1 YEAR WARRANTY

CE UK CA

OMEGA™

User's Guide

Shop online at omega.com

e-mail: info@omega.com

For latest product manuals:
omega.com/en-us/pdf-manuals

DP25-TC AND DP25B-TC
Programmable Digital Thermocouple Meter

omega.com info@omega.com

Omega Engineering, Inc:

800 Connecticut Ave. Suite 5N01, Norwalk, CT 06854, USA
Toll-Free: 1-800-826-6342 (USA & Canada only)
Customer Service: 1-800-622-2378 (USA & Canada only)
Engineering Service: 1-800-872-9436 (USA & Canada only)

Tel: (203) 359-1660
e-mail: info@omega.com

Fax: (203) 359-7700

Omega Engineering, Limited:

1 Omega Drive, Northbank,
Irlam Manchester M44 5BD
United Kingdom

Omega Engineering, GmbH:

Daimlerstrasse 26 75392
Deckenpfronn Germany

Table of Contents

Table of Contents

List of Figures

Figure **Page**

List of Tables

Table **Page**

NOTES

SECTION 1. INTRODUCTION

1.1 DESCRIPTION

The Programmable Thermocouple Meter is a value packed indicator/ controller. Four full digits allow for an accurate display of your temperature. Your meter may be a basic indicator or it may include analog output or dual relay output. 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.

1.2 STANDARD FEATURES

The following is a list of features:

* 4-digit, three color programmable “Big” LED display or
  4-digit, standard LED Display
* NEMA 4/Type 4 Front Bezel
* ±0.5 °C accuracy
* J, K, DIN J or TC thermocouple types
* Peak detection
* Non-volatile memory-no battery backup
* 115 or 230 Vac 50/60 Hz power supply or
  10-32 Vdc or 26-56 Vdc

1.3 OPTIONAL FEATURES

* Dual 5 amp, form C relay outputs
* Scalable analog output
* Proportional control
* Front-panel deviation correction
* 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.

SECTION 2. 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.

SECTION 3. 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 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.

SECTION 4. 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.

Note

- 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.

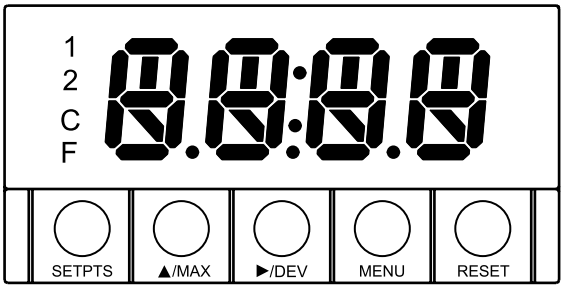
Failure to follow all instructions and warnings may result in injury!

SECTION 5. PARTS OF THE METER

5.1 FRONT OF THE METER

NEW

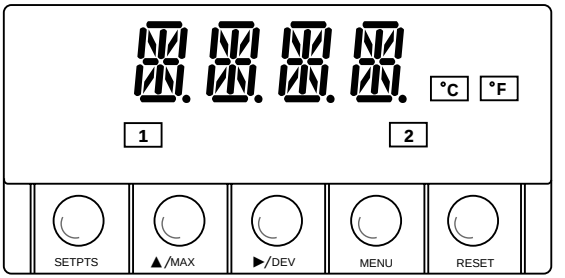
Figure 5-1 shows each part of the front of the three-color programmable “Big” LED display meter (Version B).



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 5-1. Front-Panel with Big Display

Figure 5-2 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 5-2. Front-Panel wtih Standard Display

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

- **1 -** Setpoint 1 status
- **2** - Setpoint 2 status
- **C** - °C unit indicator
- **F** - °F unit indicator

5 Pushbuttons for programming the meter.

5.1 FRONT OF THE METER (Continued)

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 or if the "**L.3=1**" on the "**LK.CF**" menu, pressing the **SETPTS** button will display the meter's firmware version.*

▲/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.

5.1 FRONT OF THE METER (Continued)

▶/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.

MENU BUTTON

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

Only if you have installed the lockout jumpers on the main board.

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.

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 "**t_C**".

In the setpoint mode, press the **RESET** button to reset the setpoints. The meter shows **"SP.RS"** 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 value. The meter shows **"PK.RS"** and return to the run mode.

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.

5.2 REAR OF THE METER

Figure 5-3 shows the connector label mounted at the top of the meter housing. Table 5-1 gives a brief description of each connector at the rear of the meter.

