

Der's Guide



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PHTX-127 SERIES pH/ORP Transmitter



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Omega PHTX-271 Series pH/ORP Transmitter

Remove power to unit before wiring input and out-

Follow instructions carefully to avoid personal injury.

CAUTION!

put connections.

Contents

- 1. Installation
- 2. Specifications
- 3. Electrical Connections
- 4. Menu Functions



Installation

PHTX-271 series transmitters are available in two styles: panel mount and field mount. The panel mount is supplied with the necessary hardware to install the transmitter. This manual includes complete panel mounting instructions. Field mounting requires a separate mounting kit. The FP90-UM Universal kit enables the transmitter to be installed virtually anywhere. Detailed instructions for field installation options are included with the FP90-UM Universal kit.

Panel Installation

- 1. The panel mount transmitter is designed for installation using a 1/4 DIN Punch. For manual panel cutout, an adhesive template is provided as an installation guide. Recommended clearance on all sides between instruments is 1 inch.
- 2. Place gasket on instrument, and install in panel.
- 3. Slide mounting bracket over back of instrument until quick-clips snap into latches on side of instrument.
- 4. To remove, secure instrument temporarily with tape from front or grip from rear of instrument. DO NOT RELEASE. Press quick-clips outward and remove.



Electrical Connections



Wiring Procedure

- 1. Remove 0.5 0.625 in. (13-16 mm) of insulation from wire end.
- 2. Press the orange terminal lever downward with a small screwdriver to open terminal jaws.
- 3. Insert exposed (non-insulated) wire end in terminal hole until it bottoms out.
- 4. Release orange terminal lever to secure wire in place. Gently pull on each wire to ensure a good connection.

Wiring Removal Procedure

- 1. Press the orange terminal lever downward with a small screwdriver to open terminal jaws.
- 2. When fully open, remove wire from terminal.

Sensor Input Connections

Wiring Tips:

- Do not route sensor cable in conduit containing AC power wiring. Electrical noise may interfere with sensor signal.
- Routing sensor cable in grounded metal conduit will help prevent electrical noise and mechanical damage.
- Seal cable entry points to prevent moisture damage.
- Only one wire should be inserted into a terminal. Splice double wires outside the terminal.
- The maximum cable length from sensor to the pH transmitter is 400 ft. (122 m).







Connecting this terminal to Earth G D may reduce electrical interference

PHTX-271-1 System Power/Loop Connections



· May be disabled (Off) if not used.

PHTX-271-2 System Power/Loop Connections

Stand-alone application, no current loop used



Connection to a PLC/Recorder, separate supply



Connection to a PLC with built-in power supply



Example: Two transmitters connected to PLC/Recorder with separate power supply





Open Collector and Relay Outputs

The Open Collector and relay outputs can be used as a switch that responds when the process value moves above or below a setpoint, or they can be used to generate a pulsing signal with a rate proportional to the process value.

Low:

Relay is on when process variable is less than the setpoint. The relay turns off when the process moves above the setpoint plus the hysteresis value.

• High:

Relay is on when process variable is greater than the setpoint. The relay turns off when the process moves below the setpoint plus the hysteresis value.



Proportional Pulsing

The output will generate a 100 mS pulse at the rate defined by settings in the CALIBRATE menu (see page 6)

In the example below:

- The output will be 0 pulses/min. at pH values less than 5.0.
- The output will be 50 pulses/min. at 7.5 pH.
- The output will be 100 pulses/min. at pH values above 10 pH.



Open Collector or Relay Output

VIEW Menu

- During normal operation, the transmitter displays the VIEW menu.
- When using the CALIBRATE or OPTIONS menus, the transmitter will return to the VIEW menu if no
 activity occurs for 10 minutes.
- To select the item you want displayed, press the UP or DOWN arrow keys. The items will scroll in a continuous loop. Changing the display selection does not interrupt system operations.
- No key code is necessary to change display selection.
- Output settings cannot be edited from the VIEW menu.

View Menu for PHTX-271 Series

pH/ORP	۱۱			
10.20 pH 25.0C				
A OMEGA				

Display	Description	
7.00 pH	Monitor the Temperature input from the sensor.	
12.6 °C	This is the permanent display.	



All of the VIEW displays below are temporary. The permanent display will return after ten minutes.

nput:Monitor the millivolt input from the electrode. Use this display to determine relative condition of your electrode during periodic calibration. (7 pH buffer 0 mV, ±50 mV)		
Loop Output: 14.16 mA	Monitor the 4-20 mA Loop output.	
Last CAL: 6-30-00 >	Display date for scheduled maintenance or date of last calibration.	
EASY CAL	Easy Cal is the fastest and simplest periodic calibration method. Requires 4 pH, 7 pH and 10 pH (any two).	

