PRTXB Series
RTD Process Thermometers

M-4998/0818

MODEL	PROBE LENGTH	PROBE TYPE
PRTXB-2	2.5"	Fixed
PRTXB-2-SL	2.5"	Spring-Loaded*
PRTXB-4	4"	Fixed
PRTXB-4-SL	4"	Spring-Loaded*
PRTXB-6	6"	Fixed
PRTXB-6-SL	6"	Spring-Loaded*
PRTXB-9	9"	Fixed
PRTXB-9-SL	9"	Spring-Loaded*
PRTXB-12	12"	Fixed
PRTXB-12-SL	12"	Spring-Loaded*

*Thermowell required for spring-loaded versions

Low battery indication

Turn at hex fitting only!

3.5"   2.0"

3.0"

1.37"   0.75"   1.25"

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

Stem Length L

Continuous weld on non-spring loaded models

Measured from top of full threads to tip of probe.

Length L = thermowell "A" or "element length"

0.25" dia.

Spring-loaded models approx. 0.25" longer to compress element in thermowell.

0.50" max. compression
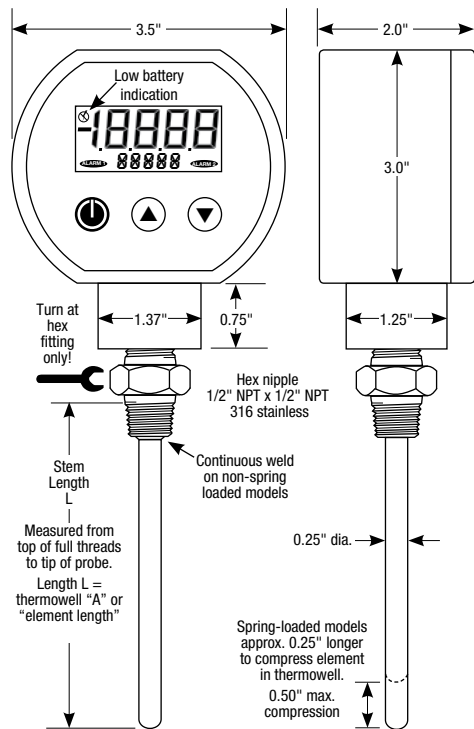
Range and Resolution
User selectable °F, °C or K
  –58.0°F to 392.0°F
  –50.0°C to 200.0°C
  220.0K to 475.0K
0.1 degree resolution

Typical Accuracy
Includes linearity error and ±1 LSD
11-point linearization
±0.7°C at –50°C
±0.4°C at 0°C
±0.9°C at 100°C
±1.4°C at 200°C

Display
4 readings per second nominal display update rate
4 digit LCD, 0.5" H, 5 character 0.25" H alphanumeric
BL models: red LED backlight

Sensor
IEC-751 Class B 100 Ω Platinum RTD, 0.00385 alpha curve
1/2" NPT male, 316 stainless steel
Spring-loaded probe versions fit standard thermowells
Fixed probe pressure rating: 5000 psi max.
Fixed probes are welded to hex fitting

Auto Shutoff Time
Factory default 5 minutes. User settable to 1, 2, 5, 10, 15, 20, 30 minutes, 1, 2, 4, 8 hours, or manual on/off.
OFF warning before auto shutoff to allow reset of timer

Batteries, Battery Life, Low Battery Indication
B: 2 AA alkaline, approx. 1000 hours
BL: 2 AA alkaline, approx. 150 to 750 hours depending on backlight usage.
BL: Button press activates backlighting for 1 minute
Low battery symbol on display

Controls and Functions
Three front buttons for power on/off, min/max functions, selection of °F, °C, or K, auto shutoff times, calibration and, configuration options
User-defined pass codes for configuration and calibration to prevent unauthorized changes

Maximum and Minimum Readings
User-configurable maximum and/or minimum temperature indication. Factory default configuration MAX/MIN disabled.
Choice of MAX only, MIN only, MAX/MIN, or none
Option to retain or clear MAX/MIN temperatures at shutoff

Out-of-Range
ALARM1 under range indication on display
ALARM2 over range indication on display

Calibration
User settable pass code required to enter calibration mode
Zero and span temperature calibration
Non-interactive zero, span, and linearity, ±10% of range

