

Model 525

Dual T/C & RTD Calibrator

With Auto Stepping

Operating Instructions

Basic Keypad Operations

① EZ-Check™ Switch

For Simulation - 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 used for Auto Stepping.

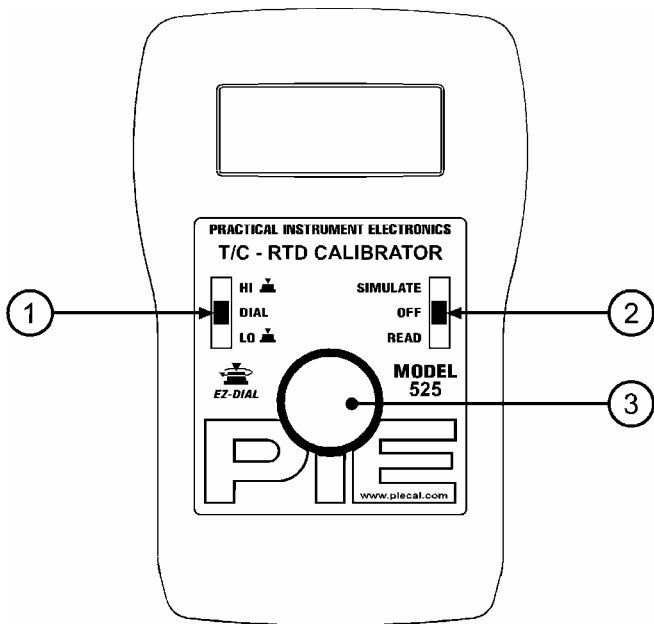
For Read - Slide the switch to the DIAL position. The Model 525 will begin making readings. Slide the switch to high and you will get the highest point read and then slide the switch to the low position and you will get the lowest range.

② SIMULATE/OFF/READ Switch

Turn the Model 525 on to SIMULATE to output a temperature, ohms, or mV. Turn the unit to READ to read temperature, ohms, or mV.

③ EZ-Dial™ Knob

Turn the knob to change temperature in 0.1° or 0.01° increments. Push and turn for faster dialing. Double push to get into the model 525 Configuration mode to auto Battery on/off, C° or F°, RTD or T/C types, 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.



Note: The Model 525 is a Universal Temperature Calibrator that works great calibrating Multi-channel Chart Recorders, Data Acquisition & Computer Systems and Smart transmitters.

The Model 525 is GUARANTEED to work with ALL transmitters, recorders and any other RTD input devices that use intermittent, or pulsed excitation current to measure the resistance of the RTD. The Model 525 automatically adjusts to the correct excitation current.

Model 525 Configuration

Instructions for Enabling and Disabling the Configuration Options

1. Turn the Model 525 on to SIMULATE or READ.
2. Double Click the EZ-Dial™ Knob at any time to enter configuration menu.
3. Select options by turning the EZ-Dial™ Knob clockwise until the arrow points to the desired option.
4. The option can be enabled or disabled by tapping the EZ-Dial™ Knob.

The Model 525 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.

NOTE: Changing the battery will reset menu options to factory settings.

**MODEL 525
DOUBLE CLICK
EZ DIAL KNOB
FOR CONFIGURATION**

→ AUTO OFF	OFF
TEMP. UNITS	°F
MODE	RTD
RTD	Ω

Model 525 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. Press the EZ-Dial™ Knob to select.

Display Units **°C/°F**

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

Mode - RTD or T/C

You are able to select the different, RTD types - Pt100 α=3850, Pt100 α=3902, Pt100 α=3916, Pt100 α=3926,

Cu10 α=427, Cu50 α=428, Ni110 Bristol, Ni120 α=672, Ω

T/C types - B, E, J, K, N, R, S, T, or mV

To change RTD or T/C 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.



Model 525 Operating Instructions

Store/Step

→ STORE/STEP	STORE
NUMBER OF STEPS	2
STEP TIME	5
RESOLUTION	LOW

To select three test point 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 and hold the EZ-Dial™ Knob until **STORED** appears 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 desired then press and hold the EZ-Dial™ Knob until **STORED** appears to store the value.

