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TEL: +49 7056 9398-0 FAX: +49 7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom:
ISO 9002 Certified
One Omega Drive
River Bend Technology Centre
Northbank, Irlam Manchester M44 5BD United Kingdom
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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.

This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as the guide contains important information relating to safety and EMC.

⚠ This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as the guide contains important information relating to safety and EMC.

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PREFACE

Manual Objectives

This manual shows you how to set up and use the Programmable Digital Meter.

Standard Procedures:

* Checking voltage jumpers, or changing voltage power
* Mounting the panel
* Selecting the input type
* Selecting a decimal point position
* Scaling with known loads (on-line calibration)
* Scaling without known loads
* Enabling/disabling the front-panel tare
* Displaying the filtered/unfiltered input signal
* Selecting a display color
* Setting the setpoint's active band
* Selecting a latched or unlatched operation
* Setting setpoint deadbands
* Enabling/disabling setpoint changes
* Enabling/disabling the RESET button in the Run Mode

Optional Procedures:

* Setting input resolution
* Enabling/disabling analog output
* Selecting analog output as current or voltage
* Selecting analog output or proportional control
* Selecting proportional band
* Using manual reset (offsetting setpoint errors)
* Scaling analog output



For first-time users: Refer to the QuickStart Manual for basic operation and set-up instructions.

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Meter description and features	2	About the Meter
Main board power jumpers; panel mounting, sensor input, main power and analog and relay output	3	Getting Started
Input type; decimal point position; reading scale & offset; reading configuration; display color; setpoint configuration; setpoint deadbands; output configuration (analog output); proportional band; manual reset; analog output scaling; lock out configuration; display brightness	4	Configuring the Meter
Display messages	5	Display Messages
Meter menu/sub-menu messages	6	Menu Configuration
Setpoint configuration messages	7	Setpoint Configuration Displays
Specifications	8	Specifications
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NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by three labels:

- **NOTE**
- **WARNING**
- **CAUTION**
- **IMPORTANT**



NOTE: provides you with information that is important to successfully setup and use the Programmable Digital Meter.



CAUTION or WARNING: tells you about the risk of electric shock.



CAUTION, WARNING or IMPORTANT: tells you of circumstances or practices that can effect the meter's functionality and must refer to accompanying documents.



TIP: Provides you helpful hints.

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SECTION 1. INTRODUCTION

1.1 UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, use the phone numbers listed on the back cover to contact the Customer Service Department nearest you.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.



The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

Verify that you receive the following items in the shipping box:

QTY	DESCRIPTION
1	Programmable Digital Meter indicator/controller with all applicable connectors attached.
1	Owner's Manual
1	Set Mounting brackets



If you ordered any of the available options (except the "BL" Blank Lens option), they will be shipped in a separate container to avoid any damage to your indicator/controller.

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1.2 SAFETY CONSIDERATIONS



This device is marked with the **international caution symbol**. It is **important to read** this manual before installing or commissioning this device as it contains important information relating to **Safety and EMC** (Electromagnetic Compatibility).

This instrument is a **panel mount** device protected in accordance with EN 61010-1:2001, electrical safety requirements for electrical equipment for measurement, control and laboratory. Installation of this instrument should be done by qualified personnel. In order to ensure safe operation, the following instructions should be followed.



This instrument has **no power-on switch**. An external **switch or circuit-breaker** shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall not interrupt the Protective Conductor (Earth wire), and it shall meet the relevant requirements of IEC 947–1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the main supply cord.



Furthermore, to provide protection against **excessive energy** being drawn from the main supply in case of a fault in the equipment, an **overcurrent** protection device shall be installed.



- Do not exceed voltage rating on the label located on the top of the instrument housing.
- Always disconnect power before changing signal and power connections.
- Do not use this instrument on a work bench without its case for safety reasons.
- Do not operate this instrument in flammable or explosive atmospheres.
- Do not expose this instrument to rain or moisture.
- Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
- Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

EMC Considerations

- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

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SECTION 2. ABOUT THE METER

2.1 DESCRIPTION

The Digital Programmable Process meter is a value packed indicator/controller. Four full digits and broad scaling capability allow for display in virtually all engineering units. A wide variety of DC current and voltage input ranges cover typical process applications. Standard features include sensor excitation and front panel or remote tare. Your meter may be a basic indicator or it may include analog output or dual relay output. Analog or dual relay output must be ordered at time of purchase. Analog output is fully scalable and may be configured as a proportional controller, or to follow your display. Dual 5 amp, form C relays control critical processes. A mechanical lockout has been included to guard against unauthorized changes.

2.2 FEATURES

The following is a list of standard features:

* 4-digit three color Programmable “Big” LED display or 4-digit, Standard LED Display
* NEMA 4 / Type 4 Front Bezel
* ±0.03 % accuracy
* 8 DC input ranges: 0-100 mV, ±50 mV, 0-5 V, 1-5 V, 0-10 V, ±5 V, 0-20 mA, and 4-20 mA
* 5, 10, 12, or 24 Vdc sensor excitation
* Peak detection
* Front panel and remote tare function
* Nonvolatile memory-no battery backup
* 115 or 230 Vac 50/60 Hz power supply or 10-32 Vdc or 26-56 Vdc

The following is a list of optional features:

* Dual 5 amp, form C relay outputs
* Scalable analog output
* Proportional control
* Easy setup for proportional control

Note Features with NEW are for the “B” version which has three-color programmable “Big” LED display - All segment characters shown are for the “B” version.

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2.3 AVAILABLE ACCESSORIES

Table 2-1. Accessories and Add-Ons

Add-On Options

FS	Special Calibration/Configuration
SPC4	NEMA-4 Splash Proof Cover
SPC18	NEMA-4 Splash Proof Cover, NEW

Accessories

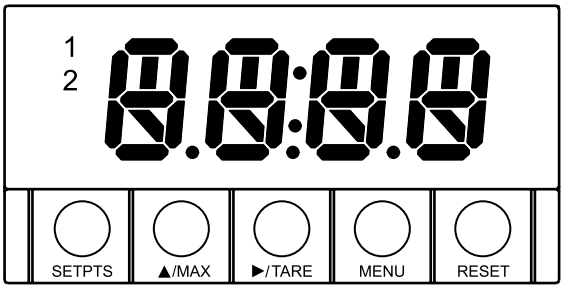
TP1A	Trimplate panel adaptor. Adapts DIN1A/DIN2A cases to larger panel cutouts
RP18	19-In. Rack Panel for one (1) 1/8 DIN instrument
RP28	19-In. Rack Panel for two (2) 1/8 DIN instruments
RP38	19-In. Rack Panel for three (3) 1/8 DIN instruments

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2.4 FRONT OF THE METER

NEW

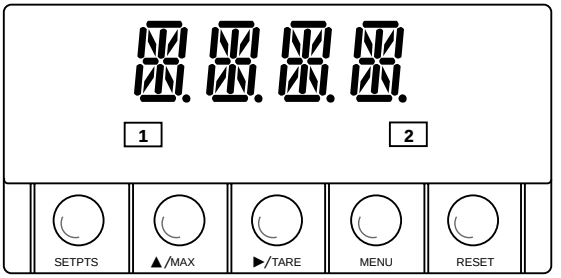
Figure 2-1 shows each part of the front of the three-color programmable "Big" LED display meter (Version B).



Digital LED Display:
-1.9.9.9 or 9.9.9.9 4-digit three color programmable, 21 mm (0.83") high LED display with programmable decimal point.

Figure 2-1. Front-Panel with Big Display

Figure 2-2 shows each part of the front of the standard LED display meter.



Digital LED Display:
-1.9.9.9. or 9.9.9.9.
14 segment, 13.8 mm (0.54") high LED display with programmable decimal point.

Figure 2-2. Front-Panel wtih Standard Display

These meter display windows (both versions) light when appropriate:

1 - Setpoint 1 status
2 - Setpoint 2 status

5 Pushbuttons for programming the meter.

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2.4 FRONT OF THE METER(Continued)

METER BUTTONS

SETPTS Button

In the Run Mode, this button will sequentially recall the previous setpoint settings. As necessary, use the ▲**/MAX** and ▶**/TARE** buttons to alter these settings, then press the **SETPTS** button to store new values.

Unless you press the **SETPTS**, ▶**/TARE**, or ▲**/MAX** button within 20 seconds, the meter will scroll to setpoint 2 and then to the Run Mode.

Note *If the dual relay option is not installed or if the* L.3=1 *on the* LK.CF *menu, pressing the* ***SETPTS*** *button will display the meter's firmware version.*

▲**/MAX** Button

In the Run Mode, this button will recall the **PEAK** reading since the last press of the **RESET** button.

In the Configuration Mode, press this button to change the value of the flashing digit shown on the display and/or toggle between menu choices, such as R.1=t or R.1=N on Rd.CF menu. When configuring your setpoint values, press the ▲**/MAX** button to advance the flashing digit's value from 0 to 9 by 1.

▶**/TARE** Button

In the Run Mode press the ▶**/TARE** button to tare your reading (zeroing) if you configure the Reading Configuration bit R.1=t of the Rd.CF menu. If you configure R.1=N, the ▶**/TARE** button has no function.

In the Configuration Mode, press the this button to scroll to the next digit.

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2.4 FRONT OF THE METER(Continued)

MENU Button

In the Run Mode, press the **MENU** button to terminate the current measuring process and enter you into the Configuration Mode.

Note ☞ *Only if you have not installed the lockout jumpers on the main board.*

In the Configuration Mode, press the **MENU** button to store changes in the nonvolatile memory and then advance you to the next menu item.

RESET Button

If you hard reset (press the **MENU** button followed by the **RESET** button) or power off/on the meter, it shows RSt, followed by PROC.

In the Run Mode, press the **RESET** button to reset tare, if any. The meter shows t.RSt and returns to the Run Mode.

In the Configuration Mode, press the **RESET** button once to review the previous menu. Press the **RESET** button twice to perform a hard reset and return to the Run Mode.

In the Peak Mode, press the **RESET** button to reset peak values. The meter shows PK.RS and returns to the Run Mode.

In the Setpoint Mode, press the **RESET** button to reset the latched setpoint. The meter shows SP.RS and enters the Run Mode.

Note ☞ *When in setpoint or Configuration Mode, if the meter shows 9999 or -1999 with all flashing digits, the value has overflowed. Press the* ▲**/MAX** *button to start a new value.*

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2.5 BACK OF THE METER

Figure 2-2 shows the label describing the connectors on the back of the meter. Table 2-2 on the following page gives a brief description of each connector at the back of the meter.

