

NEWPORT

INFINITY



Operators' Manuals



INFINITY™ C RTD Temperature Meter with Time Proportional Control

Table of Contents

Section		Page
SEC 1	INTRODUCTION	1
1.1	Description	1
1.2	Features	1
SEC 2	AVAILABLE MODELS	2
SEC 3	UNPACKING	3
SEC 4	SAFETY CONSIDERATIONS	4
SEC 5	PARTS OF THE METER	5
5.1	Front of the Meter	5
5.2	Rear of the Meter	8
SEC 6	SETUP	10
6.1	Conditions Requiring Disassembly	10
6.2	Disassembly	10
6.3	Rating/Product Label	10
6.4	Main Board Power Jumpers	10
6.5	Panel Mounting	13
SEC 7	SENSOR INPUT AND MAIN POWER CONNECTIONS	14
7.1	Sensor Input Connections.....	14
7.2	Main Power Connections	15
7.3	Analog and Relay Output Communications.....	17
SEC 8	INPUT TYPE (“INPT”)	19
SEC 9	DECIMAL POINT POSITION (“DEC.P”)	20
SEC 10	READING CONFIGURATION (“RD.CF”)	21

Table of Contents

Section	Page
SEC 11 SETPOINT 1 CONFIGURATIONS ("S1.CF")	22
SEC 12 SETPOINT 2 CONFIGURATIONS ("S2.CF")	24
SEC 13A SETPOINT 1 DEADBAND ("S1.DB")	25
SEC 13B CYCLE TIME ("TIME")	26
SEC 14 SETPOINT 2 DEADBAND (S2.DB)	27
SEC 15 OUTPUT CONFIGURATION (OT.CF)	28
15.1 To Enable/Disable the Analog Output	28
15.2 To Select Analog Output as Current or Voltage	28
15.3 To Select Analog Output or Proportional Control	29
SEC 16 PROPORTIONAL BAND (P.BND)	30
SEC 17 MANUAL RESET (M.RST)	32
SEC 18 OUTPUT SCALE AND OFFSET (OT.S.O)	33
SEC 19 TUNING PROPORTIONAL CONTROLLER	35
SEC 20 LOCKOUT CONFIGURATION	36
SEC 21 DISPLAY MESSAGES	37
SEC 22 MENU CONFIGURATION	38
SEC 23 FRONT PANEL DISPLAYS	40
SEC 24 SETPOINT CONFIGURATION DISPLAYS	44
SEC 25 SPECIFICATIONS	45
SEC 26 FACTORY PRESET VALUES	50

List of Figures

Figure		Page
5-1	Front-Panel Illustration.....	5
5-2	Connector Label	8
6-1	Main Board Power Jumpers (W1, W2, W3, W4).....	11
6-2	Main Board Jumper Positions (6 S2 Pins)	11
6-3	Meter - Exploded View	13
7-1	2-Wire RTD Input Connection	14
7-2	3-Wire RTD Input Connection	14
7-3	4-Wire RTD Input Connection	15
7-4	Main Power Connections - AC	15
7-5	Main Power Connections - DC.....	16
7-6	Analog Output Connections.....	17
7-7	Relay Output Connections.....	17
7-8	Transistor Output Connections.....	18
16-1	Proportional Band.....	30
25-1	Meter Dimensions.....	49

List of Tables

Table		Page
2-1	Model Listing	2
5-1	Front-Panel Part Description	6
5-2	Rear Connector Description	9
6-1	S3 Jumper Functions	12
7-1	AC Power Connections	16
21-1	Display Messages	37
22-1	Menu Configuration	38
23-1	Front Panel Displays	40
23-2	Run Mode Displays	43
24-1	Setpoint Configuration Displays	44
26-1	Factory Preset Values	50

SECTION 1. INTRODUCTION

1.1 DESCRIPTION

The INFINITY C Resistance Temperature Detector meter with Time Proportional (INFCRP) is a value packed low-cost indicator/controller. Four full digits accurately display the temperature. Select from 2, 3 or 4 wire input configuration. A fully scalable analog output is standard. You may configure this output as a proportional controller, or to follow your display. Dual 6 amp, form C relay outputs are also included with all units for alarm or control of critical processes. Front panel peak detection and memory are also standard. A mechanical lockout has been included to guard against unauthorized changes.

1.2 FEATURES

The following is a list of INFCRP features:

- * 4-digit red 14 segment LED display
- * ± 0.5 °C accuracy
- * Peak detection and memory
- * Dual 6 amp, form C relay outputs
- * Scalable analog output
- * Analog out proportional or time proportional control
- * Front-panel controller tuning
- * Non-volatile memory-no battery backup
- * Easy setup for proportional control
- * 115 or 230 V ac 50/60 Hz power supply
- * Optional NEMA-4 front panel cover

SECTION 2. AVAILABLE MODELS

Table 2-1. Model Listing

MODEL NO.	DESCRIPTION
INFCRP0	115 V ac power and red LED display
INFCRP1	230 V ac power and red LED display
INFCRP2	9.5 - 32 V dc power and red LED display
FS	Custom configuration or scaling
BL	Blank front panel
RP18	19" rack panel for one 1/8 DIN meter
RP28	19" rack panel for two 1/8 DIN meters
RP38	19" rack panel for three 1/8 DIN meters
SPC4	NEMA-4 front panel cover

SECTION 3. UNPACKING

Remove the packing list and verify that all equipment has been received. If there are any questions about the shipment, contact the NEWPORT Customer Service Department at 1-800-NEWPORT (800-639-7678) or (714) 540-4914.

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:

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

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.

SECTION 4. SAFETY CONSIDERATIONS

- * The meter is protected in accordance with Class II of IEC 348 and VDE 0411

To provide safe operation, follow these guidelines:

- * The meter has no power-on switch, so it will be in operation as soon as power is applied.
- * Do not expose your meter to rain or condensing moisture.
- * Do not operate your meter in flammable or explosive atmospheres.