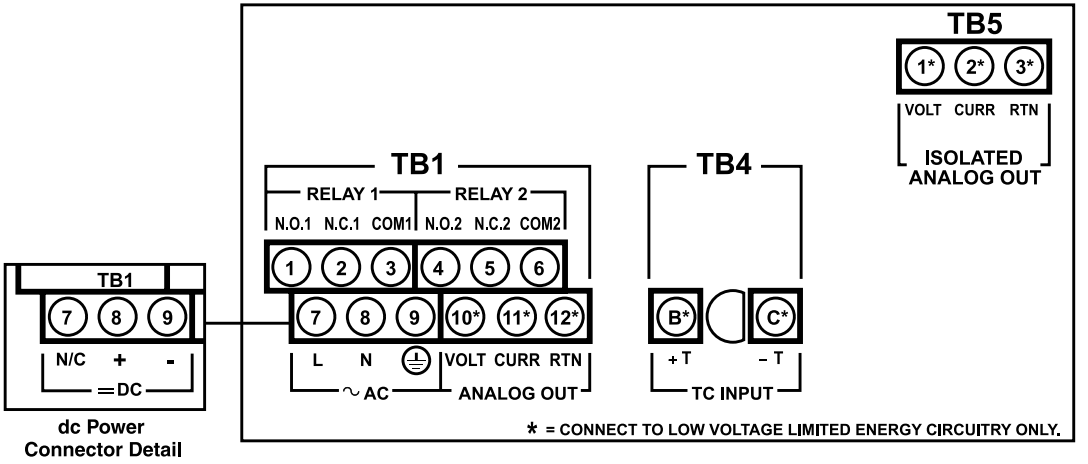


Figure 5-3. Connector Label (AC-Powered and DC-Powered Detail)

Table 5-1 Rear 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
TB4-B	+TC Input
TB4-C	-TC Input
TB5-1	Isolated Analog Voltage Output
TB5-2	Isolated Analog Current Output
TB5-3	Isolated Analog Output Return

NOTES

SECTION 6. SETUP

6.1 CONDITIONS REQUIRING 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.

6.2 DISASSEMBLY

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 it slide out of the case.

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 "**t_C**".

6.3 RATING/PRODUCT LABEL

This label is located on top of the meter housing (refer to Figure 6-3).

6.4 MAIN BOARD JUMPERS (refer to Figure 6-1)

Important: If you want to change the Factory preset jumpers, do the following steps; otherwise go to section 6.5.

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 6.2.
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.**

6.4 MAIN BOARD JUMPERS (Continued)

Figure 6-1 shows the W1 through W3 jumpers on the main board.

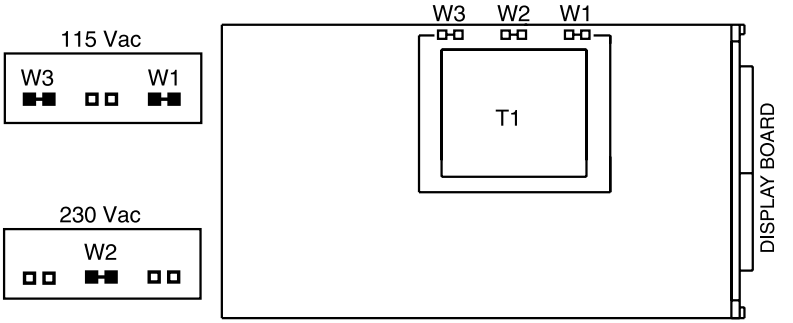


Figure 6-1. Main Board Power Jumpers (W1, W2, W3)

Figure 6-2 shows the main board jumpers.

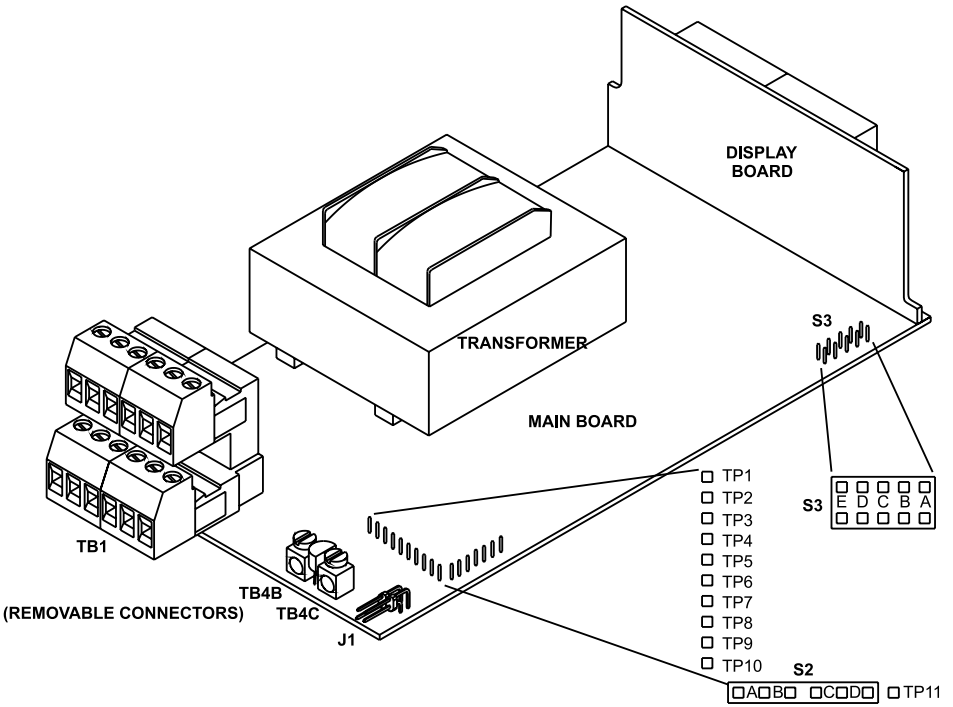


Figure 6-2. Main Board Jumper Positions

6.4 MAIN BOARD JUMPERS (Continued)

S2 jumpers are used for sensor break indications (refer to Table 6-1).