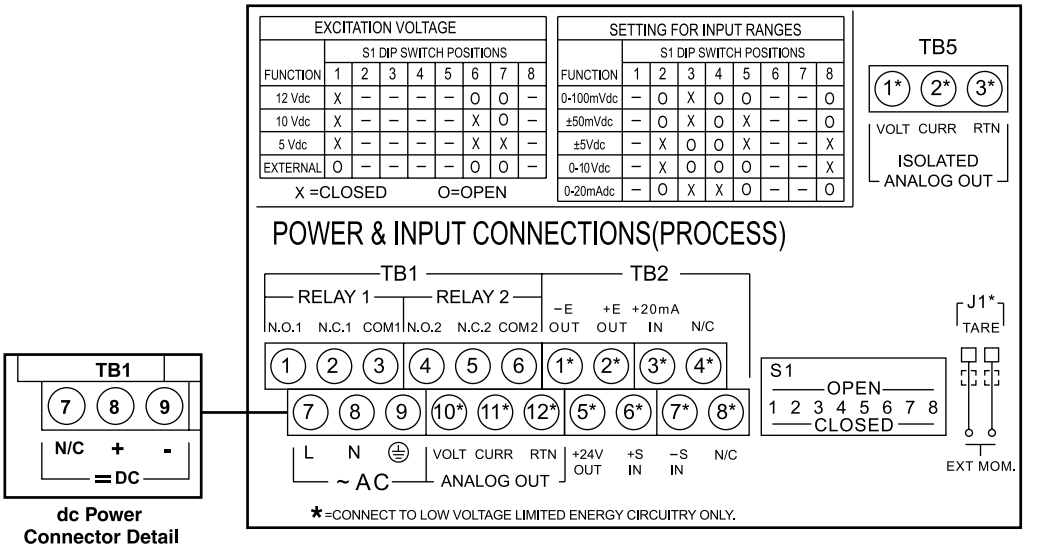


Figure 2-3. Connector Label (AC-Powered and DC-Powered Detail)

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2.5 BACK OF THE METER (Continued)

Table 2-2. Connector Description

Connector	Description
TB1-1	Setpoint 1: Normally open (N.O.1) connection
TB1-2	Setpoint 1: Normally closed (N.C.1) connection
TB1-3	Setpoint 1: Common (COM1) connection
TB1-4	Setpoint 2: Normally open (N.O.2) connection
TB1-5	Setpoint 2: Normally closed (N.C.2) connection
TB1-6	Setpoint 2: Common (COM2) connection
TB1-7	AC line connection (no connections on DC-powered units)
TB1-8	AC neutral connection (+ Input on DC-powered units)
TB1-9	AC earth ground (DC-power return on DC-powered units)
TB1-10	Analog voltage output
TB1-11	Analog current output
TB1-12	Analog return
TB2-1	-E: Negative excitation connection from meter (5, 10, 12 V)
TB2-2	+E: Positive excitation connection from meter (5, 10, 12 V)
TB2-3	+20 mA connection for analog input
TB2-4	Not used.
TB2-5	+24 V output connection
TB2-6	+S: Positive signal input
TB2-7	-S: Negative signal input and return for +20 mA or +24 V
TB2-8	Not used
TB5-1	Isolated Analog Voltage Output
TB5-2	Isolated Analog Current Output
TB5-3	Isolated Analog Output Return
J1 (1-2)	Remote tare connection with a momentary switch

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The DIP switches are located at the S1 position (refer to Figure 3-2). Use a small instrument, such as a paper clip, to change the switches from open to closed. Table 2-3 lists DIP switch settings at the S1 position required to complete the setup of your meter.

Table 2-3. DIP Switch Positions/Input Range & Excitation

Function	S1 DIP Switch Positions							
C= Closed O= Open	1	2	3	4	5	6	7	8
Settings for Excitation Voltage								
Internal 5/10/12 excitation	C	-	-	-	-	-	-	-
External 5/10/12 excitation	O	-	-	-	-	O	O	-
Internal 12 Vdc excitation	C	-	-	-	-	O	O	-
Internal 10 Vdc excitation	C	-	-	-	-	C	O	-
Internal 5 Vdc excitation	C	-	-	-	-	C	C	-
Settings for Input Ranges								
0-100 mV DC	-	O	C	O	O	-	-	O
±50 mV DC	-	O	C	O	C	-	-	O
±5 Vdc	-	C	O	O	C	-	-	C
0-10 Vdc	-	C	O	O	O	-	-	C
0-20 mA DC	-	O	C	C	O	-	-	O

Note The display must also be configured to the selected input type after setting the DIP switches (see Section 4.1, Selecting the Input Type)

2.6 DISASSEMBLY

You may need to open up the meter for one of the following reasons:

- To check or change the 115 or 230 Vac power jumpers.
- To install or remove jumpers on the main board.

Note Disconnect the power supply before proceeding.

To remove and access the main board, follow these steps:

- Disconnect the main power from the meter.
- Remove the back case cover.
- Lift the back of the main board upwards and let it slide out of the case.

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SECTION 3. GETTING STARTED

Caution: The meter has no power-on switch, so it will be in operation as soon you apply power.

If you power off/on the meter, or perform a hard reset (press the **RESET** button twice), the meter shows RSt, followed by PROC.

3.1 RATING/PRODUCT LABEL

This label is located on top of the meter housing (refer to Figure 3-4).

3.2 MAIN BOARD POWER JUMPERS (refer to Figure 3-1)

Note

Important: If you want to change the Factory preset jumpers, do the following steps; otherwise go to section 3.3.

Warning: Disconnect the power from the unit before proceeding. This device must only be reconfigured by a specially trained electrician with corresponding qualifications. Failure to follow all instructions and warnings may result in injury!

1. Remove the main board from the case. Refer to Section 2.6.
2. Locate the solder jumpers W1, W2, and W3 (located near the edge of the main board alongside the transformer).
3. If your power requirement is **115 Vac, solder jumpers W1 and W3 should be wired, but jumper W2 should not.** If your power requirement is **230 Vac, solder jumper W2 should be wired, but jumpers W1 and W3 should not.**

   Note: W4 jumper is not used.

Figure 3-1 shows the location of solder jumpers W1 through W3.

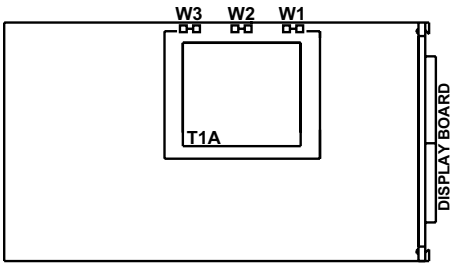


Figure 3.1 Main Board Power Jumpers

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3.2 MAIN BOARD POWER JUMPERS (Continued)

Figure 3-2 shows the location jumper positions on the main board.

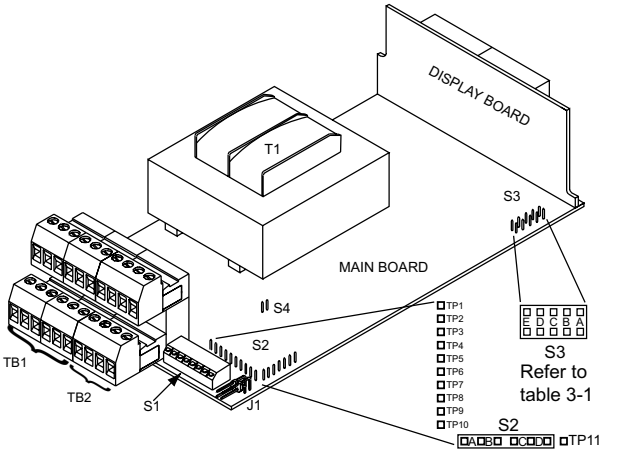


Figure 3-2. Main Board Jumper Positions

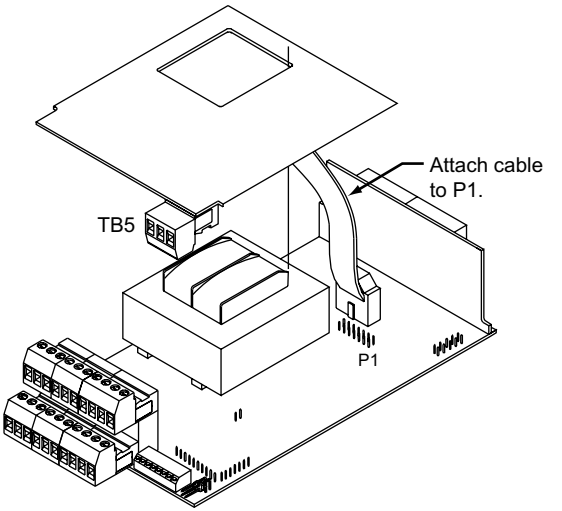


Figure 3-3. Upper Isolated Analog Output Option Board Installation

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3.2 MAIN BOARD POWER JUMPERS (Continued)

S2 jumpers are used for testing purposes. Do not use as reading errors may result.

S3 jumpers are used for the following (refer to Figure 3-2):

* To enable or disable the front panel push-buttons
* To allow for an extremely low resistance load for analog output
* To disable the **MENU** button
* To perform calibration procedure

Test pins TP1 - TP11 are for testing purposes. Do not use as reading errors may result.

S4-A Factory default jumper installed.

Table 3-1. S3 Jumper Functions

Jumper	Description
S3-A	Install to enable front panel push-buttons. Remove to disable all front panel push-buttons.
S3-B	Removed. Install for factory calibration only.
S3-C	Removed. Not used.
S3-D	Removed. Not used.
S3-E	If installed without S3-B, the **MENU** button locks out. If you press the **MENU** button, the meter shows LOCK.

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3.3 PANEL MOUNTING

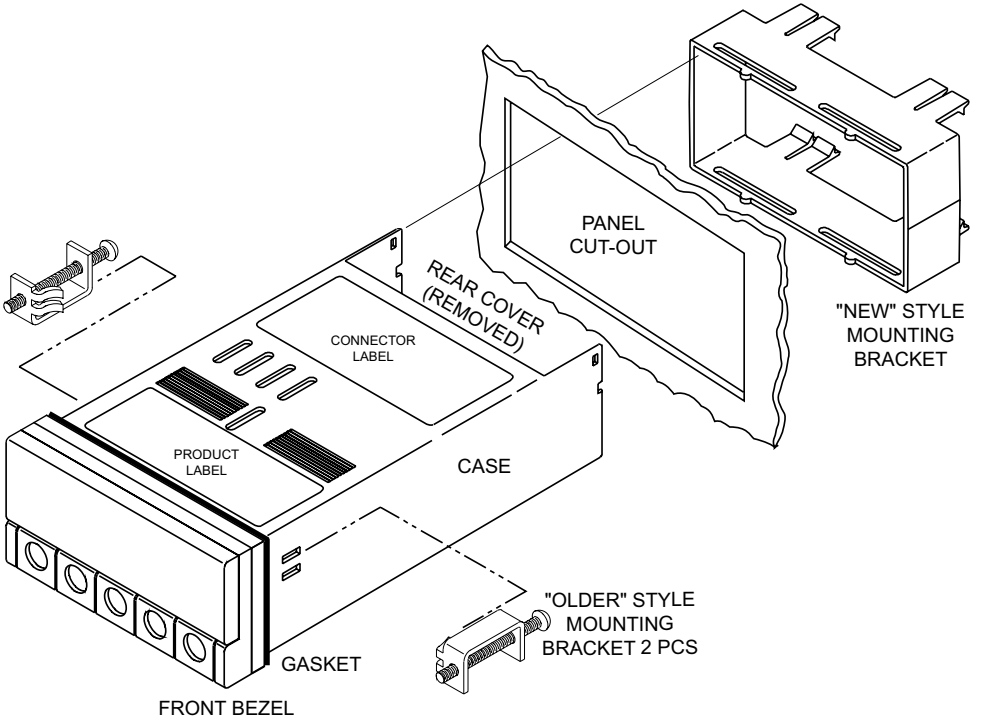
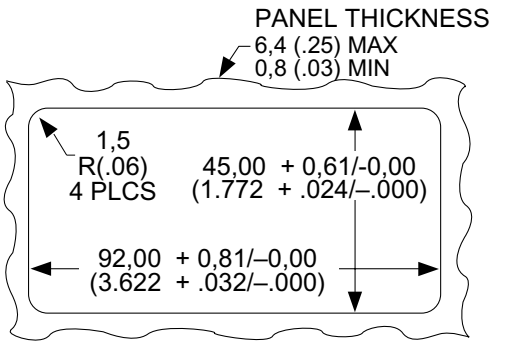


Figure 3-4. Meter - Exploded View

1. Cut a hole in your panel, as shown in **Figure 3-4**. For specific dimensions refer to **Figure 3-5**.
2. Insert the meter into the hole. Be sure the front bezel gasket is flush to the panel.
3. Slide on mounting bracket to secure.
4. Proceed to **Section 3.4** to connect your sensor input and main power.