SECTION 5. PARTS OF THE METER

5.1 FRONT OF THE METER

Figure 5-1 shows each part of the front of the meter. Table 5-1 gives a brief description of each part.

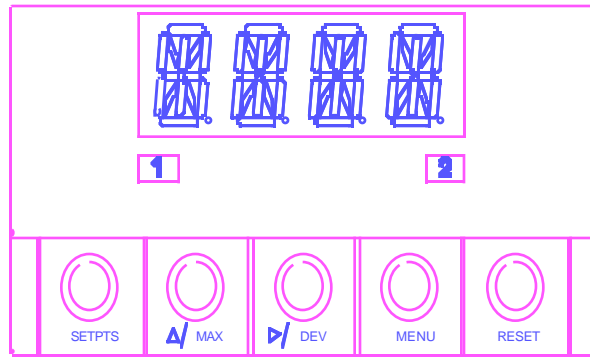


Figure 5-1. Front-Panel Illustration

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

Table 5-1. Front-Panel Part Description

ITEM	DESCRIPTION
1	<p>1.9.9.9. or 9.9.9.9. 4-digit 14 segment, 0.54" high LED display with programmable decimal point.</p>
2	<p>SETPOINT LED These LEDs labeled 1 and 2 display the status of setpoints 1 and 2.</p>
3	<p>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.</p> <p>Unless you press the SETPTS button within 20 seconds to store your input, the meter will scroll to set point 2 and retain the last value stored.</p>
4	<p>_/MAX BUTTON During the run mode, press the _/MAX button to recall the PEAK reading since the last press of the RESET button.</p> <p>To return to the current readings without resetting the PEAK reading, press the _/MAX button. To reset the PEAK reading, press the RESET button.</p> <p>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".</p> <p>When configuring your setpoint values, press the _/MAX button to increment the flashing digit from 0 to 9 by 1's.</p>

ITEM	DESCRIPTION
5	<p>_/DEV BUTTON</p> <p>During the run mode press the _/DEV button to display the deviation from setpoint 1.</p> <p>When configuring your setpoint values, press the _/DEV button to scroll to the next digit.</p>
6	<p>MENU BUTTON</p> <p>In the run mode, press the MENU button to terminate the current measuring process and enter you into the configuration mode (Note: only if you have installed the lockout jumpers on the main board).</p> <p>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.</p>
7	<p>RESET BUTTON</p> <p>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".</p> <p>In the configuration mode, press the RESET button once to review the previous menu.</p> <p>Pressing the RESET button twice results in a hard reset and returns you to the run mode.</p>

5.2 REAR OF THE METER

Figure 5-2 shows the connector label mounted at the top of the meter housing. Table 5-2 gives a brief description of each connector at the rear of the meter.

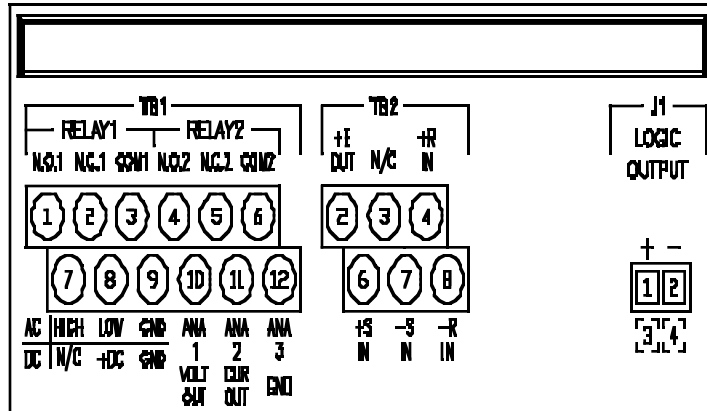


Figure 5-2. Connector Label

Table 5-2. 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 1 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 2 connection
TB1-7	AC high connection (NC on DC powered units)
TB1-8	AC low connection (+ Input on DC powered units)
TB1-9	AC ground (DC power return on DC powered units)
TB1-10	Analog 1 voltage output
TB1-11	Analog 2 current output
TB1-12	Analog 3 ground
TB2-2	+E: Positive excitation (current source)
TB2-3	No connection
TB2-4	+R: For 3 or 4 wire RTD connection
TB2-6	+S: Positive signal input
TB2-7	-S: Negative signal input
TB2-8	-R: For 2 wire RTD connection
J1-1	Transistor logic output (positive)
J1-2	Transistor logic output (ground)

SECTION 6. SETUP

6.1 CONDITIONS REQUIRING DISASSEMBLY

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

1. To check or change the 115 or 230 V ac power jumpers.
2. To install or remove jumpers on the main board.

6.2 DISASSEMBLY

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

1. Disconnect the main power from the meter.
2. Remove the rear case cover.
3. Lift the rear of the main board upwards and slide out of the case.

6.3 RATING/PRODUCT LABEL

This label is located on top of the meter housing.

6.4 MAIN BOARD POWER JUMPERS

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

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 - refer to Figure 6-1).
3. If your power requirement is **115 Vac, install solder jumpers W1 and W3, but do not install jumper W2**. If your power requirement is 230 Vac, install solder jumper W2, but do not install jumpers W1 or W3. Note: W4 jumper is not used.

6.4 MAIN BOARD POWER JUMPERS (Continued)

Figure 6-1 shows the location of solder jumpers W1, W2, W3 and W4.