S3 jumpers are used for the following (refer to Table 6-1):

* 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 6-1. Jumper Functions

JUMPER	DESCRIPTION
S2-A	Install for negative sensor break (i.e., refrigeration).
S2-B	Install for positive sensor break (i.e., heating).
S2-C	Removed. Not used.
S2-D	Removed. Not Used.
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	Normally removed. Install for analog voltage output when load has less than 1 KΩ impedance. Care should be taken when installing this jumper.
S3-D	Removed. Not used.
S3-E	If installed without S3-B, the **MENU** button locks out.
S4-A	Removed. Not used.

6.5 PANEL MOUNTING

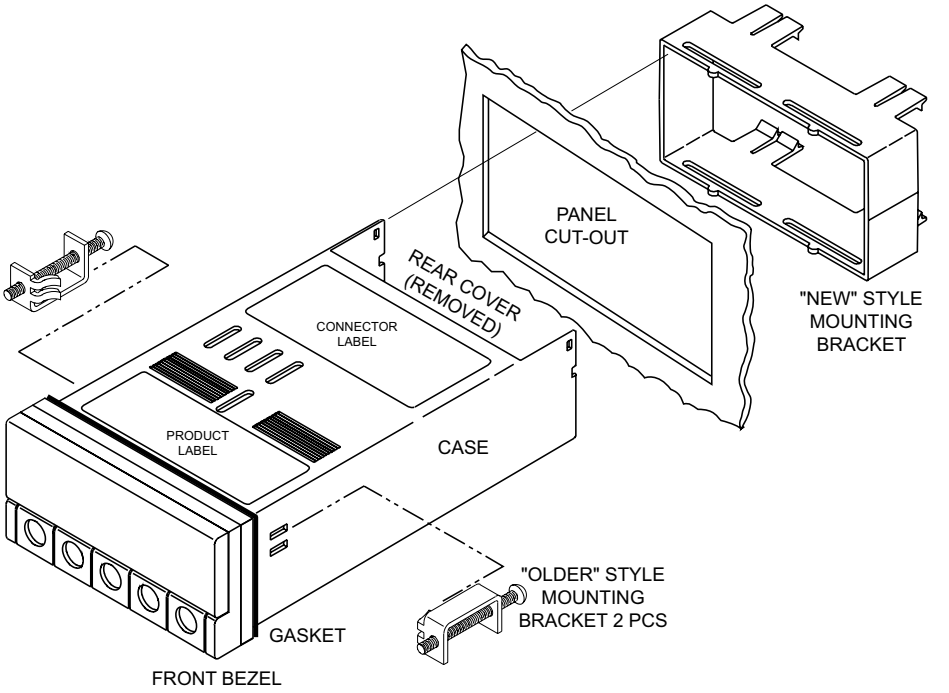


Figure 6-3. Meter - Exploded View

1. Cut a hole in your panel, as shown in Figure 6-3. For specific dimensions refer to Figure 6-4.
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 7 to connect your sensor input and main power.

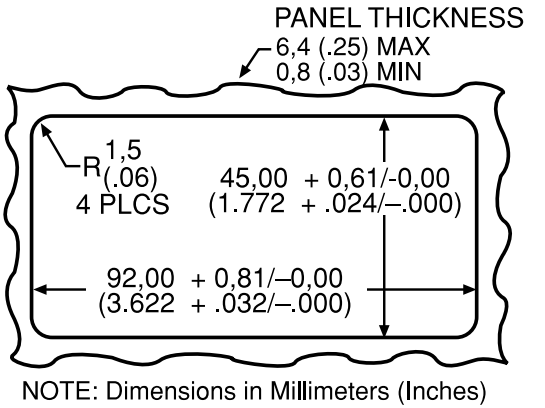


Figure 6-4 Panel Cutout

SECTION 7. SENSOR INPUT/ MAIN POWER CONNECTIONS

7.1 SENSOR INPUT CONNECTIONS

Figure 7-1 describes how to connect your sensor.

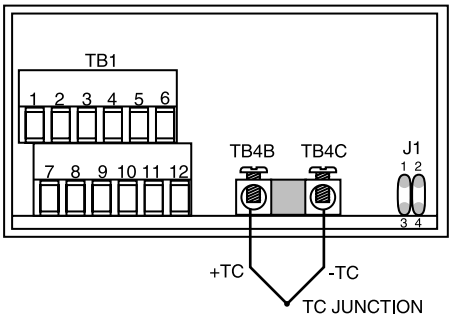


Figure 7-1. Sensor Input Connection

7.2 MAIN POWER CONNECTIONS

Figure 7-2 shows the proper AC power main power connections.

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!