Memory will be maintained even when power is off.

To start stepping after you have selected the step size and step time as described below scroll back up the configuration mode to STORE/STEP and select step then let the unit time out of configuration mode. Place the slide switch in either Hi or Lo position and press and hold 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.

Display Resolution

To Select between High resolution 0.01^o, 000.000Ω or Low resolution 0.1^o, 000.00Ω, press the EZ-Dial™ Knob to find the desired display setting.

Double-click the EZ-Dial™ Knob to return to the configuration menu at any time of operation.

Read Mode

Slide the SIMULATE/OFF/READ switch to READ for direct RTD or T/C input. Then slide the EZ-Check™ Switch to DIAL position to monitor the RTD or T/C input. The Model 525 displays temperature corresponding to resistance input for the selected RTD type. Memory is updated every second once the unit is turned on or the CLEAR option is used. This helps when looking at temperature drift or for any other deviation. Slide the EZ-Check™ Switch to HI and LO to recall maximum and minimum saved readings. Observe the "HI" and "LO" switch position indicators in the display. 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.

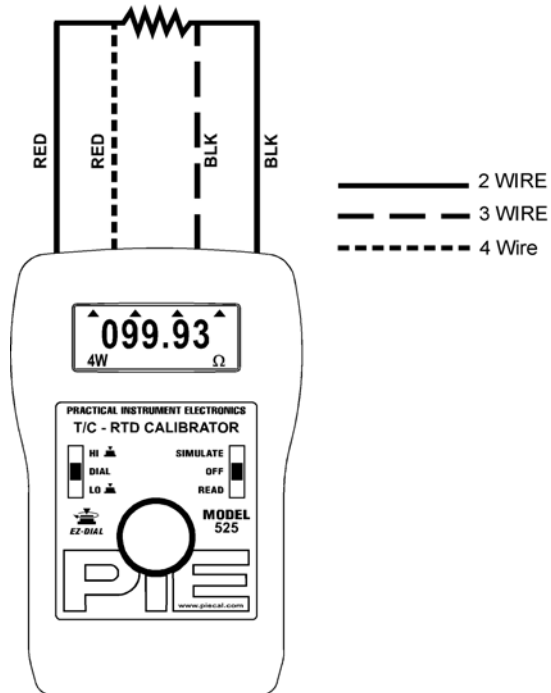
Turning the EZ-Dial™ Knob has no effect in read mode.

RTD READ ONLY-Automatic 2, 3, or 4 wire detect: Connect 2, 3, or 4 wires to the RTD sensor. Follow the connection diagrams. The Model 525 indicates "2W", "3W", or "4W" in the lower left corner of the display. It will also place an arrow under each connected wire to show which wire is connected and will indicate if there is an "ERROR". Use this feature for troubleshooting unconnected leads or sensors. **See below figure.**

RTD Read Connection, (wire kit supplied)

RTD Read Mode Connection

Display Indications:	
Check Connections 1 and 2	You have to have wires 1 and 2 connected correctly before trying to connect up to a 3 or 4 wire transmitter
OVERRANGE or UNDERRANGE	The resistance input exceeds the range of the selected RTD type.
OPEN RTD	No RTD is connected.
MISCONNECT	The Model 525 is incorrectly connected for a 3-wire or 4-wire reading. Both black leads are required.



Source Mode

Slide the SIMULATE/OFF/READ switch to SIMULATE for direct RTD or T/C output. The Model 525 outputs resistance corresponding to temperature for the selected RTD or outputs mV corresponding to temperature for the selected T/C 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. Using the STORED Values gives you very accurate values for repeatability. Adjusting the EZ-Dial™ Knob you can check for controller actions, trip points or hysteresis.

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.

RTD Connection Diagrams, (wire lead kit supplied)

SOURCE ONLY: (See opposite figure)

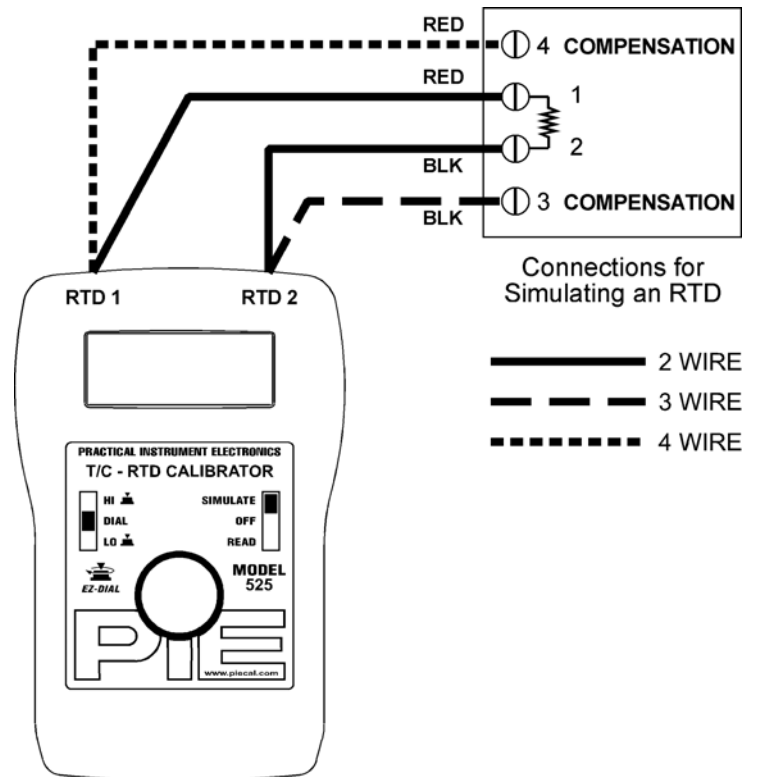
To connect to a 2 wire transmitter connect one red lead to post 1 (RTD1) and connect one black lead to post 2 (RTD2).

To connect to a 3 wire transmitter connect one red lead to post 1 (RTD1) and connect two black leads to post 2 (RTD2).

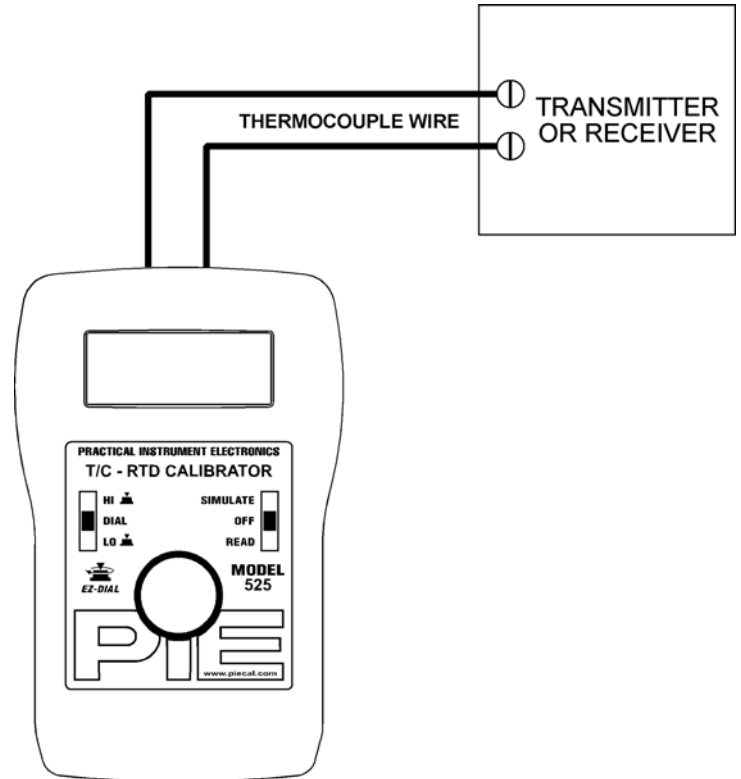
To connect to a 4 wire transmitter connect two red leads to post 1 (RTD1) and connect two black leads to post 2 (RTD2).

NOTE:

3 WIRE & 4 WIRE TERMINALS ARE FOR READ MODE ONLY. See figure page 2.



T/C Connection Diagram



Two Wire Connection to Transmitter

Color Codes FOR T/C Connections

T/C TYPE	T/C MATERIAL	ISA/ANSI COLOR	T/C TYPE	T/C MATERIAL	ISA/ANSI COLOR
J	+IRON	WHITE	N	+NICROSIL	ORANGE
	-CONSTANTAN	RED		-NISIL	RED
	JACKET	BLACK		JACKET	ORANGE
K	+CHROMEL®	YELLOW	G (W)	+TUNGSTEN	WHITE
	-ALUMEL®	RED		-W26/Re	RED
	JACKET	YELLOW		JACKET	WHITE/BLUE
T	+COPPER	BLUE	C (W5)	+W5/Re	WHITE
	-CONSTANTAN	RED		-W26/Re	RED
	JACKET	BLUE		JACKET	WHITE/RED
E	+CHROMEL®	PURPLE	D	+W3/Re	WHITE
	-CONSTANTAN	RED		-W25/Re	RED
	JACKET	PURPLE		JACKET	WHT/YEL
R	+Pt/13rH	BLACK	P Platinel®	+Pd55/Pt31/Au1 4	YELLOW
	-PLATINUM	RED		-Au65/Pd35	RED
	JACKET	GREEN		JACKET	BLACK
S	+Pt/10Rh	BLACK	din colors		
	-PLATINUM	RED	L J DIN	+IRON	RED
	JACKET	GREEN		-CONSTANTAN	BLUE
B	+Pt/30Rh	GREY	U T DIN	JACKET	BLUE
	-Pt/6Rh	RED		+COPPER	RED
	JACKET	GREY		-CONSTANTAN	BROWN
				JACKET	BROWN

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Model 525 Operating Instructions

Specifications

General Specifications: (2 minute warm-up time to reach full 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	°C or °F / 0.01 Ω or 0.001Ω
Span	0.000-400.000 Ω
Accuracy	±(0.015 % of Ω + 0.05) Ω (see accuracy tables for temperature error)
Temperature Coefficient	±0.01 % of span outside of 25°C ± 10°C

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	620 μA nominal
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T/C Simulation Specifications:

Output Range	-13.000 to +80.000 mV
Output Noise	±5 μV pp from 0.1 Hz to 10 Hz
Output Impedance	0.2 Ω (200 nV/uA)
Source Current	< 8 mA

T/C READ Specifications:

Input Noise	< ±1 LSD from 0.1 Hz to 10 Hz
Input Impedance	> 1 MΩ
Open T/C Test Pulse	< 10 μA for 300 ms
Open T/C Response Time	< 3 seconds
Open T/C Threshold	10 kΩ nominal

Available Options:

Carrying Case - included	Part Number: 020-0205
T/C wire Kits:	Wire Kit 1 includes J, T, E, K wires with mini connectors Wire Kit 2 includes B, R/S, N wires with mini connectors

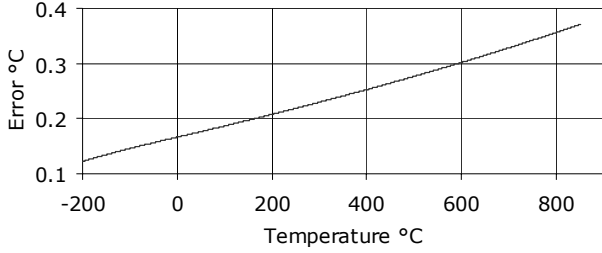


Model 525 Operating Instructions

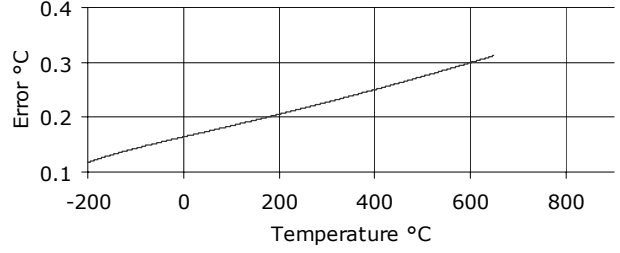
RTD Temperature Accuracy

The following charts give worst-case temperature accuracy based on stated resistance accuracy of $\pm (0.015 \% + 0.05) \Omega$.

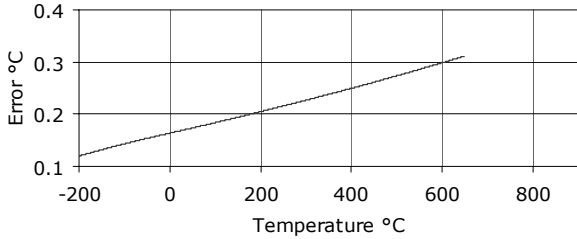
**Pt100 TCR=0.00385
-200 to 850 °C**



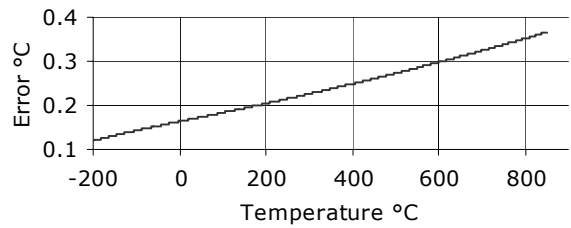
**Pt100 TCR=0.003902
-200 to 648.9 °C**



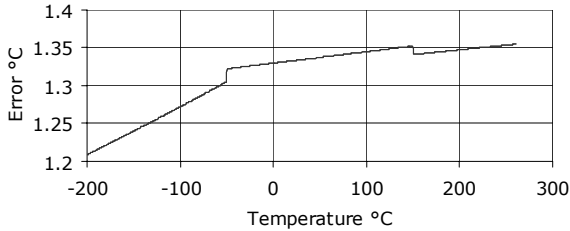
**Pt100 TCR=0.003916
-200 to 648.9 °C**



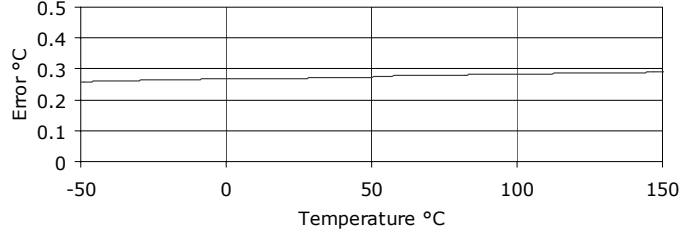
**Pt100 TCR=0.003926
-200 to 850 °C**



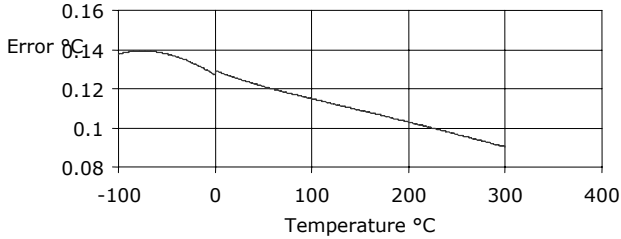
**Cu10 TCR=0.00427
-200 to 260 °C**



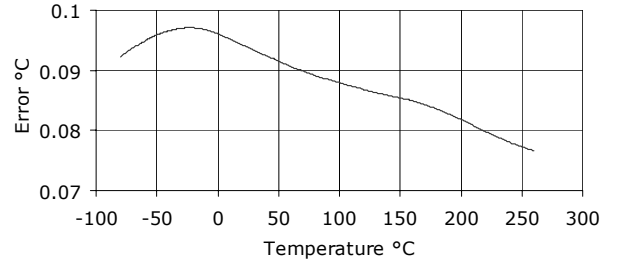
**Cu50 TCR=0.00428
-50 to 150 °C**



**Ni110 TCR=0.00530
-100 to 260 °C**



**Ni120 TCR=0.00672
-80 to 260 °C**



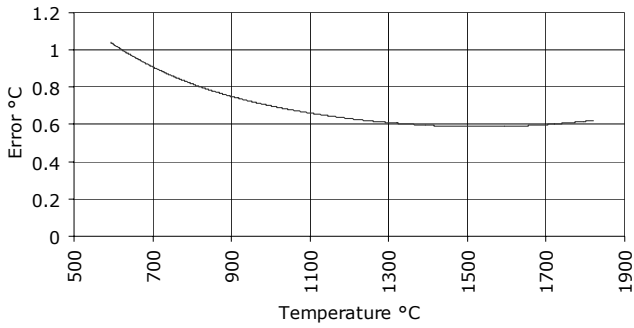


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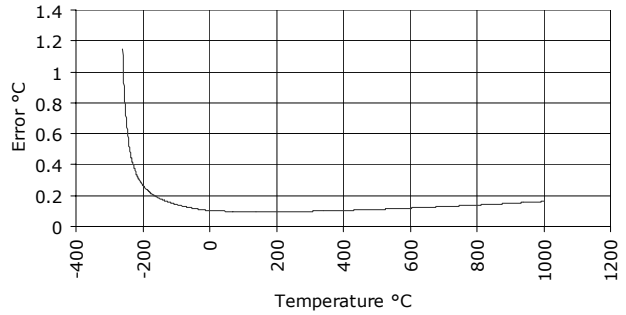
T/C Temperature Accuracy

The following charts give worst-case temperature accuracy based on stated millivolt accuracy of $\pm (0.008 \% + 0.006)$. Temperature is uncompensated on the horizontal axis, referenced to 0 °C. Cold Junction calibration accuracy of 0.1 °C is not included in the temperature error.

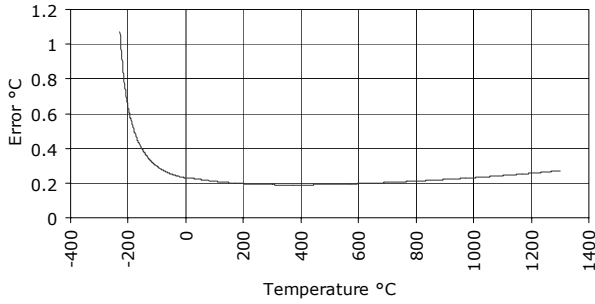
TYPE B
594 to 1820 °C



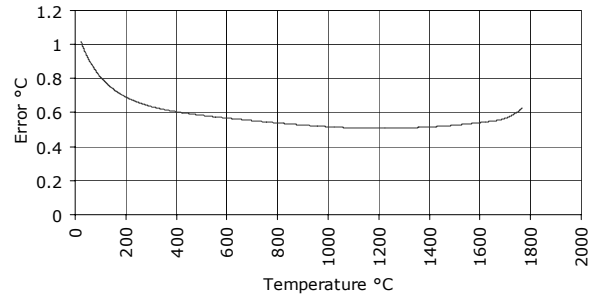
TYPE E
-260 to 1000 °C



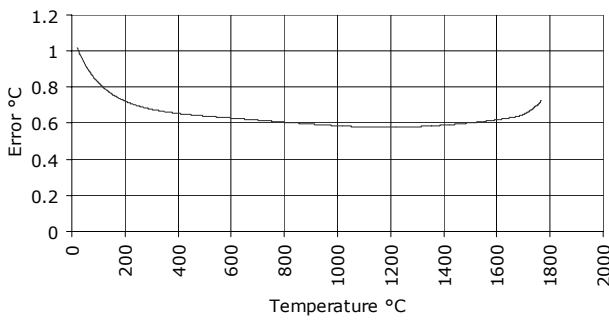
TYPE N
-229 to 1300 °C



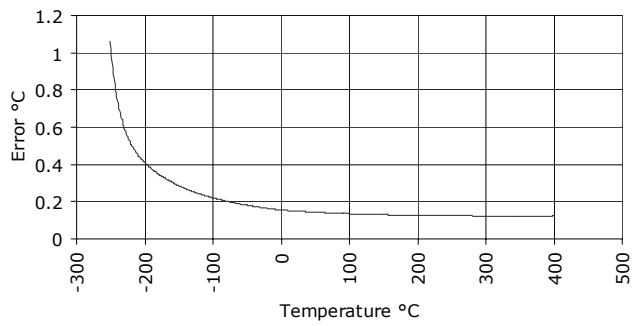
TYPE R
24 to 1768 °C



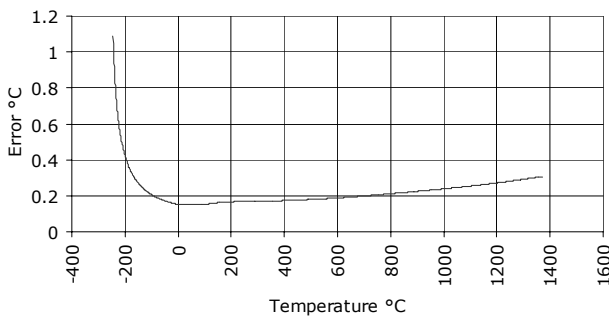
TYPE S
21 to 1768 °C



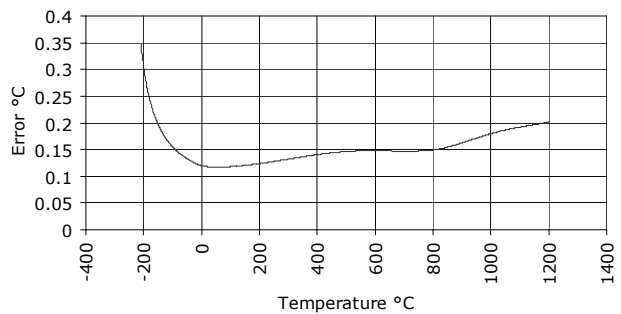
TYPE T
-251 to 400 °C



TYPE K
-245 to 1372 °C



TYPE J
-210 to 1200 °C





Model 525 Operating Instructions

Other Products Available:

RTD Source (Single Type/1° resolution)	Model 510
RTD Source (7 Types, Ω /0.1° resolution)	Model 511
Pt100: α =1.3850, 1.3902, 1.3916, 1.3926, Cu10: α =1.427	
Ni110: α =1.530, Ni120: α =1.672	
RTD Calibrator (Source/Read 7 Types, Ω /0.1° resolution)	Model 512
RTD Calibrator (Source, Read & Auto Stepping 8 Types, Ω /0.1° resolution)	Model 512S
T/C Source (Single Type/1° resolution)	Model 520
T/C Source (8 Types, mV/0.1° resolution)	Model 521
B, E, J, K, N, R, S, T, mV	
T/C Calibrator (Source/Read 8 Types, mV /0.1° resolution)	Model 522
B, E, J, K, N, R, S, T, mV	
4-20 Milliamp Loop Calibrator	Model 530
Pocket-Mate Milliamp Calibrator	Model 531
4-20 Milliamp Loop Calibrator with Diagnostic	Model 532
4-20/10-50 Dual Range Loop Calibrator	Model 535
Frequency Read & Source with Totalizer	Model 541

Warranty

Our equipment is guaranteed against defective material and workmanship (excluding batteries) for a period of three years from the date of shipment. Claims under guarantee can be made by returning the equipment prepaid to our factory. The equipment will be repaired, replaced or adjusted at our option. The liability of Practical Instrument Electronics (PIE) is restricted to that given under our guarantee. No responsibility is accepted for damage, loss or other expense incurred through sale or use of our equipment. Under no condition shall Practical Instrument Electronics, Inc. be liable for any special, incidental or consequential damage.