

# INFCR

## INFINITY<sup>®</sup> C Programmable Digital RTD Meter

Operator's Manual



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This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as it 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 RTD Meter.

## Standard Procedures:

- \* Checking voltage jumpers, or changing voltage power
- \* Mounting the panel
- \* Selecting the input type
- \* Selecting a decimal point position
- \* 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



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## NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by these 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.



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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.

**Note**

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:

<b>QTY</b>	<b>DESCRIPTION</b>
1	Indicator/controller with all applicable connectors attached.
1	Owner's Manual
1	Set Mounting brackets
1	QuickStart Manual

**Note**

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.

## 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).

### Unpacking & Inspection



Unpack the instrument and inspect for obvious shipping damage. Do not attempt to operate the unit if damage is found.

This instrument is a panel mount device protected in accordance with Class I of EN 61010 (115/230 AC power connections). 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 mains supply cord.

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



- The **Protective Conductor** must be connected for safety reasons. Check that the power cable has the proper Earth wire, and it is properly connected. It is not safe to operate this unit without the Protective Conductor Terminal connected.



- 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.

---

## SECTION 2. ABOUT THE METER

### 2.1 DESCRIPTION

The Resistance Temperature Detector (RTD) meter is a value packed indicator/controller. Four full digits accurately display your temperature. Select from 2, 3 or 4 wire input configuration. 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. Front panel peak detection and memory is also standard. A mechanical lockout has been included to guard against unauthorized changes.

### 2.2 STANDARD FEATURES

The following is a list of features:

- \* 4-digit red 14 segment LED display
- \*  $\pm 0.5^{\circ}$  C accuracy
- \* Peak detection and memory
- \* Non-volatile memory-no battery backup
- \* 115 or 230 V ac 50/60 Hz power supply

The following is a list of optional features

- \* Dual 5 amps, form C relay outputs
- \* Scalable analog output
- \* Proportional control
- \* Front-panel deviation correction
- \* Easy setup for proportional control

## 2.3 AVAILABLE ACCESSORIES

**Table 2-1. Accessories and Add-Ons**

### **Add-On Options**

FS	Special Calib/Config
SPC4	NEMA-4 Splash Proof Cover
SPC18	NEMA-4 Splash Proof Cover, NEW

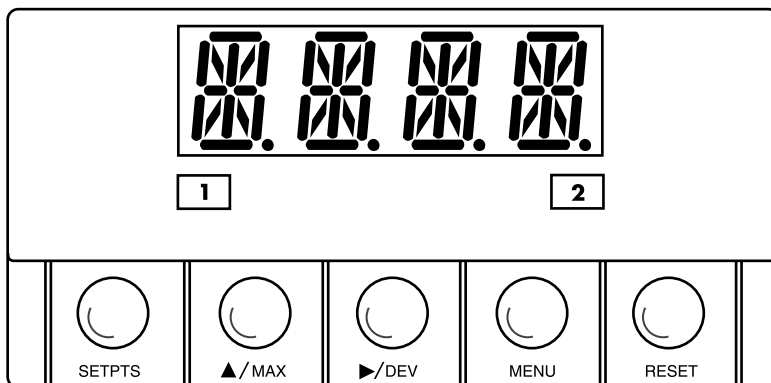
### **Accessories**

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 instrument
RP38	19-In. Rack Panel for three (3) 1/8 DIN instrument

## About The Meter

### 2.4 FRONT OF THE METER

Figure 2-1 shows each part of the front of the meter.



**Figure 2-1. Front-Panel Illustration**

#### **METER DISPLAY:**

**Digital LED display:** -1.9.9.9. or 9.9.9.9. 4-digit 14 segment, 0.54" high LED display with programmable decimal point.

**Setpoint LED:** Display windows light when appropriate:

- 1 - Setpoint 1 Status
- 2 - Setpoint 2 Status

## METER BUTTONS

### SETPTS Button

This button functions only in the run mode. When the meter is in the run mode, press this button to sequentially recall the previous setpoint settings. After using the **▲/MAX** and **▶/DEV** buttons to alter these settings as desired, press the **SETPTS** button to store these new values.

Unless you press the **SETPTS** button within 20 seconds to store your input, the meter will scroll to setpoint 2 and retain the last value stored.

**Note**

If the dual relay option is not installed, pressing the **SETPTS** button will display "**V.-03**" which is the meter's software version.

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### ▲/MAX Button

During the run mode, press the **▲/MAX** button to recall the PEAK reading since the last press of the **RESET** button. To return to the current readings without resetting the PEAK reading, press the **▲/MAX** button. To reset the PEAK reading, press the **RESET** button.

During the configuration mode, use the **▲/MAX** button to change the values of the flashing digit shown on the display and/or toggle between menu choices, such as "**R.1=F**" or "**R.1=C**". When configuring your setpoint values, press the **▲/MAX** button to increment the flashing digit from 0 to 9 by 1's.

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### ▶/DEV Button

During the run mode press the **▶/DEV** button to display the deviation from setpoint 1.

When configuring your setpoint values, press the **▶/DEV** button to scroll to the next digit.

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## **MENU** Button

In the run mode, press the **MENU** button to terminate the current measuring process and enter you into the configuration mode.

In the configuration mode, press the **MENU** button to store changes in the non-volatile memory and then advance you to the next menu item.

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## **RESET** Button

If you hard reset or power off/on the meter, it shows "**RST**" followed by "**RTD**".

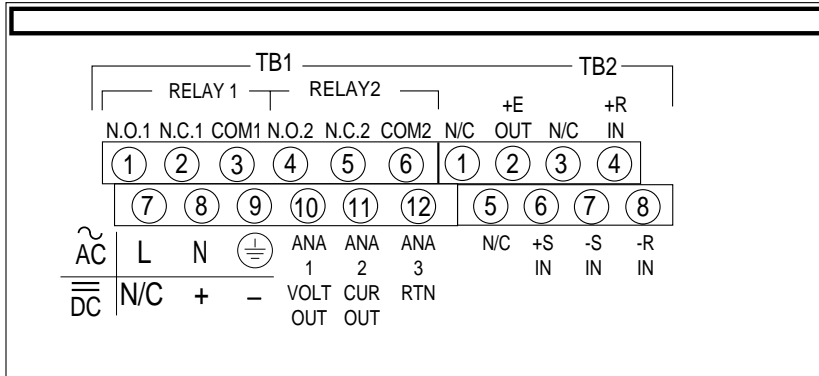
In the run mode, press the **RESET** button to reset the setpoints and display "**SP.RS**". If display shows peak value, press the **RESET** button to reset peak value. Display shows "**PK.RS**".

