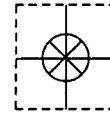
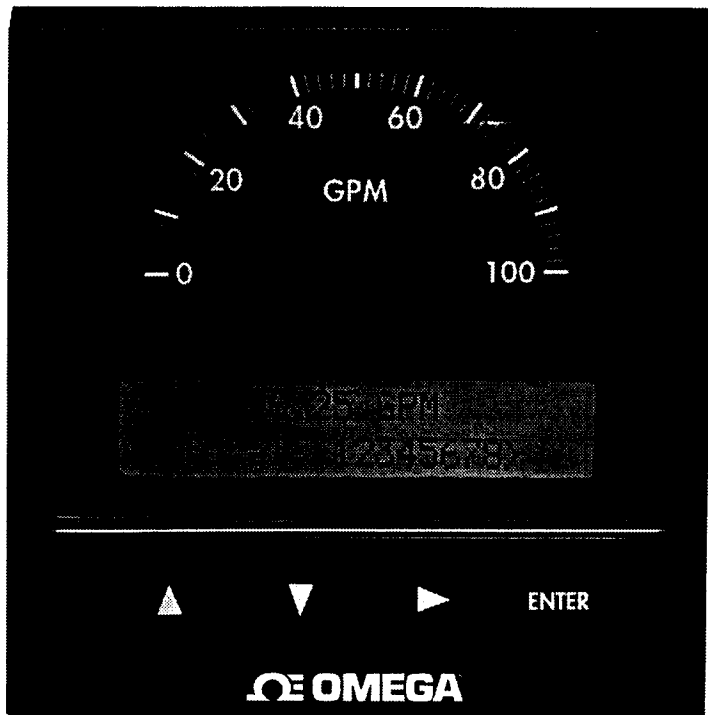


CE



User's Guide



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FPM-5500 Flow Monitor



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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 FPM-5500 Flow Monitor Instructions



CAUTION!

- Refer to this instruction manual for more details.
- Remove power to unit before wiring input and output connections.
- Follow instructions carefully to avoid personal injury.

Contents

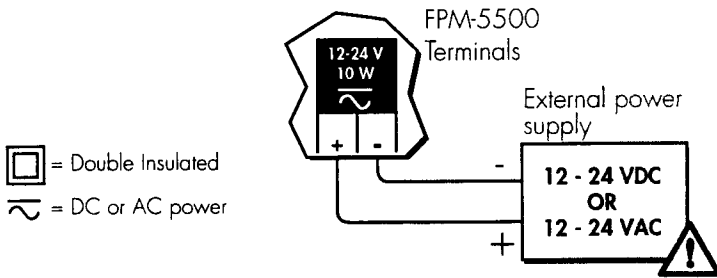
1. Power Connections
2. Compatible Sensor Wiring
3. Sensor Pulse Output Connections
4. Auxiliary Pulse Output Connections
5. Totalizer Reset Connections
6. 4 - 20 mA Current Output Connections
7. Relay Connections
8. Output Functions
9. Menu Functions
10. Parts and Accessories
11. Specifications
12. Quick Reference Menu Parameters
13. Troubleshooting
14. Maintenance

1. Power Connections



CAUTION!

Never connect 115 VAC or 230 VAC to rear power terminals. High voltage AC will damage instrument and void warranty.

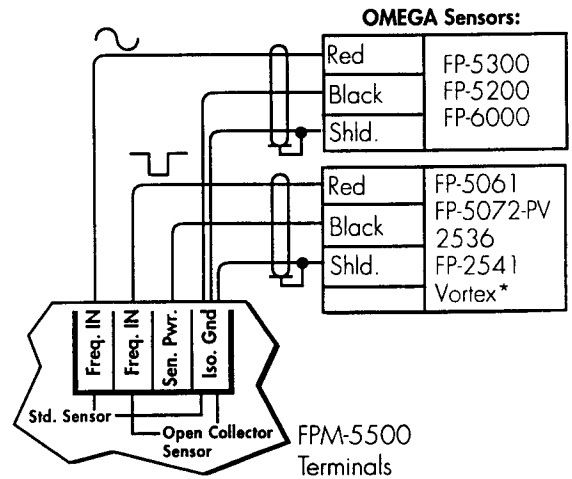


- = Double Insulated
- ~ = DC or AC power

Technical Notes:

- To reduce the possibility of noise interference, isolate AC power lines from signal lines.
- Maximum 4-20 mA loop impedance (sec. 6) is affected by the supply voltage.

2. Compatible Sensor Wiring

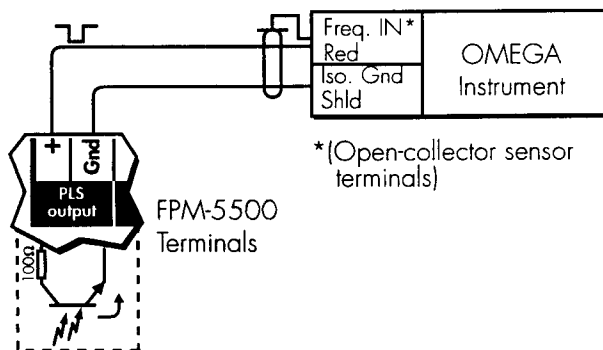


Technical Notes:

- To reduce the possibility of noise interference, route sensor cable away from AC power lines.
- *Vortex sensor or system frequency output