NOTE: Dimensions in Millimeters (Inches)

Figure 3-5. Panel Cut-Out

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3.4 CONNECTING SENSOR INPUTS

Figures 3-6 through 3-12 describe how to connect your sensors.

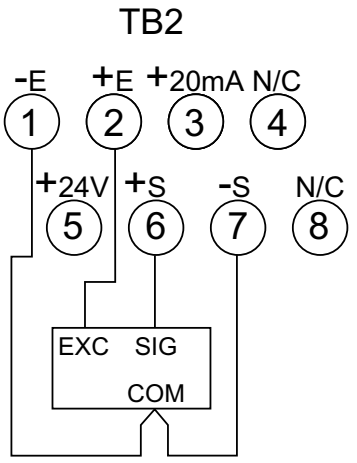


Figure 3-6. 3-Wire DC Input Connections with Internal Excitation

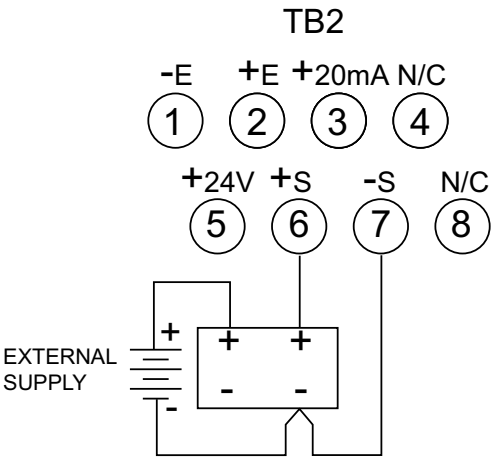


Figure 3-7. 3-Wire DC Input Connections with External Excitation

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3.4 CONNECTING SENSOR INPUTS (Continued)

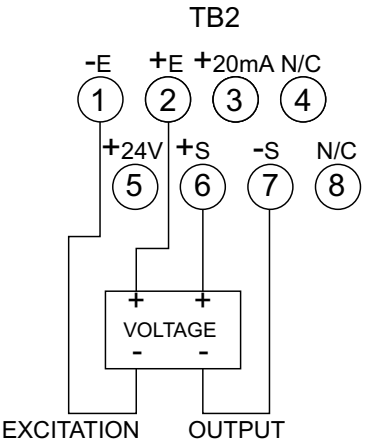


Figure 3-8. 4-Wire DC Input Connections with Internal Excitation

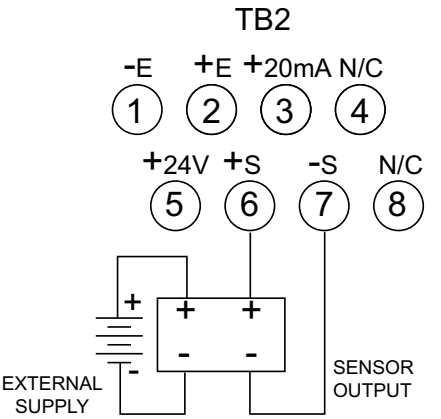


Figure 3-9. Wire DC Input Connections with External Excitation

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3.4 CONNECTING SENSOR INPUTS (Continued)

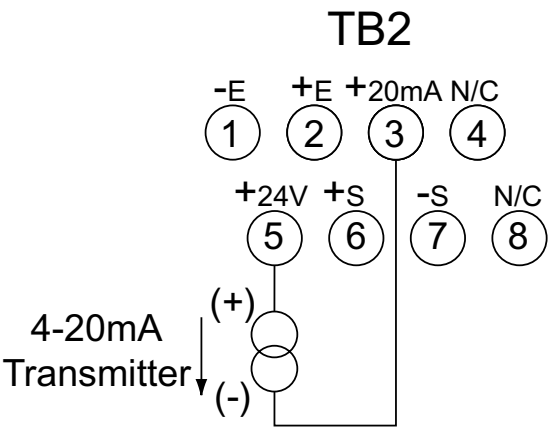


Figure 3-10. DC Current Input Connections with Internal Excitation

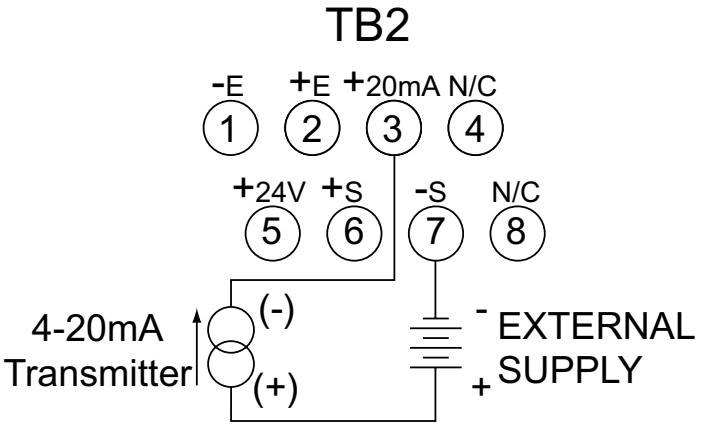


Figure 3-11. DC Current Input Connections with External Excitation

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3.4 CONNECTING SENSOR INPUTS (Continued)

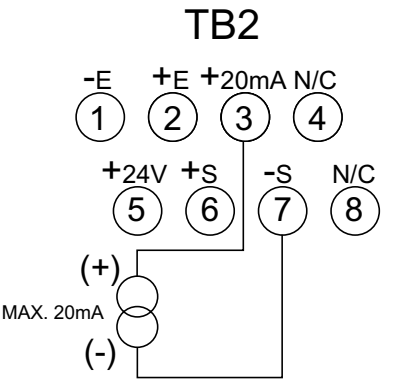


Figure 3-12. DC Current Input Connections with Current Source

3.5 CONNECTING MAIN POWER

Connect the AC main power connections as shown in Figure 3-13.

WARNING: Do not connect AC power to your device until you have completed all input and output connections. This device must only be installed by a specially trained electrician with corresponding qualifications. Failure to follow all instructions and warnings may result in injury!

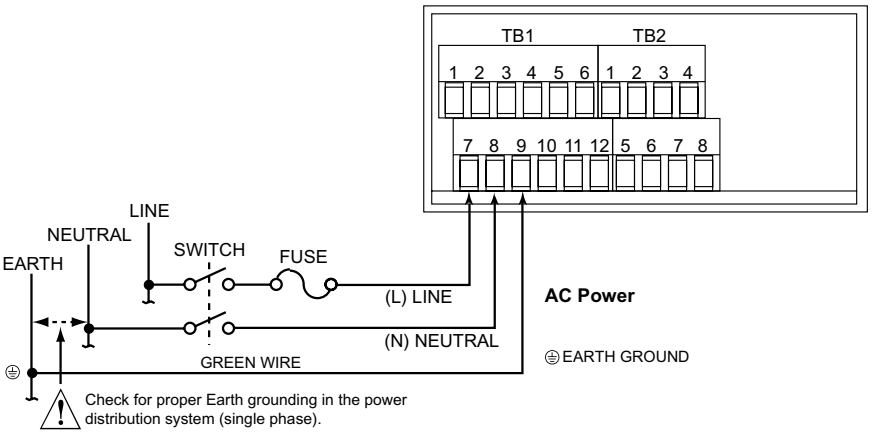


Figure 3-13. Main Power Connections - AC Powered Unit

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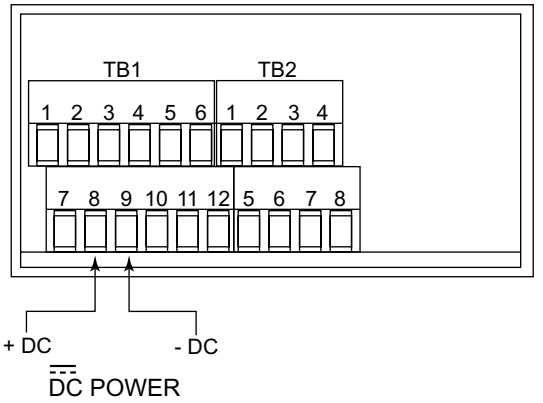
3.5 CONNECTING MAIN POWER (Continued)

Table 3-2 shows the wire color and respective terminal connections for both USA and Europe.

Table 3-2. Main Power Connection - AC Powered Unit

TB1	AC POWER	WIRE COLORS EUROPE	USA
7	∿ AC Line	Brown	Black
8	∿ AC Neutral	Blue	White
9	∿ AC Earth	Green/Yellow	Green

Connect the DC main power connections as shown in Figure 3-14.



When using DC power, refer to the Table 8-1 Color Chart in the Specifications Section for Display Color, Intensity, Excitation Voltage and Current, and Analog Output Isolated Option. Failure to use proper ratings may result in damaging the unit.

Figure 3-14. Main Power Connections - DC Powered Unit

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3.6 CONNECTING EXTERNAL TARE SWITCH

Connect external tare connections as shown in Figure 3-15.

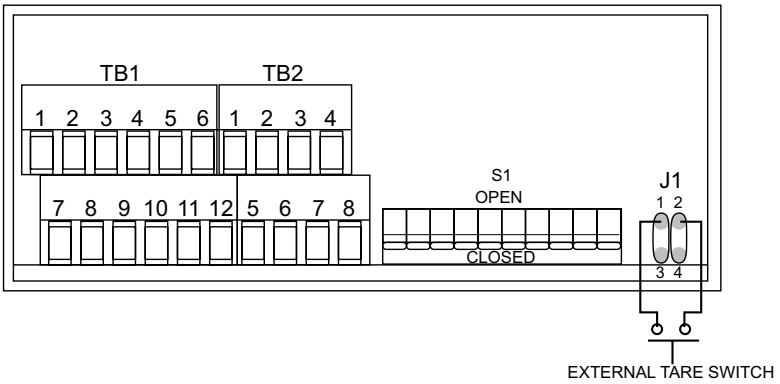


Figure 3-15. External Tare Connections

3.7 CONNECTING ANALOG AND RELAY OUTPUTS

If you have purchased a meter with analog or dual relay or isolated analog output, refer to the following drawings for output connections.