In the configuration mode, press the **RESET** button once to review the previous menu. Pressing the **RESET** button twice results in a hard reset and returns you to the run mode.

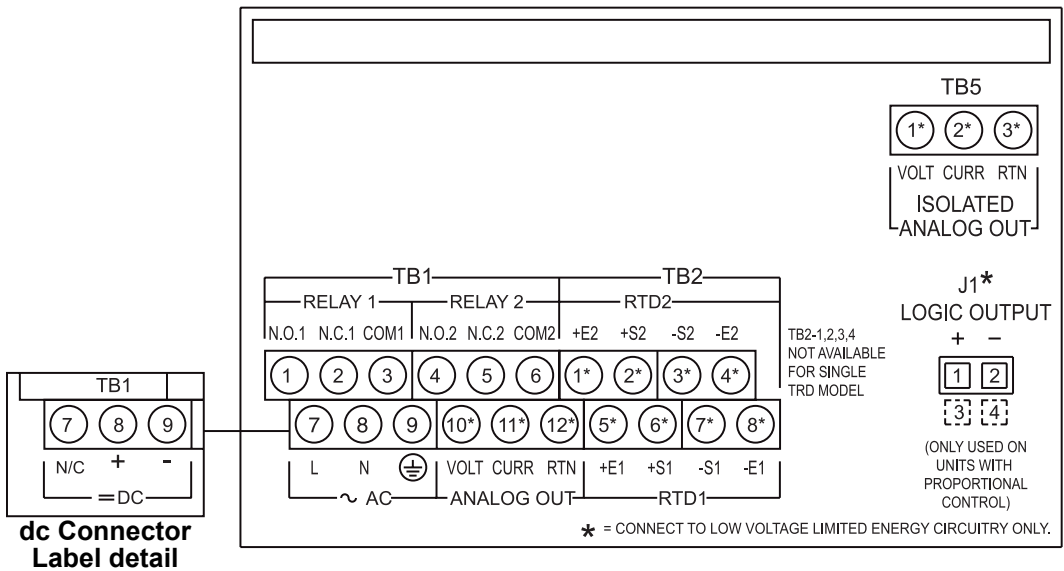
## About The Meter

### 2.5 REAR OF THE METER

Figure 2-2 shows the connector label mounted at the top of the meter housing. Table 2-2 gives a brief description of each connector at the rear of the meter.



**Figure 2-2. ac Connector Label Version 1**



**Figure 2-3. ac Connector Label Version 2**



## 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.

## 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



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

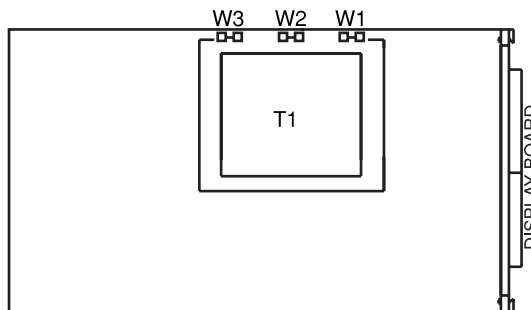


Disconnect the power from the unit before proceeding.

To check voltage jumpers, or to change from 115 V to 230 V ac:

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 - refer to Figure 3-1).
3. If your power requirement is **115 V ac, solder jumpers W1 and W3 should be wired, but jumper W2 should not.** If your power requirement is **230 V ac, solder jumper W2 should be wired, but jumpers W1 and W3 should not.**

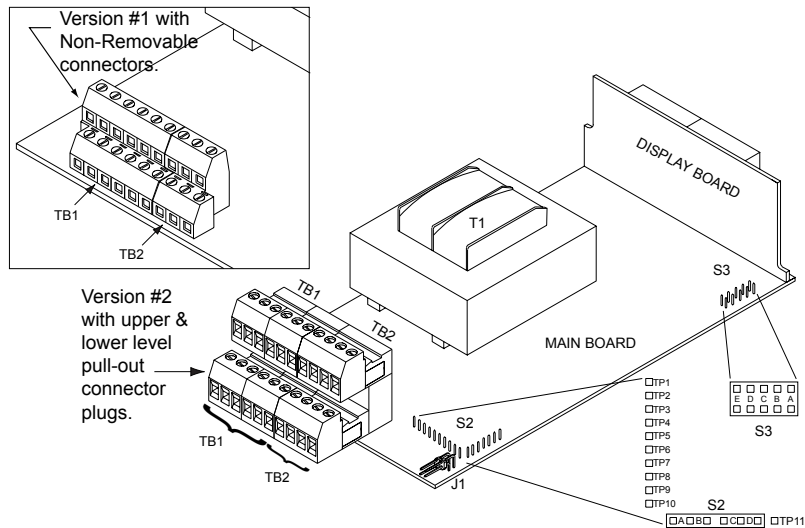
Figure 3-1 shows the location of solder jumpers W1 through W3 on the main board.



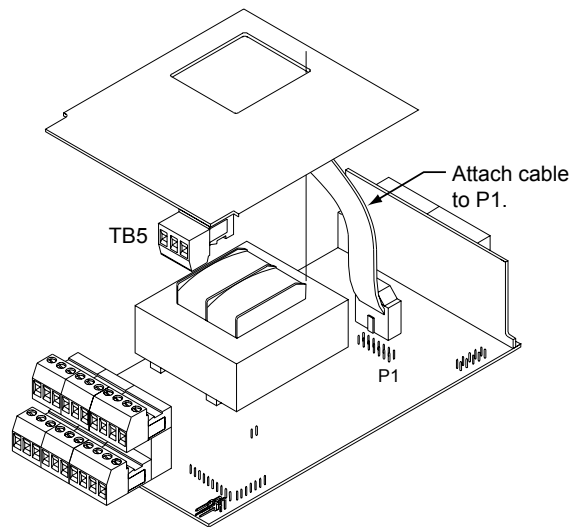
**Figure 3-1. Main Board Power Jumpers (W1, W2, W3)**

### 3.2 MAIN BOARD POWER JUMPERS (Continued)

Figure 3-2 shows the main board jumpers.



