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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

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.

# **Omega FP90 Series Flow Transmitter Instructions**



Remove power to unit before wiring input and output connections.

Follow instructions carefully to avoid personal injury.

## Contents

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



gasket on

## Installation

FP90 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 one of two separate mounting kits. The FP90IM integral kit joins the sensor and instrument together into a single package. The FP90UM Universal kit enables the transmitter to be installed virtually anywhere. Detailed instructions for integral mounting or other field installation options are included with the FP90IM Integral kit or the FP90UM 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.



Environmental

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CE

Immunity:

Emissions:

Safety:

Storage temperature:

Relative humidity:

Maximum altitude:

Pollution degree:

Insulation category:

Standards and Approvals

Operating temperature: -10 to 70°C (14 to 158°F)

11

2

EN50082-2

EN55011

EN61010

Manufactured under ISO 9001 and ISO 14001

-15 to 80°C (5 to 176°F)

2000 m (6562 ft)

0 to 95%, non-condensing

- Contrast: User selected, 5 levels
- Thermal sensitivity shift: ±0.005% of reading per °C

#### Electrical

•	Power:	12 to 24 VDC ±10%, regulated,
		21 mA max current
0		

Sensor Input:

- Range: 0.5 to 1500 Hz
   Sensor power: 2-wire: 1.5 mA @ 5 VDC ± 1% 3 or 4 wire: 20 mA @ 5 VDC ± 1%
- · Optically isolated from current loop
- Short circuit protected
- Current output:
- · 4 to 20 mA, isolated, fully adjustable and reversible
  - Max loop impedance: 50  $\Omega$  max. @ 12 V 325  $\Omega$  max. @ 18 V 600  $\Omega$  max. @ 24V

## **Electrical Connections**



**Caution:** Failure to fully open terminal jaws before removing wire may permanently damage instrument.

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

**Sensor Input Connections** 

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

### 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.

14 Snsr 2 V+ (BLACK)

> 11 Snsr 1 V-(BLACK)

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13 Snsr 1 Gnd (SHIELD)

12 Snsr 1 IN (RED) Maximum cable length is 200 ft. for FP5100, FP5200, FP5300, FP6000 and any sinusoidal flow signal.







Maximum cable length is 1000 ft. for FP-5600/FP8501,FP2540/ FP3-1500, FMG-3000 and FMG-550 and any square wave flow signal.



# No Aux Power: FP-5060 FP-5100 FP-5600 FP-5200 FP-8500A FP-6000 FP-8501A FP-8500 FP-2541 FP-8501 FMG-3000 Series Magmeter FP-8501 FMG-550 Series magmeter

#### OMEGA FP90 Series Flow Transmitter Instructions

Any Open Collector pulse input

#### FP90-1 rear terminals



#### FP90-1 System Power/Loop Connections



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



Auxiliary Power note: AUXILIARY power is used only if the flow sensor requires more than 1.5 mA current.





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



Auxiliary Power note: • AUXILIARY Power is required for all systems where relays are used.





## **Open Collector and Relay Outputs**

The open collector and relay outputs can be used as a switch that responds when the flow rate moves above or below a setpoint, or it can be used to generate a pulse that is relative to the flow volume or to the flow rate.

Low (Open Collector or Relay output)

Output triggers when the flow rate is less than the setpoint. The output will deenergize when the flow rate moves above the setpoint plus the hysteresis value.

High (Open Collector or Relay output)

Output triggers when the flow rate is greater than the setpoint. The output will deenergize when the flow rate drops below the setpoint plus the hysteresis value.

Frequency (Open Collector only)

Output is a pulse stream that is based on the input flow sensor signal. The input frequency can be divided by any value from 1 to 254.

Pulse (Open Collector or Relay output) Output is a pulse based on the volume of fluid that passes the sensor. Set any value from 0.0001 to 99999.