3. Sensor Pulse Output Connections (sec. 8.1)

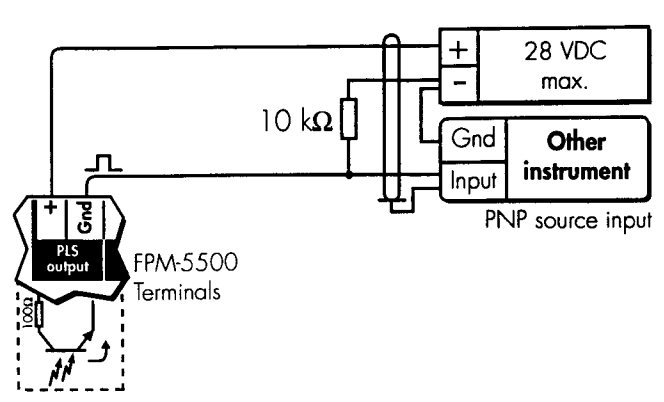
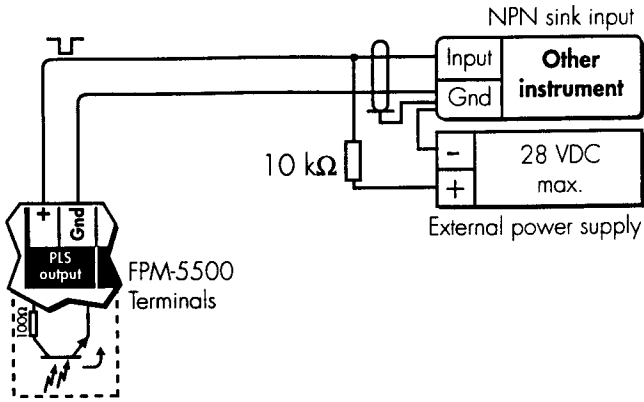
3.1 OMEGA instrument **with** internal open-collector excitation voltage and pull-up resistor.



Technical Notes:

- Use 2-conductor shielded twisted-pair cable for output lines up to 30 m (100 ft.) max.
- Pull-up resistor NOT REQUIRED when connected to OMEGA instruments.
- Use the 2536 input card setting for OMEGA FPM-9010A controllers.

3.2 Pulse output connection options for instruments **without** internal open-collector excitation voltage and pull-up resistor shown below.



Technical Notes:

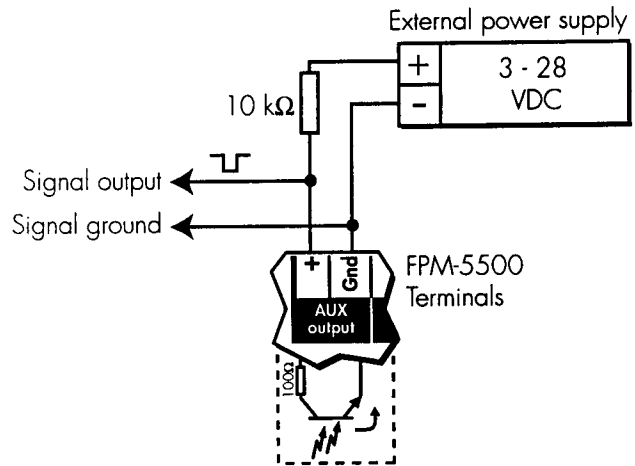
- Use 2-conductor shielded twisted-pair cable for output lines up to 30 m (100 ft.) max.

4. Auxiliary Pulse Output Connections

4.1 Pulse mode (sec. 8.2) - External device control

The auxiliary output can be configured for either TTL, CMOS, or open-collector compatible inputs using the proper pull-up resistor and an external power supply. Refer to recommendations below:

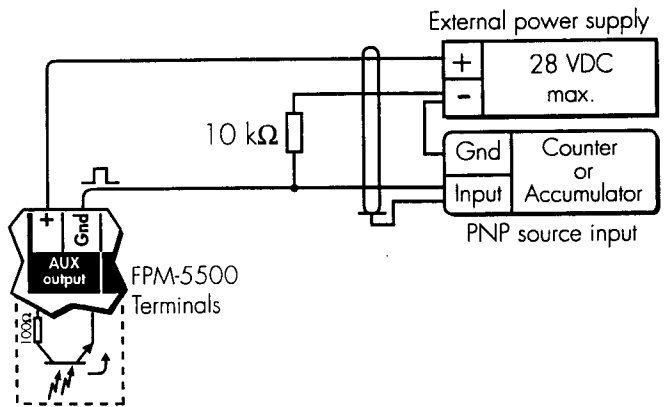
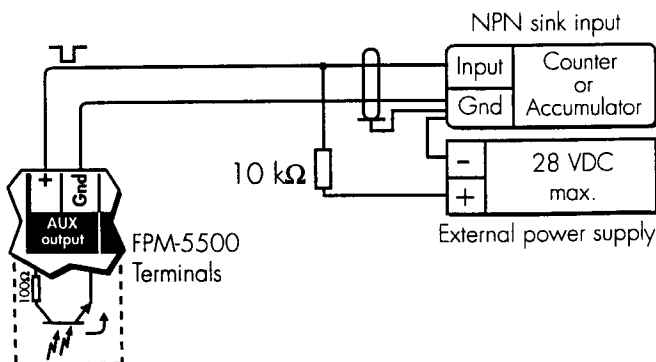
- **TTL inputs:** An external 5 VDC power supply and 10 kΩ pull-up resistor is recommended.
- **CMOS inputs:** An external 3 to 15 VDC power supply and 10 kΩ pull-up resistor is recommended.
- **12 VDC Open-collector inputs:** An external 12 VDC power supply and 10 kΩ pull-up resistor is recommended.
- **24 VDC Open-collector inputs:** An external 24 VDC power supply and 10 kΩ pull-up resistor is recommended.



Technical Notes:

- Open-collector transistor, optically isolated, 5 mA max. sink, 28 VDC max. pull-up voltage.
- Programmable pulse width, 0.10 - 999. seconds (sec. 9.2 M)
- Selectable Active high or active low pulse logic (sec. 9.3 J).
- Use 2-conductor **shielded twisted pair** cable for AUX output lines to 30 m (100 ft) max.

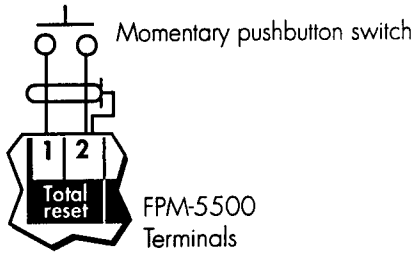
4.2 Totalizer pulse mode (sec. 8.2) - External counter or accumulator inputs **without** internal open-collector excitation voltage and pull-up resistor.