**Figure 3-2. Main Board Jumper Positions (6 S2 Pins)**



**Figure 3-3. Upper Option Board Installation**

## 3.2 MAIN BOARD POWER JUMPERS (Continued)

S2 jumpers are for sensor break indications:

- \* S2A jumper is not used
- \* S2B jumper is for positive sensor break (i.e. heating)
- \* S2C & S2D are not used

S3 jumpers are used for the following (refer to Table 3-1):

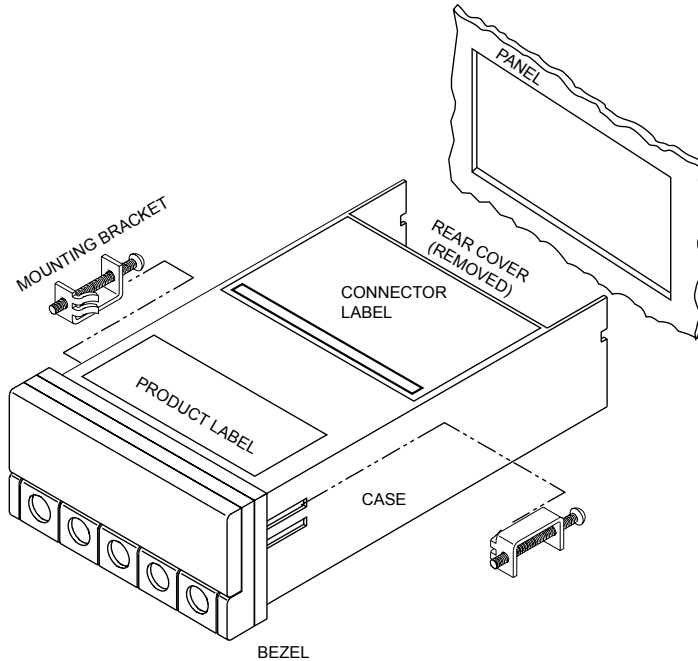
- \* To enable or disable the front panel push-buttons
- \* To allow for an extremely low resistance load for analog output
- \* To disable the **MENU** button
- \* To perform calibration procedure

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

**Table 3-1. S3 Jumper Functions**

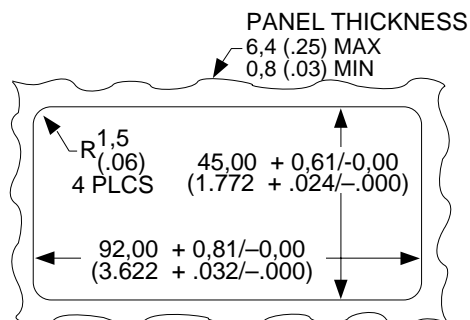
<b>Jumper</b>	<b>Description</b>
S3-A	Install to enable front panel push-buttons. Remove to disable all front panel push-buttons
S3-B	Removed. Install for meter calibration.
S3-C	Normally removed. Install for analog voltage output when load is less than 1 KW impedance. Care should be taken when installing this jumper.
S3-D	Removed. Not used.
S3-E	If installed without S3-B, the <b>MENU</b> button locks out. If you press the <b>MENU</b> button, the meter shows "LOCK".

## 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 is flush to the panel.
3. Proceed to Section 3.4 to connect your sensor input and main power.

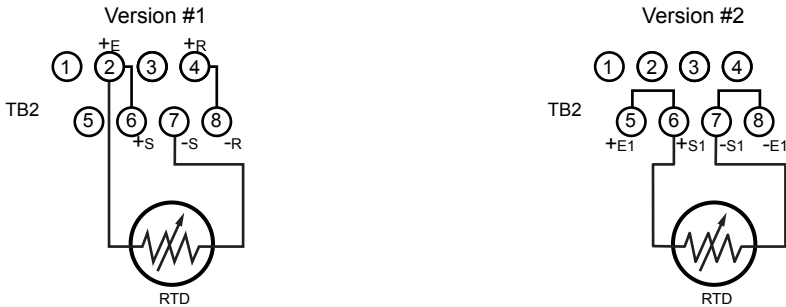


NOTE: Dimensions in Millimeters (Inches)

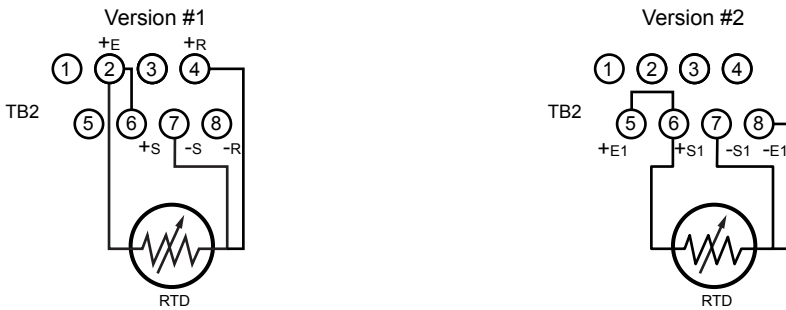
**Figure 3-5. Panel Cut-Out**

### 3.4 CONNECTING SENSOR INPUT

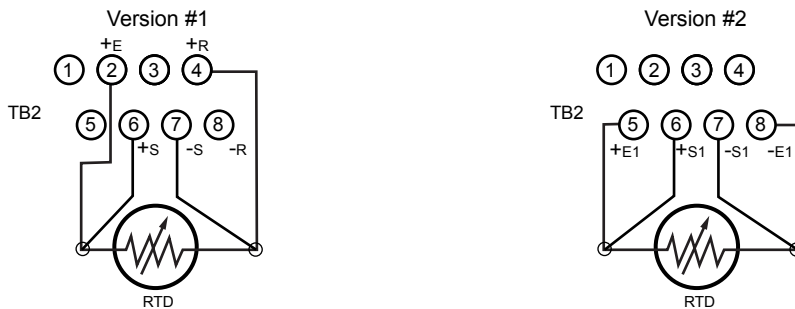
Figures 3-6 through 3-8 describe how to connect your sensors.



**Figure 3-6. 2-Wire RTD Input Connection**



**Figure 3-7. 3-Wire RTD Input Connection**



**Figure 3-8. 4-Wire RTD Input connection**

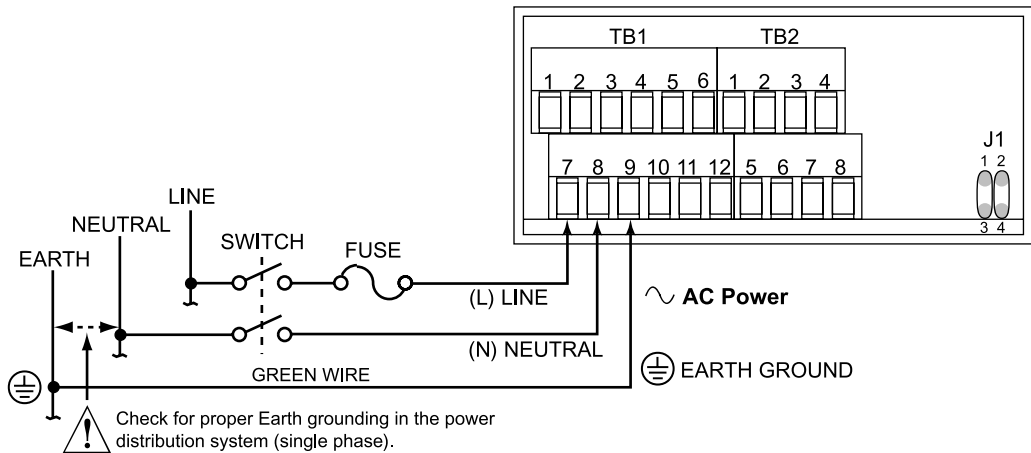
# Getting Started

## 3.5 CONNECTING MAIN POWER

Connect the ac main power connections as shown in Figure 3-8.



