



**Ω OMEGA™**

# User's Guide



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## **HHP8200 SERIES Digital Manometer**



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## Section 1 - Introduction

- The Meter will display all LCD segments when it is first turned on for approx. 3 seconds. Though you might see DATALOGGER, Y/M/D, REL, AVG... these segments are not available for these meters.
- The LCD is divided into two distinct sections: One large (primary) top screen and one smaller right - bottom screen (Relative Clock). The two display areas keep you constantly updated with the pressure measurements.
- The Meter measures gauge pressure - a measure of pressure in psi that is referenced to ambient pressure and differential pressure - a measure of the difference two pressures.
- 11 Pressure units are selectable for imperial and Metric in different areas: bar, mmHg, orin<sup>2</sup>, kgcm<sup>2</sup>, psi, inH<sub>2</sub>, kPa, ftH<sub>2</sub>O, inHg, cmH<sub>2</sub>O, mbar. .
- 4 Manometer models for your choice: Pressure Range:
  - 0~± 5 psi (HHP8205)
  - 0~± 15 psi (HHP8215)
  - 0~± 30 psi (HHP8230)
  - 0~± 100 psi (HHP8200)

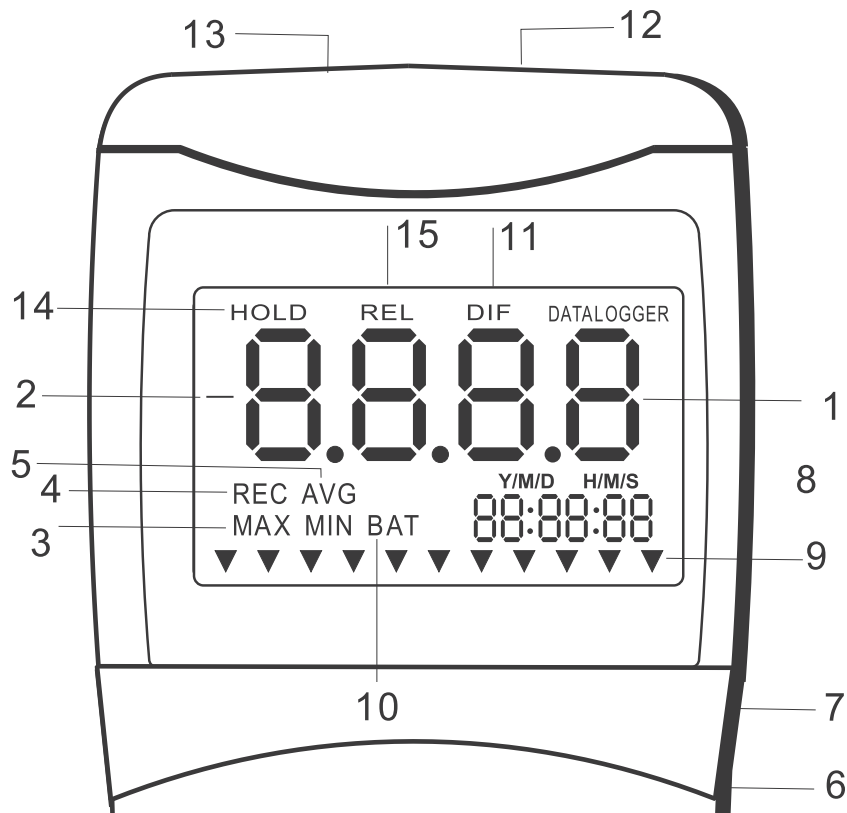
Please check the tubing is not leaking or damaged before using.

## Section 1.1 - Conversion & Resolution

PSI		5	15	30	100
		Resolution	Resolution	Resolution	Resolution
psi	1.000000	0.003	0.01	0.02	0.1
inch of H2O	27.680517	0.1	0.3	0.5	2
bar	0.068948	0.001	0.001	0.002	0.004
mbar	68.948253	0.2	1	2	4
mm of Hg	51.712016	0.2	0.5	1	3
oz/inch <sup>2</sup>	16.000844	0.05	0.2	0.3	1
kg/cm <sup>2</sup>	0.070309	0.001	0.001	0.002	0.004
kPa	6.894859	0.02	0.1	0.2	0.4
ft of H2O	2.306719	0.01	0.02	0.04	0.2
cm of H2O	70.309000	0.2	1	2	4