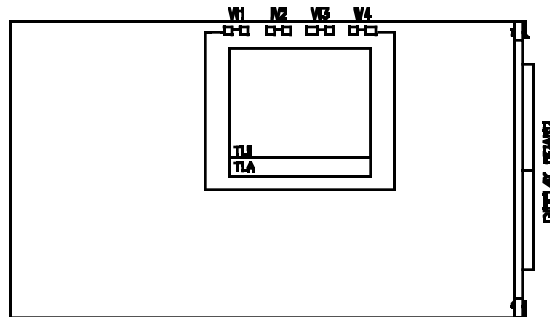


Figure 6-1. Main Board Power Jumpers (W1, W2, W3, W4)

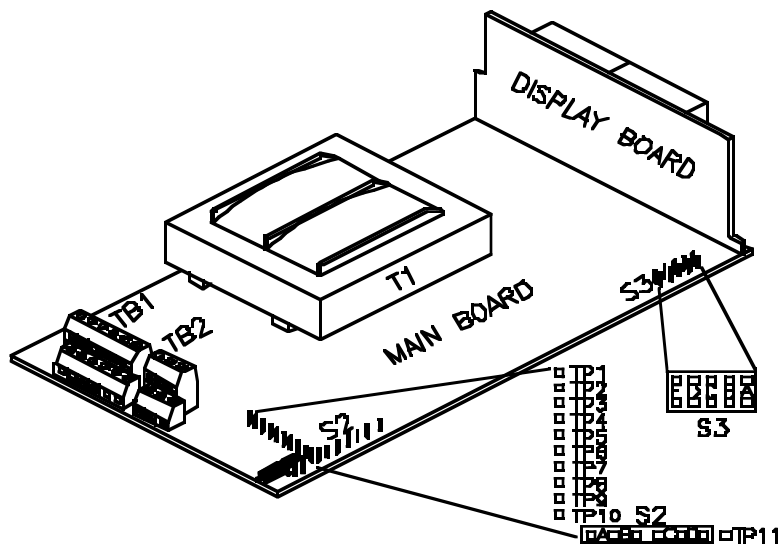


Figure 6-2. Main Board Jumper Positions

6.4 MAIN BOARD POWER JUMPERS (Continued)

Figure 6-2 shows the location of all jumpers. S2 jumpers act as sensor break indicators.

- * Install S2B for positive direction sensor break indication (i.e., for temperature).
- * S2A, S2C and S2D are not used.

Note: Manufacturer uses test pins TP1 - TP10 (TP11) for testing purposes. Do not use these pins as reading errors may result.

Install S3 jumpers for the following:

- * To enable or disable the front panel push-buttons.
- * To allow for an extremely low resistance load.
- * To disable the **MENU** button.

Table 6-1. S3 Jumper Functions

JUMPER	DESCRIPTION
S3-A	Install to enable front panel push-buttons. Remove to disable all front panel push-buttons
S3-B	Removed. Install for meter calibration.
S3-C	Normally removed. Install for analog voltage output when load is less than 1 K Ω impedance. Care should be taken when installing this jumper
S3-D	Removed. Not used.
S3-E	If installed without S3-H, it will lockout the MENU button (if you press the MENU button while in the run mode, the display will first show LOCK, and will then return to the run mode).

6.5 PANEL MOUNTING

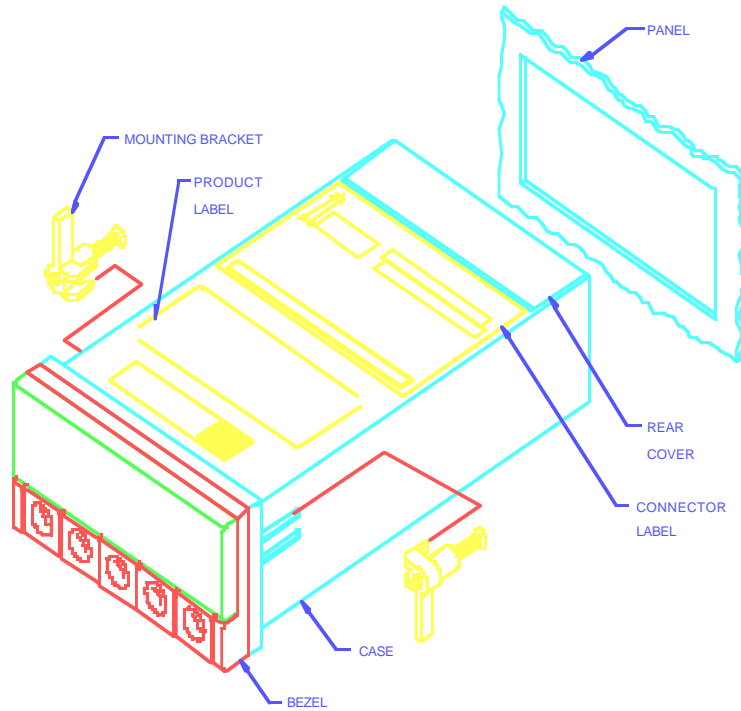


Figure 6-3. Meter - Exploded View

1. Cut a hole in the panel, as shown in Figure 6-3. For specific dimensions, refer to Section 25, Figure 25-1.
2. Insert the meter into the hole. Be sure the front bezel is flush with the panel.
3. Proceed to Section 7 to connect the sensor input and main power.

SECTION 7. SENSOR INPUT/ MAIN POWER CONNECTIONS

7.1 SENSOR INPUT CONNECTIONS

Figures 7-1 through 7-3 describe how to connect the sensors.



Figure 7-1. 2-Wire RTD Input Connection



Figure 7-2. 3-Wire RTD Input Connection

7.1 SENSOR INPUT CONNECTIONS (Continued)



Figure 7-3. 4-Wire RTD Input Connection

7.2 MAIN POWER CONNECTIONS

Figure 7-4 shows the proper AC power main power connections.

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!

