PiE
Practical Instrument Electronics

Model 512S
RTD Calibrator
With Auto Stepping
Operating Instructions

Basic Keypad Operations

① EZ-Check™ Switch

Slide the switch to select from three user stored values for the desired calibration points. The user can select HI, DIAL, and LO positions. These values can easily be changed to suit the calibration requirements. Also these stored values can be use for Auto Stepping.

② SIMULATE/OFF/READ Switch

Turn the Model 512S on to SIMULATE to output a resistance corresponding to temperature. Turn the unit to READ to read RTD resistance directly in temperature.

③ EZ-Dial™ Knob

Turn the knob to change temperature in 0.1º increments. Push and turn for faster dialing. Double push to get into the model 512S Configuration mode to auto Battery on/off, RTD types, C° or F°, Store or step feature, select step size and step time. Then press to store desired EZ-Check™ HI/LO points in SIMULATE mode. Push to clear EZ-Check™ HI/LO points in READ mode.
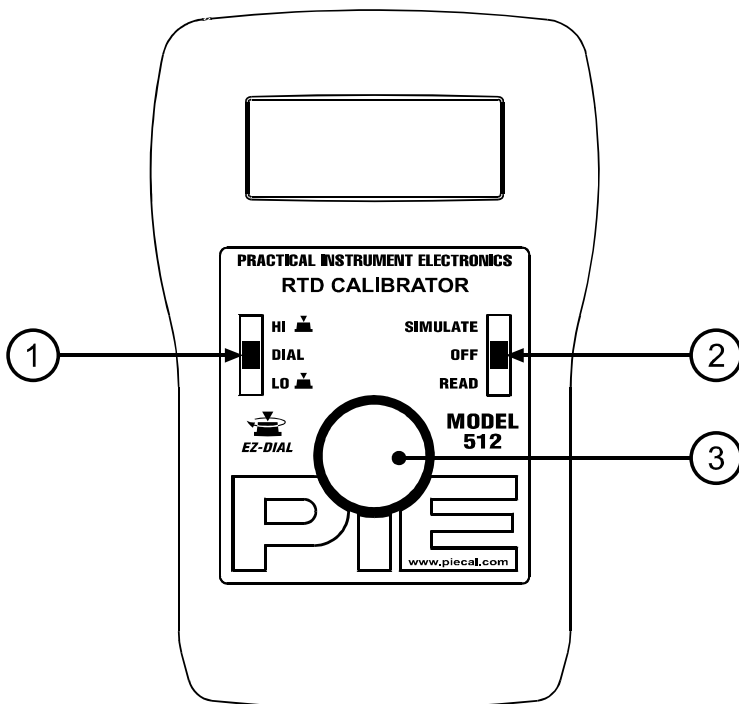
Model 512S Configuration

Instructions for Enabling and Disabling the Configuration Options

1. Turn the Model 512S on to SIMULATE or READ.

2. Double Click the EZ-Dial™ Knob while the "PRESS EZ-DIAL KNOB FOR CONFIGURATION" message is displayed.

3. Select options by turning the EZ-Dial™ Knob until the arrow points to the desired option.

4. The option can be enabled or disabled by tapping the EZ-Dial™ Knob.

The Model 512S configuration menu will exit automatically after 5 seconds of inactivity and go to normal operation with the options selected. These options are recalled at turn on until they are changed again.

```
PRESS EZ-DIAL KNOB
FOR CONFIGURATION
```

```
AUTO OFF        ON
DISPLAY UNITS   °C
RTD  Pt100 α=3850
```

Model 512S Configuration Menu

Auto Off   **ON/OFF**

If Auto Off is ON, the unit will turn off after 30 minutes to save battery life, if there is no user activity. If Auto Off is OFF the unit will stay on until it is turned off from the keypad. This is typically useful for manual loading or continuous use.

Display Units   **°C/°F**

Pressing the EZ-Dial™ Knob to toggles between °C or °F.

RTD

You are able to select the different RTD types listed - **Pt100 α=3850, Pt100 α=3902, Pt100 α=3916, Pt100 α=3926, Cu10 α=427, Cu50 α=428, Ni110 Bristol, Ni120 α=672, Ω**

And your high middle and low range set points plus °C or °F

To change RTD type, press the EZ-Dial™ Knob. Turn the EZ-Dial™ Knob to scroll through the list of available types. Press again to save and return to the configuration menu.

```
STORE/STEP   STEP
STEPS        5 25%
STEP TIME        5
```

Store/Step

To select three test points values you first have to select Store,

1. Select your high range by sliding the Hi/Lo slide switch to the HI position and dial it to the range desired then press the EZ-Dial™ Knob to store the value.

2. Slide the Hi/Lo slide switch to the middle position (dial) and dial it to the range desired. You do not have to press store to keep this value. This position if so desired is adjustable.

3. Slide the Hi/Lo slide switch to the Lo position and dial it to the range desire then press the EZ-Dial™ Knob to store the value

To start stepping after you have selected the step size and step time as described below select step and let the unit time out of configuration mode. Place the slide switch in either Hi or Lo position and press the EZ-Dial™ Knob to start and also to stop.

Step Size

To change the step size, press the EZ-Dial™ Knob to find the desired step size or %.

Step Time

To change the step time, press the EZ-Dial™ Knob to find the desired step time indicated in seconds. This is the time in-between each step.

Read Mode

Slide the SIMULATE/OFF/READ switch to READ for direct RTD input. The Model 512S displays temperature corresponding to resistance input for the selected RTD type.

Automatic 2, 3, or 4 wire detect: Connect 2, 3, or 4 wires to the RTD sensor. Follow the connection diagrams. The Model 512S indicates "2W", "3W", or "4W" in the lower left corner of the display. Use this feature for troubleshooting broken leads or sensors.

Slide the EZ-Check™ Switch to HI and LO to recall maximum and minimum saved readings. Press and hold the EZ-Dial™ Knob to clear saved readings. The display flashes "CLEARED" as a confirmation.

Be sure the switch is in the DIAL position to monitor input. Observe the "HI" and "LO" switch position indicators in the display.

Double-click the EZ-Dial™ Knob to return to the configuration menu.

Turning the EZ-Dial™ Knob has no effect in read mode.

Display Indications:

OVERRANGE or **UNDERRANGE**	The resistance input exceeds the range of the selected RTD type.
OPEN RTD	No RTD is connected.
MISCONNECT	The Model 512S is incorrectly connected for a 3-wire reading. Both black leads are required.

Source Mode

Slide the SIMULATE/OFF/READ switch to SIMULATE for direct RTD output. The Model 512S outputs resistance corresponding to temperature for the selected RTD type.

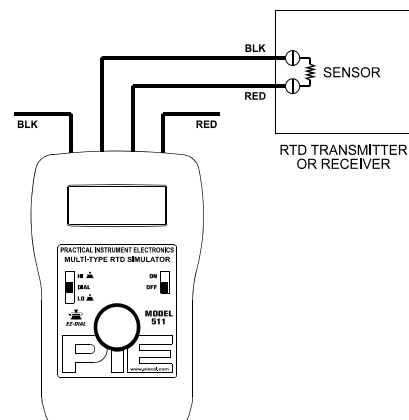Turn the EZ-Dial™ Knob to change temperature, push and turn for faster dialing.

Slide the EZ-Check™ Switch to HI or LO to recall stored settings. While in the HI or LO position, dial a new setting and press the EZ-Dial™ Knob to store. The DIAL position always holds the last setting dialed there.

Double-click the EZ-Dial™ Knob to return to the configuration menu.

Auto Stepping in Source Mode

Select the step size by pressing the EZ-Dial™ Knob to find the desired step size or %. Select the step time by pressing the EZ-Dial™ Knob to find the desired step time indicated in seconds.
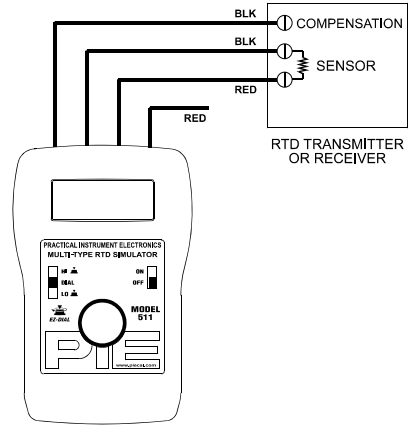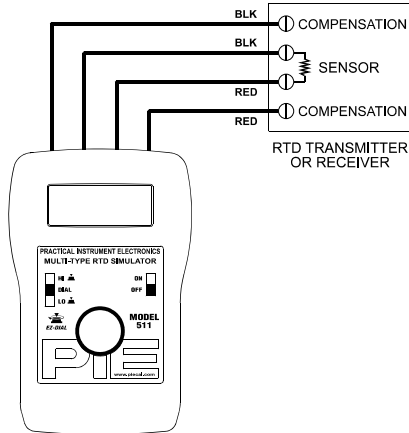
Connection Diagrams

Two Wire Connection to Transmitter

Three Wire Connection to Transmitter

BLK — COMPENSATION
BLK — SENSOR
RED — SENSOR
RED
RTD TRANSMITTER OR RECEIVER

PRACTICAL INSTRUMENT ELECTRONICS
MULTI-TYPE RTD SIMULATOR
MODEL 511

Four Wire Connection to Transmitter

BLK — COMPENSATION
BLK — SENSOR
RED — COMPENSATION
RED
RTD TRANSMITTER OR RECEIVER

PRACTICAL INSTRUMENT ELECTRONICS
MULTI-TYPE RTD SIMULATOR
MODEL 511

Specifications

General Specifications:

(Unless otherwise indicated all specifications are rated from a nominal 23 °C, 70 % RH for 1 year from calibration)

Temperature Range	-25 to 60 °C (-10 to 140 °F)
Relative Humidity Range	10 % ≤RH ≤90 % (0 to 35 °C), Non-condensing
	10 % ≤RH≤ 70 % (35 to 60 °C), Non-condensing
Size	4.9 X 3.15 X 1.82 inches (125.5 X 80 X 46.2 mm)
Weight	9.1 oz (258 grams)
Battery	9V Alkaline provides 45 hours of continuous use
Miscellaneous	Low battery indication with nominal 1 hour of operation left
	Protection to 60V for up to 30 seconds in duration
	High contrast graphic liquid crystal display with 0.357" (9.07 mm) high digits
Resolution	0.1°C or 0.1°F / 0.01 Ω
Span	0.00-400.00 Ω
Accuracy	±(0.015 % of Ω + 0.05) Ω (see accuracy tables for temperature error)
Temperature Coefficient	±0.01 % of span in Ω/°C ambient

RTD Simulation Specifications:

Allowable Excitation Current	100 μA to 10.2 mA, steady or pulsed/intermittent/smart
for accuracies below 100μA add	±10μV/Excitation Current (units are in Ω)
Pulsed Excitation Current Compatibility	DC to 0.01 second pulse widths

RTD Read Specifications:

Excitation Current	1.0 mA nominal

Available Options:

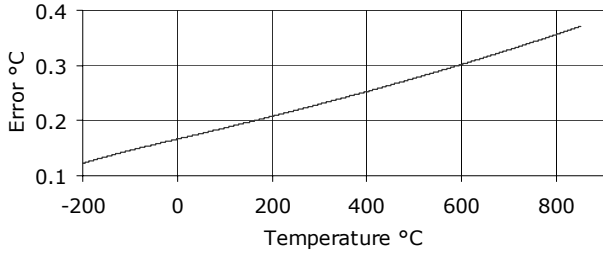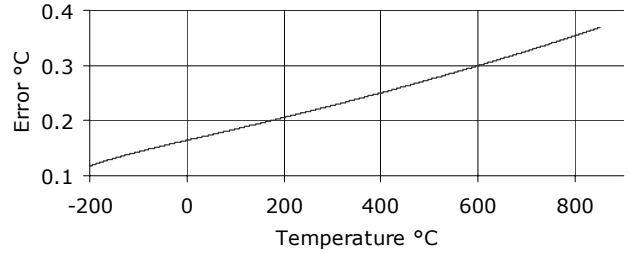|	
Carrying Case	Part Number: 020-0205

Temperature Accuracy

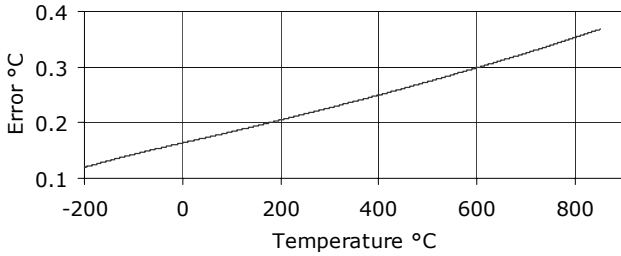The following charts give worst-case temperature accuracy based on stated resistance accuracy of ±(0.015 % + 0.05) Ω.
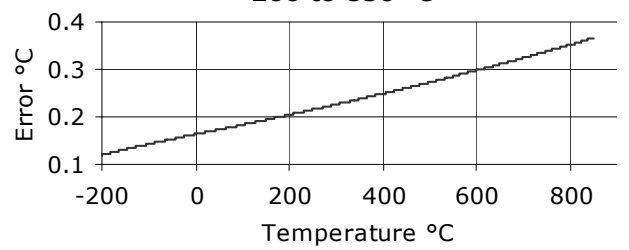
Pt100 TCR=0.00385
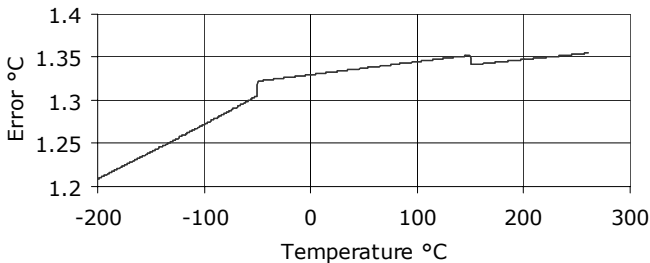**-200 to 850 °C**

Pt100 TCR=0.003902
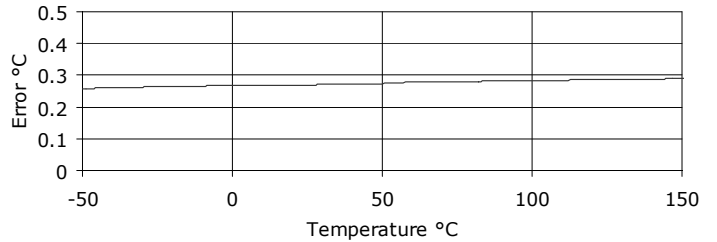**-200 to 850 °C**

Pt100 TCR=0.003916
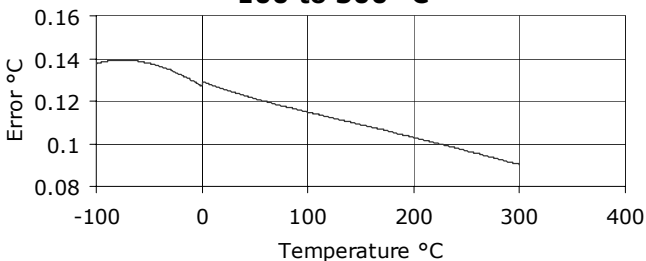**-200 to 850 °C**

Pt100 TCR=0.003926
-200 to 850 °C

Cu10 TCR=0.00427
-200 to 260 °C

Cu50 TCR=0.00428
-50 to 150 °C

Ni110 TCR=0.00530
-100 to 300 °C

Ni120 TCR=0.00672
-80 to 260 °C

Warranty