



Practical Instrument Electronics

# Model 520/521 Thermocouple Simulators Datasheet

## Features

### Direct Temperature Output

Calibrate in temperature for your T/C type

Adjust temperature output in 0.1° or 1°

### 8 Standard T/C Types Available

Types J, K, E, T, R, S, B, N and mV

Custom types and ranges are available

Ranges from -148°F to F.S. for most types

°C & °F Cold Junction Compensated

### High Accuracy

±(0.015% of mV Setting + 0.009mV)

Typical accuracy of ±0.35°C (0.6°F) for Type K

### EZ-Dial™ Knob

Easily adjust output by 0.1° (Model 521) or 1° (Model 520)

Pressing down and turning will select a faster dialing speed

### EZ-Check™ Switch

User selectable EZ-Check™ for 0% and 100% span adjustments

Store new EZ-Check™ values by pressing the EZ-Dial™ knob

### Uses a standard 9V Alkaline Battery

Superior battery life of 45 hours under typical continuous usage

Easy access to battery compartment

### Lightweight and Rugged with a Solid Feel

Small, tough and protected to 60V



Models pictured above:

**Model 520** – 1° Resolution, Single Type or Custom Type

**Model 521** – Selectable 8 types, 0.1° with selectable °C or °F and 0.001 mV resolution (J, K, E, T, R, S, B, N and mV)



## Description

The Practical Instrument Electronics' Model 520/521 Thermocouple Simulators simulate a standard thermocouple curve over the entire industrial temperature range. Choose between eight standard T/C types or millivolts. The Model 520 can also be supplied with a custom thermocouple curve and range for your specific application. Contact the factory for details.

The Model 520/521 sources precise temperatures for inputs to all types of instruments such as transmitters, recorders, controllers, alarms, data acquisition, and computer systems. The Model 521 provides a miniature T/C connector and the Model 520 provides 18" extension wire. Both are internally cold-junction compensated for changes in ambient temperature. The PIE Model 520/521 offers the highest performance and functions in its class by exceeding the accuracy and functions of many higher priced thermocouple calibrators.

The EZ-Check™ function allows the user to store three output temperatures for real convenience. This will save time for repetitive calibrations by instantly recalling the three stored temperature values. Three output settings can be stored, and all settings are saved, even with the power off.

The low cost PIE Model 520/521 is an "easy as PIE" to use thermocouple source for checkout and calibration of all thermocouple instruments in the field, shop or control room.



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# Model 520/521 Datasheet

## 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	7.2 oz (204 grams)
Battery	9V Alkaline provides 45 hours of continuous use
Miscellaneous	Low battery indication with nominal 1 hour of operation left Overload Protected to 60V for 30 seconds or less High contrast graphic liquid crystal display with 0.357" (9.07 mm) high digits

### Source Thermocouple Specifications (ITS-90 Curves):

Millivolt Uncertainty	±(0.015% of mV Setting + 0.009 mV)
Temperature Coefficient of mV Source	±0.005mV/°C Ambient
Output Noise	±5µVpp from 0.1 Hz to 10 Hz
Output Impedance	0.2Ω
Cold Junction Uncertainty	±0.25°C (0.5°F)
Cold Junction Sensor Temperature Coefficient	±0.05°/° in ambient temperature (°C or °F)
General Temperature Accuracy	±(0.015% of mV setting + 0.009mV) ± 0.25°C (0.5°F)
Output Dial Adjustment Resolution	0.1°C or °F for Model 521/1°C or °F for Model 520
Span	-13.000 - 80.000 mV
T/C Type B	594 - 1820°C (1101.2 - 3308.0°F)
T/C Type E	-260 - 1000°C (-436.0 - 1832.0°F)
T/C Type J	-210 - 1200°C (-346.0 - 2192.0 °F)
T/C Type K	-245 - 1372°C (-409.0 - 2501.6°F)
T/C Type N	-229 - 1300°C (-380.2 - 2372.0°F)
T/C Type R	24 - 1768°C (75.2 - 3214.4°F)
T/C Type S	21 - 1768°C (69.8 - 3214.4°F)
T/C Type T	-251 - 400°C (-419.8 - 752.0°F)

## Ordering Information

T/C Source (Single Type/1° resolution)	with T/C extension wire: Model 520-* (* is one of B, E, J, K, N, R, S, T, or mV) with miniature T/C connector: Model 520-M*
T/C Source (8 Types, mV/0.1° resolution)	Model 521
Optional Carrying Case	Part Number: 020-0205

## 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.*