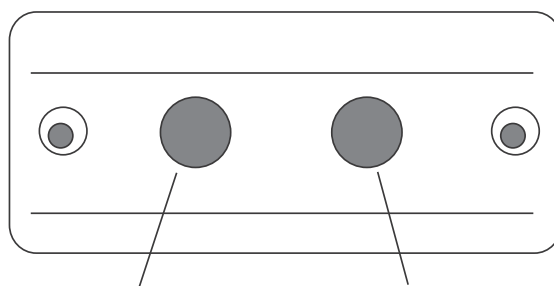
Model/Unit	psi	inH <sub>2</sub> O	mbar	kg/cm <sup>2</sup>
HHP8205	5	138	245	0.35
HHP8215	15	415	1034	1.05
HHP8230	30	830	2068	2.10
HHP8200	100	2768	6895	7.03

## Section 2.1 - Controls and Indicators



1. Primary Data Screen displays pressure value.
2. "-" : Minus pressure display.
3. **MAX MIN** : Pressure recorded.
4. **REC** : Starts recording mod and displays max/ min. pressure recorded.
5. **AVG** : Average records (N/ A).
6. **DC** : Power in Jack.
7. **RS 232** : output port.
8. **H/M/S** : 88:88:88 displays data for Hour/Minute/Second.
9. ▼ : Pressure unit indication.
10. **BAT** : Battery low indicator.
11. **DIF** : Differential pressure mode.

- 12. **"+"** : Positive pressure hoseplug.
- 13. **"-"** : Negative pressure hoseplug.
- 14. **Hold** : Freezes pressure reading.
- 15. **REL** : Establish a relative zero for the primary screen information. (N/A)



"-" Negative  
pressure

"+" Positive  
pressure

## Section 2.2 - Auto Power Off (Sleep Function)

This instrument will automatically shut off in approx. 20 minutes for every power on.

For recording or operating over longer periods of time, you can disable the sleep mode by pressing  and  simultaneously before power on.


An "n" will appear in the middle of the screen at which time you can release the  button. (see Fig. A) The disable sleep mode will be invalid after powering off.

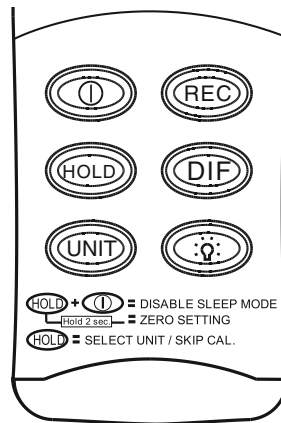
Fig. A →



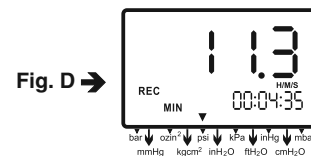
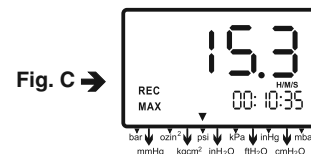
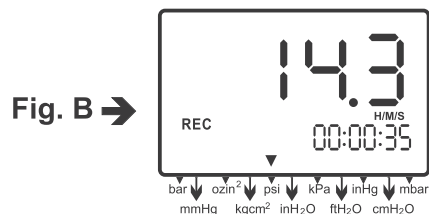
## Section 2.3 - Mode Options

Delete and replace with programmable user selectable start-up mode. The display will default to the mode last used.

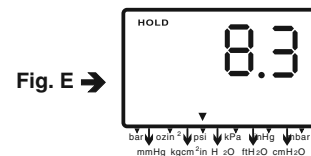
For your convenience, the meter defaults to the setting used during the last operation. The following table lists the last operation. The following table lists the modes of operation that can be invoked by pressing the button indicated.



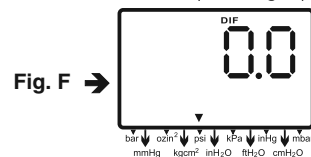
- I** Turns instrument on (Default setting) and off.
- REC** Press momentarily and relative clock starts in the lower right screen.  
**REC** is displayed in the middle left of (Fig. B) other button functions are locked out except **Power, Unit** and **Backlight**. Press momentarily again and the unit cycles through **MAX** (Fig. C) and **MIN** (Fig. D) and back to current pressure ; the record mode is displayed on the LCD. Press and hold **REC** for 3 seconds to turn off the record function and return to the normal mode.



- HOLD** Press momentarily to freeze the pressure reading. (Fig. E)



- DIF** Press momentarily, DIF appears on top of the LCD and the display indicates the relative zero (Relative zero causes the value of the display to show as "0.0") - only the amount of pressure change will be indicated. Press momentarily again and the unit returns to the normal mode of pressure differential (see Fig. F).



## Section 2.3 - Mode Options cont.

**Differential Pressure:** A measure of the difference between two pressures, i.e. use differential pressure sensor to measure gauge pressure by leaving one process connection open to atmosphere and connecting the second sensor port to your system.