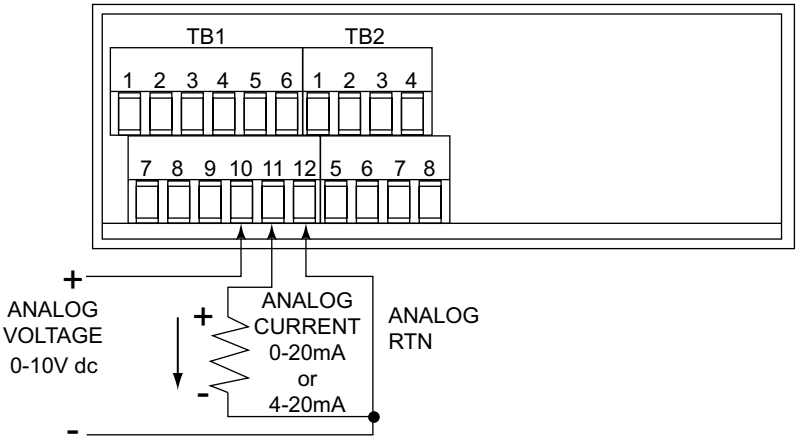


Figure 3-16. Analog Output Connections

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3.7 CONNECTING ANALOG AND RELAY OUTPUTS (Continued)

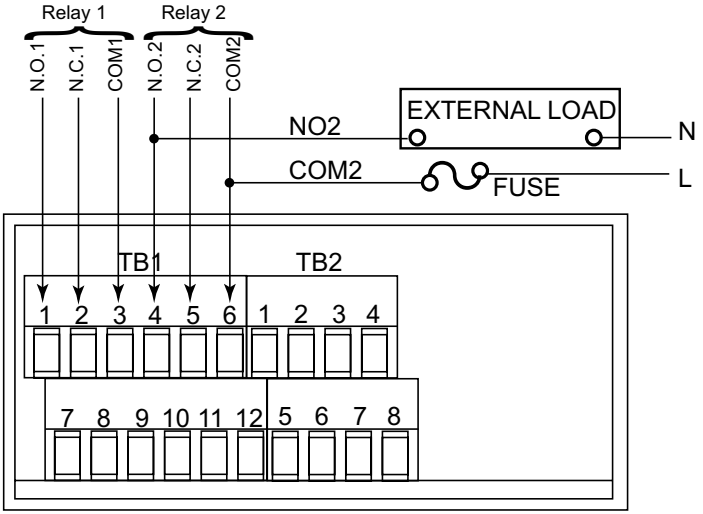


Figure 3-17. Relay Output Connections.

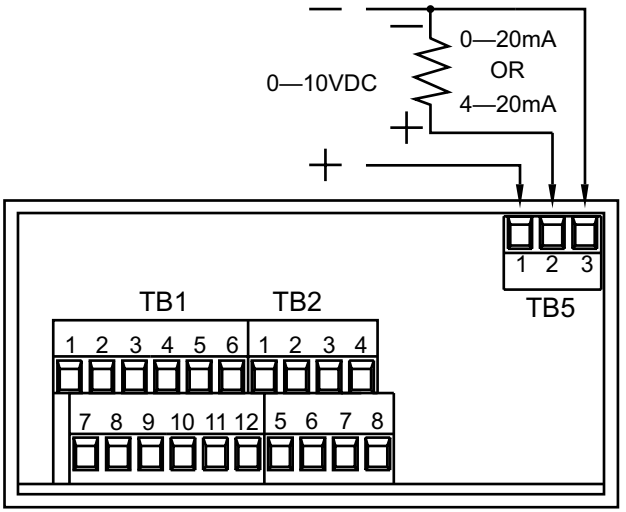


Figure 3-18. Isolated Analog Output Connections.

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SECTION 4. CONFIGURING THE METER

Note ☞ Refer to Table 6-1 for a summary list of menu configuration.

4.1 SELECTING THE INPUT TYPE INPt

To select your appropriate input type signal, follow these steps:

Note ☞ Before proceeding, set the input DIP switch settings at the back of your meter. (Refer to Table 2-3).

1. Press the **MENU** button. The meter shows INPt.

2. Press the ►/**TARE** button. The meter flashes one of the following:

   - 0-20 ***(for 4-20 mA dc)*** (Default)
   - 100M (for 0-100 mV dc)
   - ±50M (for ±50 mV dc)
   - 10V (for 0-10 Vdc)
   - ±5V (for ±5 Vdc)

3. Press the ▲/**MAX** button to scroll through available choices.

4. Press the **MENU** button to store your choice. The meter momentarily shows StRd, followed by dEC.P (Decimal Point).

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4.2 SELECTING A DECIMAL POINT POSITION dEC.P

Note Refer to Table 6-1 for a summary list of menu configuration.

To select a decimal point display position, follow these steps:

1. Press the **MENU** button until the meter shows dEC.P.
2. Press the ▶/**TARE** button. The meter shows one of the following:
   - FFF.F
   - FF.FF
   - F.FFF
   - FFFF (Default)
3. Press the ▲/**MAX** button to scroll between available choices.
4. Press the **MENU** button to store your choice. The meter momentarily shows StRd, followed by the next menu Rd.S.O (Reading Scale and Offset). Or you can press the **RESET** button to abort and go back to the dEC.P menu.

4.3 SELECTING READING SCALE AND OFFSET Rd.S.O

Note Refer to Table 6-1 for a summary list of menu configuration.

To scale the meter to show readings in engineering units. There are two methods. One method is to scale with known inputs. Another method is to scale without known inputs: you calculate input values based on the transducer specifications and manually enter them through the keyboard.

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4.3.1 Scaling with Known Loads (On-Line Calibration)

Note

For maximum resolution, find the maximum signal that will be applied to the meter input.

- For regular voltage input, refer to the main body of Table 4-1.
- For millivolt or milliamp input, refer to the main body of Table 4-2.

Set the DIP switch positions as indicated at the top of either Table 4-1 or 4-2. The numbers 1 through 8 in the top row of either table represent dip switches 1 through 8, and the O, C or X directly below the number indicates the correct position of each switch.

- 'O' Switch should be open or up.
- 'C' Switch should be closed or down.
- 'X' Switch is used to control excitation (refer to Table 2-3 to determine correct position of these switches).

Once Dip switches have been positioned correctly, apply power. Proceed to the rd.CF (Reading Configuration) and set R2 equal to the value in the right hand column of the chart.

Table 4-1. Range Selection Dip Switch Positions For Regular Voltage Input

12345678 XCOOOXXC	12345678 XCOOCXXC	RD.CF* R2=
0 - 10 V	±5 V	4
0 - 5 V	±5 V	3
0 - 3 V	±3 V	2
0 - 2 V	±2 V	1
0 - 1 V	±1 V	0

Table 4-2. Range Selection Dip Switch Positions For Millivolt/ Milliamp Input

12345678 XOCOOXX0	12345678 XOCOCXX0	12345678 XOCCOXX0	RD.CF* R2=
0 - 100 mV	±50 mV	0 - 20 mA	4
0 - 50 mV	±50 mV	0 - 10 mA	3
0 - 30 mV	±30 mV	0 - 6 mA	2
0 - 20 mV	±20 mV	0 - 4 mA	1
0 - 10 mV	±10 mV	0 - 2 mA	0

* Reading Configuration

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4.3.1 Scaling with Known Loads (On-Line Calibration) (Continued)

To scale with known inputs: apply known loads to a transducer connected to a meter, or simulate the transducer output with a voltage or current simulator. To scale with known inputs, follow these steps:

1. Apply a known load equal to approximately 0% of the transducer range.

2. Press the **MENU** button until the meter shows rd.S.0.

3. Press the ▶/**TARE** button. The meter shows IN 1 (Input 1).

   Note ☞ IN 1 (Input 1) is the unscaled display reading at minimum input.

4. Press the ▶/**TARE** button again. The meter shows last stored value for Input 1.

5. Press the ▶/**TARE** button once more. The meter shows the actual signal being received.

6. Press the **MENU** button to store this value as IN 1 (Input 1). The meter shows rd 1 (Read 1).

   Note ☞ rd 1 (Read 1) is the desired display reading at Input 1.

7. Press the ▶/**TARE** button. The meter shows the last stored value for Read 1.

8. Press the ▲/**MAX** button to change the value of your digits.

9. Press the ▶/**TARE** button to scroll horizontally to the next digit.

10. Press the **MENU** button to store value as rd 1. The meter shows IN 2 (Input 2).

    Note ☞ IN 2 (Input 2) is the unscaled display reading at maximum input.

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4.3.1 Scaling with Known Loads (On-Line Calibration) (Continued)

11. Apply a known load equal to approximately 100% of the transducer range.

12. Press the ►/**TARE** button again. The meter shows the last stored value for Input 2.

13. Press the ►/**TARE** button once more. The meter shows the actual signal being received.

14. Press the **MENU** button to store Input 2 value. The meter shows Rd 2 (Read 2).

Note ☞ Rd 2 (Read 2) is the desired display reading at input 2.

15. Press the ►/**TARE** button. The meter shows the last stored value for Read 2.

16. Press the ▲/**MAX** button to change the value of your digits.

17. Press the ►/**TARE** button to scroll horizontally to the next digit.

18. Press the **MENU** button to store value as Rd 2 (Read 2). The meter momentarily shows StRd, followed by Rd.CF. Meter scaling is now complete.

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4.3.2 Scaling Without Known Loads

To scale without known inputs, calculate input values based on the transducer specifications and manually enter them on the front-panel pushbuttons. The following example assumes a pressure transducer with these specifications:

Pressure Range: 0 to 2000 PSI

Output Span: 1 to 5 Vdc

1. Determine the correct values for IN 1 and IN 2 based on the transducer specifications. In most cases, Rd 1 & Rd 2 are equal to the minimum and maximum of the transducer output span. The example assumes Rd 1 & Rd 2 are equal to the pressure range of the transducer (Rd 1 = 0000 and Rd 2 = 2000). Calculate IN 1 and IN 2 using the transducer output span and the following equation:

   IN = (Sensor Output) x (Natural Gain) x (Multiplier).

Table 4-3. Natural Gain

Input Range	Span Units	Natural Gain
0 to 100 mV	Millivolts	100 cts/mV
±50 mV	Millivolts	40 cts/mV
0 to 10 V	Volts	1000 cts/V
± 5 V	Volts	400 cts/V
0 to 20 mA	Milliamps	500 cts/mA

2. Determine the multiplier by the Input Resolution setting (R.2 in the rd.CF menu) and the input range selected. Typically R.2=4 is suitable for most applications.