Technical Notes:

- Use 2-conductor **shielded twisted pair** cable for AUX output lines up to 30 m (100 ft) max.

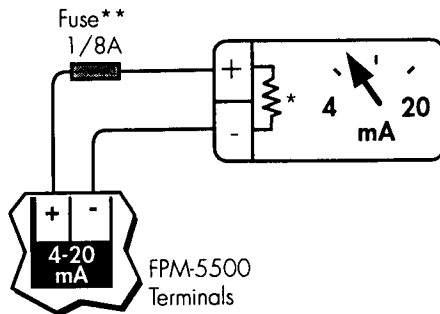
5. Totalizer Reset Connections (sec. 8.3)



Technical Notes:

- Use 2-conductor **shielded twisted pair** cable for reset lines up to 30 m (100 ft) max. External reset switch overrides software security feature (section 9.3 I).
- To reduce the possibility of AC noise interference, isolate AC power lines from reset lines.

6. 4-20 mA Current Output Connections (sec. 8.4)



Technical Notes:

- ** 1/8A fuse recommended (customer supplied)
- * 4-20 mA output is **internally powered** (non-isolated), maximum loop impedance 350 Ω with a 12 V instrument supply voltage, 950 Ω with a 24 V instrument supply voltage.

To isolate output and prevent ground loop problems:

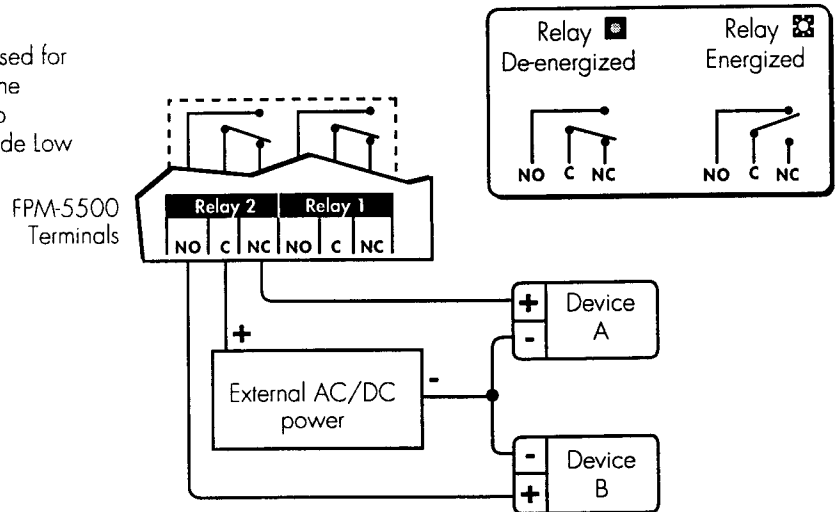
1. Use monitor device with isolated inputs, or
2. Use separate DC supply for FPM-5500 and monitor device, or
3. Power FPM-5500 with 12 - 24 VAC step down transformer

7. Relay Connections

Two internal relay contact sets (COM, NO, and NC) may be used for external device control. Front panel LED annunciators indicate the activation status of each relay. Each relay can control up to two devices simultaneously, as shown. Relay operation modes include Low alarm, High alarm, Pulse, and Totalizer (sec. 8.5).

Common device connections include:

- Pulse mode - metering pump control
- Pulse mode - solenoid valve control
- Low or High mode - warning lamps
- Low or High mode - bells or sirens
- Low or High mode - external heavy-duty relay



Wiring Example Right

Device A **IS** powered when relay 2 is de-energized (front panel LED "off"). Power is discontinued when the relay 2 setpoint is reached (front panel LED "on"). Device B **IS NOT** powered when the relay 2 is de-energized. Power is applied after the relay 2 setpoint is reached.

Technical Notes:

- Maximum relay contact ratings: 5 A @ 30 VDC, 5 A @ 125 VAC, or 3 A @ 250 VAC
- An external heavy-duty relay must be used for devices with surge currents or operating currents that exceed the above specifications.

8. Output Functions

This section gives a detailed description of all FPM-5500 output functions.

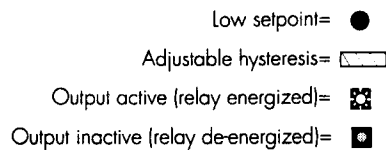
8.1 Sensor pulse output (sec. 3): This output emits an open-collector frequency equal to the sensor input. The output connects directly to a second OMEGA instrument for expanded process control with a single sensor input (sec. 3.1). The output is an open-collector type that requires an external pull up resistor and power supply for other instrument inputs (sec. 3.2).

8.2 Auxiliary pulse output (sec. 4): The auxiliary output can be configured as Low alarm, High alarm, Pulse or Totalizer output. Output logic can be selected for either active low (factory default) or active high operation (sec. 9.3 J). The auxiliary output is an open-collector type that requires an external pull-up resistor and power supply to operate. Refer to diagrams A - C below for operation details.

A. LOW alarm mode

The output is active (relay energized) when the flow drops below the setpoint, and is inactive (relay de-energized) when the flow rises above the setpoint plus hysteresis (sec. 9.2 F-G, 9.2 J-K).

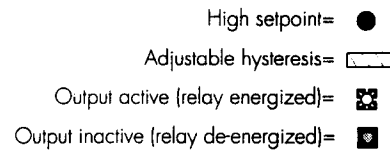
- Auxiliary output: ideal for external device inputs (sec. 4)
- Relay outputs: ideal for external warning lamps, sirens, etc. (sec. 7)



B. HIGH alarm mode

The output is active (relay energized) when the flow rises above the setpoint and is inactive (relay de-energized) when the flow falls below the setpoint plus hysteresis (sec. 9.2 F-G, 9.2 J-K).