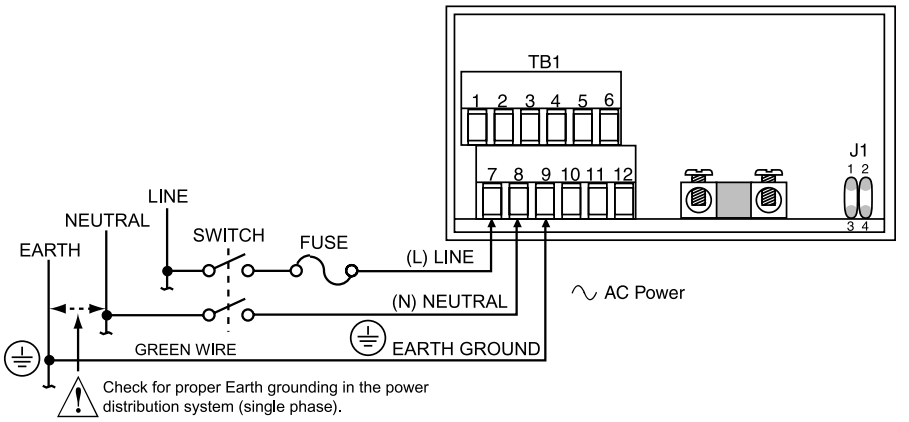


Figure 7-2. Main Power Connections - AC

7.2 MAIN POWER CONNECTIONS (Continued)

Table 7-1 shows the wire color and respective terminal connections for both USA and Europe.

Table 7-1. 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

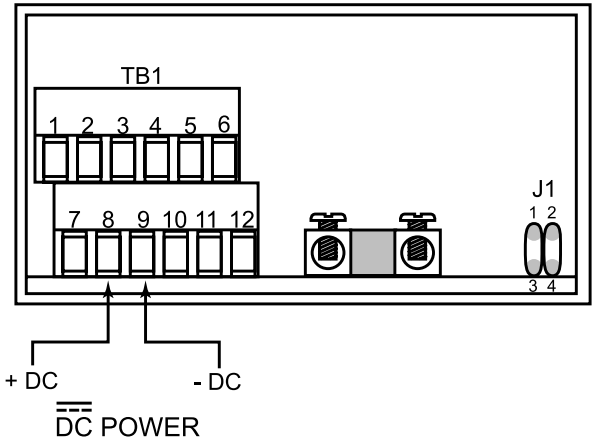


Figure 7-3. Main Power Connections - DC Powered Unit

7.3 ANALOG AND RELAY OUTPUT CONNECTIONS

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

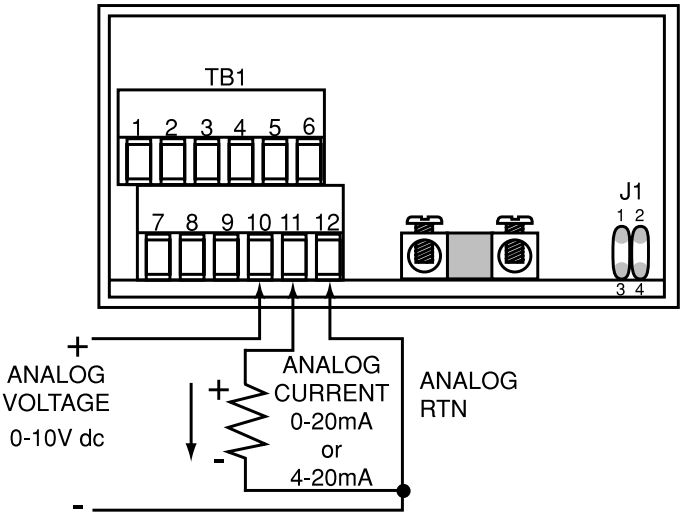


Figure 7-4. Analog Output Connections

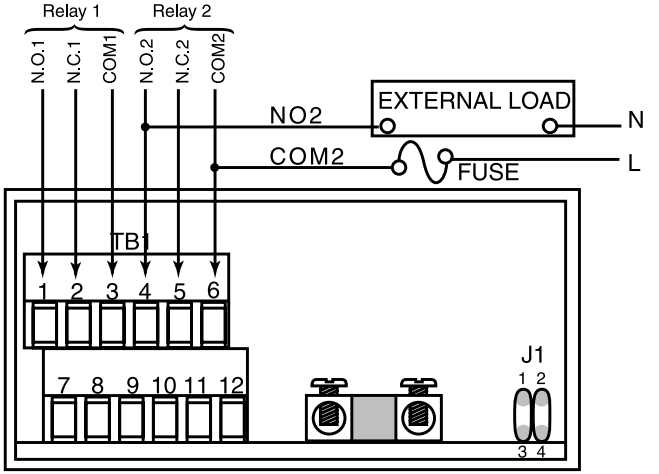


Figure 7-5. Relay Output Connections

7.3 ANALOG AND RELAY OUTPUT CONNECTING (Continued)

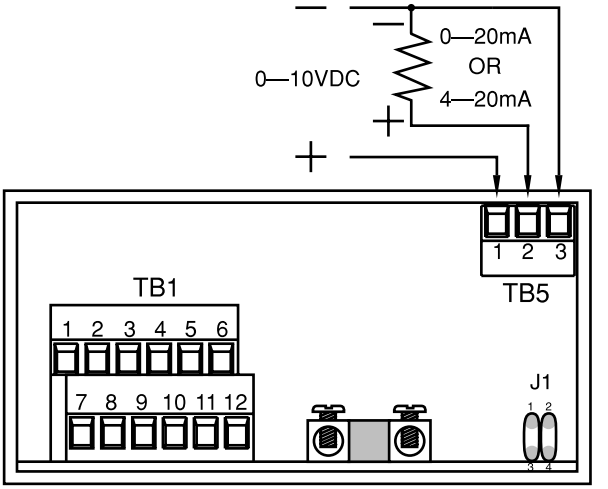


Figure 7-6. Isolated Analog Output Connections.