PHTX-271 Editing Procedure:

- Step 1. Press and hold ENTER key:
 - 2 seconds to select the CALIBRATE menu
 - 5 seconds to select the OPTIONS menu.
- **Step 2.** The Key Code is UP-UP-DOWN keys in sequence.
 - After entering the Key Code, the display will show the first item in the selected menu.
- Step 3. Scroll menu with UP or DOWN arrow keys.
- Step 4. Press RIGHT ARROW key to select menu item to be edited.The first display element will begin flashing.
- Step 5. Press UP or DOWN keys to edit the flashing element. • RIGHT ARROW key advances the flashing element.

Step 6. Press ENTER key to save the new setting and return to Step 3.

Notes on Step 1:

- The View Menu is normally displayed.
- The CALIBRATE and OPTIONS menus require a KEY CODE.



Notes on Step 2:

If no key is pressed for 5 minutes while display is showing "Enter Key Code", the display will return to the VIEW menu.



Output Setpnt:

Notes on Steps 3 and 4:

- Refer to pages 6 and 7 for complete listing of menu items and their use.
- From the Step 3 display, pressing the UP and DOWN keys simultaneously will return the display to the VIEW menu.
- If no key is pressed for 10 minutes, display will also return to the VIEW menu.



Step 3: Finished Editing?

Press the UP and DOWN keys simultaneously after saving the last setting to return to normal operation.



Notes on Steps 5 and 6:

- All output functions remain active during editing.
- · Only the flashing element can be edited.
- RIGHT ARROW key advances the flashing element in a continuous loop.
- Edited value is effective immediately after pressing ENTER key.
- If no key is pressed for 10 minutes unit will restore the last saved value and return to step 3.
- Step 6 (pressing ENTER key) always returns you to Step 3.
- Repeat steps 3-6 until all editing is completed.

Step 5: Made an Error?

Press the UP and DOWN keys simultaneously while any element is flashing. This will recall the last saved value of the item being edited and return you to Step 3.





Calibrate Menu for PHTX-271-1 pH

Display (Factory settings shown)	Description	
Set: Temperature >	Provides a maximum 25°C offset to match temperature measurement to external reference.	
Set: Standard >	Applies a linear offset to the pH measurement. If you are using a single-point calibration, use this function. The ideal value is the average pH of your application. (A sample of your application at process temperature is recommended.)	
Set: Slope >	Applies a slope to the pH measurement. This function should only be used in a two-point calibration. The slope value and the standard value must be at least 2 pH units apart. The ideal values are the minimum and maximum values of your process.	
Loop Range: pH 0.00 → 14.00 >	Select the minimum and maximum values for the 4-20 mA Current loop output.	
Output Source: pH >	Select pH or Temperature as the source for the Open Collector Output.	
Output Mode: Low >	Select the mode of operation for the Open Collector output: High, Low or proportional Pulse. The signal may be disabled if not in use.	
Output Setpnt: 4.00 pH >	In Low or High Mode, the Open Collector output will turn on when the pH reaches this value.	
Output Hys: 0.50 pH >	In Low or High mode, the Open Collector output will turn off at Setpoint ± Hysteresis, depending on High of Low Setpoint selection. (See details on page 4.)	
Output Range: pH 4.00 \rightarrow 8.00 >	In Pulse mode, set the pH values for zero and for maximum pulse rate.	
Output PlsRate: 120 pls/min >	In Pulse mode, set the maximum pulse rate, up to 400 pulses per minute.	
Last CAL: 6-30-00 >	Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.	

Options Menu for PHTX-271-1 pH

Display (Factory settings shown)	Description	
Contrast: 3 >	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. Select lower contrast if the display is in warmer ambient surroundings.	
Averaging: Off >	OFF provides the most instantaneous output response to changes in input value. LOW averaging = 4 seconds, HIGH averaging = 8 seconds of input signal.	
Output Active: Low >	Active HIGH: This setting is used to turn a device (pump, valve) ON at the setpoint. Active LOW: This setting is used to turn a device (pump, valve) OFF at the setpoint.	
Temp Display: °C >	Select temperature units: °C or °F	
Loop Adjust: 4.00 mA >	Adjust the minimum and maximum current output. The display value represents the precise current output. Adjustment limits:	
Loop Adjust: 20.00 mA >	 3.80 mA < 4.00 mA > 5.00 mA 19.00 mA < 20.00 mA > 21.00 ma Use this setting to match the PHTX-271 loop current to any external device. 	
Test Loop: >	Press UP or DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test current loop output.	
Test Output >	Press UP or DOWN keys to manually toggle the state of the open collector output.	