Weight
Product: 12 ounces (approximately)
Shipping: 1 pound (approximately)

Housing
ABS/polycarbonate NEMA 4X case, polycarbonate label, rubber rear gasket

Connection, Material, Media Compatibility
1/2" NPT male fitting, 316L stainless steel
All wetted parts are 316L stainless steel
Thermowell required for spring-loaded versions

Storage Temperature
–40 to 203°F (–40 to 95°C)

Operating Range
–4 to 185°F (–20 to 85°C) at housing

Description

The PRTXB series is microprocessor controlled industrial RTD temperature indicator with a digital temperature display in a rugged NEMA 4X housing.

The temperature reading is linearized for the digital display. The temperature display may be set up to read °F, °C, or kelvin and the auto shutoff time may be set as needed.

The unit is capable of automatically capturing and storing maximum and maximum readings. The min/max functionality can be set up as required, and the readings can be either saved or cleared when the unit shuts off.

Installation and Precautions

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

The spring-loaded versions must be used with a thermowell. Use a thermowell appropriate for the process.

The non-spring-loaded versions 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.

Do not exceed maximum allowable housing temperature.

Install or remove using wrench on probe hex fitting only. Do not attempt to tighten or loosen by turning the housing.

Operation

Press and release the power button to power up the unit. The unit tests all LCD segments and displays the RTD temperature on the upper display and the temperature units on the lower display. Readings are updated approximately 4 times per second.

The RTD probe has a time constant of approximately 10 seconds, typical of an RTD probe in a stainless sheath. Time constant is characterized as the RTD changing to 63.2% of its new temperature span in one time constant, and 95% of its new temperature span in three time constants.

If the unit is configured with an auto shutoff time, a five second warning period is provided prior to auto shutoff, during which the display indicates OFF. The auto shutoff timer is reset whenever any button is pressed and released.

To shut off the unit manually at any time, press and hold the power button until the display indicates OFF (up to about 5 seconds total if MAX/MIN is enabled) and then release the button.

Out-of-Range Indications

If the RTD temperature goes above 392°F or 200°C, ALARM1 will be displayed.

If the RTD temperature goes below −58°F or −50°C, ALARM2 will be displayed.

If the RTD temperature continues beyond these limits, the display will eventually indicate 1.-.-.-.

MAX/MIN Operation (if enabled)

The factory default setting has min/max disabled. To turn this feature on, see the section titled User Configuration Mode. The unit may be configure to use max, min, neither, or both.

To step the unit through the display modes, press and hold the power button about 1 second until the display indicates MAX or MIN and then release the button. The display mode cycle repeats through the following steps.

MAX Mode

The display indicates the stored maximum reading and the lower display alternates between indicating MAX and the temperature units. The thermometer may be left in this mode if desired.

MIN Mode

Press and hold the power button about 1 second The display indicates the stored minimum reading and the lower display alternates between indicating MIN and the temperature units. The thermometer may be left in this mode if desired.

Return to Normal Mode

To return from minimum or maximum reading mode to the normal operating mode, press and hold the power button for about 1 second until the display indicates the temperature units and then release the button. The unit returns to the normal mode. The stored maximum and minimum values are not cleared and continue to be updated.

Reset MAX and MIN

To manually reset the stored maximum and minimum readings, press and continue to hold the power button until the display indicates clr (about 3 seconds total) and then release the button. The stored maximum and minimum values are cleared. The unit returns to the normal mode.

The Min/Max memory may be configured to be automatically cleared when the unit shuts down, or may be configured to retain the values when the unit is shut off. See the section titled User Configuration Mode for these options.

Temperature Unit Selection

To change temperature units, press and hold the ▲ button until the temperature indication is blanked and only the temperature units are displayed.

Then use the ▲ and ▼ buttons to select the desired temperature units. Standard units are Fahrenheit, Celsius, and kelvin.

When the desired units are displayed, press and release the power button to save the selection and exit the change mode.

If no buttons are pressed for 15 seconds, the unit will automatically save the selection and exit the change mode.

Auto Shutoff Time Selection

To change the auto shutoff time, press and hold the ▼ button until the auto shutoff time is displayed.

The lower display will indicate AST M if the auto shutoff time displayed is in minutes, and AST H if it is in hours.