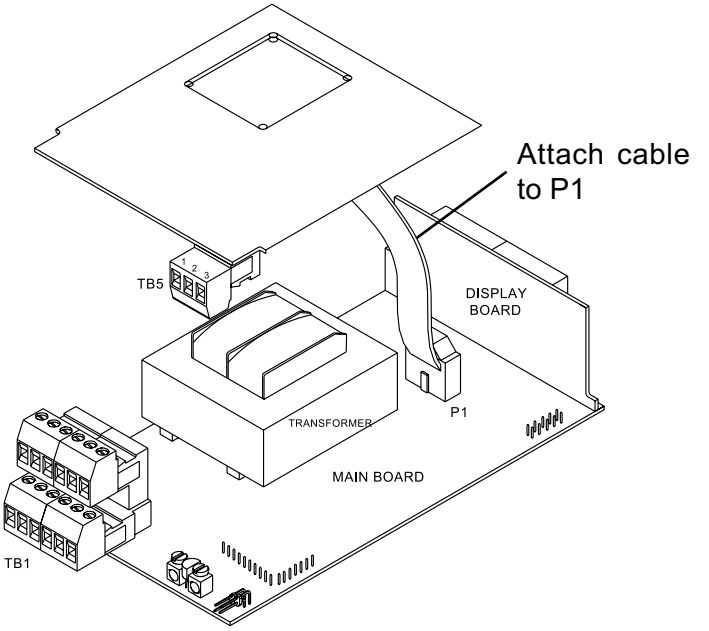


Figure 7-7. Isolated Analog Output Upper Board Installation

SECTION 8. INPUT TYPE (INPT)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

To select your appropriate input type signal follow these steps:

1. Press the **MENU** button until the meter shows "**INPT**" .

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

   * **J.TC** - Iron vs. Constantan (NIST)
   * **K.TC** - Nickel-Chromium vs. Nickel-Aluminum (NIST)
   * **DJ.TC** - Iron vs. Copper (DIN)
   * **T.TC** - Copper vs. Copper-Nickel

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).

SECTION 9. DECIMAL POINT POSITION (DEC.P)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration follow these steps:*

To select a decimal point display position follow these steps:

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 value.*

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.

SECTION 10. READING CONFIGURATION ("RD.CF")

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration follow these steps:*

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).

SECTION 11. COLOR CONFIGURATION (COLR)

NEW

Note ☞ *Refer to Table 25-1 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 ►/**DEV** 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.

SECTION 12. SETPOINT 1 CONFIGURATION (S1.CF)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

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(s). The meter momentarily shows "**STRD**", followed by "**S2.CF**" (Setpoint 2 Configuration).

SECTION 13. SETPOINT 2 CONFIGURATION (S2.CF)

Note *Refer to Table 25-1 for a summary list of menu configuration.*

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(s). The meter momentarily shows "**STRD**", followed by "**S1.DB**" (Setpoint 1 Deadband).

SECTION 14. SETPOINT 1 DEADBAND (S1.DB)

Refer to Table 25-1 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. 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)

SECTION 15. SETPOINT 2 DEADBAND (S2.DB)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

Note ☞ *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. 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 20) or "**OT.CF**" (Output Configuration) if you have analog output capabilities (refer to Section 16).

SECTION 16. OUTPUT CONFIGURATION (OT.CF)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

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 proportional to the display or to the error (the difference between reading and setpoint value)

16.1 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 19).

16.2 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 18) or "**P.BND**" (Proportional Band - refer to Section 17).

16.3 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)

Note ☞ Only shows up if relay and analog output purchased.

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 19).

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).

SECTION 17. PROPORTIONAL BAND (P.BND)

Refer to Table 25-1 for a summary list of menu configuration.

17.1 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).

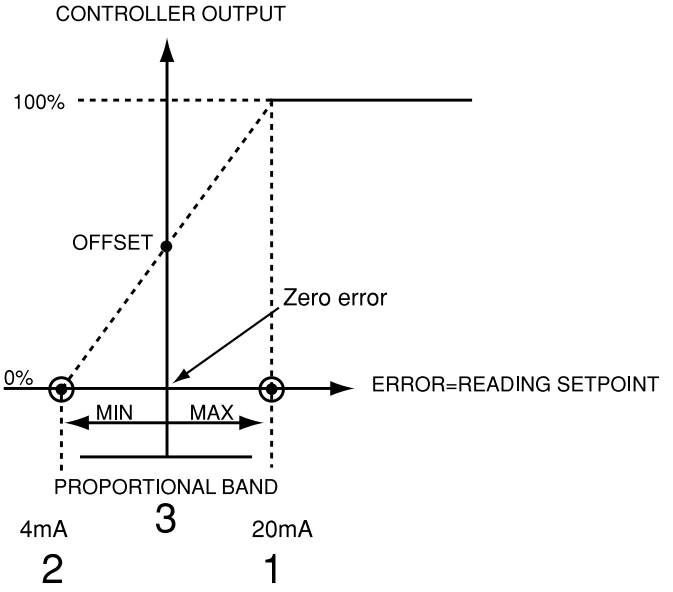


Figure 17-1. PROPORTIONAL BAND

- 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.