Calibrate Menu for PHTX-271-1 ORP

Display (Factory settings shown)	Description	
Set: Standard >	Applies a linear offset to the ORP measurement. If you are using a single-point calibration, use this function. The ideal value is the average pH of your application. (A sample of your application at process temperature is recommended.)	
Set: Slope >	Applies a slope to the ORP measurement. The ORP SLOPE is used for two-point calibration along with the ORP STANDARD. If you applied the min value of your process to the ORP STANDARD, then apply the max value to the ORP SLOPE. Else, apply the min value to the ORP SLOPE. The slope value and the standard value must be at least 30 mV apart.	
Loop Range: mV -1000 \rightarrow +1000 >	Select the minimum and maximum ORP values for the 4-20 mA Current loop output. Maximum settings are -1000 mV to +2000 $$ mV	
Output Mode: Off >	Select the desired mode of operation for the Open Collector output: High, Low or proportional Pulse. The signal may also be disabled if not in use.	
Output Setpnt: -500 mV >	In Low or High Mode, the Open Collector output will be deactivated when the ORP reaches this value.	
Output Hys: 10 mV >	In Low or High mode, the Open Collector output will be deactivated at Setpoint \pm Hysteresis, depending on High or Low Setpoint selection. (See details on page 4.)	
Output Range: mV -500 \rightarrow +500 >	In Pulse mode, set the ORP values for zero and for maximum pulse rate.	
Output PlsRate: 120 Pls/min >	In Pulse mode, set the maximum pulse rate, up to 400 pulses per minute.	
Last CAL: 6-30-00 >	Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.	

Options Menu for PHTX-271-1 ORP

Display (Factory settings shown)	Description	
Contrast: 3 >	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. Select lower contrast if the display is in warmer ambient surroundings.	
Averaging: Off >	OFF provides the most instantaneous output response to changes in input value. LOW averaging = 4 seconds, HIGH averaging = 8 seconds of input signal.	
Output1 Active: Low >	Active HIGH: This setting is used to turn a device (pump, valve) ON at the setpoint. Active LOW: This setting is used to turn a device (pump, valve) OFF at the setpoint.	
Temp Display: °C >	Select temperature units: °C or °F	
Loop 1 Adjust: 4.00 mA >	Adjust the minimum and maximum current output. The display value represents the precise current output. Adjustment limits:	
Loop 1 Adjust: 20.00 mA >	 3.80 mA < 4.00 mA > 5.00 mA 19.00 mA < 20.00 mA > 21.00 ma Use this setting to match the PHTX-271 loop current to any external device. 	
Test Loop1: >	Press UP or DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test current loop output.	
Test Output1 >	Press UP or DOWN keys to manually toggle the state of the open collector output.	

All Loop1 and Output1 functions will repeat for Loop2 and Output2.

Calibrate Menu for PHTX-271-2 pH

Display (Factory settings shown)	Description	
Set: Temperature >	Provides a maximum 25 °C offset to match temperature measurement to external reference.	
Set: Standard >	Applies a linear offset to the pH measurement. If you are using a single-point calibration, use this function. The ideal value is the average pH of your application. (A sample of your application at process temperature is recommended.)	
Set: Slope >	Applies a slope to the pH measurement. This function should only be used in a two-point calibration. The slope value and the standard value must be at least 2 pH units apart. The ideal values are the minimum and maximum values of your process.	
Loop Range: pH 0.00 → 14.00 >	Select the minimum and maximum values for the 4-20 mA Current loop output.	
Relay1 Source: pH >	Select pH or Temperature as the source for this relay.	
Relay1 Mode: Off >	Select the mode of operation for the relay output: High, Low or proportional Pulse. The signal may be disabled if not in use.	
Relay1 Setpnt: 4.00 pH >	In Low or High Mode, the relay output will turn on when the pH reaches this value.	
Relay1 Hys: 0.51 pH >	In Low or High mode, the relay output will turn off at Setpoint ± Hysteresis, depending on High or Low Setpoint selection. (See details on page 4.)	
Relay1 Range: pH 4.00 \rightarrow 8.00 >	In Pulse mode, set the pH values for zero and for maximum pulse rate.	
Relay1 PlsRate: 120 Pls/min >	In Pulse mode, set the maximum pulse rate, up to 400 pulses per minute.	
Last CAL: 6-30-00 >	Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.	

All Relay1 functions will repeat for Relay2.

Options Menu for PHTX-271-2 pH

Display (Factory settings shown)	Description	
Contrast: 3 >	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. Select lower contrast i the display is in warmer ambient surroundings.	
Averaging: Off >	OFF provides the most instantaneous output response to changes in input value. LOW averaging = 4 seconds, HIGH averaging = 8 seconds of input signal.	
Temp Display: °C >	Select temperature units: °C or °F	
Loop Adjust: 4.00 mA >	Adjust the minimum and maximum current output. The display value represents the precise current output. Adjustment limits:	
Loop Adjust: 20.00 mA >	 3.80 mA < 4.00 mA > 5.00 mA 19.00 mA < 20.00 mA > 21.00 ma Use this setting to match the PHTX-271 loop current to any external device. 	
Test Loop: >	Press UP or DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test current loop output.	
Test Relay 1 >	Press UP or DOWN keys to manually toggle the state of the open collector output.	
Test Relay 2 >	Press UP or DOWN keys to manually toggle the state of the open collector output.	

All Relay1 functions will repeat for Relay2.

Calibrate Menu for PHTX-271-2 ORP

Display (Factory settings shown)	Description	
Set: Standard >	Applies a linear offset to the ORP measurement. If you are using a single-point calibration, use this function. The ideal value is the average pH of your application. (A sample of your application at process temperature is recommended.)	
Set: Slope >	Applies a slope to the ORP measurement. The ORP SLOPE is used for two-point calibration along with the ORP STANDARD. If you applied the min value of your process to the ORP STANDARD, then apply the max value to the ORP SLOPE. Else, apply the min value to the ORP SLOPE. The slope value and the standard value must be at least 30 mV apart.	
Loop Range: mV -1000 → +1000 >	Select the minimum and maximum ORP values for the 4-20 mA Current loop output. Maximum settings are -1000 mV to +2000 mV.	
Relay1 Mode: Off >	Select the desired mode of operation for the Open Collector output: High, Low or proportional Pulse. The signal may also be disabled if not in use.	
Relay1 Setpnt: -500 mV >	In Low or High Mode, the Open Collector output will be deactivated when the ORP reaches this value.	
Relay1 Hys: 10 mV >	In Low or High mode, the Open Collector output will be deactivated at Setpoint \pm Hysteresis, depending on High or Low Setpoint selection. (See details on page 4.)	
$\begin{array}{c c} \mbox{Relay1 Range: mV} \\ \mbox{-500} \rightarrow \mbox{+500} \end{array} >$	In Pulse mode, set the ORP values for zero and for maximum pulse rate.	
Relay1 PlsRate: 120 Pls/min >	In Pulse mode, set the maximum pulse rate, up to 400 pulses per minute.	
Last CAL: 6-30-00 >	Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.	

All Relay1 functions will repeat for Relay2.

Options Menu for PHTX-271-2 ORP

Display (Factory settings shown)	Description	
Contrast: 3 >	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. Select lower contrast if the display is in warmer ambient surroundings.	
Averaging: Off >	OFF provides the most instantaneous output response to changes in input value. LOW averaging = 4 seconds, HIGH averaging = 8 seconds of input signal.	
Loop Adjust: 4.00 mA >	Adjust the minimum and maximum current output. The display value represents the precise current output Adjustment limits:	
Loop Adjust: 20.00 mA >	 3.80 mA < 4.00 mA > 5.00 mA 19.00 mA < 20.00 mA > 21.00 ma Use this setting to match the PHTX-271 loop current to any external device. 	
Test Loop: >	Press UP or DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test current loop output.	
Test Relay 1 >	Press UP or DOWN keys to manually toggle the state of the relay.	
Test Relay 2 >	Press UP or DOWN keys to manually toggle the state of the relay.	

All Relay1 functions will repeat for Relay2.

EASY CAL Procedure - pH

- This procedure simplifies system calibration using standard 4.0, 7.0, 10.0 pH buffers. If these pH buffer values are not available, calibrate the system via the CALIBRATE menu, using the STANDARD and SLOPE settings.
- Access the CALIBRATE menu and set sensor temperature before performing EASY CAL for new electrode installations.
- Access EASY CAL menu from the View menu.



Press UP, UP, UP, DOWN buttons in sequence to enter menu, XXXX will appear during code entry.



EASY CAL Procedure - ORP

- This procedure simplifies system calibration. Requires a prepared quinhydrone solution: Saturate 50 mL of pH 4.0 and 7.0 buffers with 1/8 g quinhydrone. To calibrate using any other ORP buffer solutions, use the Standard and Slope functions in the CALIBRATE menu.
- · Access EASY CAL menu from the View menu.

EASY CAL: ----Enter Key Code Press UP, UP, UP, DOWN buttons in sequence to enter menu,



For best results, gently stir the submerged electrode for approximately 5 seconds during the stabilization period.

Large temperature differences from process fluids to buffers may require longer stabilization time.

Technical notes:

The difference between the actual mV and value shown is a good indication of the condition of the electrode. Differences in excess of 50 mV may indicate a need to service the electrode.

Troubleshooting - pH

Display Condition	Possible Cause	Suggested Solution	
During EasyCal: "Out of Range Use Manual CAL"	 Required 4, 7 or 10 pH buffers not being used. Sensor is depleted too severely to use EasyCal. 	 Use pH 4, 7, 10 pH buffers Clean probe and retry EASY CAL. Use Manual calibration for Standard and Slope if mV offset exceeds 50 mV. 	
During EasyCal: "Same Buffer"	Sensor was not moved from buffer #1 to buffer #2.	 Place sensor in correct buffer solution. Use fresh buffer. 	
During CALIBRATE Std: "Standard too close to Slope!"	 pH Standard value within 2 pH units of Slope value. pH Sensor efficiency is inadequate. 	 Use pH values at least 2 pH units apart. Clean pH sensor; replace if necessary Use fresh buffer. 	
During CALIBRATE Slope: "Slope too close to Standard!"	 pH Slope value within 2 pH units of Standard value. pH Sensor efficiency is inadequate. 	 Use pH values at least 2 pH units apart. Clean pH sensor; replace if necessary Use fresh buffer. 	
During CALIBRATE: "Out of Range Check Sensor"	 No temperature or mV signal from sensor detected. No connection between pH sensor and preamplifier. 	 Check all wiring, contacts in preamplifier. Verify sensor is securely installed. Replace pH sensor. 	
During normal operation: Constant "15.00 pH" or Constant "0.00 pH" with good temp value	mV input is less than 0 pH or greater than 15 pH.	 Recalibrate system. Replace pH sensor Replace preamplifier. 	
During normal operation: "Check Sensor?"	 No temperature or mV signal from sensor detected. No connection between pH sensor and preamplifier. 	 Check all wiring, contacts in preamplifier. Verify sensor is securely installed. Replace pH sensor. 	

The mV value from the sensor when placed in a 7 pH buffer represents the sensor offset. It is recommended that the sensor be serviced or replaced when the offset exceeds 50 mV.

Troubleshooting - ORP

Display Condition	Possible Cause	Suggested Solution
During EasyCal: "Out of Range Use Manual CAL"	 Required 4 and 7 pH buffers with quinhydrone not being used. Sensor is depleted too severely to use EasyCal. 	 Use pH 4 and 7 pH buffers properly saturated with quinhydrone. Clean probe and retry EASY CAL. Use Manual calibration for Standard and Slope if mV offset exceeds 50 mV.
During EasyCal: "Same Buffer"	Sensor was not moved from buffer #1 to buffer #2.	 Place sensor in correct buffer solution. Use fresh buffer.
During CALIBRATE Std: "Standard too close to Slope!"	 ORP Standard value within 120 mV of Slope value. ORP Sensor efficiency is inadequate. 	 Use ORP values at least 120 mV apart. Clean ORP sensor; replace if necessary. Use fresh buffer.
During CALIBRATE Slope: "Slope too close to Standard!"	 ORP Slope value within 120 mV of Standard value. ORP Sensor efficiency is inadequate. 	 Use ORP values at least 120 mV apart. Clean ORP sensor; replace if necessary. Use fresh buffer.
During CALIBRATE: "Out of Range Check Sensor"	 No mV signal or sensor id from sensor detected. No connection between ORP sensor and preamplifier. 	 Check all wiring, contacts in preamplifier. Verify sensor is securely installed. Replace ORP sensor.
During normal operation: Constant "-1000" or Constant "+2000" with good temp value	Input is beyond the measurement range of the PHTX-271: Less than -999 mV or greater than +1999 mV.	 Recalibrate system. Replace ORP sensor. Replace preamplifier.
During normal operation: "Check Sensor?"	 No mV signal from sensor detected. No connection between ORP sensor and preamplifier. 	 Check all wiring, contacts in preamplifier. Verify sensor is securely installed. Replace ORP sensor.

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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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 **MON-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.

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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