Table 4-4. Input Resolution Multiplier

Input Range	R.2=4	R.2=3	R.2=2	R.2=1	R.2=0
0 to 100 mV	1.000	2.000	3.333	5.000	10.00
0 to 10 V	1.000	2.000	3.333	5.000	10.00
0 to 20 mA	1.000	2.000	3.333	5.000	10.00
± 50 mV	1.000	1.000	1.667	2.500	5.000
± 5 V	1.000	1.000	1.667	2.500	5.000

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4.3.2 Scaling Without Known Loads (Continued)

3. Determine IN 1 & IN 2 input range and resolution. The example selects the 0 to 10 V range and 10 uV resolution (R.2=4).

   Example: IN 1 = (1 Volt) x (1000 cts/v) x (1.000) = 1000
   IN 2 = (5 Volt) x (1000 cts/v) x (1.000) = 5000
   Rd 1 = 0000
   Rd 2 = 2000

4. Press **MENU** button until the meter shows Rd.S.0.

5. Press the ▶/**TARE** button. The meter shows IN 1.

6. Press the ▶/**TARE** button again, the meter shows the last Input 1 value, with the fourth digit flashing.

7. Press the ▲/**MAX** button to change the value of your digits.

8. Press the ▶/**TARE** button to scroll horizontally to the next digit.

9. Press the **MENU** button to store this value. The meter shows Rd 1.

10. Press the ▶/**TARE** button. The meter shows the last value for read 1.

Repeat steps 7, 8 and 9 until Rd 1, IN 2 and Rd 2 have been displayed, verified, changed (if necessary) and stored.

4.4 USING READING CONFIGURATION Rd.CF

Note Refer to Table 6-1 for a summary list of menu configuration.

You may use Reading Configuration Rd.CF to configure your meter for the following:

- To enable or disable the front panel tare
- To set the input resolution of your meter
- To display the filtered/unfiltered signal input value

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4.4.1 Enabling or Disabling the Front-Panel Tare

To enable or disable the front-panel tare, follow these steps:

1. Press the **MENU** button until Rd.CF displays.

2. Press the ▶/**TARE** button. The meter shows one of the following:

   - R.1=E ***(Tare enabled)*** (Default)
   - R.1=N (Tare disabled)

3. Press the ▲/**MAX** button to view last stored selection. Press the ▲/**MAX** button to toggle between selections.

4. Press the ▶/**TARE** button to select input resolution or press the **MENU** button to store your selections. StRd momentarily displays, followed by COLR menu.

4.4.2 Setting Input Resolution

To set the input resolution of your meter, follow these steps:

1. Press the MENU button until Rd.CF displays, then press the ▶/**TARE** button twice.
   or
   Press the ▶/**TARE** button from R.1.

   One of the following displays (default is R.2=4):

   R.2=4 = ***10 µV for Unipolar inputs. 25 µV for Bipolar inputs***
   R.2=0 = 1 µV for Unipolar inputs. 5 µV for Bipolar inputs.
   R.2=1 = 2 µV for Unipolar inputs. 10 µV for Bipolar inputs
   R.2=2 = 3 µV for Unipolar inputs. 15 µV for Bipolar inputs.
   R.2=3 = 5 µV for Unipolar inputs. 25 µV for Bipolar inputs

Example: 3 µV resolution means that if you input 0-30 mV, at 30 mV the display shows 9999.

2. Press the ▲/**MAX** button to scroll through available selections.

3. Press the ▶/**TARE** button to display the filtered/unfiltered signal input or press the **MENU** button to store your selections. StRd momentarily displays, followed by COLR menu.

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4.4.3 Displaying the Filtered/Unfiltered Input Signal

To display the filtered/unfiltered signal input, follow these steps:

1. Press the **MENU** button until Rd.CF displays, then press the ▶/**TARE** button three times.
   or
   Press the ▶/**TARE** button from R.2.

   One of the following displays:

   - R.3=F ***(Filtered value)*** (Default)
   - R.3=U (Unfiltered value)

2. Press the ▲/**MAX** button to toggle between available choices.
3. Press the **MENU** button to store your selections. StRd momentarily displays, followed by COLR menu.

4.5 Selecting a Display Color COLR NEW

Note Refer to Table 6-1 for a summary list of menu configuration.

Selecting “Display Color” is not active unless your meter is a Version “B”.

To select a display color, follow these steps:

1. Press the **MENU** button until the meter shows COLR.
2. Press the ▶/**TARE** button. The meter shows one of the following:

   - GRN
   - REd
   - AMbR

3. Press the ▲/**MAX** button to scroll between available choices.
4. Press the **MENU** button to store your choice. The meter momentarily shows StRd, followed by the next menu S1.CF (Setpoint 1 Configuration). Or you can press the **RESET** button to abort and go back to the Rd.CF menu.

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4.6 USING SETPOINT 1 CONFIGURATION S 1.CF

Note Refer to Table 6-1 for a summary list of menu configuration.

Setpoint 1 Configuration S 1.CF is not active unless your meter has dual relay output capabilities. The LED's will display whether the S 1.CF is active or not. You may use Setpoint 1 Configuration S 1.CF for the following:

- To set the setpoint's active band above or below your chosen value
- To select whether the setpoint operation is latched or unlatched

4.6.1 Setting Setpoint 1's Active Band

1. Press the **MENU** button until the meter shows S 1.CF.
2. Press the ▶/**TARE** button. The meter shows one of the following:
   - S.1=A ***(Active above the setpoint)*** (Default)
   - S.1=b (Active below the setpoint)
3. Press the ▲/**MAX** button to toggle between available choices.
4. Press the ▶/**TARE** button to select if Setpoint 1 is latched or unlatched or press the **MENU** button to store your selection.

4.6.2 Selecting if Setpoint 1 is Latched or Unlatched

1. Press the **MENU** button until S 1.CF displays, then press the ▶/**TARE** button twice.
   or
   Press the ▶/**TARE** button from S.1.

   The meter shows one of the following:
   - S.2=U ***Setpoint 1 to be unlatched*** (Default)
   - S.2=L Setpoint 1 to be latched
2. Press the ▲/**MAX** button to toggle between available choices.
3. Press the **MENU** button to store your selection(s). The meter momentarily shows StRd, followed by S2.CF (Setpoint 2 Configuration).

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4.7 USING SETPOINT 2 CONFIGURATION S2.CF

Note Refer to Table 6-1 for a summary list of menu configuration.

Setpoint 2 Configuration S2.CF is not active unless your meter has dual relay output capabilities. The LED's will display whether the S2.CF is active or not. You may use Setpoint 2 Configuration S2.CF for the following:

- To set the setpoint's active band above or below your chosen value
- To select whether the setpoint operation is latched or unlatched

4.7.1 Setting Setpoint 2's Active Band

1. Press the **MENU** button until the meter shows S2.CF.
2. Press the ▶/**TARE** button. The meter shows one of the following:
   - S.1=A ***(Active above the setpoint)*** (Default)
   - S.1=b (Active below the setpoint)
3. Press the ▲/**MAX** button to toggle between available choices.
4. Press the ▶/**TARE** button to select if Setpoint 2 is latched **or** unlatched or press the **MENU** button to store your selection and enter S 1.db (Setpoint 1 Deadband)

4.7.2 Selecting if Setpoint 2 is Latched or Unlatched

1. Press the **MENU** button until S2.CF displays, then press the ▶/**TARE** button twice.
   or
   Press the ▶/**TARE** button from S. 1.

   The meter shows one of the following:
   - S.2=U ***Setpoint 2 to be unlatched*** (Default)
   - S.2=L Setpoint 2 to be latched
2. Press the ▲/**MAX** button to toggle between available choices.
3. Press the **MENU** button to store your selection(s). The meter momentarily shows StRd, followed by S 1.db (Setpoint 1 Deadband).

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4.8 SETTING THE SETPOINT 1 DEADBAND S1.db

Note Refer to Table 6-1 for a summary list of menu configuration.

Setpoint 1 Deadband S1.db is not active unless your meter has dual relay output capabilities. The LED's will display whether the S1.db is active or not. The Setpoint 1 Default deadband is 0003. To change the deadband (hysteresis) of Setpoint 1, follow these steps:

1. Press the **MENU** button until the meter shows S1.db.
2. Press the ▶/**TARE** button. The meter shows the last previously stored 4-digit number (0000 through 9999) with flashing 4th digit.
3. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.
4. Press the ▶/**TARE** button to scroll to the next digit.
5. Press the **MENU** button to store your selection. The meter momentarily shows StRd, followed by S2.db (Setpoint 2 Deadband).

4.9 SETTING THE SETPOINT 2 DEADBAND S2.db

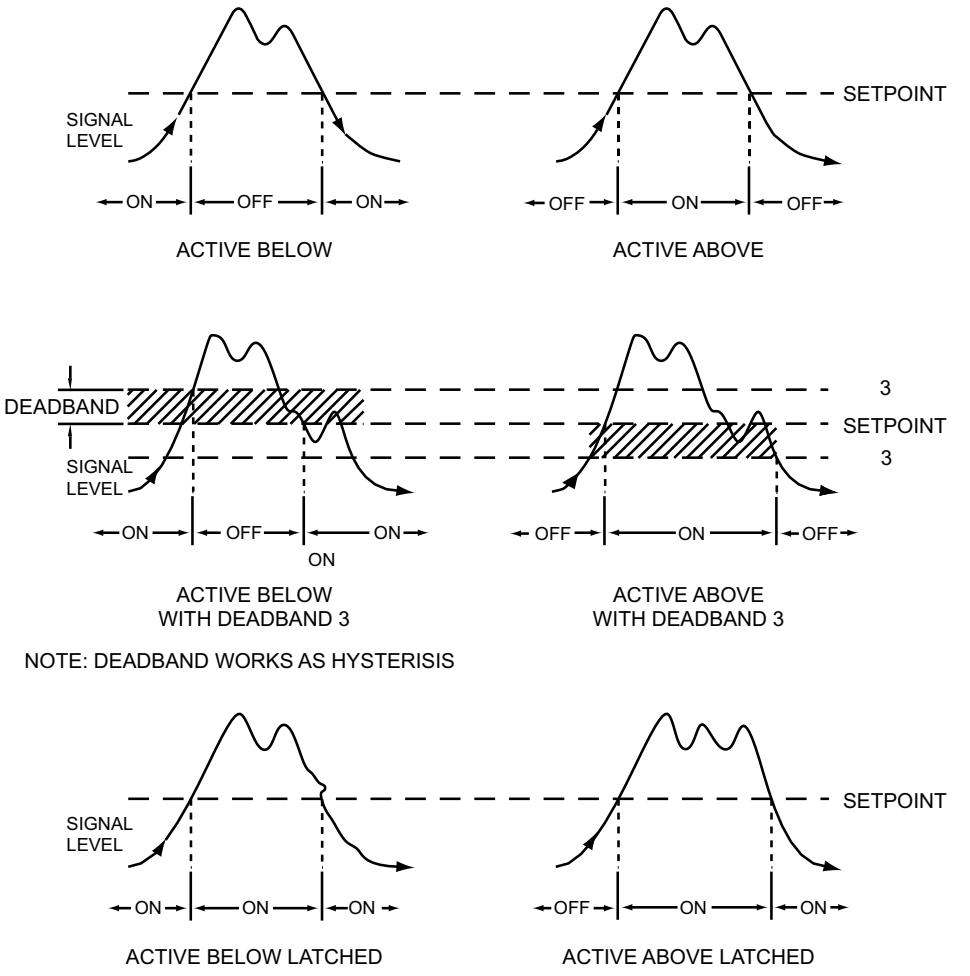
Note Refer to Table 6-1 for a summary list of menu configuration.

Setpoint 2 Deadband S2.db is not active unless your meter has dual relay output capabilities. The LED's will display whether the S2.db is active or not. The Setpoint 2 default deadband is 0003. To change the deadband (hysteresis) of Setpoint 2, follow these steps:

1. Press the **MENU** button until the meter shows S2.db.
2. Press the ▶/**TARE** button. The meter shows the last previously stored 4-digit number (0000 through 9999) with flashing 4th digit.
3. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.
4. Press the ▶/**TARE** button to scroll to the next digit.
5. Press the **MENU** button to store your selection. The meter momentarily shows StRd, followed by Ot.CF (Output Configuration) if you have analog output capabilities.

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Figure 4-1. Alarm Example



Note

To reset latched alarms you must:

1. Input a signal OUT of the alarm zone
2. Then press **SETPTS** and then, **RESET** button

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4.10 USING OUTPUT CONFIGURATION 0t.CF

Note Refer to Table 6-1 for a summary list of menu configuration.

Output Configuration 0t.CF is not active unless your meter has analog output capabilities. The menu will display whether analog output is present or not. Analog output must be ordered at the time of purchase.

Use Output Configuration 0t.CF to select the following:

- To enable or disable the analog output
- To select if the analog output is current or voltage
- To select if the analog output is regular or proportional

4.10.1 Enabling or Disabling the Analog Output

To enable or disable the analog output, follow these steps:

1. Press the **MENU** button until the meter shows 0t.CF.

2. Press the ▶/**TARE** button. The meter shows one of the following:

   - 0.I=E ***(Analog output enabled)*** (Default)
   - 0.I=d (Analog output disabled)

3. Press the ▲/**MAX** button to toggle between available choices.

4. Press the ▶/**TARE** button to select analog output as current or voltage or press the **MENU** button to store your selection and enter 0t.S.0 (Output Scale and Offset).

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4.10.2 Selecting Analog Output as Current or Voltage

1. Press the **MENU** button until it shows 0t.CA, then press the ▶/**TARE** button twice.
   or
   Press the ▶/**TARE** button from 0.1.
   The meter shows one of the following:

   - 0.2=C ***(Analog output = current)*** (Default)
   - 0.2=V (Analog output = voltage)

2. Press the ▲/**MAX** button to toggle between available choices.

3. Press the ▶/**TARE** button to select analog output or proportional control or press the **MENU** button to store your selection and enter 0t.S.O (Output Scale and Offset).

4.10.3 Selecting Analog Output or Proportional Control

Note ☞ Use this section to select if the meter will transmit an analog signal proportional to the display readings, or proportional to the error signal between the display reading and Setpoint 1.

Proportional Control Analog Option is not available for models without Relay Option.

1. Press the **MENU** button until it shows 0t.CA, then press the ▶/**TARE** button twice.
   or
   Press the ▶/**TARE** button from 0.2.
   The meter shows one of the following:

   - 0.3=A ***(Analog output is regular)*** (Default)
   - 0.3=P (Analog output is proportional)

2. Press the ▲/**MAX** button to toggle between available choices.

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4.10.3 Selecting Analog Output or Proportional Control (Continued)

3a. If you select 0.3=A, press the **MENU** button to store your selection. The meter momentarily shows StRd, followed by 0t.S.0 (Output Scale and Offset).

3b. If you select 0.3=P, press the ▶/**TARE** button. The meter shows one of the following:

- 0.4=d (Proportional analog output is **DIRECT ACTING)**
- 0.4=R (Proportional analog output is **REVERSE ACTING**).

4. Press the ▲/**MAX** button to toggle between available choices.

5. Press the **MENU** button to store your selections. The meter momentarily shows StRd, followed by P.bNd (Proportional Band).

   Additionally, if you select 0.2=V (Analog output to be voltage), press the ▶/**TARE** button. One of the following displays:

- 0.5=F (Proportional 0-10 V analog output)
- 0.5=H (Proportional 0-5 V analog output).

6. Press the ▲/**MAX** button to toggle between available choices.

7. Press the **MENU** button to store your selections. The meter momentarily shows StRd, followed by P.bNd (Proportional Band).

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4.11 SELECTING PROPORTIONAL BAND P.bnd

Proportional Band P.bnd is not active unless your meter has analog output and relay capabilities. The menu will display whether analog output is present or not.

- A proportional controller's output is linearly proportional to the change of the error signal, whenever the signal is within 2 prescribed values (Proportional Band).
- There are three (3) points of interest on the proportional controller transfer curve.
- The first is the magnitude of the error signal that drives the controller to "full on" (e.g. 20 mA out for 4-20 mA).

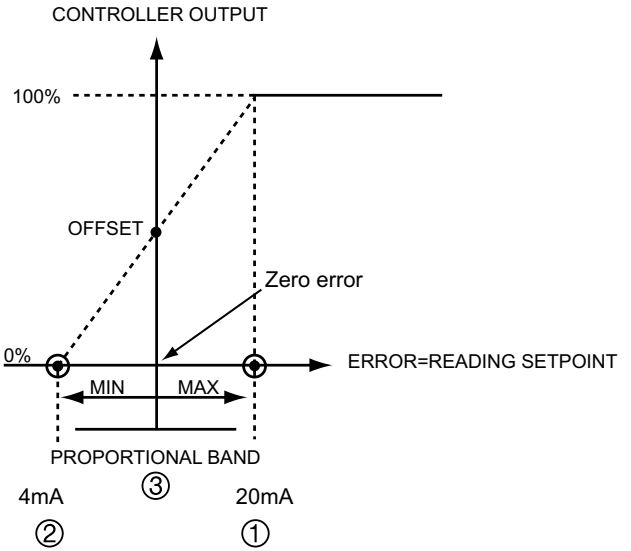


Figure 4-2. Controller Output

- The second point of interest is the magnitude of the error signal that drives the controller output to "full off" (e.g. 4 mA out on 4-20 mA). These two (2) points need not be equally spaced on either side of the zero error point.
- The third is the factor "Offset" and it is the output value of the controller which causes zero error.

Note

The above example illustrates the parameters for the 4-20 mA analog out, likewise, analog voltage output will have these (3) points of interest.

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4.11 SELECTING PROPORTIONAL BAND P.bNd (Continued)

If A is the controller gain then,

Proportional Band = $\frac{\text{Max. out - Min. out}}{A}$

CONTROLLER OUT = A • ERROR + OFFSET

To select the proportional band for your proportional controller, follow these steps:

1. Press the **MENU** button until the meter shows P.bNd.

If P.bNd menu doesn't show, set 0.3=P on Menu 0t.CF.

Note — Remember to press ►/**TARE** when 0t.CF is displayed until 0.3=A, then press ▲/**MAX,** unit will show 0.3=P. Pressing the **MENU** button will store the selection.

2. Press the ►/**TARE** button. The meter shows last previously stored 4-digit number (0000 through 9999) with flashing 4th digit.

3. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.

4. Press the ►/**TARE** button to scroll to the next digit.

5. Press the **MENU** button to store your selection. The meter shows StRd, followed by M.RSt (Manual Reset).

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4.12 USING MANUAL RESET M.RSt

Note Refer to Table 6-1 for a summary list of menu configuration.

Manual Reset M.RSt is not active unless your meter has analog output and relay capabilities. The menu will display whether analog output is present or not. This feature allows you to offset the error that may occur with your setpoint. In order to determine the amount of error, you must compare your display value to the Setpoint 1 value. The difference between these two values (display - Setpoint 1) is the amount of error that you may want to enter into Manual Reset M.RSt. The value of M.RSt must be less than P.bNd/2. Larger values will not be accepted and the meter will display ER4 (flashing).

1. Press the **MENU** button until M.RSt displays.

Note This menu M.RSt and P.bNd will show up if **0.3=P** on **OT.CF**.

2. Press the ►/**TARE** button. The meter shows the last previously stored 4-digit number (-1999 through 9999) with flashing 4th digit.

3. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.

4. Press the ►/**TARE** button to scroll to the next digit.

5. Press the **MENU** button to store your selection. StRd momentarily displays, followed by RSt (Reset).

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4.13 USING OUTPUT SCALE AND OFFSET 0t.S.0

Note ☞ Refer to Table 6-1 for a summary list of menu configuration.

Output Scale and Offset 0t.S.0 is not active unless your meter has analog output capabilities. The menu will display whether analog output is present or not. Output Scale and Offset 0t.S.0 scales your analog output to be equal to the meter's display and/or any engineering units you require. You may scale the output for direct (4-20 mA, 0-10 V, etc) or reverse acting (20-4 mA, 10-0 V, etc).

1. Press the **MENU** button until 0t.S.0 displays.

2. Press the ►/**TARE** button. Rd 1 (Read 1) displays.

   Note ☞ This is your first point of display reading.

3. Press the ►/**TARE** button again. The meter shows the last previously stored 4-digit number (-1999 through 9999) with flashing 4th digit.

4. Press the ▲/**MAX** button to change the digits.

5. Press the ►/**TARE** button to scroll to the next digit.

6. Press the **MENU** button to store your selection. Out.1 (Output 1) displays.

   Note ☞ This starting analog signal corresponds to your Read 1 display.

7. Press the ►/**TARE** button. Selected output displays.

   Note ☞ If you select 0.2=4 for voltage, the maximum signal you may select is 10.00 for an 0-10 Vdc signal output. If you select 0.2=C for current, the maximum signal you may select is 20.00.

8. Press the ▲/**MAX** button to enter the Output 1 signal selection. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.

9. Press the ►/**TARE** button to scroll to the next digit.

10. Press the **MENU** button to store your selection. Rd 2 (Read 2) displays.

    Note ☞ This is your second point of display reading.

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4.13 USING OUTPUT SCALE AND OFFSET 0t.S.0 (Continued)

11. Press the ►/**TARE** button. The meter shows last previously stored 4-digit number (-1999 through 9999) displays with flashing 4th digit.

12. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.

13. Press the ►/**TARE** button to scroll to the next digit.

14. Press the **MENU** button to store your selection. The meter shows OUt.2 (Output 2).

Note This analog signal should correspond to your Read 2 display.

15. Press the ►/**TARE** button. The meter shows selected output.

Note If you select 0.2=V for voltage, the maximum signal you may select is 10.00 for an 0-10 Vdc signal output. If you select 0.2=C for current, the maximum signal you may select is 20.00 for a 0-20 or 4-20 mA DC signal output.

16. Press the ▲/**MAX** button to change the value of the flashing digit. If you continue to press the ▲/**MAX** button, the flashing digit's value continues to change.

17. Press the ►/**TARE** button to scroll to the next digit.

18. Press the **MENU** button to store your selection. The meter momentarily shows StRd, followed by LK.CF (Lockout Configuration).

WARNING: If the meter displays all flashing values on any item, the value has overflowed. Press the ▲/**MAX** button to start new values.

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4.14 USING LOCK OUT CONFIGURATION LK.CF

Note Refer to Table 6-1 for a summary list of menu configuration.

Use Lock Out Configuration LK.CF for the following:

- To enable or disable setpoint changes
- To enable or disable the **RESET** button in the Run Mode
- To enable or disable displaying the meter's firmware version.

4.14.1 Enabling or Disabling the RESET button in the Run Mode

1. Press the **MENU** button until the meter shows LK.CF (after Ot.S.0).
2. Press the ▶/**TARE** button. The meter shows one of the following:
   - RS.=E ***To enable the RESET button in the Run Mode*** (Default)
   - RS.=d To disable the **RESET** button in the Run Mode
3. Press the ▲/**MAX** button to toggle between available choices.
4. Press the **MENU** button to store the changes. The meter shows StRd if the new value is different otherwise the meter shows bR.tE and returns to the Run Mode.

4.14.2 Enabling or Disabling SETPOINT Changes

1. Press the **MENU** button until the meter shows LK.CF (after Ot.S.0).
2. Press the ▶/**TARE** button twice. The meter shows one of the following:
   - SP.=E ***To enable setpoint changes*** (Default)
   - SP.=d To disable setpoint changes
3. Press the ▲/**MAX** button to toggle between available choices.
4. Press the **MENU** button to store the changes. The meter shows StRd if the new value is different otherwise the meter shows bR.tE and returns to the Run Mode.

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4.14.3 SETPOINT Display Function: Firmware version or Setpoint value

1. Press the **MENU** button until the meter shows LK.CF (after Ot.S.O).
2. Press the ▶/**TARE** button three times. The meter shows one of the following:
   - L.3=0 **SETPTS** button will display setpoint values.
   - L.3=1 **SETPTS** button will display the meter's firmware version.
3. Press the ▲/**MAX** button to toggle between the choices above.
4. Press the **MENU** button to store the changes. The meter shows StRd if the new value is different otherwise the meter shows bR.tE and returns to the Run Mode.

Note ☞ If your meter does not have the relay option, setpoint menu items above will not be available and **SETPTS** button will always display the meter's firmware version. These units will have FOL (overload) or FOPN memory indicated by Alarm 1 & 2 LED displays. LEDs can be reset by pressing **MENU** then **RESET** button or by Power **OFF** then **ON**.

4.15 USING DISPLAY BRIGHTNESS CONFIGURATION NEW

Changing “Display Brightness” is not active unless your meter is a Version “B”.

1. Press the **MENU** button until the meter shows bR.tE (after LKCF).
2. Press the ▶/**TARE** button from bR.tE. The meter shows one of the following:
   - M.brt Medium Brightness
   - L.brt Low Brightness
   - H.brt ***High Brightness*** (Default)
3. Press the ▲/**MAX** button to toggle between available choices.
4. Press the **MENU** button to store your selection. The meter momentarily shows StRd followed by StRd, RSt, PROC, then measured value.

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SECTION 5. DISPLAY MESSAGES

Table 5-1. Display Messages

MESSAGE	DESCRIPTION
PROC	Process Meter
RSt	Hard (Power On) Reset
INPt	Input Type
dEC.P	Decimal Point
Rd.S.O	Reading Scale and Offset
Rd.CF	Reading Configuration
COLR	Display Color NEW
S1.CF	Setpoint 1 Configuration
S2.CF	Setpoint 2 Configuration
S1.db	Setpoint 1 Deadband
S2.db	Setpoint 2 Deadband
P.bNd	Proportional Band
M.RSt	Manual Reset
ER4	Manual Reset Error
Ot.CF	Output Configuration
Ot.S.O	Output Scale and Offset
LK.CF	Lock Out Configuration
bR it	Display Brightness NEW
+OL	+ Overload Signal
-OL	- Overload Signal
RS.OF	Resolution Overflow
+999	Value Overflow in Setpoint/Menu & Peak Routines
-1999	Value Overflow in Setpoint/Menu & Peak Routines
ER 1	2 Coordinate Format Programming Error
PEAK	Peak Value
PK.RS	Peak Reset
t.RS	Tare Reset
SP.RS	Reset Latched Alarms
SP 1	Setpoint 1 Value
SP2	Setpoint 2 Value
R.OV.S	Resolution Over Scale
V.-8.8	Firmware Version (where 8 is 0 ~ 9)
RUN	Operating Mode

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SECTION 6. MENU CONFIGURATION DISPLAYS

Not all menu items display on standard meters.

Table 6-1. Menu Configuration Displays

(Defaults in Bold and Italics)

MENU	►/TARE	▲/MAX
INPt	Show input choices:	100M ±50M 10V ±5V 0-20 (***Default***)
dEC.P	Show current decimal point position	FFFF (***Default***) F.FFF FF.FF FFF.F
Reading Scale & Offset Rd.S.O	Shows IN 1 **1** Shows prior value entered and flashing digit. Scrolls to the next digit. • If ►/**TARE** is pressed, actual input is shown and can not be changed with ▲/**MAX**. • If ▲/**MAX** is pressed, unit can scroll through digits with ►/**TARE**.	Changes the value of the flashing digit
2 Enter new value and show Rd 1	**3** Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit
4 Enter new value and show IN2	**5** Shows prior value entered and flashing digit. Scrolls to the next digit. • If ►/**TARE** is pressed, actual input is shown and can not be changed with ▲/**MAX**. • If ▲/**MAX** is pressed, unit can scroll through digits with ►/**TARE**.	Changes the value of the flashing digit
6 Enter new value and show Rd2	**7** Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit

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SECTION 6. MENU CONFIGURATION DISPLAYS (Continued)

Table 6-1. Menu Configuration Displays (Continued)

(Defaults in Bold and Italics)

MENU	►/TARE	▲/MAX
Reading Configuration rd.CF	**R.1=**	r.1=t ***(Tare enabled)*** r.1=N (Tare disabled)
	R.2=	r.2=0 (1 µV resolution for unipolar & 5 µV resolution for bipolar)
		r.2=1 (2 µV resolution for unipolar & 10 µV resolution for bipolar)
		r.2=2 (3 µV resolution for unipolar & 15 µV resolution for bipolar)
		r.2=3 (5 µV resolution for unipolar & 25 µV resolution for bipolar)
		r.2=4 ***(10 µV resolution for unipolar & 25 µV resolution for bipolar)***
		Note: *3 µV resolution means if your input is 0-30 mV, at 30 mV the display shows 9999.*
	R.3=	r.3=F ***(Filtered value)*** r.3=U (Unfiltered value)
NEW Display Color Selection COLR	Show input choices:	GRN (Green) RED (Red) AMbR (Amber)
Setpoint 1 Configuration S1.CF	**S.1=**	S.1=A ***(Active above)*** S.1=b (Active below)
	S.2=	S.2=U ***(Unlatched)*** S.2=L (Latched)
Setpoint 2 Configuration S2.CF	**S.1=**	S.1=A ***(Active above)*** S.1=b (Active below)
	S.2=	S.2=U ***(Unlatched)*** S.2=L (Latched)

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SECTION 6. MENU CONFIGURATION DISPLAYS (Continued)

Table 6-1. Menu Configuration Displays (Continued)

(Defaults in Bold and Italics)

MENU	►/TARE	▲/MAX
Setpoint 1 Deadband S1.db	Press to scroll to the next digit to the right	Press to change the value of the flashing digit
Setpoint 2 Deadband S2.db	Press to scroll to the next digit to the right	Press to change the value of the flashing digit
Output Configuration Ot.CF	0.1 =	0.1=E ***(Analog output is enabled)*** 0.1=d (Analog output is disabled)
	0.2 =	0.2=C ***(Analog output is current)*** 0.2=V (Analog output is voltage)
	0.3 =	0.3=R ***(Regular analog output)*** 0.3=P (Proportional analog output)*
	0.4 = shown if menu 0.3=P	0.4=d (Proportional analog is direct acting) 0.4=R (Proportional analog is reverse acting)
	0.5 = shown if menu 0.2=V	0.5=F (Analog output is 0-10 Vdc) 0.5=H (Analog output is 0-5 Vdc)
	Note * If you select 0.2V and 0.3=P, you may select your analog output to be 0-10 V or 0-5 V by accessing submenu 0.5=F or 0.5=H. * If 0.3=P, you may select your proportional output analog to be: • Direct Acting 0.4=d: 4-20 mA, 0-5 V, 0-10 V • Reverse Acting 0.4=R: 20-4 mA, 5 V-0 V, 10 V-0 V	

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SECTION 6. MENU CONFIGURATION DISPLAYS (Continued)

Table 6-1. Menu Configuration Displays (Continued)

(Defaults in Bold and Italics)

MENU	▶/TARE	▲/MAX
P.bNd Proportional Band **shown menu if** 0.3=P	Shows prior value entered. Scrolls to the next digit to the right.	Changes the value of the flashing digit
M.RSt Manual Reset **shown menu if** 0.3=P	Shows prior value entered. Scrolls to the next digit to the right.	Changes the value of the flashing digit
Output Scale & Offset 0t.5.0 (Shown if 0.3=A in Output Configuration Menu 0t.CF)	**1** Shows Rd1 Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit
2 Enter new value and show Out1	**3** Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit
4 Enter new value and show Rd2	**5** Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit
6 Enter new value and show Out2	**7** Shows prior value entered and flashing digit. Scrolls to the next digit.	Changes the value of the flashing digit

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SECTION 6. MENU CONFIGURATION DISPLAYS (Continued)

Table 6-1. Menu Configuration Displays (Continued)

(Defaults in Bold and Italics)

MENU	▶/TARE	▲/MAX
Lock Out Configuration 	**RS=**	 ***(Enable RESET button in the Run Mode)*** (Disable **RESET** button in the Run Mode)
	SP=	 ***(Enable setpoint changes)*** (Disable setpoint changes)
	L3=	 ***(SETPTS button display setpoint values)*** (**SETPTS** button display firmware version  where 8 is 0~9)
NEW Brightness Configuration 		 (Medium Brightness)  (Low Brightness)  ***(High Brightness)***

Table 6-2. Run Mode Displays

Display	▶/TARE	▲/MAX	RESET	Description
		Displays the peak reading and must be pressed again to return to the normal operating mode without resetting.	Reset the peak reading when in this mode.	**Peak Reading** Displays the highest reading since last reset.
	Press to activate.		Will reset your tare when viewing this function.	**Tare Reset**
				**Reset Latched Alarms** Pressing the **RESET** button resets your latched alarms.