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

SECTION 17. PROPORTIONAL BAND (P.BND) (Continued)

If A is the controller gain the,

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

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**".

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).

Note ☞ *"**P.BND**" displays only if you select analog output as proportional.*

SECTION 18. MANUAL RESET (M.RST)

Note *Refer to Table 25-1 for a summary list of menu configuration.*

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**).

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). Then "**CJ.OF**" (Cold Junction Offset) displays (refer to Section 20).

*"**M.RST**" displays only if you select analog output as proportional.*
*Always choose the value of **"M.RST"** less than **"P.BND/2"**.*
*Meter will not accept larger values and displays with flashing **"ER 4"**.*

SECTION 19. OUTPUT SCALE AND OFFSET (OT.S.O)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

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 for a 0-20 or 4-20 mA dc signal output.*

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.

SECTION 19. OUTPUT SCALE AND OFFSET (OT.S.O) (Continued)

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.*

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.

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

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

    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 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 ▶/**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). "**CJ.OF**" (Cold Junction Offset) then displays.

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

SECTION 20. COLD JUNCTION OFFSET CALIBRATION (C.J.OF)

Note ☞ *Refer to Table 25-1 for a summary list of menu configuration.*

The cold junction offset equals the actual temperature minus the reading temperature. You may compensate for any error due to cold junction on the TC input. You may perform this compensation in any temperature from 0°C to 40°C (or 32°F to 104°F), however we recommend you perform this compensation at 0°C (32°F) for best result. To do this, immerse the thermocouple hot junctions into a mixture of ice and water. Check the Reading Configuration bit R.1 of the "RD.CF" menu setting for the proper temperature units.

TO PERFORM THIS COMPENSATION, FOLLOW THESE STEPS:

1. Connect the thermocouple wire to the +S and -S input.

2. Press the **MENU** button until meter displays **"CJ.OF"**.

3. Press the ▶/**DEV** button. the meter displays the previous offset value with flashing 4th digit.

4. Press the ▶/**DEV** button again. The reading temperature will be displayed (with no digit flashing).

5A. If the value is okay, then press the **MENU** button. The 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 ▲/**MAX** buttons. Once you enter the accurate temperature, press the **MENU** button. The meter displays **"STRD"** and stores the offset value.

Note ☞ *1. Temperature unit is either celsius or fahrenheit and will always be displayed at 0.1 degree resolution. The meter flashes corresponding LED.*

Note ☞ *2. MAX/MIN offset value will be ±25.0 °C or 45.0 °F. If offset the limit, the meter will flash **"ER 3"** and previous offset will not be changed.*

SECTION 21. LOCK OUT CONFIGURATION (LK.CF)

Note *Refer to Table 25-1 for a summary list of menu configuration.*

Use Lock Out Configuration (**LK.CF**) for the following:

* To enable or disable the **RESET** button in the run mode.
* To enable or disable setpoint changes

21.1 To Enable or Disable the RESET button in the Run Mode

1. Press the **MENU** button until the meter shows "**LK.CF**" after ("C.J.OF").
2. Press the ▶/**DEV** button until the meter shows "***RS.=E" (Default)***.
3. Press the ▲/**MAX** button to toggle between:

   "RS.=E" To enable the RESET button in the run mode (Default).

   "RS.=D" To disable the **RESET** button in the run mode.
4. Once desired mode shows, press the **MENU** button to store the change. The meter returns to the run mode.

21.2 To Enable or Disable Setpoint Changes

1. Press the **MENU** button until the meter shows "**LK.CF**" (after "**C.J.OF**").
2. Press the ▶/**DEV** button until the meter shows "***SP.=E"(Default).***
3. Press the ▲/**MAX** button to toggle between:

   "SP.=E" To enable setpoint changes (Default).

   "SP.=D" To disable setpoint changes
4. Once desired mode shows, press the **MENU** button to store the change.

21.3 To Enable Display's Program Version:

1. Press the **MENU** button until the meter shows "**LK.CF**" (after "**C.J.OF**").
2. Press the ▶/**DEV** button until 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.

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.*

SECTION 22. BRIGHTNESS CONFIGURATION

Refer to Table 25-1 for a summary list of menu configuration.

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

1. Press the **MENU** button until the meter shows “**bRit**” (after “**LK.CF**”).

2. Press the ►/**DEV** button from “**bRit**”. 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**”, “**t_C**”, then measured value.

SECTION 23. TUNING PROPORTIONAL CONTROLLER

The Proportional Controller is not active unless your meter has analog output and relay capabilities. The menu will display whether analog output is present or not. This function allows you to tune your controller provided you have analog output capabilities. Select proportional on Output Configuration (refer to Section 16-3) 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, then do the following.