**UNIT** Press momentarily and the unit will cycle through "bar" , "mmHg", "ozin<sup>2</sup>", "kgc m<sup>2</sup>" , "psi" , " InH<sub>2</sub>O", "kPa", "ft H<sub>2</sub>O" , "inHg" , "cm H<sub>2</sub>O" , "mbar " , which indicated on the bottom of the display (See Fig.G & H).

**☼** Press momentarily and the back-light illuminates for approx. 30 seconds then turns off automatically.  
Or press momentarily to decrease the figure when calibration is being performed.

Fig. G →

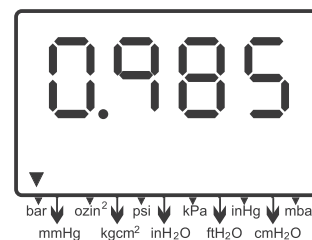
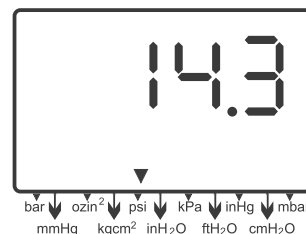


Fig. H →





### Section 3.1 - Maintenance

- ✓ The meter is calibrated in-house before shipping.
- ✓ To maintain the meter in good condition, it is recommended to calibrate the meter after long time use.
- ✓ When properly maintained, the meter will maintain it's accuracy specification. To ensure your meter is performing at its peak, send it to the factory or a qualified instrument calibration facility for annual calibration.
- ✓ It is recommended to always set to zero before taking a measurement. Refer to the zero setting procedure on page 12.

#### **Cleaning:**

Use a damp cloth and mild soap to clean the case of the Manometer, do not use harsh detergents or abrasives as these may mark the surface or damage the unit's case with an adverse chemical reaction

## Section 4.1 - Calibration

Calibration mode is only applicable for a standard Manometer calibrator or any qualified meter calibration facility for annual calibration.

1. First , please manually set the display to zero (no pressure applied to the connector), refer to the Manual zero procedure.
2. Turn the meter off.
3. Press **REC** & **①** simultaneously, "**CA**" appears on the display, (See Fig.I) the meter enters to the calibration mode, make sure the pressure unit to be pointed under the arrow mark "**▼**" is "**psi**" to start positive (+) pressure calibration
4. For the DM8200, the meter has an 80 psi calibration point by default. The adjustable pressure range is from 78.0 to 82.0.  
If calibration pressure source is not 80 psi, increase the figure by pressing **REL** key , or decrease the figure by pressing **②** key to set calibration point as required.
5. Save the calibration point by pressing **REC** key, "**SA**" and small "**CA**" appears on the display (See Fig.J) in 2 seconds , the meter auto-skip to the negative pressure (-) point for next calibration mode.

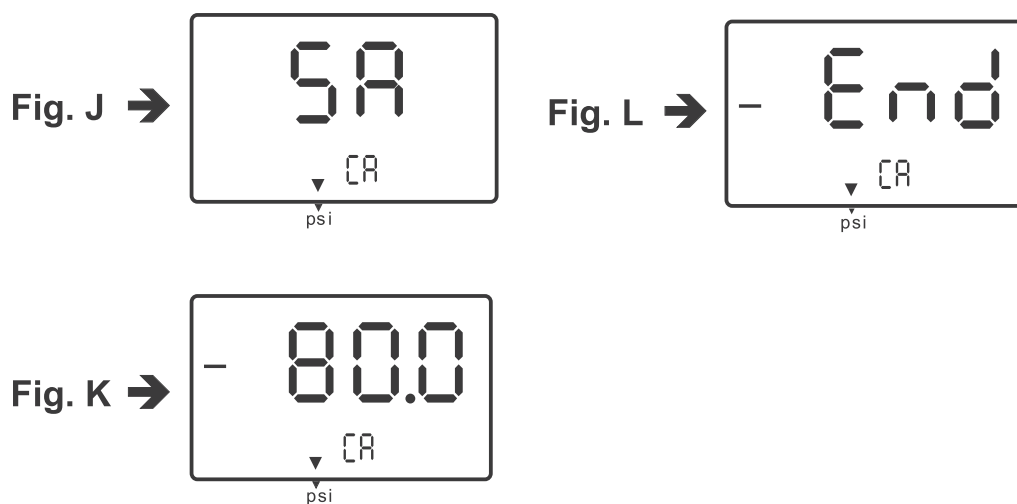
Fig. I →



## Section 4.1 - Calibration cont.

6. Follow the same procedure as step 4 for the negative pressure calibration point by pressing **UNIT** key, the LCD now displays "-80.0" and small **"CA"** (See Fig.K), do the necessary calibration figure refer to your pressure standard if needed.
7. Again save the calibration point by pressing **REC** key, **"SA"** and **"CA"** appears in 2 seconds and then **"End"** and **"CA"** appears in another 2 seconds, the meter turns back to the normal mode (See Fig.L ).