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SECTION 7. SETPOINT CONFIGURATION DISPLAYS

Table 7-1. Setpoint Configuration Displays

MENU	▶/TARE	▲/MAX	Description
	Press to scroll to the next digit to the right	Press to change the value of the flashing digit	SETPOINT 1 Select from -1999 through 9999
	Press to scroll to the next digit to the right	Press to change the value of the flashing digit	SETPOINT 2 Select from -1999 through 9999

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SECTION 8. SPECIFICATIONS

SIGNAL INPUT

Input Ranges:	0-100 mV, ± 50 mV, 0-10 V, ± 5 V, 0-20 mA, 4-20 mA
Isolation:	Dielectric strength to 2500V transient per 3mm spacing based on EN 61010 for 260Vrms or DC working voltage
Noise Rejection:	Normal Mode Rejection (NMR) = 60 dB Common Mode Rejection (CMR) = 120 dB
Resistance:	100 Meg ohms for 100 mV or ±50 mV input range 1 Meg ohm for 10 V or +5 V input range 5 ohms for 20 mA current input range
NEW “Big” Display:	4-digit, three color programmable 9-segment, LED 21 mm (0.83")
Symbol:	8.8.8.8 (-1.9.9.9 ~ 9.9.9.9)
Standard Display:	4-digit, 14-segment LED, 13.8 mm (0.54”)
Symbol:	8.8.8.8 (-1.9.9.9. ~ 9.9.9.9.)

ANALOG TO DIGITAL

Technique:	Dual slope
Internal resolution:	15 bits
Read Rate:	3/sec Polarity Automatic

ACCURACY AT 25°C

Max Error Strain/Process:	±0.03% of reading, ±1 count
Span Tempco:	50 ppm/°C
Step Response:	1 sec
Warm Up to Rated Accuracy:	30 min
Excitation Voltage:	AC power units: 24 V @ 25 mA, 12 V @ 50 mA, 10 V @ 120 mA, 5 V @ 60 mA DC power units: **Refer to Table 8-1** Color chart for DC Output Excitation
Load Regulation:	1.1%
Line Regulation:	0.02% per Vac

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SECTION 8. SPECIFICATIONS (Continued)

ALARM OUTPUTS (if applicable)

2 Form "C" on/off relays. Configurable for latched and unlatched by software.

Max current: 5 AMPS, resistive load
Max voltage: 250 Vac or 30 Vdc

ANALOG OUTPUT (if applicable)

Signal Type:	Current or voltage
Signal Level:	Current: 10 V max compliance at 20 mA output Voltage: 20 mA max for 0-10 V output
Function:	May be assigned to a display range or proportional control output with Setpoint #1 when used as a control output.
Linearity:	0.2%
Step Response Time:	2 - 3 seconds to 99% of the final value

ISOLATED ANALOG OUTPUT (TB5, if applicable)

Same as non-isolated analog output except isolated.

Signal Type:	Current or voltage
Signal Level:	Current: 10 V max compliance at 20 mA output Voltage: 20 mA max for 0-10 V output
Function:	May be assigned to a display range or proportional control output with Setpoint #1 when used as a control output.
Linearity:	0.2%
Step Response Time:	2 - 3 seconds to 99% of the final value
Isolation	130 Vrms working voltage, 1000 V/60sec Dielectric test

Note ☞

- Only one analog output is available on each unit and it must be factory installed.

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SECTION 8. SPECIFICATIONS (Continued)

INPUT POWER INFORMATION

∿ AC units	115/230 V~(AC) ± 10%, 50/60 Hz 9.5 W max, power consumption (Non-Isolated Analog Out) 11.0 W max, power consumption (Isolated Analog Out)
⎓ DC units	10-32 Vdc or 26-56 Vdc, 8W (Refer to Table 8-1 below)

External Fuse Required:

IEC 127-2/III	
Power	Fuse
115 V	125 mA @ 250 (T)
230 V	63 mA @ 250 (T)
UL 248-14 (Listed Fuse)	
Power	Fuse
115 V	175 mA @ 250 V Slow-Blow
230 V	80 mA @ 250 V Slow-Blow

ENVIRONMENT

Operating temperature:	0° to 50°C (32° to 122°F)
Storage temperature:	-40° to 85°C (-40° to 185° F)
Relative humidity:	90% at 40°C (non-condensing)

MECHANICAL

Panel cutout:	1/8 DIN 3.62 x 1.78" (45 x 92mm)
Weight:	1.27 lb (575 g)
Case material:	Polycarbonate, 94 V-O UL rated
Protection:	NEMA-4/Type 4 Front Bezel

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SECTION 8. SPECIFICATIONS (Continued)

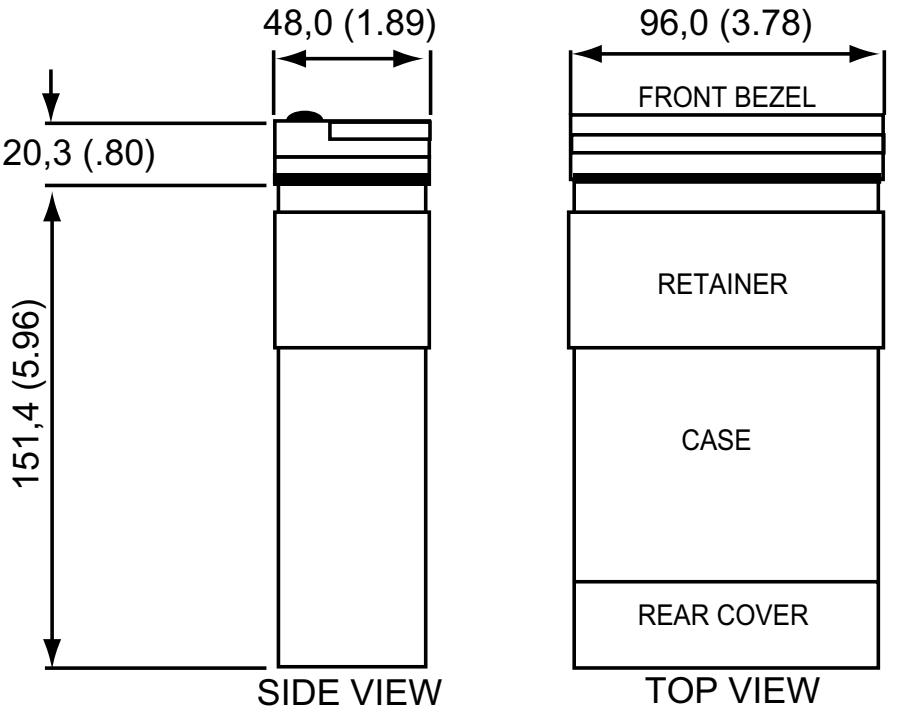
Table 8-1. COLOR CHART FOR DC POWER

COLOR	HIGH BRIGHTNESS	MEDIUM & LOW BRIGHTNESS
RED	Sensor Excitation: 24 V @ 25 mA, 12 V, 10 V, 5 V @ 35 mA Max Analog Output: Non-Isolated option only	Any combination of Sensor Excitation and Analog Output 24 V @ 25 mA, 12 V @ 35 mA Max 10 V @ 35 mA Max 5 V @ 35 mA Max Analog Output: Non-Isolated options or Isolated Analog option
GREEN	**Warning:** • Do not use Internal Excitation. Use External Excitation. • Do not use Isolated Analog Output. Use Non-Isolated Analog Ouput.	
AMBER		

Note ☞ HIGH/LOW Brightness and AMBER are only available on Version “B” meters. Standard display meters are MEDIUM Brightness.

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SECTION 8. SPECIFICATIONS (Continued)



NOTE: Dimensions in Millimeters (Inches)

Figure 8-1 Meter Dimensions/ Panel Cutout

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SECTION 9. FACTORY PRESET VALUES

Table 9-1. Factory Preset Values

MENU ITEM	FACTORY PRESET VALUES
INPt	Input Type: 0-20 (0-20 mA dc input)
dEC.P	Decimal Point Position: FFFF
Rd.S.O	Reading Scale and Offset: 4-20 mA dc = 0-1000
Rd.CF	Reading Configuration: R.1=t (Tare enabled) R.2=4 (10 µV resolution for unipolar & 25 µV resolution for bipolar) R.3=F (Filtered value)
NEW COLR	Normal Color Display: REd or GRN (Note: depending how unit was ordered)
S1.CF	Setpoint 1 Configuration: S.1=A (Setpoint is active above) S.2=U (Setpoint is unlatched)
S2.CF	Setpoint 2 Configuration: S.1=A (Setpoint is active above) S.2=U (Setpoint is unlatched)
S1.db	Setpoint 1 Deadband: 0003
S2.db	Setpoint 2 Deadband: 0003
Ot.CF	Output Configuration: O.1=E (Analog output is enabled) O.2=C (Analog output is current) O.3=A (Analog output follows the display value)
Ot.S.O	Output Scale and Offset: 0-1000 = 4-20 mA dc
LK.CF	Lock Out Configuration RS=E (Enable the **RESET** button in the Run Mode) SP=E (Enable setpoint changes) L3=O (Display setpoint values)
NEW bRIt	H.brt (Brightness Level)
SP1	Setpoint 1 Value: 0000
SP2	Setpoint 2 Value: 0000
Sensor Excitation Output: 12 Vdc	

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CE APPROVALS INFORMATION

CE This product conforms to the EMC directive 89/336/EEC amended by 93/68/EEC, and with the European Low Voltage Directive 72/23/EEC.

Electrical Safety EN61010-1:2001

Safety requirements for electrical equipment for measurement, control and laboratory.

Double Insulation

Pollution Degree 2

Dielectric withstand Test per 1 min

- Power to Input/Output: 2300 Vac (3250 Vdc)
- Power to Input/Output: 500 Vac (720 Vdc)
  (Low Voltage dc Power Option*)
- Power to Relays Output: 2300 Vac (3250 Vdc)
- Relay 1 to Relay 2: 2300 Vac (3250 Vdc)
- Isolated Analog to Inputs: 1000 Vac (1420 Vdc)
- Analog to Inputs: No Isolation

Measurement Category I

Category I are measurements performed on circuits not directly connected to the Mains Supply (power). Maximum Line-to-Neutral working voltage is 50 Vac/dc. This unit should not be used in Measurement Categories II, III, IV.

Transients Overvoltage Surge (1.2 / 50uS pulse)

- Input Power: 2500 V
- Input Power: 500 V
  (Low Voltage dc Power Option*)
- Isolated Analog: 500 V
- Input/Output Signals: 500 V

Note: **Units configured for external low power dc voltage, 10-32 Vdc (Basic Insulation)*

EMC EN61326:1997 + and A1:1998 + A2:2001

Immunity and Emissions requirements for electrical equipment for measurement, control and laboratory.

- EMC Emissions Table 4, Class B of EN61326
- EMC Immunity** Table 1 of EN61326

Note: ***I/O signal and control lines require shielded cables and these cables must be located on conductive cable trays or in conduits. Furthermore, the length of these cables should not exceed 30 meters*

⚠ Refer to the EMC and Safety installation considerations (Guidelines) of this manual for additional information.

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NOTES

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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 **one (1) year** from the date of purchase. In addition to OMEGA's standard warranty period, OMEGA Engineering will extend the warranty period for **four (4) additional years** if the warranty card enclosed with each instrument is returned to OMEGA.

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.

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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 product, and
3. Repair instructions and/or specific problems relative to the product.

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