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 there is no error (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 ☞ *Allow enough time for process to settle before proceeding with **"TUNE"** procedure. If any error happens during this procedure, meter will flash **"ER 4"** and abort the tuning. You have to restart the procedure.*

Note ☞ *"TUNE" will be active if your meter has analog output capabilities.*

3. Press the ▶/**DEV** button. Verify that blinking value is zero. If blinking value is not zero, repeat step 2.

SECTION 24. DISPLAY MESSAGES

Table 24-1. Display Messages

MESSAGE	DESCRIPTION
RST	Hard (power on) Reset
INPT	Input Type
DEC.P	Decimal Point
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
OT.CF	Output Configuration
P.BND	Proportional Band
M.RST	Manual Reset
OT.S.O	Output Scale and Offset
C.J.OF	Cold Junction Offset
ER3	Cold Junction Offset Error
LK.CF	Lock Out Configuration
bRit	Display Brightness NEW
+OL	+ Overload Signal
-OL	- Overload Signal
TUNE	Tuning Proportional Controller
ER4	Tuning Proportional Error
OPN	Sensor Breaker or Temperature Outside the Range
+999	Value Overflow in Setpoint/Menu Peak Deviation Routine
-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
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.
v.-*θ*.*θ*	Firmware version (where *θ* is 0 ~ 9)

SECTION 25. MENU CONFIGURATION

Not all menu items display on standard meters.

Table 25-1. Configuration Menu

(Defaults in Bold and Italics)

MENU	▶/DEV	▲/MAX
INPT Input Type	Shows input choices:	J.TC Iron vs. Constantan (NIST) ***K.TC Chromel vs. Alumel (NIST)*** DJ.TC Iron vs. Copper (DIN) T.TC Copper vs. Copper-Nickel
DEC.P Decimal Point	Shows decimal point position	***FFFF*** FFF.F
RD.CF Reading Configuration	R.1	C: Celsius ***F: Fahrenheit***
NEW **COLR** Display Color Selection	Shows input choices:	GRN (Green) RED (Red) AMBR (Amber)
S1.CF Setpoint 1 Configuration	S.1 S.2	***A: Active above*** B: Active below ***U: Unlatched*** L: Latched
S2.CF Setpoint 2 Configuration	S.1 S.2	***A: Active above*** B: Active below ***U: Unlatched*** L: Latched
S1.DB Setpoint 1 Deadband	Press to scroll to the next digit to the right	Press to change the value of the flashing digit
S2.DB Setpoint 2 Deadband	Press to scroll to the next digit to the right	Press to change the value of the flashing digit

Table 25-1. Configuration Menu (Continued)

(Defaults in Bold and Italics)

MENU	▶/DEV	▲/MAX
OT.CF Output Configuration Analog Output	0.1	D: Disabled ***E: Enabled***
	0.2	V: Voltage analog out ***C: Current analog out***
	0.3	***A: Retransmission of temperature*** P: Proportional to error
	0.4	D: Proportional analog output is direct reading R: Proportional analog output is reverse acting
	0.5	F: 0-10 V proportional H: 0-5 V proportional
	Note ☞ *If you select 0.2=V, you may select your analog output to be 0-10 V or 0-5V by accessing sub-menu 0.5=F or 0.5=H *If 0.3=P, you may select your proportional output analog to be direct 0.4=D (4-20 mA, 0-5 V, 0-10 v) or reverse acting 0.4=R (20-4 mA, 5-0 V, 10-0 V) .	
P.BND Proportional Band shown 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 if 0.3 = P	Shows prior value entered. Scrolls to the next digit to the right	Changes the value of the flashing digit

Table 25-1. Configuration Menu (Continued)

(Defaults in Bold and Italics)

MENU	▶/DEV	▲/MAX
OT.S.O Output Scale & Offset	Show "**RD 1**" & prior value	Change flashing digit's value
Enter new value & show "**OUT1**"	Scroll right one digit Show prior value	Change flashing digit's value
Enter new value & show "**RD 2**"	Scroll right one digit Show prior value	Change flashing digit's value
Enter new value & show "**OUT2**"	Scroll right one digit Show prior value	Change flashing digit's value
C.J.OF Cold Junction Offset	Show actual or prior value	Change flashing digit's value (°C only)
LK.CF Lock Out Configuration	RS=	***E*** ***(Enable RESET button in run mode)*** D (Disable **RESET** button in run mode)
	SP=	***E*** ***(Enable setpoint changes)*** D (Disable setpoint changes)
	L3=	***0*** ***(SETPTS button display setpoint values)*** 1 (**SETPTS** button display firmware version v.-8.8 where 8 is 0~9)
NEW **bRIt** Brightness Configuration		M.brt (Medium Brightness) L.brt (Low Brightness) ***H.brt*** ***(High Brightness)***

Table 25-2. Run Mode Displays

DISPLAY	▶/DEV	▲/MAX	RESET	DESCRIPTION
PEAK Peak Reading		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.
DEV	Press to activate		Tare proportional controller or exit deviation mode	Shows deviation value.
SP.RS				**LATCHED RESET** Press **RESET** button to reset your setpoints. **WARNING!** This resets your tare if you are using this mode.