If you can't save by pressing the **REC** key, i.e. no **"SA"** appeared, please Check: (a) The calibration pressure source is between 75.0 and 85.0, or check (b) if you enter the correct positive pressure(+) or negative pressure (-).



## Section 4.1 - Calibration cont.

If you want to skip positive (+) calibration when entered into the Calibration mode, press **UNIT** to skip to negative (-) calibration point.

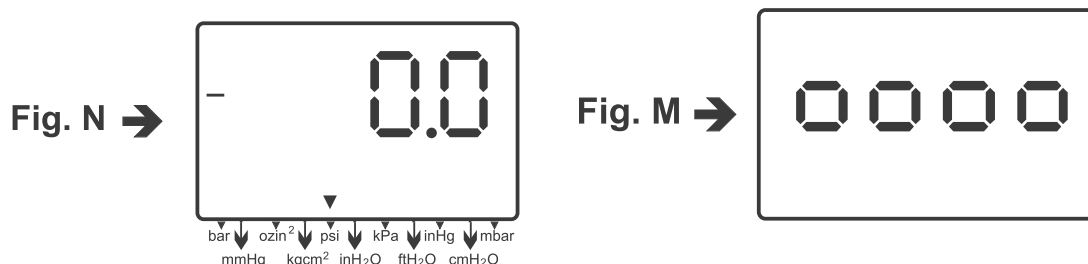
Again, the above calibration is an example for model DM8200, i.e. the pressure range is from 0 to +100 psi (Positive pressure) or from 0 to -100 psi (Negative pressure).

### Calibration point reference:

Model:	psi range	Calibration point(±)	Reommend (±)
DM8205	0~± 5	4.000	3.900~4.100
DM8215	0~± 15	12.00	11.70 ~12.30
DM8230	0~± 30	24.00	23.40~24.60
DM8200	0~±100	80.00	78.00~82.00

## Section 4.2 - Manual Zero Setting

When you set the display to zero (no pressure applied to the connector), press **HOLD** button for 2 seconds, now the meter displays "0.0.0.0" from right to left (See Fig.M), and then each "0" disappears from left back to right, the LCD display shows a normal mode (See Fig.N).



## Section 5.1 - TroubleShooting

- **Power on but no display.** Check that the battery is in place and making good contact with correct polarity, replace with a new battery or attach optional AC adaptor if weak battery is identified as the cause.
- **BAT indication.** Replace with a new battery when LCD display **BAT** at the middle bottom.
- **No Display.** Make sure battery is not dead. If the display disappears, check if sleep mode is active. Refer to the Disable sleep mode function for a longer time than 20 minutes use. Or check that the tubing is connected to the meter tightly.
- **Err.1.** If the pressure value exceeds the maximum range, "**Err.1**" will appear on the display (See Fig.O), please change the sensor, otherwise the sensor will become damaged for making the overrange measurement.

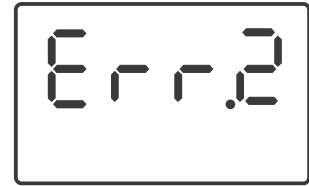
Fig. O →



## Section 5.1 - Troubleshooting cont.

- **Err.2.** If the measurement pressure is less than minimum range "**Err. 2**" will appear (See Fig.P), it is recommended to change the sensor (meter).

Fig. P →



- **Err.3.** For operating the **DIF** function, the differential pressure value is larger than maximum display digit, **Err.3** appears on the display (See Fig.Q).

Fig. Q →



- **Err.4.** When you set zero, make sure that you have disconnected the tubing, no pressure applied to the connector. Then if you see **Err.4** appear on the display, it means the sensor or meter is damaged (See Fig.R). Return the unit to the store you purchased it from for repair.

Fig. R →



**P.S. Err.4** will be also appear while the tube or hose is connected during setting the zero mode.

- **E1OL or E2UL.** When you see the errors while operating RS232 software, it means that the pressure source is less than or over the range of the instrument.

## Section 5.2 - Replacing The Battery

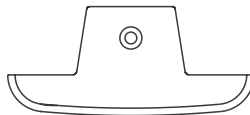
### Replace your “9V” battery when:

- ✓ The **BAT** icon appears on the right of the screen.
- ✓ The meter will not power on.
- ✓ Use of the backlight causes the **BAT** icon to appear.

Even if the battery was recently replaced, check it's voltage level if you get no response from your instrument.

### **To replace the battery :**

1. Remove the tubing from the instrument.
2. Lay the instrument face-down on a clean, flat surface.
3. Remove the battery by screwdriver and observe indicated polarity.  
Close the cover after replacing with a new battery.



Remove battery from instruments that you do not plan to use for a month or more. Do not leave the battery in the instrument.

## Section 6.1 - Operating Conditions

- ✓ Compensated temperature range:  
32° to 122°F (0° to 50°C)
- ✓ Operating temperature: 32° to 122°F  
(0° to 50°C)
- ✓ Storage temperature range:  
-4° to 140°F (-20° to 60°C)
- ✓ Operating Humidity: Max. 80%RH
- ✓ Power: One “9V” battery
- ✓ Exceeding Maximum pressure will  
cause permanent damage to sensor.

Model	Max. Pressure
HHP8205	20 psi
HHP8215	30 psi
HHP8230	60 psi
HHP8200	150 psi

	Pressure
Range	0~±(5 or 15 or 30 or 100 psi)
Resolution	See page 8 data sheet
Accuracy	± 0.3% of full scale at ± 25°C
Dimensions	7.2" x 2.8" x 1.2" 182 x 72 x 30mm
Unit Weight	Approx. 7.8 oz (220g) with battery
Response Time	0.5 seconds
Format	Baud Rate: 2400 bit/sec Data Bit: 8, Stop Bit: 1 P XXXXX, P - XXXXX (unit)



## Section 6.1 - Materials supplied

### *This package contains:*

- ✓ The meter
- ✓ Battery ("9V")
- ✓ Operation manual
- ✓ Hard carrying case
- ✓ Connection hose: 0.16" (4mm (ID))  
x 0.24" (6mm (OD)) x 39.37"  
(1000mm length) x 2 pcs

## Section 6.2 - Optional Accessories

- ✓ RS232 software disk or CD with  
D-sub connector
- ✓ DC Adaptor

## Section 6.3 - Optional Accessories

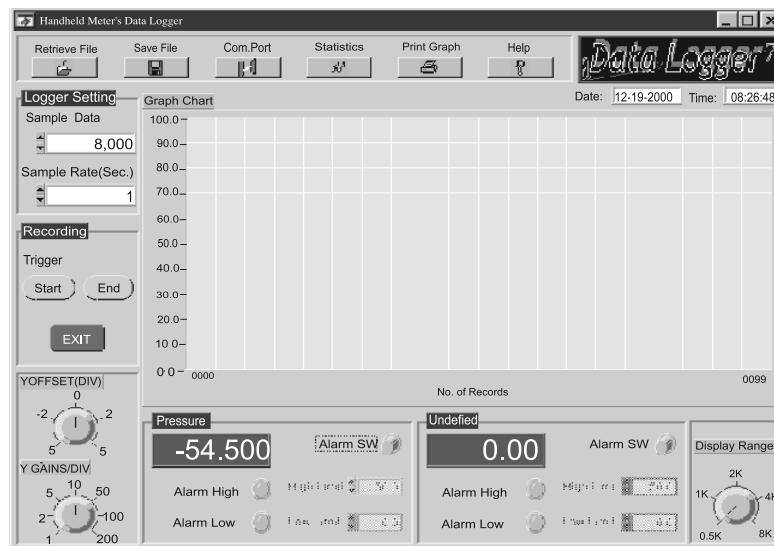
The meter can link with a personal computer to capture on-line data. It can display pressure records with real-time output. You can retrieve files and save the data for operating data analysis, records statistics, multi-files display on the screen,... versatile functions of your choice.

### *Connection procedures:*

1. Plug the optional accessory RS232 cable into the DC jack port (on the right side of the meter).

## Section 6.3 - Optional Accessories cont.

2. Insert the D-sub 9P type connector  
Into computer's Com.1 or 2 port or...
3. Start to set up RS232 software by  
inserting the CD-ROM or Floppy  
diskette.
4. When installing the RS232 software,  
please follow the operation manual  
procedure in the software package.



## Section 6.4 - Warranty

This meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover battery, misuse, abuse, alteration, tampering, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the meter has been opened.

## Section 6.5 - Return Authorization

Authorization must be obtained from the supplier before returning items for any reason. When requesting a Return Authorization (RA), Please include data regarding the defective reason. The meter is to be returned along with good packing to prevent any damage in shipment and insured against possible damage or loss.

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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.

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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.

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