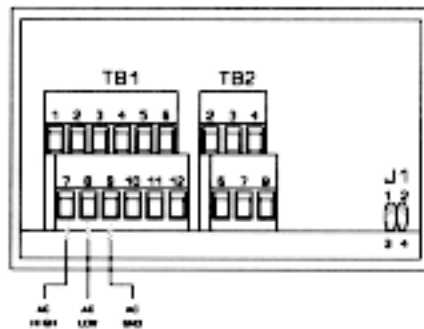


Figure 7-4. Main Power Connections -AC

7.1 SENSOR INPUT CONNECTIONS (Continued)

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

Table 7-1. AC Power Connections

AC POWER	WIRE COLORS	
	EUROPE	USA
AC High	Brown	Black
AC Low	Blue	White
AC Gnd	Green/Yellow	Green

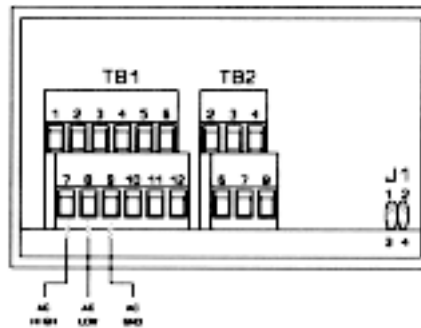


Figure 7-5. Main Power Connections - DC

7.3 ANALOG AND RELAY OUTPUT CONNECTIONS

Figures 7-6 and 7-7 illustrate how to connect your analog and dual relay outputs at the rear of the meter.

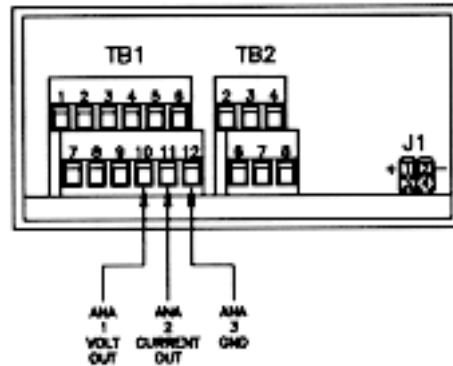


Figure 7-6. Analog Output Connections

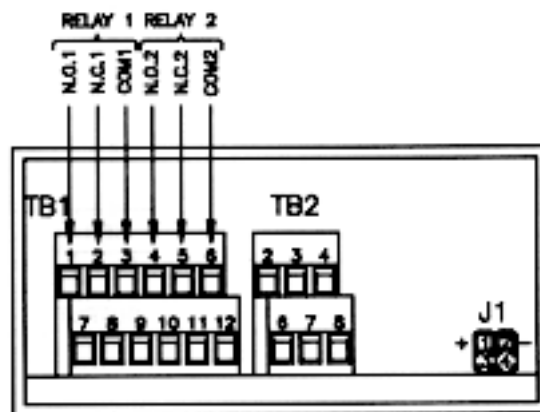


Figure 7-7. Relay Output Connections

7.3 ANALOG AND RELAY OUTPUT CONNECTIONS
(Continued)

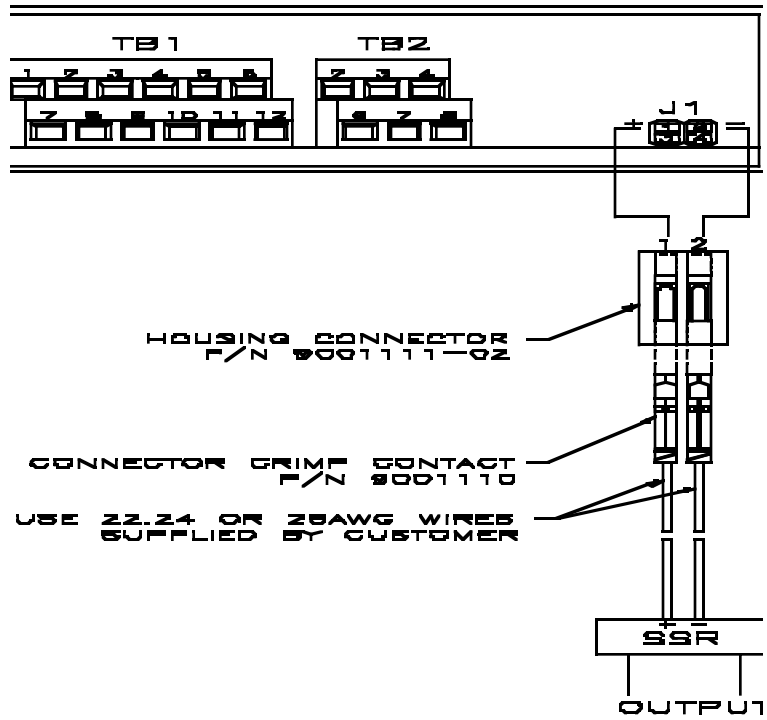


Figure 7-8. Transistor Output Connections

SECTION 8. INPUT TYPE ("INPT")

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

1. Press the **MENU** button until **"INPT"** appears.
2. Press the **_/DEV** button. One of the following flashes:
 - * **"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 selections.
4. Press the **MENU** button to store your selection. **"STRD"** momentarily appears, followed by **"DEC.P"** (Decimal point).

SECTION 9. DECIMAL POINT POSITION ("DEC.P")

To select a decimal point display position.

1. Press the **MENU** button until "**DEC.P**" appears.
2. Press the **_/DEV** button. One of the following appears:
 - * "**FFFF.**"
 - * "**FFF.F**"
3. Press the **_/MAX** button to change the decimal point position.
4. Press the **MENU** button to store your selection. "**STRD**" momentarily appears, followed by "**RD.CF**" (Reading Configuration).

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

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

To determine if the meter displays in _F (Fahrenheit) or _C (Celsius), follow these steps:

1. Press the **MENU** button until "**RD.CF**" appears.
2. Press the **_/DEV** button. One of the following appears:
 - * "**R.1=F**" (_F)
 - * "**R.1=C**" (_C)
3. Press the **_/MAX** button to toggle between selections.
4. Press the **MENU** button to store your selection. "**STRD**" momentarily appears, followed by "**S1.CF**" (Setpoint 1 Configuration).