# **VIEW** menus

- During normal operation, the FP90 displays the VIEW menu.
- When using the CALIBRATE or OPTIONS menus, the FP90 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 FP90-1

6-16-09

Display	Description	
0.0 GPM	Monitor the flow rate and the resettable totalizer. Press the RIGHT ARROW key to reset	
Total: 12345678	<ul> <li>the totalizer. If the totalizer is locked, you will need to enter the Key Code first.</li> <li>Lock or Unlock the totalizer in the OPTIONS menu.</li> <li>This is the permanent View display.</li> </ul>	
of the displays b	elow are temporary. After ten minutes the display will return to the permanent displa	
Perm: 12345678		
Gallons	Monitor the Permanent Totalizer value.	
Gallons	Monitor the Permanent Totalizer value.	
Gallons Loop Output: 12.00 mA	Monitor the Permanent Totalizer value. Monitor the 4-20 mA Loop output.	

# View Menu for FP90-2

	Display	Description	
	0.0 GPM Total: 12345678 >	Monitor the flow rate and the resettable totalizer. Press the RIGHT ARROW key to reset the totalizer. If the Reset is locked, you will need to enter the Key Code first. Lock or Unlock the totalizer in the OPTIONS menu. This is the permanent View display.	
	All of the displays below are temporary. After ten minutes the display will return to the permanent display.		
	Perm: 12345678 Gallons	Monitor the Permanent Totalizer value.	
	Loop Output: 12.00 mA	Monitor the 4-20 mA Loop output.	
	Last CAL: 6-16-09	Monitor date for scheduled maintenance or date of last calibration.	

## View Menu for FP90-3

D	Display	Description
Flow1:	123.4 GPM	Monitor the flow rate of Channel 1 and Channel 2 simultaneously.
Flow2:	567.8 GPM	This is a permanent display.
Delt	ta Flow:	Monitor the delta flow rate (Channel 1 rate - channel 2 rate = Delta Flow)
10.	.5 GPM	This is a permanent display.

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

Tot1: 1234567.8 Tot2: 123456.78 >	Monitor channel 1 and channel 2 Resettable Totalizers. Press the RIGHT ARROW key to reset the totalizer. If Reset is locked, you must enter Key Code. Lock or Unlock function is in OPTIONS menu.
Perm1: 1234567.8 Gallons	Monitor channel 1 Permanent Totalizer.
Perm2: 123456.78 Gallons	Monitor channel 2 Permanent Totalizer.
Loop 1 Output: 12.00 mA	Monitor the 4-20 mA Loop 1 output.
P	•
Loop 2 Output: 12.00 mA	Monitor the 4-20 mA Loop 2 output.
r	
Last CAL 6-16-09	Monitor date for scheduled maintenance or date of last calibration.

# **FP90 series 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.



## **CALIBRATE and OPTIONS menus**

The following pages contain the CALIBRATE and OPTIONS menus for each version of the FP90 Flow Transmitter. Be sure you are using the correct menu:

- FP90-1: Single-channel Loop Flow Transmitter with one open-collector output
- FP90-2: Single-channel Loop Flow Transmitter with 2 SPDT relays
- FP90-3: Dual-channel Loop Flow Transmitter with two open-collector outputs