SECTION 26. SETPOINT CONFIGURATION DISPLAYS

Table 26-1. Setpoint Configuration Displays

MENU	▶/DEV	▲/MAX	DESCRIPTION
SP 1 Setpoint 1	Press to scroll to the next digitto the right	Press to change the value of the flashing digit	SETPOINT 1 Select from -1999 through 9999
SP 2 Setpoint 2	Scroll right one digit	Press to change the value of the flashing digit	SETPOINT 2 Select from -1999 through 9999

SECTION 27. SPECIFICATIONS

SIGNAL INPUT

Thermocouple Types	J - Iron vs. Constantan (NIST)
Temperature Ranges	-210° through 760°C (-346° through 1400°F) K - Chromel vs. Alumel (NIST) -270° through 1372°C (-454° through 2500°F) DIN J - Iron vs. Constantan (DIN) -200° through 900°C (-328° through 1652°F) T - Copper vs. Copper-Nickel -270° through 400°C (-454° through 752°F)
Isolation	Dielectric strength to 2500V transient per 3mm spacing based on EN 61010 for 260Vrms or dc working voltage NMR- 60 dB CMR- 120 dB
"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	±0.5°C
Temperature Stability	0.05°C/°C
Step Response Time	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
Signal Level 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 (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.

INPUT POWER INFORMATION

∿ AC units	115/230 V~(AC) ±10%, 50/60 Hz 7 W max, power consumption (Non-Isolated Analog Output) 8 W max, power consumption (Isolated Analog Output)
⎓ DC units	12-32 Vdc 6 W max, power consumption (Non-Isolated Analog Output) 7 W max, power consumption (Isolated Analog Output)

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 1.77" (92 x 45mm)
Weight	1.27 lb (574 g)
Case Material	Polycarbonate, 94 V-O UL rated
Protection:	NEMA 4/Type 4 Front Bezel

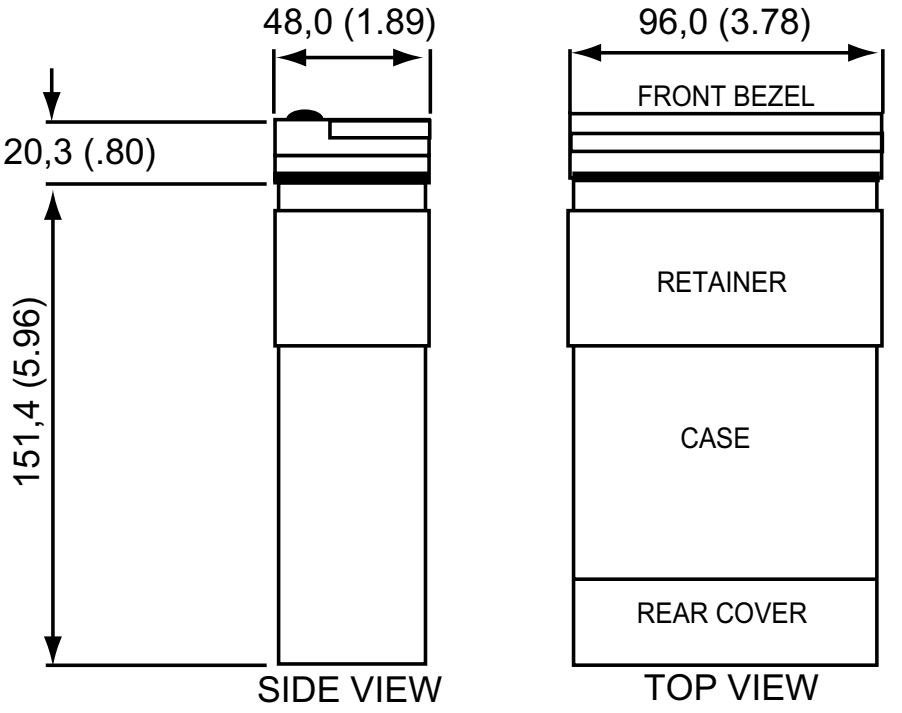
RELAY OUTPUTS (if applicable)

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 28 V DC

***Important Note:** For inductive loads not to exceed the maximum voltage/current relay specifications, a proper TVS protection diode needs to be used externally across Wiper and NC/NO contacts of relays.



NOTE: Dimensions in Millimeters (Inches)

Figure 27-1 Meter Dimensions

SECTION 28. FACTORY PRESET VALUES

Table 28-1. Factory Preset Values

MENU ITEM	FACTORY PRESET VALUES
INPT	Input Type: K.TC (Type K T/C)
DEC.P	Decimal Point Position: FFFF.
RD.CF	Reading Configuration: R.1=F (Fahrenheit)
COLR NEW	Normal Color Display: REd or GRN (Note: Depending how it 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=0 (**SETPTS** button display setpoint values)
bRit NEW	H.brt (Brightness Level)
SP1	Setpoint 1 Value: 0000
SP2	Setpoint 2 Value: 0000

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.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

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

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

OMEGA is a trademark of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

Shop online at omega.com

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Communications-Based Acquisition Systems
- Data Logging Systems
- Wireless Sensors, Transmitters, & Receivers
- Signal Conditioners
- Data Acquisition Software

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments