PRTXAL Series RTD Process Temperature Alarms
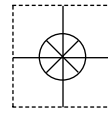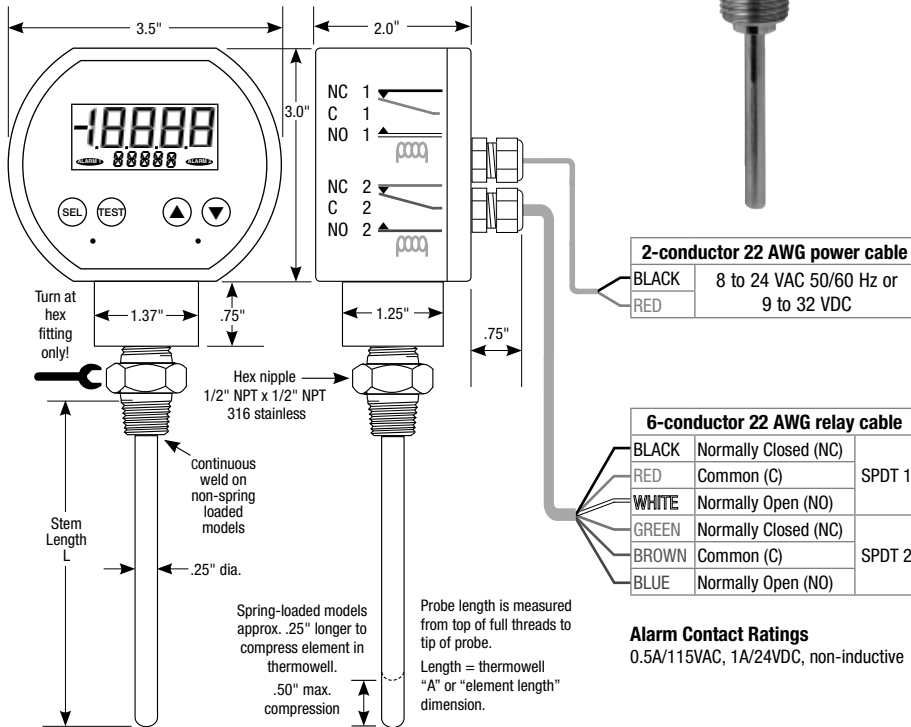
M-4997/1110

PRTXAL Series RTD Temperature Alarms 2 SPDT Configurable Relays		
MODEL	PROBE LENGTH	PROBE TYPE
PRTXAL-2	2.5"	Fixed
PRTXAL-2-SL	2.5"	Spring-Loaded*
PRTXAL-4	4"	Fixed
PRTXAL-4-SL	4"	Spring-Loaded*
PRTXAL-6	6"	Fixed
PRTXAL-6-SL	6"	Spring-Loaded*
PRTXAL-9	9"	Fixed
PRTXAL-9-SL	9"	Spring-Loaded*
PRTXAL-12	12"	Fixed
PRTXAL-12-SL	12"	Spring-Loaded*

*Thermowell required for spring-loaded versions

Turn at hex fitting only!

Hex nipple 1/2" NPT x 1/2" NPT 316 stainless

continuous weld on non-spring loaded models

Stem Length L

.25" dia.

Spring-loaded models approx. .25" longer to compress element in thermowell.
.50" max. compression

Probe length is measured from top of full threads to tip of probe.
Length = thermowell "A" or "element length" dimension.

2-conductor 22 AWG power cable

BLACK	8 to 24 VAC 50/60 Hz or 9 to 32 VDC
RED	

6-conductor 22 AWG relay cable

BLACK	Normally Closed (NC)	
RED	Common (C)	SPDT 1
WHITE	Normally Open (NO)	
GREEN	Normally Closed (NC)	
BROWN	Common (C)	SPDT 2
BLUE	Normally Open (NO)	

Alarm Contact Ratings
0.5A/115VAC, 1A/24VDC, non-inductive

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e-mail: info@omega.com
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ISO 9001 CERTIFIED CORPORATE QUALITY STAMFORD, CT

ISO 9002 CERTIFIED CORPORATE QUALITY MANCHESTER, UK

® 1 YEAR WARRANTY

MADE IN USA

Range and Resolution
–58.0°F to 392.0°F or –50.0°C to 200.0°C
User selectable °F or °C
0.1 degree resolution over entire range

Accuracy
±0.1% of span plus maximum sensor error of ±0.3°C at 0°C, ±1.1°C at 150°C
11 point linearization

Sensor
100 Ω RTD element
0.00385 alpha coefficient
IEC-751 Class B: ±0.3°C at 0°C, ±1.1°C at 150°C
10 second time constant

Display
4 readings per second nominal display update rate
4 digit LCD, 1/2" digit height, alphanumeric lower display for units

Alarm Outputs
Dual form C (SPDT) relay contacts
Relay contacts rated 1A/24VDC, 0.5A/115VAC, non-inductive
Bi-color (red/green) LEDs on front panel
Alarm trip update rate approximately 4 times per second

Setpoint Functionality
Two independent alarm set points
Setpoint 1 high or low alarm
Setpoint 2 high or low alarm
Setpoint 1 deadband adjustment
Setpoint 2 deadband adjustment
Normal or reverse acting relays

Test Function
Front panel TEST button toggles both SP1 and SP2 alarm status, independent of temperature input to allow testing of system operation. Access can be pass code protected.

Out of Range Indication
User configurable upscale or downscale burnout
ALARM1 on display above 392°F or 200°C
ALARM2 on display below –58°F or –50°C
Below approx. –103°F (–75°C) or above approx. 482°F (250°C), the display will indicate 1.-.-.-.

Controls and Functions
TEST Test alarm function
SEL Select
▲ Up: increment up for setup, pass code, or calibration
▼ Down: increment down for setup, pass code, or calibration

Calibration
User settable pass code to enter calibration mode
Zero and span temperature calibration

Electrical Connections
3 foot long, 2-conductor 22AWG cable for power
3 foot long, 6-conductor 22AWG cable for relays

Power
8 to 24 VAC 50/60 Hz or 9 to 32 VDC
1.0 watt maximum power consumption

Weight
Thermometer: approx. 14 ounces
Shipping weight: approx. 1 pound

Housing
NEMA 4X ABS/polycarbonate, gasketed rear cover

Connection and Probe Material
1/2" NPT male hex nipple, 316 stainless steel
316 stainless steel probe sheath

Environmental
Storage: –40 to 203°F (–40 to 95°C) at housing
Operating: –4 to 185°F (–20 to 85°C) at housing

Precautions

Read these instructions before installation. Configuration may be easier before installation.

Avoid shock hazards! Turn power off before connecting or disconnecting wiring. All wiring must be performed by a qualified electrician or instrumentation technician. See diagrams on other side for wiring examples. Consult factory for assistance.

Install or remove thermometer using a wrench on the hex fitting only. Do not attempt to turn by forcing the housing.

Do not exceed maximum allowable housing temperature.

The spring-loaded design must be used with a thermowell. The non-spring-loaded design can be used in non-pressurized applications or applications with no flow. Due to the hardness of 316 stainless steel, it is recommended that a thread sealant be used to ensure leak-free operation.

Normal Operation

The factory default configuration is °F, downscale burnout, Setpoint 1 High Alarm, Setpoint 2 Low Alarm, 1.0 degree alarm deadband, normal acting relays, no pass code required for configure/test alarms mode.

To turn the unit on, apply power. If so equipped, the optional display backlighting will be on. The display backlighting will not be apparent under bright lighting conditions.

The display segments are tested for approximately 1 second. During the startup sequence, the alarm relays are de-energized and the alarm status LEDs are off.

After power-up the RTD temperature and units are displayed along with the alarm relay states as indicated by the LEDs. The display and alarm status are updated approximately 4 times per second,

Display and Keypad

Numeric display
Lower alpha-numeric display
RTD over-range
RTD under-range
Select Test
Up Down
Alarm 1 status LED
Green = Normal
Red = Alarm
Alarm 2 status LED
Green = Normal
Red = Alarm
Red blinking LED = unacknowledged alarm
Press Test to acknowledge alarm
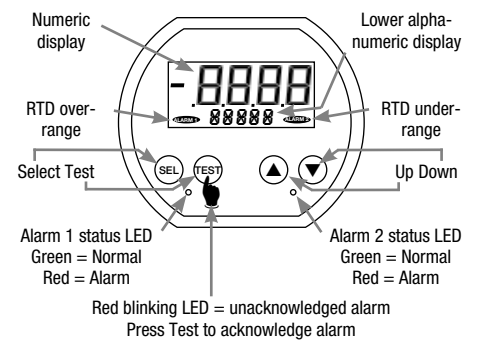
Out-of-Range Indications

RTD over-range condition >392.0°F or >200.0°C ALARM 1

RTD under-range condition <−58.0°F or <−50.0°C ALARM 2

If the RTD temperature is outside of the extrapolated range, a burnout condition will be assumed.

1. . . . if upscale burnout is selected

−1. . . . if downscale burnout is selected.
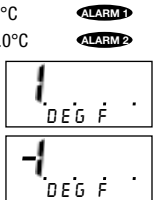
Alarm Indications

The relevant bi-color LED will be illuminated green for a normal condition or red for an alarm condition.

The red LED will blink at a slow rate until the alarm is acknowledged or the alarm condition clears.

To acknowledge an alarm condition, press and release the TEST button.

Viewing Alarm Trip Points

The RTD temperature, the value of Trip Point 1, and the value of Trip Point 2 may be selected for display as follows.

When the RTD temperature is being displayed, press and release the SEL (select) button. The Trip Point 1 value will be displayed with TRIP1 on the lower display.

When the Trip Point 1 value is being displayed, press and release the SEL button. The Trip Point 2 value will be displayed with TRIP2 on the lower display.

When the Trip Point 2 value is being displayed, press and release the SEL button. The RTD temperature will be displayed.

Alarm Test Mode

This mode allows testing of the alarms regardless of the alarm trip points or the temperature reading.

From the normal mode with temperature being displayed, press and hold the TEST button and then press the SEL button.

Release both buttons when the display indicates - - - - .

- or -

If pass code protection is enabled, before the unit enters the Alarm Test Mode, the display initially indicates _ _ _ _ with the left-most underscore blinking, and with TSTPC on the lower display. Enter the user-defined pass code (3510 factory default) as described in the Pass Code Entry section.

Note: During pass code entry the LEDs will turn off and the unit will not respond to changes in RTD temperature. The alarm relays will maintain their prior states. The unit will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

While in the Alarm Test Mode with no buttons pressed, the display will indicate temperature with DEG C or DEG F slowly blinking on the lower display.

While the TEST button is pressed and held, both LED indicators and alarm relays will toggle to their opposite state. The display will continue to indicate the temperature.

To exit the Alarm Test Mode, press and release the SEL button. The display briefly indicates - - - - and then returns to normal operation.
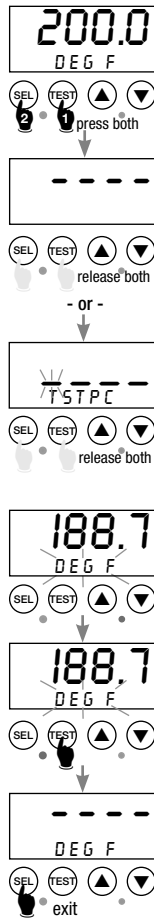
Adjusting Set Points

Go to the User Configuration Mode to set up the alarm parameters before setting up the alarm setpoints. Whenever the user configuration mode is entered, even if no changes are made, all alarm set points will be reset to the factory default maximum and minimum values.

Alarm 1 factory default: HI alarm, 392.0°F trip point.
Alarm 2 factory default: LO alarm, −58.0°F trip point.

"Set Point" is defined as the temperature that will result in a change of state only from a normal to an alarm condition.

"Trip Point" is defined as the temperature value that will result in a change of state of alarm condition, and includes the effect of deadband when returning from an alarm to a normal condition.

The instructions illustrate how to change Trip Point 1. The procedure is the same for Trip Point 2.

From the normal mode press and release the SEL button to display Trip Point 1. If you want to change Trip Point 2, press SEL again until TRIP2 is displayed.
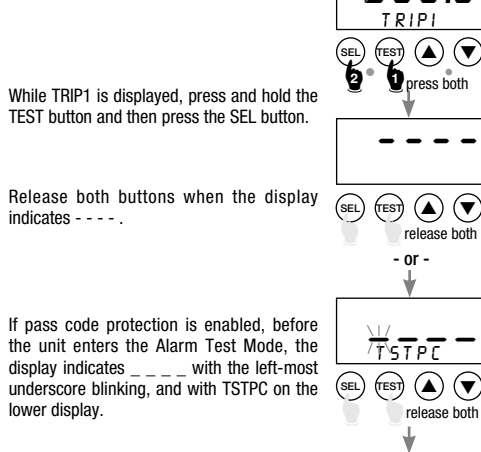
While TRIP1 is displayed, press and hold the TEST button and then press the SEL button.

Release both buttons when the display indicates - - - - .

- or -

If pass code protection is enabled, before the unit enters the Alarm Test Mode, the display indicates _ _ _ _ with the left-most underscore blinking, and with TSTPC on the lower display.

Pass Code Entry

Pass codes are used to prevent unauthorized changes to settings. Up to three different pass codes can be used to allow access to the configuration, alarm settings and output test, or calibration.

During pass code entry the LEDs will turn off and the unit will not respond to temperature changes. The alarm relays will maintain their prior states. The unit will automatically revert to normal operation if no buttons are pressed for 15 seconds.

Configuration Pass Code

From the normal operating mode press and hold the TEST and the ▲ buttons. Then press the SEL button. Release all buttons when the display indicates CFG.
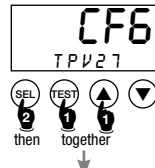
The display initially indicates _ _ _ _ with the first underscore blinking, and with CFGPC on the lower display.

Enter the user-defined pass code as described on the next page.
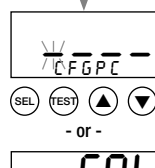
Calibration Pass Code

Press and hold the TEST and the ▼ buttons. Then press the SEL button. Release all buttons when the display indicates CAL.

The display initially indicates _ _ _ _ with the first underscore blinking, and CALPC on the lower display.

Enter the user-defined pass code as described on the next page.

Test and Set Point Adjust Pass Code

The optional for pass code protected alarm testing or set point changes is set in CFG mode. It is not used in the factory default configuration.

Press and hold the TEST button. Then press the SEL button. Release all buttons when the display indicates - - - - .

If TSTPC pass code is enabled, the display indicates _ _ _ _ with the first underscore blinking, and TSTPC on the lower display.

Enter the user-defined pass code as described on the next page.

Enter the user-defined pass code (3510 factory default) as described in the Pass Code Entry section.

Note: During pass code entry the LEDs will turn off and the unit will not respond to changes in RTD temperature. The alarm relays will maintain their prior states. The unit will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

While in the Set Point 1 Adjust Mode, the display will indicate Trip Point 1 with TRIP1 blinking at a slow rate on the lower display.
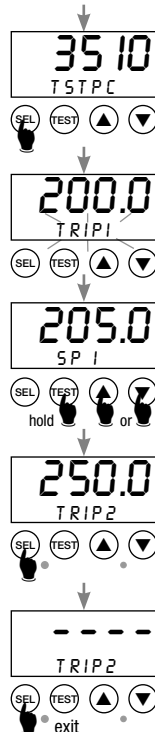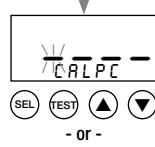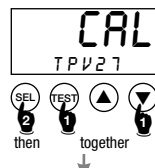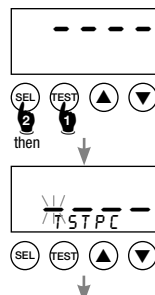
To adjust Set Point 1, press and hold the TEST button and the display will indicate SP1 on the lower display. If the alarm is not tripped the display will change by an amount equal to the deadband value.

While holding the TEST button operate the ▲ and ▼ buttons to adjust Set Point 1 to the desired value. The Set Point 1 value is stored when the TEST button is released.

Note that the unit will not respond to changes in temperature, LEDs are turned off, and the alarm relays will maintain their prior states while the TEST button is held.

To change Trip Point 2 press SEL until TRIP 2 is shown. The procedure is the same as Trip Point 1.

To exit, press the SEL button until the display indicates - - - -. The unit then returns to normal operation.

User-Defined Pass Code Entry

Enter the user-defined pass code (3510 factory default).

Use the ▲ and ▼ buttons to increase or decrease the numerical value.

Press and release the SEL button to index to the next position.

Once the 4-digit the user-defined pass code has been entered, press and release the SEL button to proceed to the specific mode of operation.

Note: If an incorrect pass code was entered, the unit will to exit to the normal operating mode.
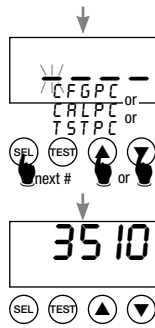
Pass Code Modification

To modify any of the default factory pass codes, enter pass code 1220 using the same procedure as described above.

Once the 1220 pass code has been entered, press and release the SEL button to proceed. If an incorrect pass code was entered, the unit will to exit to the normal operating mode.

The display will then indicate the existing pass code with CFGPC, CALPC, or TSTPC on the lower display, depending on the key combination used.

Operate the ▲ or ▼ button to select the first character of the new pass code. Press and release the SEL button to proceed to the next character. Repeat until the entire pass code is complete. Write down the new pass code in a secure place.

To exit the Pass Code Modification mode, press and hold the SEL button. Release the button when the display indicates - - - - to restart the unit in the normal mode.

User Configuration Mode

Whenever the user configuration mode is entered, even if no changes are made, all alarm set points will be reset to the factory default maximum and minimum values.

From the Normal Mode with RTD temperature being displayed, press and hold the TEST and the ▲ buttons. Then press the SEL button. Release all buttons when the display indicates CFG.
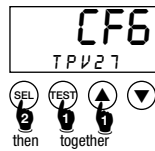
Enter the user-defined pass code (3510 factory default) as described in the Pass Code Entry section.
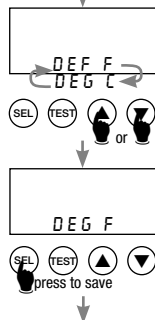
Temperature Scale Selection

The upper display will be blank, and the lower section will display either DEG C or DEG F.

To change from degrees Celsius to Fahrenheit, press and release the ▲ button. The lower display will change to DEG F.

To change from degrees Fahrenheit to Celsius, press and release the ▼ button. The lower display will change to DEG C.

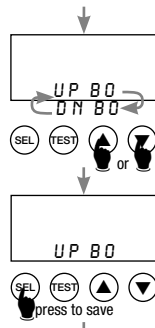Press and release the SEL button to move on to the next parameter.

Upscale/Downscale Burnout Action

The upper display will be blank, and the lower section will display either DN BO or UP BO.

To change from Downscale Burnout to Upscale Burnout, press and release the ▲ button. The lower display will change to UP BO.

To change from upscale burnout to downscale burnout, press and release the ▼ button. The lower display will change to DN BO.

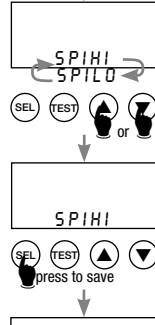Press and release the SEL button to move on to the next parameter.

Set Point 1 LO or HI

The upper display will be blank, and the lower section will display either SP1LO or SP1HI.

To configure Setpoint 1 as a High Alarm, press and release the ▲ button. The lower section of the display will indicate SP1HI.

To configure Setpoint 1 as a Low Alarm, press and release the ▼ button. The lower section of the display will indicate SP1LO.

Press and release the SEL button to move on to the next parameter.
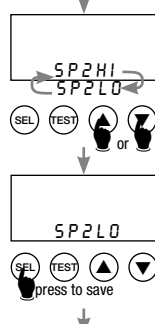
Set Point 2 LO or HI

The upper display section will be blank, and the lower section will display either SP2LO or SP2HI.

To configure Setpoint 2 as a High Alarm, press and release the ▲ button. The lower section of the display will indicate SP2HI.

To configure Setpoint 2 as a Low Alarm, press and release the ▼ button. The lower section of the display will indicate SP2LO.

Press and release the SEL button to move on to the next parameter.

Normal/Reverse Alarm Action

The upper display section will be blank, and the lower section will display either NOR or REV.

To configure the relays for reverse action, press and release the ▲ button. The lower section of the display will indicate REV.

To configure the relays for normal action, press and release the ▼ button. The lower section of the display will indicate NOR.

Press and release the SEL button to move on to the next parameter.
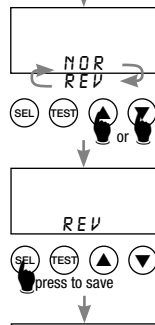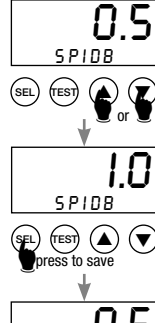
Set Point 1 Deadband

The upper display will indicate the Setpoint 1 deadband in °C or °F, and the lower section will display SP1DB.

Use the ▲ and ▼ buttons to set the desired Setpoint 1 deadband value.

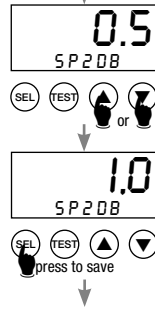Press and release the SEL button to move on to the next parameter.

Set Point 2 Deadband

The upper display will indicate the Setpoint 2 deadband in °C or °F, and the lower section will display SP2DB.

Use the ▲ and ▼ buttons to set the desired Setpoint 2 deadband value.

Press and release the SEL button to move on to the next parameter.

Test Mode and Set Point Security

The upper display will be blank, and the lower section will display either TSTPC or NOTPC.

To enable Test and Set Point Adjust Mode pass code protection, press and release the ▲ button. The lower section of the display will indicate TSTPC.

To disable Test and Set Point Adjust Mode pass code protection, press and release the ▼ button. The lower section of the display will indicate NOTPC.

Save Settings and Exit

Press and release the SEL button to save the configuration parameters and restart the unit. Note: The configuration parameters will not be saved if the procedure is interrupted before completion.

The unit proceeds through a restart sequence during which all active display segments are turned on for approximately 1 second. During the restart sequence, the alarm relays are de-energized, the alarm status LEDs are off.
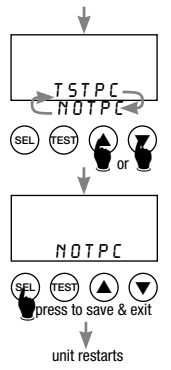
Calibration

Temperature calibration is performed at two points: ice point and at a temperature above ice point. For general service, the full scale temperature is normally used for the second point. However, if a particular temperature is of critical interest, it may be used instead for greatest accuracy at that point. When the applied temperature is below approximately 12 °C (or 54 °F), the unit will automatically select the ice-point calibration mode.

Entering Calibration Mode

From the normal mode with RTD temperature being displayed, press and hold the TEST and the ▼ buttons. Then press the SEL button. Release all buttons when the display indicates CAL.

Enter the user-defined pass code (3510 factory default) as described in the Pass Code Entry section.

Upon successful pass code entry, the upper segments of the display will indicate the RTD probe temperature. The lower segments of the display will alternate as indicated below.
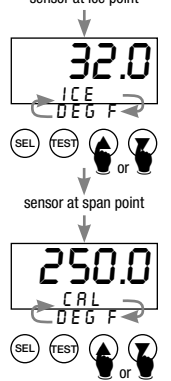
Note: To store the calibration parameters and exit calibration mode at any time, press and hold the SEL button until the display indicates - - - - .
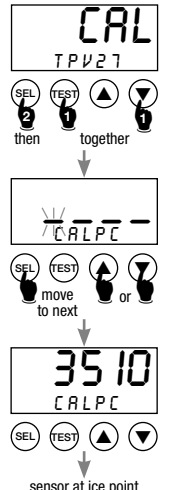
Ice-Point Calibration

Apply 0.0°C or 32.0°F to the RTD. The lower display segments will alternate between ICE and DEG C or DEG F.
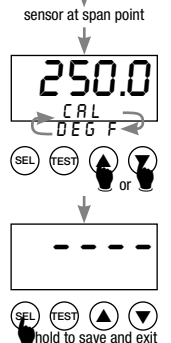
Use the ▲ and ▼ buttons to adjust the upper display segments to indicate 0.0°C or 32.0°F.

### Span Calibration

Apply full-scale temperature to the RTD. The lower display segments will alternate between CAL and DEG C or DEG F.

Use the ▲ and ▼ buttons to adjust the upper display segments to indicate the applied temperature value.

Exit and Save

To store the calibration parameters and exit calibration mode, press and continue to hold the SEL button until the display indicates - - - - .
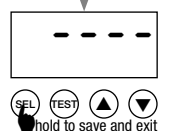
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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 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 which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS 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.

PATENT NOTICE: U. S. Pat. No. 6,074,089; 5,465,838 / Canada 2,228,333; 2,116,055 / UK GB 2,321,712 / Holland 1008153 / Israel 123052 / France 2 762 908 / EPO 0614194. Other patents pending.

FOR <u>WARRANTY</u> 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 <u>NON-WARRANTY</u> 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.

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