## Calibrate Menu for FP90-1

Display (Factory settings show	vn)	Description
Flow Units: GPM	>	The first two characters set the Flow Rate units of measure. They have no effect on calculations. They may be any alpha or numeric character, upper or lower case. The last character sets the Flow rate Timebase. Select S (seconds), M (minutes), H (hours) or D (days).
		This setting tells the transmitter how to convert the input frequency from the flow sensor into a flow
60	>	rate. The K-factor is unique to the sensor model and to the pipe size and schedule. Refer to data in the sensor manual for the correct value. Limits: 0.0001 to 99999. (The K-factor cannot be set to 0)
Total Units:		This setting identifies the Totalizer units. It has no effect on any calculation. It serves as a label only. Each character can be any alpha or numeric selection, upper or lower case.
Gallons	>	,,,,,,, _
Total K-Factor		This setting tells the transmitter how to convert the input frequency from the flow sensor into a
60	>	volumetric total. It also is used as the basis for the Open Collector pulse mode. The setting is usually the same as the Flow K-factor, or different by x10 or x100. Limits: 0.0001 to 99999. (The K-factor cannot be set to 0)
Loop Range: GPM		Select the minimum and maximum values for the 4-20 mA Current loop output. The FP90 will allow any values from 0.0000 to 99999.
000.00 → 100.00	>	
Output Mode:		Select the desired mode of operation for the Open Collector output. Options available are High Low
		volumetric Pulse, or Frequency. The signal may be disabled if not used.
Low	>	
Output Setpnt:		In Low or High Mode, the Open Collector output will be deactivated when the Flow rate reaches this
10.0 GPM	>	value. Be sure to modify this setting if you change the Flow Units.
10.0 GI MI		
Output Hys:		The Open Collector output will be deactivated at Setpoint ± Hysteresis, depending on High or Low
5.0 GPM	>	Setpoint selection. (See details on page 6.)
Output Volume:		In Pulse mode, the Open collector output will generate one pulse when this volume of flow passes the sensor. The measurement is based on the Total K-factor. The EP90 will allow any value from 0.0000 to
100.00 Gallons	>	99999.
Output PlsWdth:		any value from 0.1 seconds to 999.9 seconds.
0.1 Seconds	>	
Output Freq :		In Frequency mode, the Open Collector output will simulate the sensor frequency, divided by this
	1.	setting. The FP90 allows any value from +1 to +254.
	1>	
Last CAL:		Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.
6-16-09		

# Options Menu for FP90-1

Display (Factory settings shown)	Description
Contrast:	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. In general, select lower contrast if the display is in warmer ambient surroundings.
3 >	
Averaging:	OFF provides the most instantaneous output response to changes in flow. Options are 8 seconds, 20 seconds, 50 seconds or 120 seconds.
Off >	Longer averaging produces more stable display and output response.
Loop Adjust:	Adjust the minimum and maximum current output. The display value represents the precise current output.
4.00 mA >	Adjustment limits: • 3.80 mA < 4.00 mA > 5.00 mA
Loop Adjust:	<ul> <li>19.00 mA &lt; 20.00 mA &gt; 21.00 ma</li> <li>Use this setting to match the system output to any external device.</li> </ul>
20.00 mA >	
Output Active:	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 OFF at the setpoint.
Low >	
Test Loop:	Press UP and DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test the output loop.
Test Output:	Press UP and DOWN keys to manually toggle the Open Collector output state.
>	

# Calibrate Menu for FP90-2

Display (Factory settings show	n)	Description
Flow Units: GPM	>	The first two characters set the Flow Rate units of measure. They have no effect on calculations. They may be any alpha or numeric character, upper or lower case. The last character sets the Flow rate Timebase. Select S (seconds), M (minutes), H (hours) or D (days).
Flow K-Factor: 60.00	>	This setting tells the transmitter how to convert the input frequency from the flow sensor into a flow rate. The K-factor is unique to the sensor model and to the pipe size and schedule. Refer to data in the sensor manual for the correct value. Limits: 0.0001 to 99999. (The K-factor cannot be set to 0.)
Total Units: Gallons	>	This setting identifies the Totalizer units. It has no effect on any calculation. It serves as a label only. Each character can be any alpha or numeric selection, upper or lower case.
Total K-Factor 60	>	This setting tells the transmitter how to convert the input frequency from the flow sensor into a volumetric total. It also is used as the basis for the volumetric Pulse mode. The setting is usually the same as the Flow K-factor, or different by x10 or x100. Limits: 0.0001 to 99999. (The K-factor cannot be set to 0.)
Loop Range: GPM 000.00 → 100.00	>	Select the minimum and maximum values for the 4-20 mA Current loop output. The FP90 will allow any values from 0.0000 to 99999.
Relay1 Mode: Low	>	Select the desired mode of operation for relay 1. Options available are High, Low or volumetric Pulse. The signal may be disabled if not in use.
Relay1 Setpnt: 10.0 GPM	>	In Low or High Mode, the relay output will be activated when the Flow rate reaches this value. Be sure to modify this setting if you change the Flow Units.
Relay1 Hys: 5.0 GPM	>	Relay 1 will be deactivated at Setpoint ± Hysteresis, depending on High or Low Setpoint selection. (See details on page 6.)
Relay1 Volume: 100.00 Gallons	>	In Pulse mode, the relay output will generate one pulse when this volume of flow passes the sensor. (The measurement is based on the Total K-factor.) The FP90 will allow any value from 0.0000 to 99999.
Relay1 PlsWdth: 0.1 Seconds	>	In Pulse mode, this setting defines the duration of the relay pulse. The FP90 allows any value from 0.1 seconds to 999.9 seconds.
Last CAL: 6-16-09		Use this "note pad" to record important dates, such as annual recertification or scheduled maintenance.