SECTION 11. SETPOINT 1 CONFIGURATIONS ("S1.CF")

You may use Setpoint 1 Configuration ("**S1.CF**") for the following:

- * To set the setpoint's active band above/below your chosen value
- * To select whether the setpoint operation is latched or unlatched
- * To select on/off or time proportional control

1. Press the **MENU** button until "**S1.CF**" appears.

2. Press the **_/DEV** button. One of the following appears:

*

"**S.1=A**" (Active above the setpoint)

*

"**S.1=B**" (Active below the setpoint)

3. Press the **_/MAX** button to toggle between selections (press the **MENU** button only if you want to bypass "S.2" or "S.3" options and go directly to Setpoint 2 Configurations).

4. Press the **_/DEV** button again. One of the following appears:

*

"**S.2=L**" (Setpoint 1 to be latched)

*

"**S.2=U**" (Setpoint 1 to be unlatched)

5. Press the **_/MAX** button to toggle between selections (press the **MENU** button only if you want to bypass "S.3" options and go directly to Setpoint 2 Configurations).

6. Press the **_/DEV** button. One of the following appears:

*

"**S.3=O**" (setpoint 1 on/off control)

*

"**S.3=P**" (setpoint 1 on time proportional control)

SECTION 11. SETPOINT 1 CONFIGURATIONS ("S1.CF")

7. Press the **_MAX** button to toggle between available selections.
8. If you selected "**S.3=O**" (factory default), press the **MENU** button to store. "**STRD**" momentarily appears, followed by "**S2.CF**" (Setpoint 2 Configurations). If you selected "**S.3=O**" and press the **_DEV** button, the meter returns to **S.1** option.

If you selected "**S.3=P**", press the **_DEV** button. One of the following appears:

*

"**S.4=R**" (reverse acting, i.e., for heating)

*

"**S.4=D**" (direct acting, i.e., for refrigeration)

9. Press the **_MAX** button to toggle between available selections (press the **MENU** button only if you want to bypass "**S.5**" options and go directly to Setpoint 2 Configurations).
10. Press the **_DEV** button. One of the following proportional control options appears:
 - * "**S.5=S**" (slow control, cycle time from 5 to 199 sec)
 - * "**S.5=F**" (fast control, cycle time from .1 to 4.9 sec)
11. Press the **_MAX** button to scroll between available selections.
12. Press the **MENU** button to store your selection(s). "**STRD**" momentarily appears, followed by "**S2.CF**" (Setpoint 2 Configuration).

Note: Transistor logic out is always enabled for either On/Off or Time Proportional control modes. Relay #1 is enabled for On/Off control and for slow Time Proportional control ("**S.5=S**") modes. Relay #1 is disabled if "**S.5=F**" (fast mode).

SECTION 12. SETPOINT 2 CONFIGURATIONS ("S2.CF")

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 "**S2.CF**" appears.
 2. Press the **_/DEV** button. One of the following appears:
 - * "**S.1=A**" (Active above the setpoint)
 - * "**S.1=B**" (Active below the setpoint)
 3. Press the **_/MAX** button to toggle between selections (press the **MENU** button only if you want to bypass "S.2" options and go directly to the "**TIME**" display).
 4. Press the **_/DEV** button again. One of the following appears:
 - * "**S.2=L**" (Setpoint 1 to be latched)
 - * "**S.2=U**" (Setpoint 1 to be unlatched)
 5. Press the **_/MAX** button to toggle between selections.
 6. Press the **MENU** button to store your selection(s). "**STRD**" momentarily appears, followed by "**S1.DB**" (Setpoint 1 Deadband) or "**TIME**" (Cycle Time).

SECTION 13A. SETPOINT 1 DEADBAND ("S1.DB")

If you have selected "**S.3=0**" in Setpoint 1 Configurations ("**S1.CF**" - refer to Section 11), you may set the deadband (hysteresis) of setpoint 1.

1. Press the **MENU** button until "**S1.DB**" appears.
2. Press the **_/DEV** button. The last previously stored 4-digit number (0000 through 9999) appears 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 appears, followed by "**S2.DB**" (Setpoint 2 Deadband)

SECTION 13B. CYCLE TIME ("TIME")

If you have selected "**S.3=P**" in Setpoint 1 Configurations ("**S1.CF**" - refer to Section 11), you may specify a cycle time for the time proportional outputs.

1. Press the **MENU** button until "**TIME**" appears.
2. Press the **_/DEV** button. The last stored value appears as follows:

If you have selected "**S.5=S**" (slow) in S1.CF, the third digit will flash and you may enter maximum/minimum values from 0005. through 0199. seconds (unit of measure is second in this mode).

***Note:** If you have selected "S.5=S" the Transistor and Relay 1 outputs are both enabled.*

or

If you have selected "**S.5=F**" (fast) in "**S1.CF**", the second digit will flash and you may enter maximum/minimum values from 000.1 through 004.9 seconds (unit of measure is .1 second in this mode).

***Note:** If you have selected "S.5=F" only the Transistor output is enabled.*

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 appears, followed by "**S2.DB**" (Setpoint 2 Deadband).

SECTION 14. SETPOINT 2 DEADBAND ("S2.DB")

To set the deadband (hysteresis) of setpoint 2, follow these steps:

1. Press the **MENU** button until "**S2.DB**" appears.
2. Press the **_/DEV** button. The last previously stored 4-digit number (0000 through 9999) appears 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 appears, followed by "**OT.CF**" (Output Configuration).

SECTION 15. OUTPUT CONFIGURATION (OT.CF)

Use Output Configuration ("**OT.CF**") to perform the following tasks:

- * 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)

15.1 To Enable or Disable The Analog Output

1. Press the **MENU** button until "**OT.CF**" appears.
2. Press the **_/DEV** button. One of the following appears:
 - * "**O.1=D**" (Analog output disabled)
 - * "**O.1=E**" (Analog output enabled)
3. Press the **_/MAX** button to toggle between selections.
4. Press the **_/DEV** button to select analog output as current/voltage **or** press the **MENU** button to store your selection. "**STRD**" momentarily appears, followed by "**OT.S.O**" (Output Scale and Offset).

15.2 To Select Analog Output as Current or Voltage

1. Press the **_/DEV** button. One of the following appears:
 - * **"O.2=V"** (Analog output = voltage)
 - * **"O.2=C"** (Analog output = current)
2. Press the **_/MAX** button to toggle between selections.
3. Press the **_/DEV** button to select analog output or proportional control **or** press the **MENU** button to store your selection. **"STRD"** momentarily appears, followed by **"OT.S.O"** (Output Scale and Offset).

15.3 To Select Analog Output or Proportional Control

To determine if the meter is to transmit an analog signal out proportional to your display or proportional to the error (proportional control) (The error is defined as the difference between reading and Setpoint 1 value).

If you have selected **"S.3=P"** in Setpoint 1 Configurations (**"S1.CF"** - refer to Section 11), you cannot program the meter for analog output proportional control. You may, however, use the regular analog output. If you have selected **"S.3=O"** in Setpoint 1 Configurations, then you may select analog output or proportional control as follows:

1. Press the **_/DEV** button. One of the following appears:
 - * **"O.3=A"** (Analog output is retransmission of temperature)
 - * **"O.3=P"** (Analog output is proportional to the error)
2. Press the **_/MAX** button to toggle between selections.

15.3 To Select Analog Output or Proportional Control
(Continued)

- 3a. If you select "**O.3=A**", press the **MENU** button to store your selections. "**STRD**" momentarily appears, followed by "**OT.S.O**" (Output Scale and Offset).
- 3b. If you select "**O.3=P**", press the **_/DEV** button. One of the following appears:
- * "**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 selections.
5. Press the **MENU** button to store your selections. "**STRD**" momentarily display, followed by "**P.BND**" (Proportional Band).

Additionally, if you select "**O.2=V**" (Analog output to be voltage), press the **_/DEV** button. One of the following appears:

- * "**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 selections.
7. Press the **MENU** button to store your selections. "**STRD**" momentarily appears, followed by "**P.BND**" (Proportional Band).

SECTION 16. PROPORTIONAL BAND ("P.BND")

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).

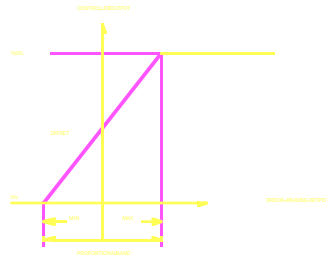


Figure 16-1. Proportional Band

There are three 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). The second 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 points need not be equally spaced on either side of the zero error point. The third is the factor that determines where these two points fall. This factor is called the "Offset" and it is the output value of the controller which causes zero error.

If A is the controller gain then,

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

A

$$\text{CONTROLLER OUT} = A * \text{ERROR} + \text{OFFSET}$$

SECTION 16. PROPORTIONAL BAND ("P.BND") (Continued)

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

Note: "P.BND" appears only if you select analog output as proportional.

1. Press the **MENU** button until "**P.BND**" appears.
2. Press the **_/DEV** button. The last previously stored 4-digit number (0000 through 9999) appears 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 appears, followed by "**M.RST**" (Manual Reset).

SECTION 17. MANUAL RESET ("M.RST")

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" *appears only if you select analog output as proportional.*

1. Press the **MENU** button until "**M.RST**" appears.
2. Press the **_/DEV** button. The last previously stored 4-digit number (-1999 through 9999) appears 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 appears, followed also momentarily by "**RST**" (Reset).

SECTION 18. OUTPUT SCALE AND OFFSET ("OT.S.O")

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" *appears only if you select analog output as a retransmission of temperature.*

1. Press the **MENU** button until "**OT.S.O**" appears.
2. Press the **_/DEV** button. "**RD 1**" (Read 1) appears.

Note: This is your first point of display reading.

3. Press the **_/DEV** button again. The last previously stored 4-digit number (-1999 through 9999) appears 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. "**OUT.1**" (Output 1) appears.

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

SECTION 18. OUTPUT SCALE AND OFFSET ("OT.S.O")

(Continued)

7. Press the **_/DEV** button. Selected output appears.

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.*

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.

11. Press the **_/DEV** button. The last previously stored 4-digit number (-1999 through 9999) appears 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) appears.

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

SECTION 18. OUTPUT SCALE AND OFFSET ("OT.S.O")

(Continued)

15. Press the **_/DEV** button. Selected output appears.

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 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. "**STRD**" momentarily appears, followed also momentarily by "**RST**" (Hard Reset). Meter then returns you to the "**RUN**" mode.

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

SECTION 19. TUNING PROPORTIONAL CONTROLLER ("TUNE")

This function allows you to tune your controller. Select either time proportional control or analog and proportional control.

Select time proportional control by setting "**S.3=P**" in Setpoint 1 Configurations ("**S1.CF**" - refer to Section 11).

or

Select analog and proportional control by setting "**O.3=P**" in Output Configuration ("**OT.CF**" - refer to Section 15).

Include the meter in the process loop and turn on the meter. Allow enough time for the system to settle.

1. Press **_/DEV** button. "**DEV**" momentarily appears, 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 appears, proceed with step 2.
2. Press **RESET** button. "**TUNE**" appears, tuning your controller and canceling any error. Once tuned, "**RST**" appears and meter returns to the run mode.
3. Allow enough time for process to settle. Press **_/DEV** button. Verify that blinking value is zero. If blinking value is not zero, repeat step 2.