**WARNING:** Do not connect ac power to your meter until you have completed all input and output connections. Failure to do so may result in injury!



**Figure 3-9. Main Power Connections - ac**

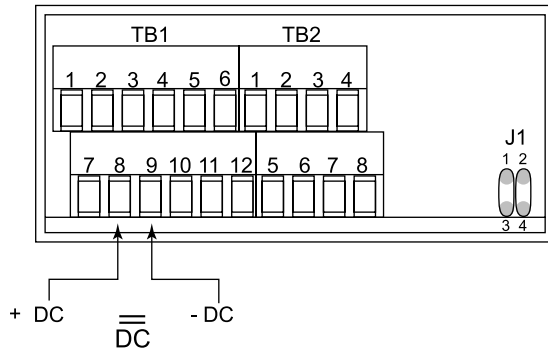
Table 3-2 shows the wire color and respective terminal connections for both USA and Europe.

**Table 3-2. AC Power Connections**

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

### 3.5 CONNECTING MAIN POWER (Continued)

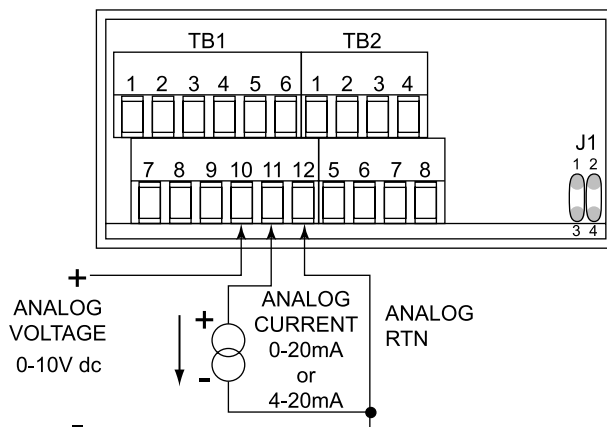
Connect the dc main power connections as shown in Figure 3-10.



**Figure 3-10. Main Power Connections - DC**

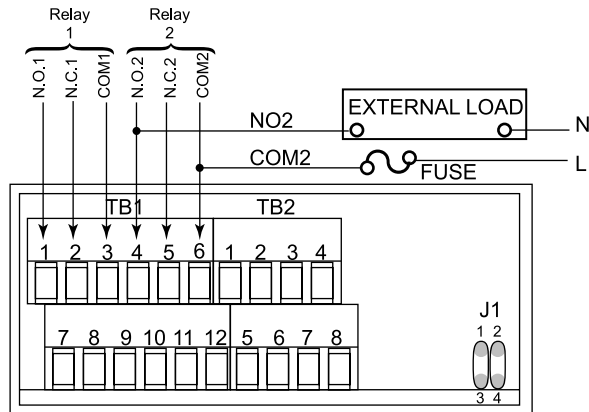
### 3.6 ANALOG AND RELAY OUTPUT CONNECTIONS

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

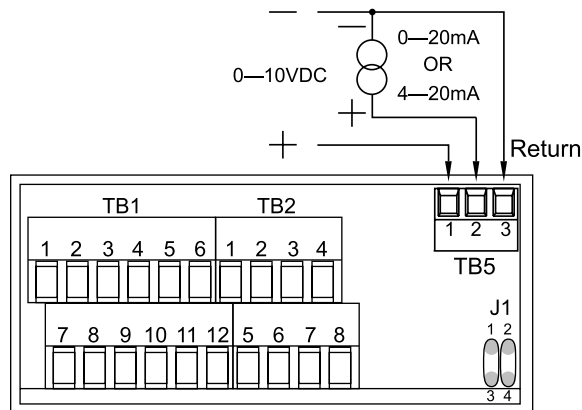


**Figure 3-11. Analog Output Connections**

## 3.6 ANALOG AND RELAY OUTPUTS (Continued)



**Figure 3-12. Relay Output Connections.**



**Figure 3-13. Isolated Analog Output Connections.**

## 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.

1. Press the **MENU** button until the meter shows "INPT" .
2. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "RTD.2" (2-wire RTD input)
  - \* "RTD.3" (3-wire RTD input)
  - \* "RTD.4" (4-wire RTD input)
3. Press the **▲/MAX** button to scroll through available choices.
4. Press the **MENU** button to store your choices. The meter momentarily shows "STRD", followed by "DEC.P" (Decimal point).

### 4.2 DECIMAL POINT POSITION (DEC.P)

To select a decimal point display position.

1. Press the **MENU** button until the meter shows "DEC.P".
2. Press the **▶/DEV** button. The meter shows one of the following:
  - \* FFFF.
  - \* FFF.F
3. Press the **▲/MAX** button to scroll between choices.
4. Press the **MENU** button to store your choices. The meter momentarily shows "STRD", followed by "RD.CF" (Reading Configuration).

**Note**

*When you change the decimal position the meter adjusts setpoints, deadbands, proportional band, and manual reset values. These adjustments are made according to the new decimal point. If one or more of these values overflow the meter flashes "ER2" when you store a new decimal point position.*

### AUTOMATIC DECIMAL POINT ADJUST

If you select 0.1 degree resolution the decimal point automatically adjusts itself to 1 degree if the temperature reading is above 999.9 or below -199.9.

## 4.3 READING CONFIGURATION ("RD.CF")

To determine if your meter shows in °F (Fahrenheit) or °C (Celsius).

1. Press the **MENU** button until the meter shows "**RD.CF**".
2. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "R.1=F" (°F)
  - \* "R.1=C" (°C)
3. Press the **▲/MAX** button to toggle between choices.
4. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**S1.CF**" (Setpoint 1 Configuration).

## 4.4 SETPOINT 1 CONFIGURATION (S1.CF)

Setpoint 1 is not active unless your meter has dual relay output capabilities. The LED's will display whether the (S1.CF) is active or not. You may use Setpoint 1 Configuration (S1.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
1. Press the **MENU** button until the meter shows "**S1.CF**".
  2. Press the **▶/DEV** button. The meter shows one of the following:
    - \* "S.1=A" (Active above the setpoint)
    - \* "S.1=B" (Active below the setpoint)
  3. Press the **▲/MAX** button to toggle between choices.
  4. Press the **▶/DEV** button again. The meter shows one of the following:
    - \* "S.2=L" Setpoint 1 to be latched
    - \* "S.2=U" Setpoint 1 to be unlatched
  5. Press the **▲/MAX** button to toggle between choices.
  6. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S2.CF**" (Setpoint 2 Configuration).

# Configuring The Meter

## 4.5 SETPOINT 2 CONFIGURATION (S2.CF)

Setpoint 2 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
1. Press the **MENU** button until the meter shows "**S2.CF**".
  2. Press the **▶/DEV** button. The meter shows one of the following:
    - \* "S.1=A" (Active above the setpoint)
    - \* "S.1=B" (Active below the setpoint)
  3. Press the **▲/MAX** button to toggle between choices.
  4. Press the **▶/DEV** button again. The meter shows one of the following:
    - \* "S.2=L" Setpoint 1 to be latched
    - \* "S.2=U" Setpoint 1 to be unlatched
  5. Press the **▲/MAX** button to toggle between choices.
  6. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S1.DB**" (Setpoint 1 Deadband).

## 4.6 SETPOINT 1 DEADBAND (S1.DB)

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

1. Press the **MENU** button until the meter shows "**S1.DB**".
2. Press the **▶/DEV** 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 **▶/DEV** button to scroll to the next digit.
5. Press the **MENU** button to store value. The meter momentarily shows "**STRD**", followed by "**S2.DB**" (Setpoint 2 Deadband)

## 4.7 SETPOINT 2 DEADBAND (S2.DB)

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

1. Press the **MENU** button until the meter shows "**S2.DB**".
2. Press the **▶/DEV** 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 **▶/DEV** button to scroll to the next digit.
5. Press the **MENU** button to store your selection. "**STRD**" momentarily displays, followed by cold junction offset if you have a standard meter (refer to Section 4.12) or "**OT.CF**" (Output Configuration) if you have analog output capabilities (refer to Section 4.8).

## 4.8 OUTPUT CONFIGURATION (OT.CF)

Output Configuration is not active unless your meter has analog output capabilities. The menu will display whether analog output is present or not. Use Output Configuration (OT.CF) to select the following:

- \* To enable or disable the analog output
- \* To determine if the analog output is current or voltage
- \* To determine if the analog output is a retransmission of the display or proportional to the error (the difference between reading and setpoint value)

### 4.8.1 To Enable or Disable The Analog Output

1. Press the **MENU** button until the meter shows "**OT.CF**".
2. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "O.1=D" (Analog output disabled)
  - \* "O.1=E" (Analog output enabled)
3. Press the **▲/MAX** button to toggle between choices.
4. Press the **▶/DEV** button to select analog output as current/voltage or press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset - refer to Section 4.11).

# Configuring The Meter

## 4.8.2 To Select Analog Output as Current or Voltage

1. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "O.2=V" (Analog output = voltage)
  - \* "O.2=C" (Analog output = current)
2. Press the **▲/MAX** button to toggle between choices.
3. Press the **▶/DEV** button to select analog output/proportional or press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset - refer to Section 4.11) or "**P.BND**" (Proportional Band - refer to Section 4.9).

## 4.8.3 To Select Analog Output or Proportional Control

To determine if the meter is to transmit an analog signal out (proportional to your display), or serve as a proportional controller (proportional to the error = display - setpoint 1).

1. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "O.3=A" (Analog output is retransmission of temperature)
  - \* "O.3=P" (Analog output is proportional)
2. Press the **▲/MAX** button to toggle between choices.
- 3a. If you select O.3 to equal A, press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset- refer to Section 4.11).
- 3b. If you select O.3 to equal P, press the **▶/DEV** button. The meter shows one of the following:
  - \* "O.4=D" (Proportional analog output is DIRECT ACTING)
  - \* "O.4=R" (Proportional analog output is REVERSE ACTING).
4. Press the **▲/MAX** button to toggle between choices.
5. Press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**P.BND**" (Proportional Band).
 

Additionally, if you select O.2 to equal V (Analog output to be voltage), press the **▶/DEV** button. The meter shows one of the following:

  - \* "O.5=F" (Proportional 0-10 V analog output)
  - \* "O.5=H" (Proportional 0-5 V analog output)
6. Press the **▲/MAX** button to toggle between choices.
7. Press the **MENU** button to store your choice(s). The meter momentarily shows "**STRD**", followed by "**P.BND**" (Proportional Band).

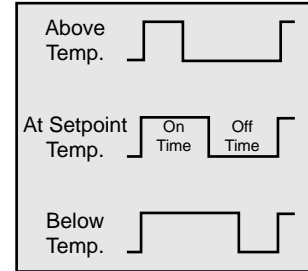
### 4.9 PROPORTIONAL BAND (P.BND)

Proportional controls are designed to eliminate the cycling associated with on-off control. A proportional controller decreases the average power being supplied to the heater, as the temperature approaches setpoint. This has the effect of slowing down the heater, so that it will not overshoot the setpoint, but will approach the setpoint and maintain a stable temperature. This proportioning action can be accomplished by turning the output on and off for short intervals. This "time proportioning" varies the ratio of "on" time to "off" time to control the temperature.

The time period between two successive turn-ons is known as the "cycle time" or "duty cycle". The proportioning action occurs with a "proportional band" around the setpoint temperature. Outside this band, the controller functions as an on-off unit, with the output either fully on (below the band) or fully off (above the band). However, within the band, the output is turned on and off in the ratio of the measurement difference from the setpoint. At the setpoint (the midpoint of the proportional band), the output on-off ratio is 1:1 that is, the on-time and off-times vary in proportion to the temperature difference. If the temperature is below setpoint, the output will be on longer. If the temperature is too high, the output will be off longer.

The proportional band is usually expressed as a percent of full input range scale, or in degrees. It may also be referred to as gain, which is the reciprocal of the band. In many units, the cycle time and/or proportional bandwidth are adjustable, so that the controller may be better matched to a particular process.

Proportional controllers have a manual reset (trim) adjustment, which may be used to adjust for an offset between the steady state temperature and the setpoint.



**Figure 4.1 Proportional Band**

In addition to electromechanical and solid state relay outputs, proportional controllers are also available with proportional analog signal outputs, such as 4 to 20mA or 0 to 5 Vdc. With these outputs, the actual output level amplitude is varied, rather than the proportion of on and off times.

To select the proportional band for your proportional controller.

**Note**

"P.BND" only shows if you select analog output as proportional.

1. Press the **MENU** button until the meter shows "**P.BND**".
2. Press the **▶/DEV** 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 **▶/DEV** button to scroll to the next digit.
5. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**M.RST**" (Manual Reset).

## 4.10 MANUAL RESET (M.RST)

Manual Reset (M.RST) is not active unless your meter has analog output capabilities. The menu will display whether analog output is present or not. This feature allows you to offset the error that may occur within 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 is the amount of error that you may want to enter into Manual Reset (M.RST).

**Note**

"M.RST" only shows if you select analog output as proportional.

1. Press the **MENU** button until the meter shows "**M.RST**".
2. Press the **▶/DEV** button. The meter shows 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 **▶/DEV** button to scroll to the next digit.
5. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed also momentarily by "**RST**" (Reset).

Always choose the value of "**M.RST**" less than "**P.BND/2**". meter will not accept larger values and displays with flashing "**ER 4**".

## 4.11 OUTPUT SCALE AND OFFSET (OT.S.O)

Output Scale and Offset (OT.S.O) 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 (OT.S.O) 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).

**Note** 

"OT.S.O" only shows if you select analog output as a retransmission of temperature.

1. Press the **MENU** button until the meter shows "**OT.S.O**".
2. Press the **▶/DEV** button. The meter shows "**RD 1**" (Read 1).

**Note** 

This is your first point of display reading.

3. Press the **▶/DEV** 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 value of Read 1.
5. Press the **▶/DEV** button to scroll to the next digit.
6. Press the **MENU** button to store your selection. The meter shows "**OUT.1**" (Output 1).

**Note** 

This starting analog signal corresponds to your Read 1 display.

7. Press the **▶/DEV** button. The meter shows selected output.

**Note** 

If you select "**O.2=V**" for voltage, the maximum signal you may select is 10.00 for an 0-10 V dc signal output. If you select "**O.2=C**" for current, the maximum signal you may select is 19.99.

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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 **▶/DEV** button to scroll to the next digit.
10. Press the **MENU** button to store your selection. The display shows "**RD 2**" (Read 2).

**Note** 

This is your second point of display reading.

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# Configuring The Meter

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11. Press the **▶/DEV** button. The 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 **▶/DEV** button to scroll to the next digit.
14. Press the **MENU** button to store your selection. "**OUT.2**" (Output 2) displays.



This analog signal should correspond to your Read 2 display.

15. Press the **▶/DEV** button. Selected output displays.



If you select "**O.2=V**" for voltage, the maximum signal you may select is 10.00 for an 0 to 10 V dc signal output. If you select "**O.2=C**" for current, the maximum signal you may select is 19.99 for a 0 to 20 or 4 to 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 **▶/DEV** button to scroll to the next digit.
18. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed also momentarily by "**RST**" (Hard Reset). Meter then returns you to the "**RUN**" mode.



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

## 4.12 LOCK OUT CONFIGURATION (LK.CF)

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.

### 4.12.1 To Enable or Disable Setpoint Changes

1. Press the **MENU** button until the meter shows "**LK.CF**" (after "**O.T.S.O**").
2. Press the **▶/DEV** button. The meter shows "**SP.=E**".
3. Press the **▲/MAX** button to toggle between:  
 "SP.=E" To enable setpoint changes  
 "SP.=D" To disable setpoint changes
4. Once desired mode shows, press the **MENU** button to store the change.

### 4.12.2 To Enable or Disable the RESET button in the Run Mode

1. If accessing this function from the main menu, press the **MENU** button until the meter shows "**LK.CF**". Otherwise, proceed to step 2.
2. Press the **▶/DEV** button until the meter shows "**SP.=E**".
3. Press the **▶/DEV** button again. The meter shows "**RS.=E**".
4. Press the **▲/MAX** button to toggle between:  
 "RS.=E" To enable the **RESET** button in the run mode  
 "RS.=D" To disable the **RESET** button in the run mode
5. Once desired mode shows, press the **MENU** button to store the change. The meter returns to the run mode.

### 4.12.3 To Enable Display's Program Version

1. Press the **▶/DEV** button. The meter shows one of the following:
  - \* "L.3=0" "**SETPTS**" button will display setpoint values.
  - \* "L.3=1" "**SETPTS**" button will display "**v.-03**" which is the meter's current software version.
2. Press the **▲/MAX** button to toggle between the choices above.
3. Press the **MENU** button to store the changes.

**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 software version. These units will have **+OL** (overload) or **+OPEN** memory indicated by Alarm 1 & 2 LED displays. LEDs can be reset by pressing **MENU** then **RESET** button or by power **OFF** then **ON**. These units can not use analog output proportional to error from setpoint 1, under menu OT.CF, 0.3=P.

# Configuring The Meter

## 4.13 RTD TEMPERATURE OFFSET. (T.OFF)

A new item has been added to calibrate for any offset error due to the RTD. This item will enable you to compensate any temperature offset due to the RTD transducer:

OFFSET = ACTUAL TEMPERATURE - DISPLAY TEMPERATURE

1. Press the **MENU** button until "**T.OFF**" displays.
2. Press the **▶/DEV** button. Previous offset value with digit 4 flashing will be displayed.
3. Press the **▶/DEV** button again. Reading temperature will be displayed (with no digit flashing).
4.
  - a. If the value is okay, then press the **MENU** button. Display will show "**STRD**" and 0 value will be entered at the offset.
  - b. If the value is not okay, then enter the actual temperature using the **▶/DEV** and the **▲/MAX** buttons.
5. Press the **MENU** button to store the changes.

**Note**

- a. Temperature unit is either celsius or fahrenheit and will always be displayed at 0.1 degree resolution. The meter flashes corresponding LED.
- b. MAX/MIN offset value will be  $\pm 25.0^{\circ}\text{C}$  or  $45.0^{\circ}\text{F}$ . If offset the limit, the meter will flash "**ER 3**" and previous offset will not be changed.

## 4.14 TUNING PROPORTIONAL CONTROLLER

The Proportional Controller is not active unless your meter has analog output capabilities. The menu will display whether analog output is present or not. This function allows you to tune your controller. Select proportional on Output Configuration (refer to Section 4.8.3) prior to tuning your controller. Include the meter in the process loop and turn on the meter. Allow enough time for the system to settle.

1. Press the **▶/DEV** button. The meter momentarily shows "**DEV**" followed by a blinking value. This value is the deviation (error) between Reading and Setpoint 1 values. If this error is zero, your controller is tuned. If a value other than zero shows, proceed with step 2.
2. Press **RESET** button. The meter shows "**TUNE**", tuning your controller and canceling any error. Once tuned, the meter shows "**RST**" and returns to the run mode.

**Note**

"**TUNE**" will be active if your meter has analog output and/or relay output capabilities.

3. Allow enough time for process to settle. Press the **▶/DEV** button. Verify that blinking value is zero. If blinking value is not zero, repeat step 2.

## SECTION 5. DISPLAY MESSAGES

**Table 5-1. Display Messages**

MESSAGE	DESCRIPTION
RTD	RTD Meter
RST	Hard (power on) reset
INPT	Input type
DEC.P	Decimal point
RD.CF	Reading configuration
S1.CF	Setpoint 1 configuration
S2.CF	Setpoint 2 configuration
S1.DB	Setpoint 1 deadband
S2.DB	Setpoint 2 deadband
OT.CF	Output Configuration
P.BND	Proportional band
M.RST	Manual reset
OT.S.O	Output scale and offset
LK.CF	Lock out configuration
±OPN	Sensor breaker or temperature outside the range
9999	Value overflow in setpoint/menu peak deviation routines
-1999	Value overflow in setpoint/menu peak deviation routine
ER1	2 coordinate format programming error
PEAK	Peak value
PK.RS	Peak reset
SP.RS	Reset setpoints
TUNE	Tuning proportional controller
SP1	Setpoint 1 value
SP2	Setpoint 2 value
ER2	One or more the following items have overflowed because of decimal point change: setpoint values, setpoint deadbands, proportional bands or manual reset.

## SECTION 6. MENU CONFIGURATION

Not all menu items display on standard meters.

**Table 6-1. Menu Configuration**

MENU	SUBMENU	DESCRIPTION
INPT		INPUT TYPE
	RTD.2	2-wire RTD 100 $\Omega$ PT., DIN standard.
	RTD.3	3-wire RTD 100 $\Omega$ PT., DIN standard
	RTD.4	4-wire RTD 100 $\Omega$ PT., DIN standard
DEC.P		DECIMAL POINT POSITION
	FFFF. FFF.F	Select to display whole degrees or tenths of a degree.
RD.CF		READING CONFIGURATION
		Select unit of temp:
	R.1 = C R.1 = F	Celsius Fahrenheit
S1.CF		SETPOINT 1 CONFIGURATION:
	S.1 = A	Active above
	S.1 = B	Active below
	S.2 = U	Unlatched
	S.2 = L	Latched
S2.CF		SETPOINT 2 CONFIGURATION:
	S.1 = A	Active above
	S.1 = B	Active below
	S.2 = U	Unlatched
	S.2 = L	Latched
S1.DB	0000 through 9999	SETPOINT 1 DEADBAND Select from 0000 through 9999
S2.DB	0000 through 9999	SETPOINT 2 DEADBAND Select from 0000 through 9999

Table 6-1 Continued

MENU	SUBMENU	DESCRIPTION
OT.CF		OUTPUT CONFIGURATION
	0.1	Analog Output: D: Disabled E: Enabled
	0.2	V: Voltage analog out C: Current analog out
	0.3	O: Proportional to reading P: Proportional to Setpoint 1
	0.4	D: Direct reading R: Reverse acting
	0.5	F: 0-10 V proportional H: 0-5 V proportional
P.BND	0000 through 9999	PROPORTIONAL BAND Select from 0000 through 9999
M.RST	-1999 through 9999	MANUAL RESET Select from -1999 through 9999
OT.S.O	-1999 through 9999	OUTPUT SCALE AND OFFSET 2-coordinate format for scaling the analog output
LK.CF		LOCK OUT CONFIGURATION
	SP.=E	Enable setpoint changes
	SP.=D	Disable setpoint changes
	RS.=E	Enable <b>RESET</b> button in run mode
	RS.=D	Disable <b>RESET</b> button in run mode

# Menu Configuration

Not all menu items display on standard meters.

**Table 6-2. Front Panel Displays**

<b>MENU</b>	<b>►/DEV</b>	<b>▲/MAX</b>	<b>DESCRIPTION</b>
INPT	Show input choices	SIGNAL INPUT RTD.2 RTD.3 RTD.4	2-wire RTD 3-wire RTD 4-wire RTD
DEC.P	Show input choices	FFFF. FFF.F	DECIMAL POINT
RD.CF	R.1	F C	READING CONFIGURATION Display in °F Display in °C
S1.CF	S.1	A B	SETPOINT 1 CONFIGURATION Active above Active below
	S.2	U L	Unlatched Latched
S2.CF	S.1	A B	SETPOINT 2 CONFIGURATION Active above Active below
	S.2	U L	Unlatched Latched
S1.DB	Scroll right one digit	Change the flashing digit's value	SETPOINT 1 DEADBAND Select 0000 through 9999 (Factory preset: 0003).
S2.DB	Scroll right one digit	Change the flashing digit's value	SETPOINT 2 DEADBAND Select 0000 through 9999 (Factory preset: 0003).

# Menu Configuration

Not all menu items display on standard meters.

**Table 6-2. Front Panel Displays (Continued)**

MENU	▶/DEV	▲/MAX	DESCRIPTION
OT.CF			OUTPUT CONFIGURATION
	0.1=	D	Disable analog output
		E	Enable analog output
	0.2=	V	Analog output = voltage
		C	Analog output = current
	0.3=	R	Regular analog output
		P	Proportional analog output
	0.4=	D	Proportional analog output is direct acting
		R	Proportional analog output is reverse acting
	0.5=	F	Analog output is 0-10 Vdc
		H	Analog output is 0-5 Vdc
<p><b>Note</b> If you select 0.2 = V, you may select your analog output to be 0-10 V or 0-5 V by accessing submenu 0.5. If you select 0.3=P, you may select your proportional output analog to be direct or reverse acting (4-20 or 20-4).</p>			
OT.S.O			OUTPUT SCALE AND OFFSET
Enter new value and show:	Show RD 1 and prior value entered. Scroll right one digit		
OUT1.			
Enter new value and show:	Prior value entered. Scroll right one digit	Change the flashing digit's value	
RD 2.			
Enter new value and show:	Prior value entered. Scroll right one digit	Change the flashing digit's value	
OUT2.	Scroll right one digit	Change the flashing digit's value	
P.BND text	Scroll right one digit	Change the flashing digit's value	PROPORTIONAL BAND Select from 0000 through 9999
M.RST	Scroll right one digit	Change the flashing digit's value	MANUAL RESET Select from -1999 through 9999

**Table 6-3. Run Mode Displays**

DISPLAY	▶/DEV	▲/MAX	RESET	DESCRIPTION
PEAK		Shows 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 Shows the highest reading since last reset
SP.RS				LATCHED RESET Pressing the <b>RESET</b> button will reset your setpoints
DEV	Shows the difference between the display reading and the setpoint 1 value.		Tunes the proportional control if 0.3=P. Goes back to "run" mode if 0.3=A	

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## SECTION 7. SETPOINT CONFIGURATION DISPLAYS


**Table 7-1. Setpoint Configuration Displays**

<b>MENU</b>	<b>▶/DEV</b>	<b>▲/MAX</b>	<b>DESCRIPTION</b>
SP 1	Scroll right one digit	Change the flashing digit's value	SETPOINT 1 Select from -1999 through 9999
SP 2	Scroll right one digit	Change the flashing digit's value	SETPOINT 2 Select from -1999 through 9999

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## SECTION 8. SPECIFICATIONS

### SIGNAL INPUT

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) = 60dB Common Mode Rejection (CMR) = 120dB
Input Protection:	Voltage Input = 120Vrms max Current Input = 200mA max
Protection:	240 V rms max for RTD input ranges
Display:	LED 14-segment, 13.8 mm (0.54") red
Symbol:	

### ANALOG TO DIGITAL

Technique:	Dual slope
Internal resolution:	15 bits
Read rate:	3/sec
Polarity:	Automatic
DIN Platinum	
Temperature range:	-200° to 850°C (-328 to 1562°F)
Alpha =	0.00385 (DIN 43760)

### ACCURACY AT 25°C

Temperature Stability:	±0.04°C/°C
Lead Resistance for Specified Accuracy	
	2 Wire Up to 100 milliohm/lead
	3 Wire Up to 10 ohms/lead balanced
	4 Wire Up to 20 ohms/total unbalanced
Step response:	1-2 seconds
Warm up to rated accuracy:	30 min

**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%
Load Regulation:	1.1%
Line Regulation:	0.02% /V ac
Step Response Time:	2 - 3 seconds to 99% of the final value

**INPUT POWER INFORMATION:**

Voltage -	ac	115/230 Vrms $\pm$ 10%
	dc	9.5 at 950mA dc to 32 V dc at 250mA dc
Frequency:		50-60 Hz
Power:		9.5 watts max.
External Fuse		
Protection Recommended:		
	ac	115V IEC 127-2/III, 125mA, 250V (T Type) or UL Slow-Blow, 175mA, 250V
	ac	230V IEC 127-2/III, 63mA, 250V (T Type) or UL Slow-Blow, 80mA, 250V

**ENVIRONMENT**

Operating temperature:	0 to 60°C (115/230 V rms $\pm$ 10%)
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 (574 g)
Case material:	Polycarbonate, 94 V-O UL rated

## **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 V ac or 30 V dc

## **ISOLATED ANALOG OUTPUT (TB5, if applicable)**

Same as non-isolated analog output except isolated to 1000 Vdc.

Signal Type: Current or voltage

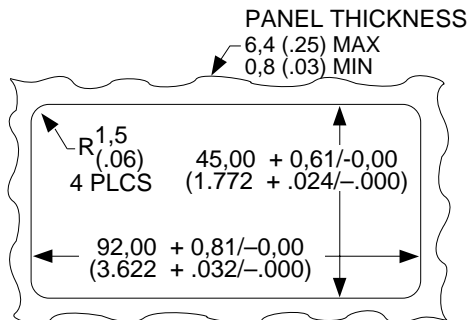
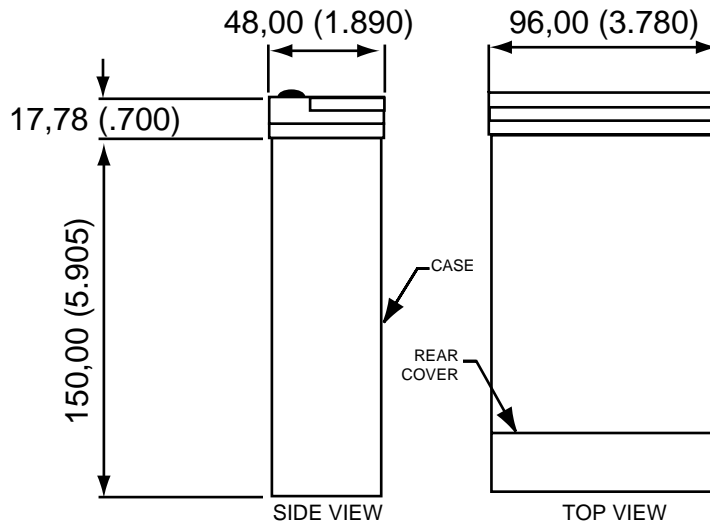
Signal Level: Current: 10 V max compliance at 20 mA output  
Voltage: 20 mA max for 0-10 V output

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

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



NOTE: Dimensions in Millimeters (Inches)

**Figure 8-1. Meter Dimensions**

## SECTION 9. FACTORY PRESET VALUES

**Table 9-1. Factory Preset Values**

<b>MENU ITEM</b>	<b>FACTORY PRESET VALUES</b>
INPT	Input Type: RTD.3
DEC.P	Decimal Point: FFFF.
RD.CF	Reading Configuration: R.1=F
S1.CF	Setpoint 1 Configuration: S.1=A S.2=U
S2.CF	Setpoint 2 Configuration: S.1=A S.2=U
S1.DB	Setpoint 1 Deadband: 0003
S2.DB	Setpoint 2 Deadband: 0003
OT.CF	Output Configuration: O.1=E O.2=C O.3=A
OT.S.O	Output Scale and Offset: 0-1000 = 4-20 mA dc
SP1	Setpoint 1 Value: 0000
SP2	Setpoint 2 Value: 0000



## **Warranty/Disclaimer**

NEWPORT Electronics, 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 NEWPORT's standard warranty period, NEWPORT Electronics will extend the warranty period for one (1) additional year if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective it will be repaired or replaced at no charge. NEWPORT'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 NEWPORT's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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## **Return Requests/Inquiries**

Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'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 NEWPORT:

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 NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:

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.

NEWPORT'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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For immediate technical or application assistance please call:

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