All Relay settings repeat for Relay 2.

# **Options Menu for FP90-2**

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.
Flow Decimal:	Set the decimal to the best resolution for your application. The display will automatically scale up to this restriction. Select *****., ****.**, ***.***, or *.**** or *.****
Total Decimal:	Set the totalizer decimal to the best resolution for your application. Select ********., *******.*, or ******.**
Averaging: Off >	OFF provides the quickest output response to changes in flow. Options are 8 seconds, 20 seconds, 50 seconds or 120 seconds. Longer averaging produces more stable display and output response.
Total Reset: Lock Off >	Locked: The Key Code must be entered to reset the resettable totalizer. Unlocked: No key code required to reset the resettable totalizer.
Loop Adjust: 4.00 mA > Loop Adjust:	Adjust the minimum and maximum current output. The display value represents the precise current output. Adjustment limits: • 3.80 mA < 4.00 mA > 5.00 mA • 19.00 mA < 20.00 mA > 21.00 ma Use this setting to match the system output to any external device.
20.00 mA >	
Test Loop:	Press UP and DOWN keys to manually order any output current value from 3.6 mA to 21.00 mA to test the output loop.
Test Relay 1:	Press UP and DOWN keys to manually toggle the state of relay 1. Repeat for relay 2.

# Calibrate Menu for FP90-3

Display (Factory settings show	vn)	Description
Flow1 Units: GPM	>	The first two characters set the Flow Rate units of measure. They have no effect on calculations. They may be any alpha or numeric character, upper or lower case. The last character sets the Flow rate Timebase. Select S (seconds, M (minutes, H (hours) or D (days)
-		
Flow1 K-Factor:		This setting tells the transmitter how to convert the input frequency from the flow sensor into a flow rate. The K-factor is unique to the sensor model and to the pipe size and schedule. Refer to data in the sensor manual for the correct value. Limits: 0.0001 to 99090 (The K-factor cannot be set to 0)
60.000	>	manual for the confect value. Limits. 0.000 to 93939. (The relactor cannot be set to 0)
Total1 Units:		This setting identifies the Totalizer units. It has no effect on any calculation. It serves as a label only. Each character can be any alpha or numerical selection, upper or lower case.
Gallons	>	
Total1 K-Factor		This setting tells the transmitter how to convert the flow sensor signal into a volumetric total. It also is used as the basis for the Open Collector pulse mode. The setting is usually the same as the Flow K-factor, or different by x10 or x100.
60.00	>	Limits: 0.0001 to 99999. (The K-factor cannot be set to 0)
Loop1 Source:		Select the input source to be associated with Loop output #1: Flow sensor #1, Flow sensor #2, or Delta Flow
Flow1	>	
Loop1 Range: GPM		Select the minimum and maximum values for the Current loop output #1.
000.00 > 100.00	>	
Output1 Source:		Select the input source for Open Collector output #1: Flow sensor #1, Flow sensor #2, or Delta Flow
Flow1	>	
Output1 Mode:		Select the mode of operation for Open Collector output #1.
low	>	Options available are Hign, Low, Pulse (volumetric), or Frequency (based on rate). The signal may be disabled if not in use.
Output1 Setpoint		In Low or High Mode, this Open Collector output will be activated when the Flow rate reaches this value.
10.0 GPM	>	Be sure to modify this setting if you change the Flow Units.
	-	
Output1 Hys:		The Open Collector output will be deactivated at Setpoint ± Hysteresis, depending on High or Low
5.0 GPM	>	Selpoint selection.
Output1 Volume:		In Pulse mode, Open collector output #1 will generate one pulse when this volume of flow passes the
100.00 Gallons	>	The FP90 will allow any value from 0.0000 to 99999.
Output1 Pulsewdth:		In Pulse mode, this setting defines the duration of Open Collector output pulse #1. The FP90 allows any
0.1 Seconds	>	value from 0.1 seconds to 999.9 seconds.
	/	1
Output1 Freq.:		In Frequency mode, Open Collector output #1 will simulate the sensor frequency, divided by this value.
Divide by 1	~	The FP90 allows any value from ÷1 to ÷254.
	/	
Last Cal		Use this "notepad" to record important dates, such as annual recertification or scheduled maintenance.
6 16 00		
0-10-09	>	

All functions labeled "1" will repeat for channel 2.

# Options Menu for FP90-3

Display (Factory settings shown)	Description
Contrast:	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.
3 >	
Flow1 Decimal	Set the decimal to the best resolution for your application. The display will automatically scale up to this restriction. Select *****., ****.**, **.*** or *.****
<u>****</u> >	
Total1 Decimal	Set the totalizer decimal to the best resolution for your application. Select ********., *******.*, or ******.**
******	
<b></b>	
Averaging 1	OFF provides the quickest output response to changes in flow. Options are 8 seconds, 20 seconds, 50 seconds or 120 seconds. Longer averaging produces more stable display and output response.
Off >	
Total Reset	Lock Off : No key code required to reset the resettable totalizer. Lock On : The Key Code must be entered to reset the resettable totalizer.
Lock Off >	
Loop1 Adjust:	Adjust the minimum and maximum current output. The display value represents the precise current output.
4 00 mA >	Adjustment limits:
	<ul> <li>3.80 mA &lt; 4.00 mA &gt; 5.00 mA</li> <li>19.00 mA &lt; 20.00 mA &gt; 21.00 ma</li> </ul>
Loop1 Adjust:	Use this setting to match the system output to any external device.
20.00 mA >	
	Active HIGH: This setting is used to turn a device (pump, valve) ON at the setpoint.
Output1 Active:	Active LOW: This setting is used to turn a device OFF at the setpoint.
Low >	
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 #1.
>	
	Press UP or DOWN keys to manually toggle the state of open collector output #1.
Tast Output 1	

Test Output 1:	
>	

All functions labeled "1" will repeat for channel 2.

# FP90 Series Flow Transmitter Troubleshooting

Display Condition	Possible Causes	Suggested Solutions	
""	Flow rate exceeds display capability	<ul><li>Increase Flow units timebase</li><li>Move flow decimal one place to the right</li></ul>	
"Pulse Overrun Output1"	Relay or Open Collector pulse rate	<ul> <li>Increase Output Volume setting</li> </ul>	
"Pulse Overrun Output2"	exceeds 300 pulses per minute.	<ul> <li>Decrease pulse width setting</li> </ul>	
	Pulse width set too wide.	<ul> <li>Reduce system flow rate</li> </ul>	
	-		
"Makes more the mean them o"			
"Value must be more than 0"	K-factors cannot be set to U.	Enter K-factor between 0.0001 to 99999	
Relay or open Collector output	Hysteresis value too large	Reset the hysteresis value	
is always activated			

Notes:



# 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 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, EXPRESS 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.

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 <u>WARRANTY</u> 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.

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- 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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