An auto shutoff time of zero signifies that the auto shutoff feature is disabled.

Use the ▲ and ▼ buttons to select 0, or 1, 2, 5, 10, 15, 20, or 30 minutes, or 1, 2, 4, or 8 hours.

When the desired auto shutoff time is displayed, press and release the power button to save the selection and exit the change mode.

If no buttons are pressed for 15 seconds, the unit will automatically save the displayed selection and exit the change mode.
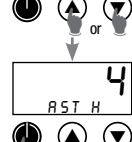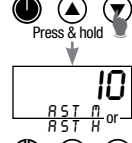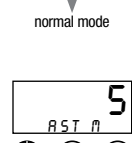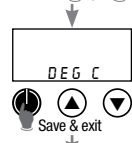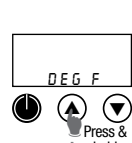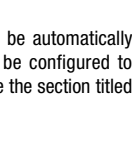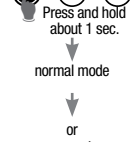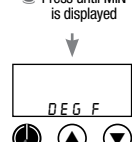
User Configuration Mode

With the unit off, press and hold the ▲ button.

Then press the power button.

Release all buttons when the display indicates CFG.

Before the unit enters the configuration mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with CFGPC on the lower display.

The unit will automatically revert to normal operation if no buttons are operated for approximately 15 seconds. To cancel and return to normal operation, press and release the power button without entering any pass code characters.

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

Use the ▲ and ▼ buttons to set the left-most digit to 3.

Press and release the power button to index to the next position. The 3 will remain, and the second position will be blinking.

Use the ▲ and ▼ buttons to select 5.

Press and release the power button to index to the next position. 3 5 will remain, and the third position will be blinking.

Use the ▲ and ▼ buttons to select 1.

Press and release the power button to index to the next position. 3 5 1 will remain, and the fourth position will be blinking.

Use the ▲ and ▼ buttons to select 0.

Press and release the power button to proceed with configuration procedures. Note: If an incorrect pass code is entered, the unit will return to the start of the pass code entry sequence.

MAX/MIN Capture Configuration

The upper display will be blank.

Use the ▲ and ▼ buttons to select from the following.

MX/MN Both highest and lowest values will be captured

MX/-- Only highest value will be captured

--/MN Only lowest value will be captured

--/-- Capture feature is disabled

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

Auto/Manual MAX/MIN Clearing

The upper display will indicate clr.

Use the ▲ and ▼ buttons to select from the following.

AUTO Maximum and minimum values will automatically be cleared whenever the unit shuts off.

MAN Maximum and minimum values will be retained and must be cleared manually as desired.
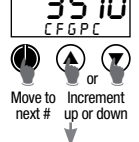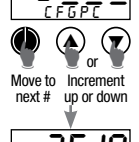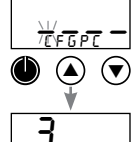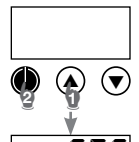
Press and release the power button to save the user configuration and restart the unit.
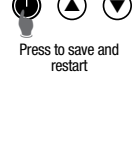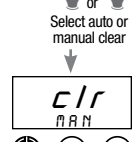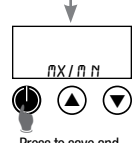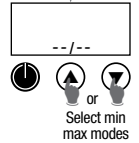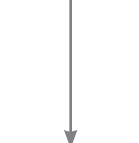
Calibration

The PRTXB is factory calibrated and there is generally no need to alter calibration settings. Required calibration equipment includes a temperature reference of at least four times the unit's accuracy, a dry-block calibrator or a temperature controlled bath.

Calibration may be performed in any of the available temperature units, the use of Fahrenheit or Celsius is assumed in this procedure. Select the temperature units for calibration prior to entering the calibration mode.

The unit enters and remains in the calibration mode until restarted manually or power is removed. While in the calibration mode, the auto shutoff timer is disabled, and the Min/Max feature is disabled.

The unit is calibrated at two points, at 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.

Enter Calibration Mode

To enter the calibration mode, begin with the unit powered off, and press and hold the ▼ button.

Then press the power button.

Release all buttons when the display indicates CAL.

