarrow T \rightarrow E \rightarrow R \rightarrow S \rightarrow N \rightarrow L \rightarrow U \rightarrow B \rightarrow C \rightarrow mV.$$
Press " ◀ " button to make left shifts to cycle through
$$K \rightarrow mV \rightarrow C \rightarrow B \rightarrow U \rightarrow L \rightarrow N \rightarrow S \rightarrow R \rightarrow E \rightarrow T \rightarrow J.$$
Press the "type" button again to choose the selected thermocouple.

4. Backlight "❀" button

Pressing the button less than two seconds to turn on and pressing the button again less than two seconds to turn off the backlight in the LCD. It will turn off after thirty minutes without operation.
Auto power off
It is in the APO mode when the meter is turned on and will turn off the meter without operation for fifteen minutes. Pressing the "❀" button over two seconds to cancel the function. And pressing the "❀" button again to activate the APO function.

5. "REL" button

The relative value function can be used for comparing the saved reference value with other measurements. Press the "REL" button less than to store the current measurement as the reference value, and press the "REL" over two seconds to disable the function.

6. "HOLD" button

When HOLD mode is selected, the thermometer holds the present readings and stops all further measurements. To activate the data hold mode, press the HOLD button, and "HOLD" is displayed on the LCD. Pressing the HOLD button again cancels the function, and the instrument will automatically resume measurements. When the Hold key is activated, it will stop functions of the other entire key except Power and Backlight.

7. "T1/T2 SOURCE" button

Pressing T1/T2 SOURCE to cycle through T1, T2 and SOURCE. In the main display the blinking digit is the one to be adjusted, you can push the " ◀ ▶ " button to make right or left shifts to the desired position. When incrementing to the utmost range of the selected thermocouples, the LIMIT will show on the display.

SOURCE is to provide the output parameter settings. There are ten individual temperature setting points in group 0, which can be set at your desired output point. Use " ◀ ▶ " to shift the desired digit to be adjusted and rotate the knob to increase or decrease the values you want to set. Press the T/C OFFSET to save the settings.

8. "OFFSET" button (Thermocouple offset adjust)

When the main display input is T1 or T2, and socket thermocouple is connected. Press T/C OFFSET over two seconds the SET annouciator will appear on the right side of display and enter the offset adjustment mode. And the blinking digit is the one to be adjusted. Rotate the knob to the right increasing the values, to the left side decreasing the values. The maximum range of the knob is ±5 centigrade. When turning to the utmost range, it will appear LIMIT symbol on the left side of the display and means that there is no further incrementing of the offset. Press the T/C OFFSET over two seconds to save the settings.

9. "MIN/MAX" button

Press MIN/MAX button to enter the MIN/MAX recording mode and REC shows on the display. The beeper emits a tone when a new minimum or maximum measurement is recorded. Press the MIN/MAX button again to rotate through the current readings:
MAX: The highest measurement recorded.
MIN: The lowest measurement recorded.
MAX-MIN: The difference of the highest and the lowest measurement.
AVG: The average values of the measurements.
Press MIN/MAX button over two seconds to exit the function.

10. Knob usages in the settings

In the TYPE mode, it is used for thermocouples selection to make right or left shifts to choose selectors. In the SOURCE mode, it is used to increase or decrease the values of the output function.

11. PWM Group

Group 0 set

In the OUT mode, press T/C OFFSET over two seconds to set.
LCD display Set CLEAr press T1/T2 SOURCE button to clear data, display SEt 0-0.
In the main display the blinking digit is the one to be adjusted, you can push the " ◀ ▶ " button to make right or left shifts to the desired position. Rotary knob to increase or decrease the values. Press T1/T2 SOURCE to save the one step setting. CL3515R can set 10 step, (Group 1 to 9 use software setting) press T/C OFFSET exit group set mode.

Group out

In the OUT mode, press T/C OFFSET less than two seconds. Rotary knob to select step. Press T/C OFFSET exit group out mode.

WARNING

To avoid possible electrical shock, disconnect the thermocouple connectors from the thermometer before removing the cover.

MAINTENANCE

Battery Replacement

Power is supplied by a 9 volt battery. (NEDA 1604, IEC 6F22). The "⊟" appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery cover. Remove the battery from battery contacts.

Cleaning

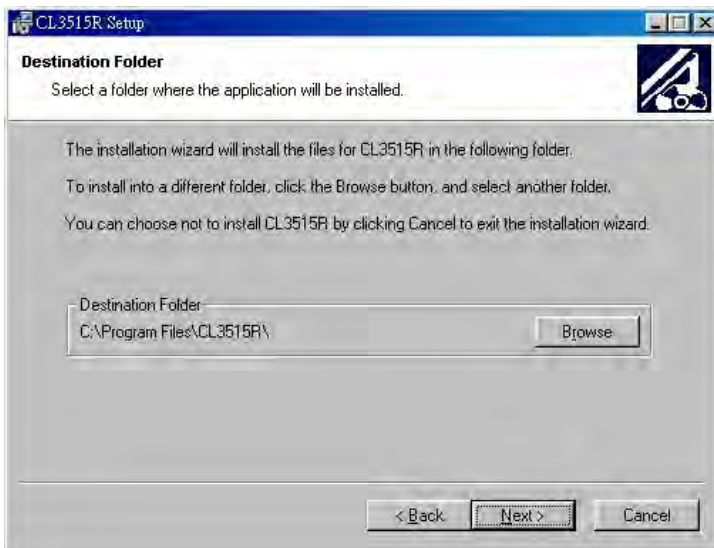Periodically wipe the case with a damp cloth and detergent, do not use abrasives of solvents.

Periodically wipe the meter with soft and mild cloth. Do not use abrasive or solutions to clean the meter.
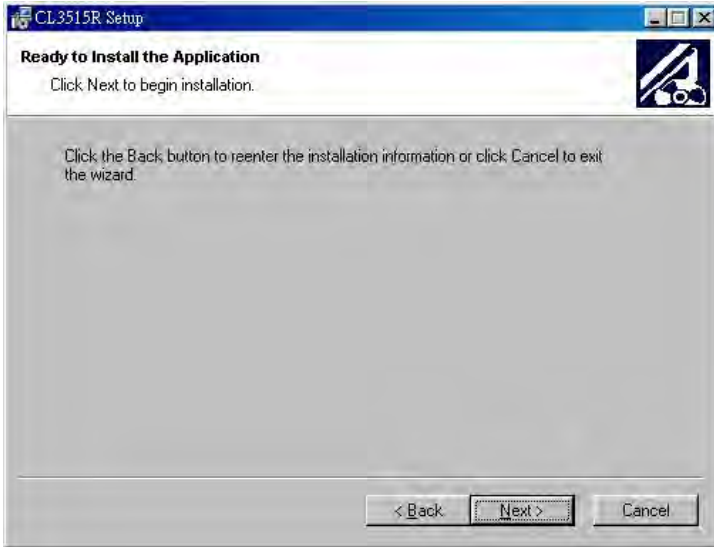
I CL3515R Software Install

Click Next

Click Next

Click Next

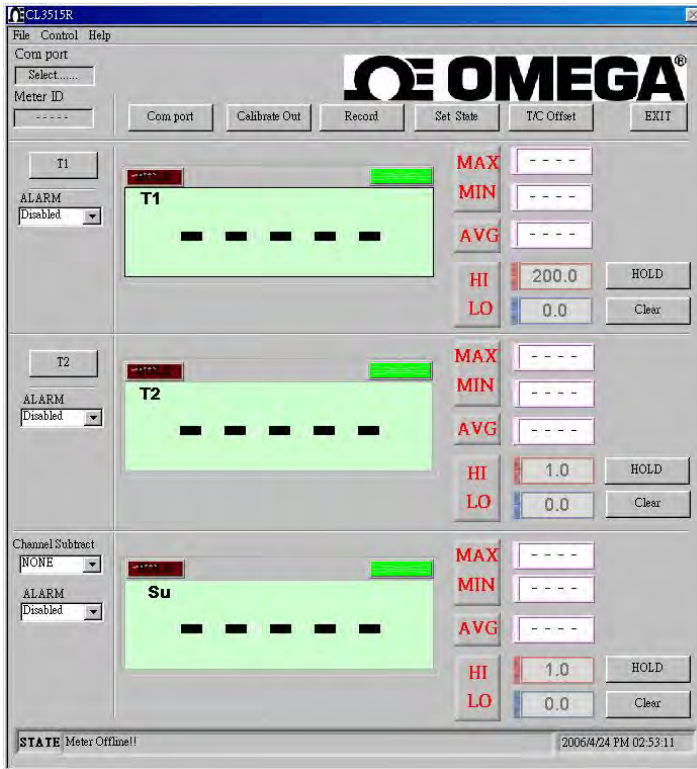Click Finish

II Uninstall

Star→setting→control→new/remove program→CL3515R

III Software Operating Instructions

Start→Program→ CL3515R →CL3515R

Com Port Select

Select CL3515R Connection Com Port.

IV Measurement

1. T1, T2, Channel Subtract (NONE, T1-T2, T2-T1)

ALARM function

Disable

Hi enable

Enables alarm Hi function, and it will become red flashing, when it is over Hi setting value.

Lo enable

Enables alarm Lo function, and it will become blue flashing, when it is below Lo setting value.

Both enable

To enable both Hi and Lo, and it will become red flashing, when it is over Hi setting value, and it will become blue flashing when it is below Lo setting value.
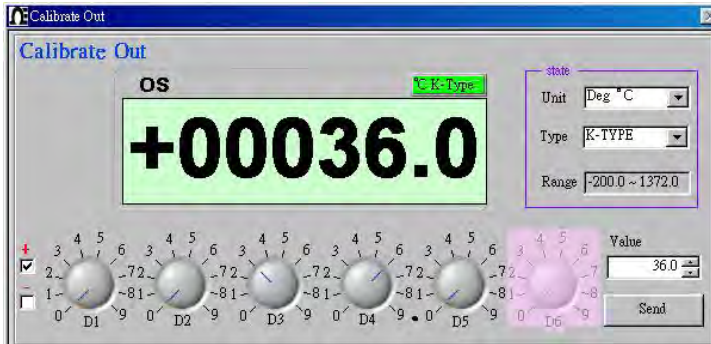
HOLD

Hold the present reading.

Clear

Clear MAX, MIN, AVG recorded.
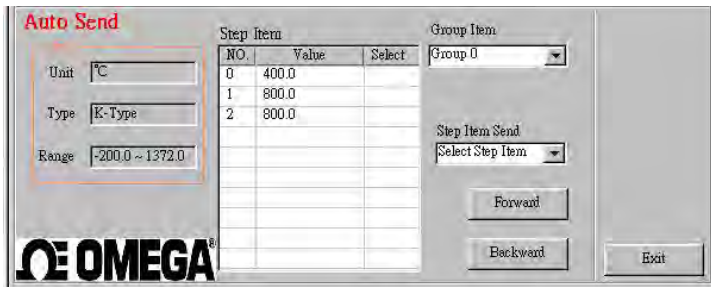
2. Calibrate Out
   Adjust output in real time.

Value
   Set the output vale.
Send
   Press "Send" CL3515R send out the output setting vale.

3. Auto Send

Group Item
   Group 0 to Group 9.
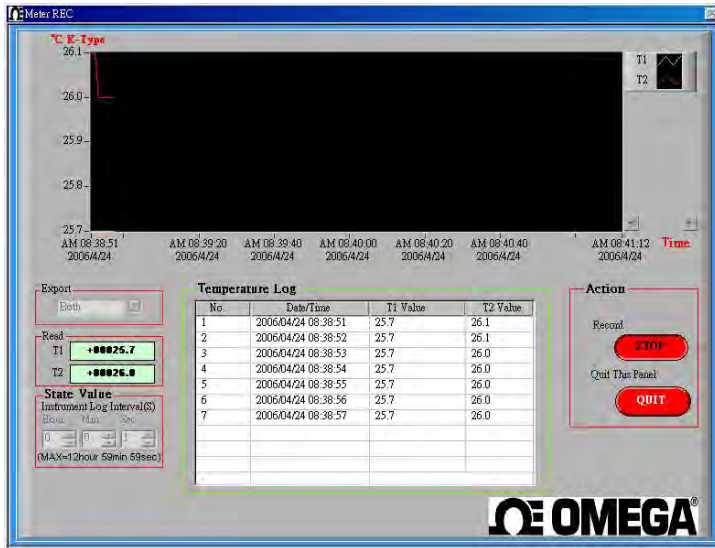**Step Item Send**
   Step Item 0 to Step Item 9.
Forward
   Select step forward.
Backward
   Select step backward.

4. Record

Export
Both
  Display drawing T1 and T2.
T1
  Display drawing T1.
T2
  Display drawing T2.
State Value
  Setting Interval.
Start
  Log
  File type *.txt or *.xls
Quit
  Exit

5. Set State

Read
  Read out the groups reading of CL3515R.
Save
  Make the setting value read in CL3515R.
EXIT

6. Meter
  Temperature
  Unit
    °C, °F, °K
  Type
    K, J, T, E, R, S, N, L, U, B, C, mV

  Group
  Group Item
    Group 0 to Group 9
  Unit
    °C, °F, °K

Type
  K, J, T, E, R, S, N, L, U, B, C, mV
Step Item
  Step 1 to Step 10

Edit
Default
  CL3515R setting values.
Clear
  Clear the current group.
Clear All
  Clear all group's value.

7. File
  Load
  From PC load the stored value.
  Save
  Save the setting value into PC.
  Setup

Temperature Channel
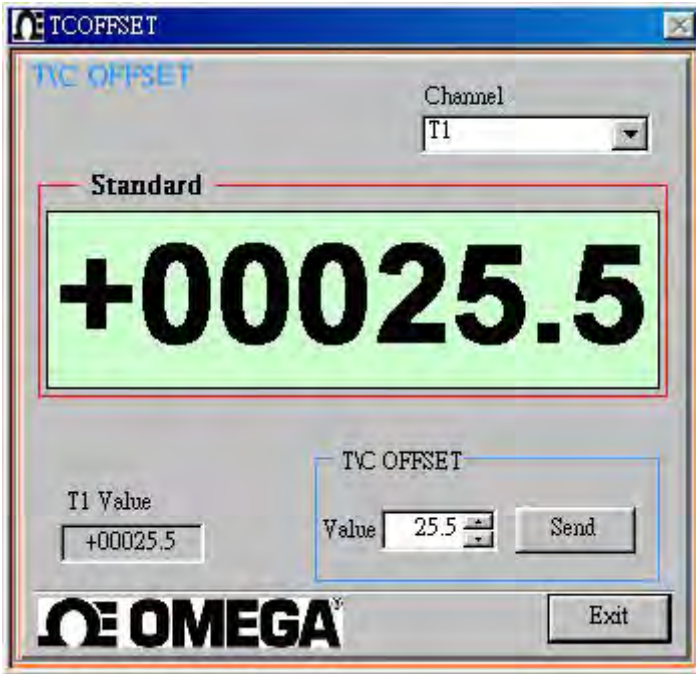 T1   Hi, Lo Setting
  T2   Hi, Lo Setting
  Subtract Hi, Lo Setting
File Data Count
  10000, 20000, 30000

8. T/C Offset

Channel
  T1
  T2
T/C Offset
Offset ±5°C

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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 in which wear is not warranted, include but are 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 the company 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. 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 theproduct, and
3. Repair instructions and/or specific problems relative to the product.

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