SECTION 20. LOCKOUT CONFIGURATION ("LK.CF")

Use Lockout Configuration to disable setpoints, thereby allowing you to make changes. Also, to disable the **RESET** button in the run mode.

1. Press the **MENU** button until "**LK.CF**" appears.
2. Press the **_/DEV** button. One of the following appears:
 - * "**SP.=E**" (Setpoint change enabled)
 - * "**SP.=D**" (Setpoint change disabled)

Note: *If you set "SP.=D" , you may view setpoints, but cannot change their values.*

3. Press the **_/MAX** button to toggle between available selections.
4. Press the **_/DEV** button. One of the following appears:
 - * "**RS.=E**" (**RESET** button enabled)
 - * "**RS.=D**" (**RESET** button disabled)

Note: *If you set "RS.=D", when you press the RESET button "LOCK" appears. Meter then enters the Run mode.*

5. Press the **_/MAX** button to toggle between available selections.
6. Press the **MENU** button to store your selection. Meter appears "**RST**" and enters the run mode.

SECTION 21. DISPLAY MESSAGES

Table 21-1. Display Messages

MESSAGE	DESCRIPTION
"RST"	Hard (power on) reset
"INPT"	Input Type
"DEC.P"	Decimal Point
"RD.S.O"	Reading Scale and Offset
"RD.CF"	Reading Configuration
"S1.CF"	Setpoint 1 Configuration
"S2.CF"	Setpoint 2 Configuration
"S1.DB"	Setpoint 1 Deadband
"TIME"	Cycle time for the time proportional controller
"S2.DB"	Setpoint 2 Deadband
"OT.CF"	Output Configuration
"P.BND"	Proportional Band
"M.RST"	Manual Reset
"LK.CF"	Lockout 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
"OT.SO"	Output Scale and Offset
"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 22. MENU CONFIGURATION

Table 22-1. Configuration Menu (defaults are in bold and italics)

MENU	SUBMENU	DESCRIPTION
"INPT"	RTD.2 <i>RTD.3</i> RTD.4	INPUT TYPE 2-wire RTD 100 Ω PT., DIN standard. <i>3-wire RTD 100 Ω PT., DIN standard</i> 4-wire RTD 100 Ω PT., DIN standard
"DEC.P"	<i>FFFF.</i> FFF.F	DECIMAL POINT POSITION Select to display whole degrees or tenths of a degree.
"RD.CF"	R.1	READING CONFIGURATION Select unit of temp: C: Celsius <i>F: Fahrenheit</i>
"SLCF"	S.1 S.2 S.3 S.4 S.5	SETPOINT 1 CONFIGURATION: <i>A: Active above</i> B: Active below <i>U: Unlatched</i> L: Latched <i>O: Setpoint 1 on/off control</i> P: Setpoint 1 on time proportional control R: Reverse acting D: Direct acting S: Slow proportional control F: Fast proportional control
"S2.CF"	S.1 S.2	SETPOINT 2 CONFIGURATION: <i>A: Active above</i> B: Active below <i>U: Unlatched</i> L: Latched
"SL.DB"	0000 through 9999	SETPOINT 1 DEADBAND Select from 0000 through 9999

MENU	SUBMENU	DESCRIPTION
"S2.DB"	0000 through 9999	SETPOINT 2 DEADBAND Select from 0000 through 9999
"OT.CF"	0.1 0.2 0.3 0.4 0.5	OUTPUT CONFIGURATION Analog Output: D: Disabled E: <i>Enabled</i> V: Voltage analog out C: Current analog out A: <i>Retransmission of temperature</i> P: Proportional to Setpoint 1 D: Direct acting R: Reverse acting 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"	SP RS	LOCKOUT CONFIGURATION E: <i>Setpoint change enabled</i> D: Setpoint change disabled E: <i>RESET button enabled</i> D: RESET button disabled

SECTION 23. FRONT PANEL DISPLAYS

Table 23-1. Front Panel Displays (defaults are in bold and italics)

MENU	▷/DEV	◀/MAX	DESCRIPTION
"INPT"	Show input choices	RTD.2 <i>RTD.3</i> RTD.4	SIGNAL INPUT 2-wire RTD <i>3-wire RTD</i> 4-wire RTD
"DEC.P"	Show input choices	FFFF. <i>FFF.F</i>	DECIMAL POINT
"RD.CF"	R.1	F C	READING CONFIGURATION <i>Display in °F</i> Display in °C
"S1.CF"	S.1	A B	SETPOINT 1 CONFIGURATION <i>Active above</i> Active below
	S.2	U L	<i>Unlatched</i> Latched
	S.3	O P	<i>Setpoint 1 on/off ctrl</i> Setpoint 1 on time proportional control
	S.4	R D	Reverse acting Direct acting
	S.5	S F	Slow proportional ctrl Fast proportional ctrl
"S2.CF"	S.1	A B	SETPOINT 2 CONFIGURATION <i>Active above</i> Active below
	S.2	U L	<i>Unlatched</i> Latched
"S1.DB"	Scroll right one digit	Change flashing digit's value	SETPOINT 1 DEADBAND Select from 0000 through 9999. (Factory preset is 0003)
"S2.DB"	Scroll right one digit	Change flashing digit's value	SETPOINT 2 DEADBAND Select from 0000 through 9999. (Factory preset is 0003)

MENU	▷/DEV	◀/MAX	DESCRIPTION
"OT.CF"	0.1	D	OUTPUT CONFIGURATION Disable analog output
		E	Enable analog output
	0.2	V	Analog output = voltage
		C	Analog output = current
	0.3	A	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 V dc
		H	Analog output is 0-5 V dc

Note: * 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 (i.e. 4-20 or 20-4)

"OT.S.O"	Enter new value and show "OUT1"	Show RD 1 and prior value entered Scroll right one digit	OUTPUT SCALE AND OFFSET
Enter new value and show "RD 2"	Press to show prior value entered. Scroll right one digit	Change flashing digit's value.	
Enter new value and show "OUT2"	Press to show prior value entered. Scroll right one digit	Change flashing digit's value.	
"PBND"	Scroll right one digit	Change flashing digit's value	PROPORTIONAL BAND Select from 0000 through 9999

MENU	▶/DEV	◀/MAX	DESCRIPTION
"M.RST"	Scroll right one digit	Change flashing digit's value	MANUAL RESET Select from -1999 through 9999
"LK.CF"	SP RS	E D E D	LOCKOUT CONFIGURATION <i>Setpoint change enabled</i> <i>Setpoint change disabled</i> <i>RESET button enabled</i> <i>RESET button disabled</i>

Table 23-2. Run Mode Displays

DISPLAY	↵/DEV	▲/MAX	RESET	DESCRIPTION
"PEAK"		Shows 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
"SP.RS"				LATCHED RESET Pressing the RESET 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	

SECTION 24. SETPOINT CONFIGURATION DISPLAYS

Table 24-1. Setpoint Configuration Displays

MENU	↔/DEV	↔/MAX	DESCRIPTION
"SP 1"	Scroll right one digit	Change flashing digit's value	SETPOINT 1 Select from -1999 through 9999
"SP 2"	Scroll right one digit	Change flashing digit's value	SETPOINT 2 Select from -1999 through 9999

SECTION 25. SPECIFICATIONS

SIGNAL INPUT

Isolation:	354 V peak per IEC spacing NMR- 60 dB CMR- 120 dB
Protection:	240 V rms max for RTD input ranges
Display:	LED 14 segment, 13.8 mm (0.54") red
Symbols:	8888

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** _0.5_C

**Temperature
Stability:** _0.04_C/_C

ANALOG TO DIGITAL (Continued)

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 second

Warm up to

rated accuracy: 30 min

ALARM

OUTPUTS: 2 Form "C" relays. Maximum rating: 6 AMPS at 28 V dc or 300 Vac. Alarms are configurable for on/off and latch/unlatch. Relay 1 may also be configured for time proportional from 5 seconds to 199 seconds.

TRANSISTOR

LOGIC OUT: (7 - 11) V \pm .3 V dc. Maximum current: 25 mA. Output may be configured as On/Off or Time Proportional for .1 to 199 seconds.

ANALOG OUTPUT

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.

ANALOG OUTPUT (Continued)

Linearity: 0.2%

4 -20 mA Load

Regulation: 1.1%

Step Response Time: 2 - 3 seconds

PROPORTIONAL CONTROL (TIME OR ANALOG OUT)

Time: Cycle time for .1 second to 199 seconds. On/off time to 99% of cycle time. Transistor and /or relay outputs. Configurable for reverse or direct acting. Front-panel tuning capability.

Analog: 4-20 mA; 0-10 or 0-5 V out. Configurable for reverse or diirect. Front-panel tuning capability

INPUT POWER INFORMATION:

Voltage AC: 115/230 V rms \pm 15%
115/230 V rms \pm 10%
DC 9.5 to 32 V dc

Frequency: 50-60 Hz

Power: 6 watts

ENVIRONMENT

Operating temperature: 0 to 50° C (115/230 V rms \pm 15%)
0 to 60° C (115/230 V rms \pm 10%)

Storage temperature: -40° to 85°C

Relative humidity: 90% at 40°C (non-condensing)

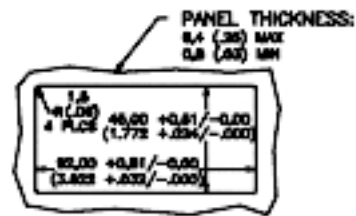
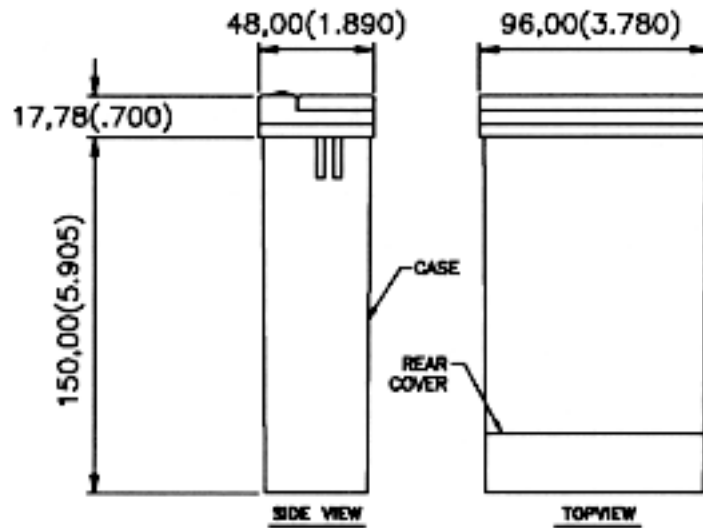
MECHANICAL

Panel cutout: 1/8 DIN 3.62x1.8" (45 x 92mm)

Weight: 1.27 lb (574 g)

Case material: Polycarbonate, 94 V-0 UL rated

SECTION 25. SPECIFICATIONS (Continued)



NOTE: DIMENSIONS IN MILLIMETES (INCHES)

SECIION 26. FACTORY PRESET VALUES

Table 26-1. Factory Preset Values

MENU ITEM	FACTORY PRESET VALUES
"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 (Setpoint is active above) S.2=U (Setpoint is unlatched) S.3=O (on/off control)
"S2.CF"	Setpoint 2 Configuration: S.1=A S.2=U
"S1.DB"	Setpoint 1 Deadband: 30
"S2.DB"	Setpoint 2 Deadband: 30
"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
"SP1"	Setpoint 1 Value: 0000
"SP2"	Setpoint 2 Value: 0000
"LK.CF"	Lockout Configuration: SP=E (Setpoint change enabled) RS=E (RESET button enabled)