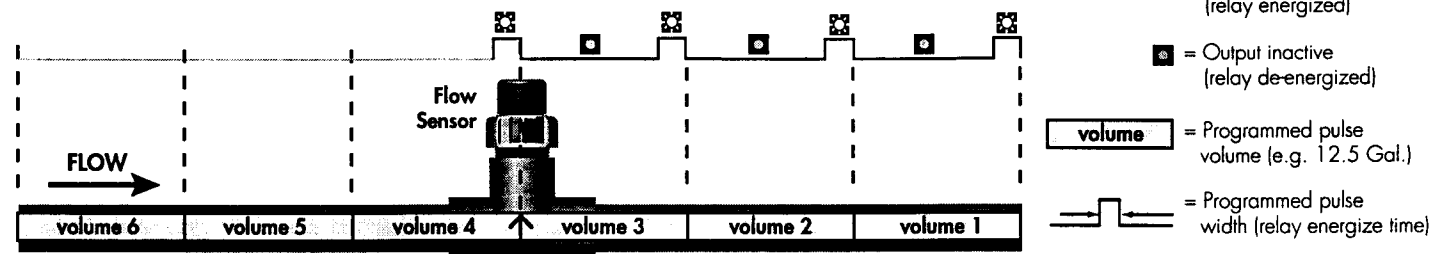
- Auxiliary output: ideal for external device inputs (sec. 4)
- Relay outputs: ideal for external warning lamps, sirens, etc. (sec. 7)



C. PULSE mode

The output is active (relay energized) for the programmed pulse width each time the programmed pulse volume is measured by the flow sensor (sec 9.2 H-I, 9.2 L-M).

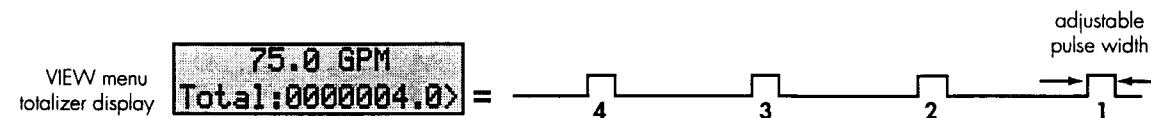
- Auxiliary output: ideal for external device control (sec. 4)
- Relay outputs: ideal for metering pump or solenoid valve control (sec. 7)



Totalizer function

The output emits an adjustable signal pulse width for each whole engineering unit measured by the flow sensor (also displayed on totalizer). To enable the totalizer function, the operator must set the relay or auxiliary pulse volume setpoint to 1.0000 (sec. 9.2 H, 9.2 I).

- Totalizer function: ideal for external counter or accumulator use (sec 4.2)



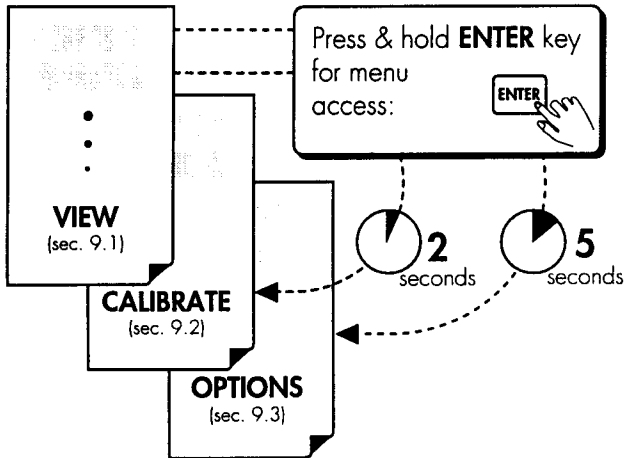
8.3 Totalizer reset (sec. 5): This feature allows the operator to reset the totalizer with a dry switch contact closure at any time. The external reset switch overrides software security feature (sec. 5).

8.4 4-20 mA output (sec. 6): The 4-20 mA output is internally powered by the instrument. 4 mA and 20 mA setpoints are fully adjustable within the programmed flow range (sec. 11 B). The output can also be reverse spanned.

8.5 Relay 1 and 2 outputs (sec 7): Relay outputs 1 and 2 can be independently configured as Low alarm, High alarm, Pulse or Totalizer output. Refer to diagrams A - C above for operation details.

9. Menu Functions

To access either CALIBRATE or OPTIONS menus, press and hold the ENTER key as illustrated below:



Menus:

- **VIEW menu (sec. 9.1):** The VIEW menu is displayed during standard operation. The operator can navigate freely through the menu by pressing either UP or DOWN arrow keys. The VIEW menu also offers a resettable totalizer feature that allows the operator to reset the displayed total at the press of a button.
- **CALIBRATE Menu (sec. 9.2):** The CALIBRATE menu contains all critical display setup and output parameters. A simple security code feature prevents unauthorized tampering. The operator is required to enter a simple access code for menu access. The same code also unlocks OPTIONS menus.
- **OPTIONS Menu (sec. 9.3):** The OPTIONS menu contains setup and display features that are seldom accessed for minor display or output adjustments.

9.1 VIEW Menu

1 Choose:	2 Change:	3 Save:
<p>HJ ▲</p> <p>A. 0.0 GPM Total: 000000.0 Flow & resettable total</p> <p>▲ ▼</p> <p>B. Gallons Total: 000000.0 Permanent total</p> <p>▲ ▼</p> <p>C. Loop Output: 4.00 mA Loop output</p> <p>▲ ▼</p> <p>D. Min→Max: GPM 0.000 → 100.00 Range</p> <p>▲ ▼</p> <p>E. Relay 1: High 10.000 GPM Relay 1</p> <p>▲ ▼</p> <p>F. Relay 2: Low 90.000 GPM Relay 2</p> <p>▲ ▼</p> <p>G. Aux Out: Pulse 1.0000 Gallons Aux output</p> <p>▲ ▼</p> <p>H. Last CAL: 01-01-98 Last calibration</p> <p>▲ ▼ AT</p>	<p>OPTIONS = (sec. 9.3)</p> <p>A. Reset Total? 1234567.8</p> <p>To reset total press: </p> <p>B. Reset Total? 000000.0</p> <p>To exit without changes: quick press</p> <p>OR</p>	<p>OPTIONS = (sec. 9.3)</p> <p>A. Reset Total? Key Code: ----</p> <p>Press keys in sequence, (display shows: XXXXX)</p> <p>B. Reset Total? 1234567.8</p> <p>To reset total press: </p> <p>C. Reset Total? 000000.0</p>

Menu Displays A - H:

(Factory default displays shown in menu column 1)

- Flowrate and resettable total display: can be reset by the front panel keypad or by remote reset switch (sec. 5). A simple access code feature prevents accidental total reset, when enabled (sec. 9.3 I). External reset switch inputs override security feature, when enabled.
- Permanent total display: records volumetric flow total for the life of the product and is non-resettable.
- Loop output display: shows the current output level at the rear terminals.
- Flow Range display: shows the programmed min and max meter range (sec. 9.2 B)
- Relay 1 display: this display shows the programmed operation mode and setpoint for relay 1 (sec. 9.2 F-I)
- Relay 2 display: this display shows the programmed operation mode and setpoint for relay 2 (sec. 9.2 F-I).
- Aux output display: this display shows the programmed operation mode and setpoint for the auxiliary output (sec. 9.2 J-M).
- Last calibration: this display shows a user defined setup date for maintenance records. This feature is not an internal timer or calendar.

9.2 CALIBRATE Menu

CALIBRATE: ---- Press keys in sequence **▲▲▲▼** to enter menu,
Enter Key Code **XXXX** will appear during code entry.

1 Choose:	2 Change:	3 Save:
A. Flow Units: GPM > ▶ Flow units	Flow Units: GPM Unit + timebase: h,m,s,d	Flow Units: mL/m ▶
B. Min→Max: GPM 0.000 →100.00 > ▶ Flow range	Min→Max: GPM 00.000 →100.00 Meter Min→Max	Min→Max: GPM 00.000 →500.00 ▶
C. Flow K-Factor: 60.000 > ▶ Flow K-Factor	Flow K-Factor: 60.000 K-Factor	Flow K-Factor: 32.480 ▶
D. Total Units: Gallons > ▶ Total units	Total Units: Gallons - Display label only -	Total Units: Gal x 10 ▶
E. Total K-Factor: 60.000 > ▶ Total K-Factor	Total K-Factor: 60.000 K-Factor	Total K-Factor: 324.80 ▶
Relay Low or High Mode Selected		
F. Relay 1: Low 10.000 GPM > ▶ Relay	Relay 1: Low 10.000 GPM -Mode & setpoint-	Relay 1: High 100.00 GPM ▶
G. Relay 1 Hys: 2.0000 GPM > ▶ Relay	Relay 1 Hys: 2.0000 GPM Hysteresis setting	Relay 1 Hys: 1.5000 GPM ▶
Relay Pulse Mode Selected, step F		
H. Relay 1: Pulse 10.000 Gallons > ▶ Relay	Relay 1: Pulse 10.000 Gallons -Mode & setpoint-	Relay 1: Pulse 12.500 Gallons ▶
I. Relay1 PlsWidth: 10.0 Seconds > ▶ Relay	Relay1 PlsWidth: 10.0 Seconds Pulse width	Relay1 PlsWidth: 12.5 Seconds ▶
Aux Output Low or High Mode Selected		
J. Aux Out: Low 1.0000 GPM > ▶ Aux output	Aux Out: Low 1.0000 GPM -Mode & setpoint-	Aux Out: Low 10.500 GPM ▶
K. Aux Out Hys: 0.0000 GPM > ▶ Aux output	Aux Out Hys: 0.0000 GPM Hysteresis	Aux Out Hys: 1.5000 GPM ▶
Aux Output Pulse mode selected, step J		
L. Aux Out: Pulse 1.0000 Gallons > ▶ Aux output	Aux Out: Pulse 1.0000 Gallons -Mode & setpoint-	Aux Out: Pulse 125.00 Gallons ▶
M. AuxOut PlsWidth: 0.10 Seconds > ▶ Aux output	AuxOut PlsWidth: 0.10 Seconds Pulse width	AuxOut PlsWidth: 0.25 Seconds ▶
N. Last CAL: 01-01-98 > ▶ Last calibration	Last CAL: 01-01-98 Setup date	Last CAL: 02-05-98 ▶
To return to VIEWV menu: ▲▼ quick press	To restore original value: ▲▼ quick press	

Menu Settings A - N:

(Factory default displays shown in menu column 1)

A. Sets flow units label (gpm) and timebase (gpm).
Flow units label: Aa - Zz, 0 - 9, /
Timebase options: h=hours, m=minutes, s=seconds,
d=days (timebase entry affects flow rate display and
4 to 20 mA output)

B. Sets Min→Max meter and dial range, 00.000 to
99999. (does not affect 4 to 20 mA output)

C. Sets flow K-Factor: 0.0001 to 99999. (see technical
notes below)

D. Sets 8-digit totalizer units label: Aa - Zz, 0 - 9, /
(does not affect totalizer display or outputs)

E. Sets totalizer K-Factor: 0.0001 to 99999. (see
technical notes below)

Menu items F - I repeat for relay 2 setup.

F. Sets relay operation mode Low or High, and flow rate
setpoint, 0.0000 - 99999. (sec. 8.5)

G. Sets relay hysteresis, 0.0000 - 99999. (sec. 8.5)
(Set to zero to disable hysteresis feature)

H. Sets relay pulse volume setpoint, 0.0001 - 99999.
(sec. 8.5). Set to 1.0000 to enable totalizer
function (sec. 8.5).

I. Sets relay pulse width, 0.10 - 999. seconds
(sec. 8.5)

J. Sets auxiliary output mode Low or High, and flow rate
setpoint, 0.0000 - 99999. (sec. 8.2).

K. Sets auxiliary output hysteresis, 0.0000 - 99999.
(Set to zero to disable hysteresis feature)

L. Sets auxiliary output pulse volume setpoint,
0.0001 - 99999. (sec. 8.2). Set to 1.0000 (factory
default) to enable totalizer function (sec. 8.2).

M. Sets auxiliary output pulse width, 0.10 - 999. seconds

N. Sets user defined setup date for maintenance records.
This feature is not an internal timer or calendar

Technical Notes:

The flow and total K-Factors are independent of each other.
The K-Factor settings represent the number of pulses
generated by the OMEGA flow sensor for each
engineering unit of fluid measured (published in flow sensor
manual).

ENTER
"SAVING"
briefly
displays

9.3 OPTIONS Menu

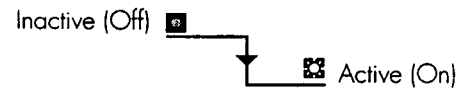
OPTIONS: ----		Press keys in sequence to enter menu,	
Enter Key Code		XXXXX will appear during code entry.	
1 Choose:	2 Change:	3 Save:	
A. Contrast: 3 >	Contrast: 1 2 3 4 5	Contrast: 1 2 3 4 5	 "SAVING" briefly displays
Display contrast	Low - - - - High		
B. Display Decimal: XXXX.X >	Display Decimal: XXXX.X	Display Decimal: XXXX.X	
Flow display	Decimal		
C. Total Decimal: XXXXXX.X >	Total Decimal: XXXXXX.X	Total Decimal: XXXXXX.X	
Total display	Total decimal		
D. Display Average: Off >	Display Average: Off Low High	Display Average: Off Low High	
Display averaging	0s 4s 8s		
E. Set 4 mA: 0.0000 GPM >	Set 4 mA: 0.0000 GPM	Set 4 mA: 20.000 GPM	
Loop output	4 mA setpoint		
F. Set 20 mA: 100.00 GPM >	Set 20 mA: 100.00 GPM	Set 20 mA: 480.00 GPM	
Loop output	20 mA setpoint		
G. 4 mA Adjust: 4.00 mA >	4 mA Adjust: 4.00 mA	4 mA Adjust: 4.02 mA	
Loop output	4 mA adjust		
H. 20 mA Adjust: 20.00 mA >	20 mA Adjust: 20.00 mA	20 mA Adjust: 19.98 mA	
Loop output	20 mA adjust		
I. Total Reset Lock: Off >	Total Reset Lock: Off On	Total Reset Lock: Off On	
Totalizer reset	VIEW menu=	VIEW menu=	
J. Aux Out active: Low >	Aux Out active: Low High	Aux Out active: Low High	
Auxiliary out logic	Active Low or High		
To return to VIEW menu: quick press	To restore original value: quick press		

Menu Settings A - J:

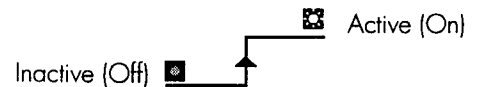
(Factory default displays shown in menu column 1)

- A. Selects LCD display contrast: 5 levels
- B. Selects flow display decimal: ***** to *****
- C. Selects totalizer display decimal: ***** to *****
- D. Selects LCD display averaging: Off = 0 seconds, Low = 4 seconds, High = 8 seconds (also effects 4 - 20 mA output)
- E. Sets 4 mA output setpoint. 4 mA and 20 mA setpoints are reversible.
- F. Sets 20 mA output setpoint. 20 mA and 4 mA setpoints are reversible.
- G. Sets 4 mA current output: 3.0 to 5.0 mA (overrides 4.00 mA factory calibration)
- H. Sets 20 mA current output: 19 to 21 mA (overrides 20.00 mA factory calibration)
- I. Selects totalizer reset options: Lock "Off" disables the VIEW menu access code feature; Lock "On" enables the feature (sec. 9.1 A). When enabled, the operator must enter an access code for totalizer reset privileges. The totalizer will be reset in either case if a contact closure is detected at rear reset terminals (sec. 5).
- J. Selects Auxiliary output logic:
 - Active Low logic (factory default): Output changes from high to low when active, see diagram below.
 - Active high logic: Output changes from low to high when active, see diagram below.

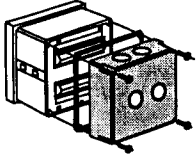
Active Low Logic (factory default)



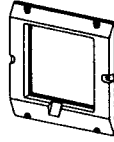
Active High Logic



10. Parts and Accessories



Splashproof rear cover
#3-5000.395



5 x 5 inch adapter plate
for OMEGA retrofit
#3-5000.399



Optional surface mount
bracket #3-5000.598

- Power supply, 115 VAC - 24 VAC, #3-5000.075
- Front snap-on bezel, #3-5000.525
- Assorted flow unit/multiplier decals, #3-FPM-5500.611
- FPM-5500 instruction sheet #M-2976

11. Specifications

General

Sensor compatibility: All OMEGA flow sensors
Accuracy: $\pm 0.5\%$ of reading
Input: Optically isolated

Enclosure:

- Rating: NEMA 4X/IP65 front
- Dimensions: 1/4 DIN, 96 x 96 x 88 mm (3.8 x 3.8 x 3.5 in.)
- Case materials: ABS plastic
- Keypad material: Sealed 4-key silicone rubber
- Weight: Approximately 500 g (18 oz.)

Display:

- Type: Microprocessor controlled air-core meter movement and backlit alphanumeric 2 x 16 LCD
- Update rate: Flow = 1s, totalizer = <200 ms
- Contrast: User selected, 5 levels
- Relay annunciators: 2 LEDs

Totalizers:

- 8-digit resettable with security option
- 8-digit non-resettable

Environmental

Operating temp.: -10 to 55 °C (14 to 131 °F),
50 °C (122 °F) max. with optional rear
cover

Storage temp.: -15 to 80 °C (5 to 176 °F)

Relative humidity: 0 to 95%, non-condensing

Altitude: 4000 m max.

Pollution degree: 2

Agency Approvals

- CSA, CE, UL listed
- Manufactured under ISO 9001

Electrical

Power:

- 12 to 24 VDC or 12 to 24 VAC, unregulated, 50-60 Hz,
10 W max.

Relay contacts (2 sets):

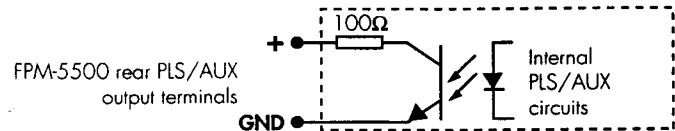
- Mechanical SPDT contacts
- Maximum voltage rating: 5 A @ 30 VDC, 5 A @ 125 VAC, or
3 A @ 250 VAC, (power factor = 1.0)
- Hysteresis: User adjustable

Current output:

- 4 to 20 mA, non-isolated, internally powered, fully adjustable and
reversible
- Update rate: < 200 ms
- Max loop impedance: 350 Ω max with a 12 V instrument supply
voltage, 950 Ω max with a 24 V instrument supply voltage
- Accuracy: $\pm 0.1\%$ of max range

Sensor (PLS) Auxiliary (AUX) pulse outputs:

- Open-collector transistor, optically isolated, 5 mA max. sink,
28 VDC max. pull-up voltage, programmable (AUX) pulse width



Totalizer reset:

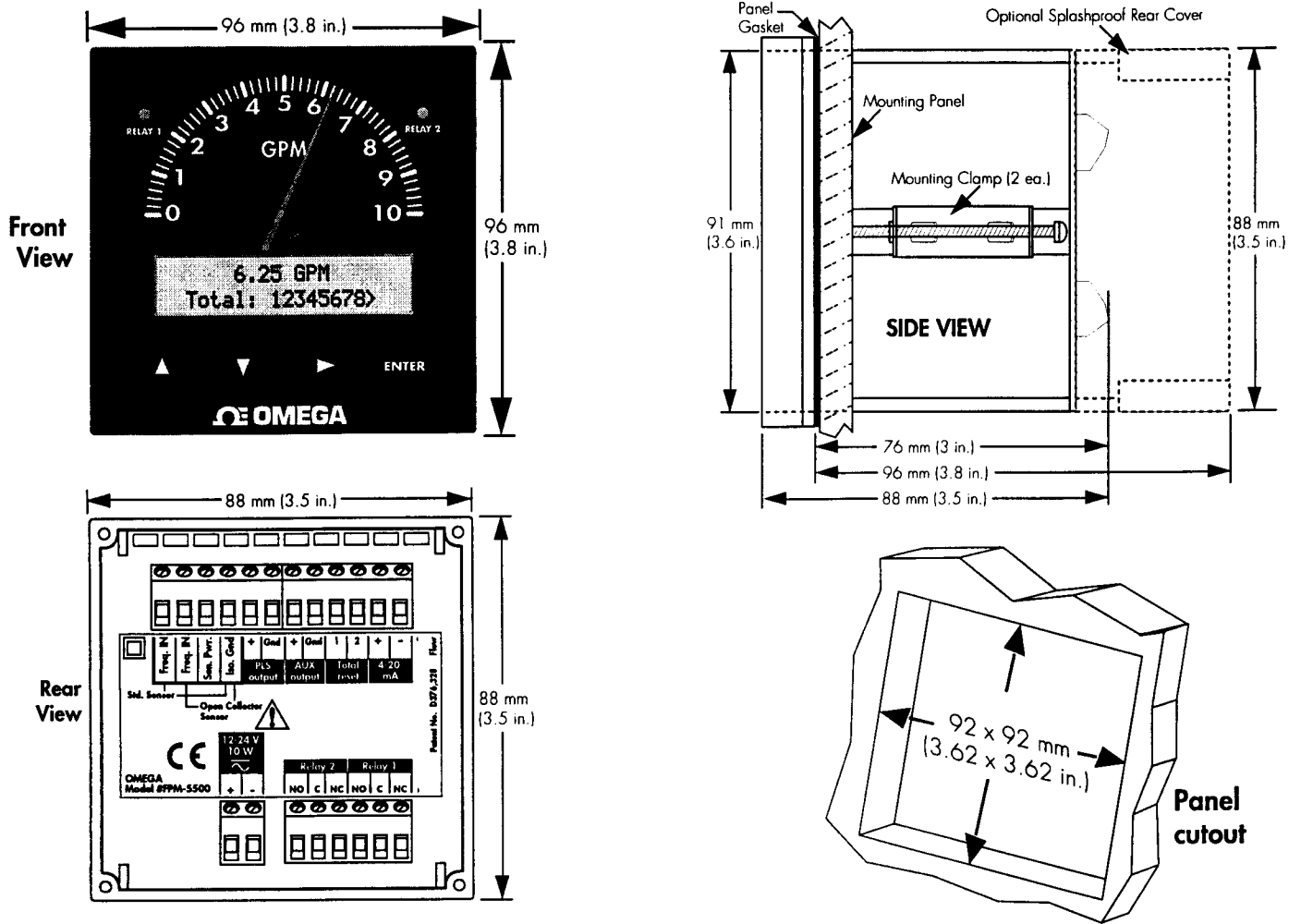
- Front keypad or external contact closure, 30 m (100 ft) max. cable
length
- External contact closure overrides security feature (sec. 5)

Noise immunity: EN50082-2

Noise emissions: EN55011

Safety: EN61010-1

Dimensions



12. Quick Reference Menu Parameters

VIEW Menu Setup Parameters (sec. 9.1)

Menu Parameters	Display Description	Range	Factory Default
A. 0.0 GPM Total: 0000000.0	<ul style="list-style-type: none"> Flow rate and units Resetable total 	00.000 - 99999. GPM 000000.00 - 99999999.	0000.0 0000000.0
B. Gallons *Total: 0000000.0	Permanent total	000000.00 - 99999999.	0000000.0
C. Loop Output: 4.00 mA	Current loop output	3 - 21 mA	n/a
D. Min→Max: GPM 0.000 → 100.00	Min → Max meter and dial range	00.000 - 99999.	0.000 - 100.00
E. Relay 1: High 10.000 GPM	<ul style="list-style-type: none"> Relay 1 mode Relay 1 setpoint 	Low or High, 0.0000 - 99999. Pulse, 0.0001 - 99999.	Low 10.000 GPM
F. Relay 2: Low 90.000 GPM	<ul style="list-style-type: none"> Relay 2 mode Relay 2 setpoint 	Low or High, 0.0000 - 99999. Pulse, 0.0001 - 99999.	High 90.000 GPM
G. Aux Out: Pulse 1.0000 Gallons	<ul style="list-style-type: none"> Aux output mode Aux output setpoint 	Low or High, 0.0000 - 99999. Pulse, 0.0001 - 99999.	Pulse 1.0000 Gallons
H. Last CAL: 01-01-98	Last calibration date	00 - 00 - 00 to 39 - 39 - 99	01 - 01 - 98

CALIBRATE Menu Setup Parameters (sec. 9.2)

Menu Parameters	Display Description	Range	Factory Default
A. Flow Units: GPM >	flow unit= digits 1-3 flow timebase= digits 4	Aa - Zz, 0 - 9, /, _; Mm, Ss, Hh, Dd	_GPM
B. Min→Max: GPM 0.000 →100.00 >	Min → max range	00.000 - 99999.	00.000 - 100.00 GPM
C. Flow K-Factor: 60.000 >	Flow K-Factor	0.0001 - 99999.	60.000
D. Total Units: Gallons >	Total units	Aa - Zz, 0 - 9, /, _ (8-digits max.)	_Gallons
E. Total K-Factor: 60.000 >	Total K-Factor	0.0001 - 99999.	60.000
F. Relay 1: Low 10.000 GPM >	<ul style="list-style-type: none"> Relay 1 mode Relay 1 setpoint 	Low or High 0.0000 - 99999.	Low 10.000 GPM
G. Relay 1 Hys: 2.0000 GPM >	<ul style="list-style-type: none"> Relay 1 Hysteresis Hysteresis volume 	0.0000 - 99999.	2.0000 GPM
H. Relay 1: Pulse 10.000 Gallons >	<ul style="list-style-type: none"> Relay 1 mode Relay 1 pulse volume 	Pulse 0.0001 - 99999.	10.000 Gallons
I. Relay1 PlsWidth: 10.0 Seconds >	Relay 1 pulse width	0.10 - 999. seconds	10.0 seconds
J. Aux Out: Low 1.0000 GPM >	<ul style="list-style-type: none"> Aux output mode Aux output setpoint 	Low or High 0.0000 - 99999.	Low 1.0000
K. Aux Out Hys: 0.0000 GPM >	Aux output hysteresis volume	0.0000 - 99999.	0.0000
L. Aux Out: Pulse 1.0000 Gallons >	<ul style="list-style-type: none"> Aux output mode Aux output setpoint 	Pulse 0.0001 - 99999.	1.000 Gallons
M. AuxOut PlsWidth: 0.10 Seconds >	Aux output pulse width	0.10 - 999. seconds	0.10 seconds
N. Last CAL: 01-01-98 >	Last calibration date	00 - 00 - 00 to 39 - 39 - 99	01 - 01 - 98

*_ = blank
display digit
option*

*_ = blank
display digit
option*

*Relay mode
and setpoint
displays repeat
for relay 2
setup*

OPTIONS Menu Setup Parameters (sec. 9.3)

Menu Parameters	Display Description	Range	Factory Default
A. Contrast: 3 >	Display contrast	0 to 5	3
B. Display Decimal: xxxx.x >	Flow decimal	**.* to *****.	*****.
C. Total Decimal: xxxxxxxx.x >	Totalizer decimal	*****.* to *****.*.	*****.*
D. Display Average: Off >	Display averaging	Off= 0 sec., Low= 4sec., High= 8 sec.	Off
E. Set 4 mA: 0.0000 GPM >	4 mA setpoint	Unlimited	0.0000 GPM

OPTIONS Menu Setup Parameters Continued...

F.	Set 20 mA: 100.00 GPM >	20 mA setpoint	Unlimited	100.00 GPM
G.	4 mA Adjust: 4.00 mA >	4 mA adjust	3.0 to 5.0 mA	4.00 mA
H.	20 mA Adjust: 20.00 mA >	20 mA adjust	19 to 21 mA	20.00 mA
I.	Total Reset Lock: Off >	VIEW menu total reset access code	On or Off	Off
J.	Aux Out active: Low >	Auxiliary (AUX) output pulse logic	Active Low or Active High	Low

13. Troubleshooting

Display	Problem	Solution
-----	Display timebase too large	Change flow timebase (S=Seconds, M=Minutes, H=Hours, D=Days) in CALIBRATE menu to a smaller value (e.g. GPD to GPM)
Check settings for Relay 1	Relay 1 pulse width too large for frequency input or pulse volume too small	Reduce Relay 1 pulse width setting (sec. 9.2 I) or increase pulse volume setting (sec. 9.2 H)
Check settings for Relay 2	Relay 2 pulse width too large for frequency input or pulse volume too small	Reduce Relay 2 pulse width setting (sec. 9.2 I) or increase pulse volume setting (sec. 9.2 H)
Check settings for AUX output	Auxiliary output pulse width too large for frequency input or pulse volume too small	Reduce auxiliary output pulse width setting (sec. 9.2 M) or increase pulse volume setting (sec. 9.2 I).
Must be between 0.0001 - 99999	Relay 1, Relay 2, or Auxiliary output (AUX) pulse volume setpoint must be within 0.0001 - 99999.	Enter volumetric setpoint within 0.0001 - 99999. engineering units (sec. 9.2 H or 9.2 I)
Must be between 0.10 - 999	Relay 1, Relay 2, or Auxiliary output (AUX) pulse width must be within 0.10 - 999 seconds	Enter pulse width within 0.10 - 999 seconds (sec. 9.2 I or 9.2 M)
Flow K-Factor can not be zero	Flow display K-Factor cannot be zero	Enter K-Factor greater than zero (sec. 9.2 C)
Total K-Factor can not be zero	Totalizer K-Factor cannot be zero	Enter K-Factor greater than zero (sec. 9.2 E)
SETUP READ ERROR Press any Key	Power fault occurred while saving setup menu entry	Press any key to reload factory defaults then reprogram flow system setup parameters. Note: totalizer displays remain undistrubed and will resume after instrument reset.

14. Maintenance

Clean the instrument case and front panel with a soft cloth and mild liquid soap solution.

Notes:



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **25 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **two (2) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED 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 **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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