Before the unit enters the calibration mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with CALPC on the lower display.

Note: The unit will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

To cancel and return to normal operation, press and release the power button without entering any pass code characters.

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

Use the ▲ and ▼ buttons to set the left-most digit to 3.

Press and release the power button to index to the next position. The 3 will remain, and the second position will be blinking.

Use the ▲ and ▼ buttons to select 5.

Press and release the power button to index to the next position. 3 5 will remain, and the third position will be blinking.

Use the ▲ and ▼ buttons to select 1.

Press and release the power button to index to the next position. 3 5 1 will remain, and the fourth position will be blinking.

Use the ▲ and ▼ buttons to select 0.

Press and release the power button to proceed with calibration.

Note: If an incorrect pass code is entered, the unit will return to the start of the pass code entry sequence.

Calibration Procedure

Upon successful pass code entry, the upper display will indicate the RTD probe temperature. The lower display will alternate as indicated below.

Note: To store the calibration parameters and exit calibration mode at any time, press and hold the power button until the display indicates - - - -.
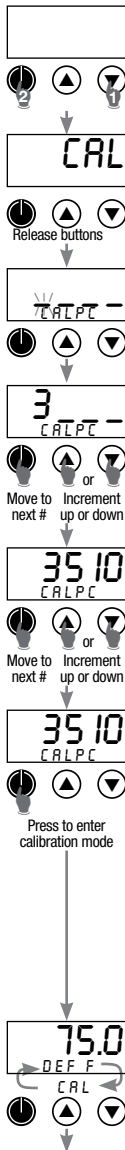
Ice-Point Calibration

When the applied temperature is below approximately 12 °C (or 54 °F), the unit will automatically select the ice-point calibration mode.

Apply 0.0 °C or 32.0 °F to the RTD.

The lower display will alternate between ICE and DEG C or DEG F.

Use the ▲ and ▼ buttons to adjust the upper display 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.

To store the calibration parameters and exit calibration mode, press and hold the power button until the display indicates - - - - .

Changing the Pass Codes

The factory default pass code of 3510 may be changed if desired. Separate pass codes may be used for min/max configuration access and calibration access.

Configuration Pass Code Access

With the unit off, press and hold the ▲ button.

Then press the power button.

Release all buttons when the display indicates CFG.

Calibration Pass Code Access

With the unit off, press and hold the ▼ button to view and/or change the user calibration pass code.

Then press the power button.

Release all buttons when the display indicates CAL.

View/Change Pass Code

Before the unit enters the view or change pass code mode, the display initially indicates _ _ _ _ with the first underscore blinking, and with CFGPC or CALPC on the lower display.

Note: The unit will automatically revert to normal operation if no buttons are operated for approximately 15 seconds.

To cancel and return to normal operation, press and release the power button without entering any pass code characters.

Enter Access Code 1220

Use the ▲ and ▼ buttons to set the left-most digit to 1.

Press and release the power button to index to the next position. The 1 will remain, and the second position will be blinking.

Use the ▲ and ▼ buttons to select 2.

Press and release the power button to index to the next position. 1 2 will remain, and the third position will be blinking.

Use the ▲ and ▼ buttons to select 2.

Press and release the power button to index to the next position. 1 2 2 will remain, and the fourth position will be blinking.

Use the ▲ and ▼ buttons to select 0.

Note: If an incorrect access code was entered, the unit will return to the start of the access code entry sequence.

Press and release the power button to proceed.

The display will indicate the existing user-defined pass code with CFGPC or CALPC on the lower display. To exit without changes, press the power button.
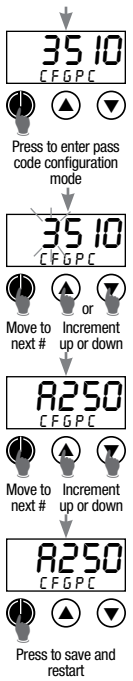
Operate the ▲ and ▼ button to select the first character of the new pass code. Characters 0-9 and A, b, C, d, E, F may be used.

When the correct first character is being displayed, press and release the power button to proceed to the next pass code character.

Repeat above until the entire pass code is complete.

To exit the view or change pass code mode, press and hold the power button.

Release the button when the display indicates - - - - to restart the unit.

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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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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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.

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