PIECAL 422

Automated Thermocouple Calibrator

Actual Size

- **Easy to use**
  With the PIECAL 422 you can check and calibrate all your thermocouple instruments and measure thermocouple sensors.
- **Take it into the shop, plant or field**
  Carry it without worry - it comes protected with a rubber boot and rugged, low profile switches. Easy to operate even in the dark areas of the plant with the backlit display.
- **Calibrate directly in temperature (°C & °F)**
  Stop carrying around a millivolt source and thermocouple tables. The PIECAL 422 works with the thermocouples you use including types J, K, T, E, R, S, B, N, G, C, D, L (J-DIN), U (T-DIN) and P (Platinel II). Easily set any value quickly to within 0.1° with the adjustable digital potentiometer "**DIAL**" plus store any three temperatures for instant recall with the EZ-CHECK™ switch. Or calibrate from -13.000 to +80.000 mV.
- **Fast calibration with automatic output stepping**
  Choose between 2, 3, 5, 11 steps and ramp to automatically increment the output in 100%, 50%, 25%, 10% or 5% of span. Select the step time to match your system from 5, 6, 7, 8, 9, 10, 15, 20, 25, 30 and 60 seconds.
- **Compatible with *ALL* process instruments**
  No competitor's calibrator is compatible with as many process instruments! Connect directly to the thermocouple inputs of transmitters, PLCs, DCS & multichannel recorders to verify their outputs or displays.
- **Measure thermocouple sensors**
  Trouble shoot sensor connections and find broken wires or corroded connections. Connect your thermocouple and the PIECAL 422 measures the probe in degrees C or F. Secondary display shows the millivolt value corresponding to the thermocouple temperature as well as the junction temperature measured by the calibrator.
- **Calibration Lab Accurate & Stable**
  The internal cold junction thermistor is accurate to ±0.05°C and is traceable to NIST. The sensor is thermally bonded to an isothermal mass which includes brass blocks with screw terminals for connection of bare thermocouple wires along with a miniature thermocouple connector for fast connections. The circuitry uses an extremely stable voltage reference and low drift components which make the PIECAL 422 more accurate than most other handheld and benchtop thermocouple calibrators.
- **Perform Heat Treating Uniformity Surveys and System Accuracy Tests**
  The PIECAL 422 meets or exceeds the requirement of AMS 2750 as a Field Test Instrument.
- **Evolutionary design**
  PIECAL Calibrators are designed and built by members of the same team that designed and built the calibrators manufactured by Fluke* under the Altek* label. The PIECAL 422 improves upon other brands by including a rubber boot, tilt stand, backlit display with larger digits, rugged switches & a battery compartment for fast battery changes.

* PIECAL Calibrators are not manufactured or distributed by Fluke Corp or Altek Industries Inc, manufacturers of Altek Calibrators.

Connections

Simulating or reading thermocouples requires the use of thermocouple or extension grade thermocouple wire.
Plug thermocouple wires into the miniature thermocouple jack or place bare thermocouple wires onto the brass block under the screws.

The PIECAL 422 has two banana jacks mounted in the top end of the housing. These are not temperature compensated and are to be used only for millivolt signals.

PIECAL 422 Specifications

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

General	
Accuracy	±(0.008% of Reading + 0.006 mV)
Cold Junction Compensation	± 0.09°F (±0.05 °C) - Thermistor traceable to NIST for 11 years
Millivolt Range	-13.000 to 80.000 mV
Operating Temperature Range	-25 to 60 °C (-10 to 140 °F)
Temperature Effect	≤ ±50 ppm/°C; Cold Junction Sensor ≤ ±25 ppm/°C
Relative Humidity Range	10 % ≤RH ≤90 % (0 to 35 °C), Non-condensing
	10 % ≤RH≤ 70 % (35 to 60 °C), Non-condensing
Size	L=5.63 x W=3.00 x H=1.60 inches
Weight	12.1 ounces (including boot & batteries)
Batteries	Four "AA" Alkaline 1.5V (LR6)
Battery Life	50 Hours
Optional NiMh Rechargeable battery kit	120 VAC for North America Only; charger, four NiMh batteries, AC & DC cords [Part # 020-0103]
Low Battery	Low battery indication with nominal 1 hour of life left
Protection against misconnection	Over-voltage protection to 60 V dc (rated for 30 seconds)
Display	High contrast graphic liquid crystal display. LED backlighting for use in low lit areas.

Read	
Input Impedance	> 10 Megohms
Open Thermocouple Threshold Pulse	 10,000 Ohms nominal < 10 microamp pulse for 300 milliseconds
Normal Mode Rejection	50/60 Hz, 50 dB
Common Mode Rejection	50/60 Hz, 120 dB

Source	
Output Impedance	< 0.3 Ohms
Source Current	> 20 mA (drives 80 mV into 10 Ohms)
Noise	≤ 4 microvolts p-p for frequencies of 10 Hz or below

ThermocoupleRanges & Accuracies

Based on ≤ ± (0.008 % of Reading + 0.006 mV)

T/C	Degrees C Range	°C	Degrees F Range	°F	T/C Material
J	-200.0 to -180.0	±0.3°	-328.0 to -292.0	±0.5°	+Iron -Connstantan
	-180.0 to -50.0	±0.2°	-292.0 to -58.0	±0.4°	
	-50.0 to 500.0	±0.1°	-58.0 to 932.0	±0.2°	
	500.0 to 1200,0	±0.2°	932.0 to 2192.0	±0.4°	
K	-230.0 to -100.0	±0.6°	-382.0 to -148.0	±1.1°	+ Chromel® -Alumel®
	-100.0 to 1050.0	±0.2°	-148.0 to 1922.0	±0.4°	
	1050.0 to 1371.1	±0.3°	1922.0 to 2500.0	±0.5°	
T	-260.0 to -200.0	±1.0°	-436.0 to -328.0	±1.8°	+Copper -Constantan
	-200.0 to -50.0	±0.5°	-328.0 to -58.0	±0.9°	
	-50.0 to 0.0	±0.2°	-58.0 to 32.0	±0.4°	
	0.0 to 400.0	±0.1°	32.0 to 752.0	±0.2°	
E	-240.0 to -200.0	±0.4°	-400.0 to -328.0	±0.7°	+Chromel -Constantan
	-200.0 to -100.0	±0.2°	-328.0 to -148.0	±0.4°	
	-100.0 to 850.0	±0.1°	-148.0 to 1562.0	±0.2°	
	850.0 to 1000.0	±0.2°	1562.0 to 1832.0	±0.4°	
R	-18.3 to 250.0	±1.2°	-1.0 to 482.0	±2.2°	+Pt/13Rh -Platinum
	250.0 to 750.0	±0.6°	482.0 to 1382.0	±1.1°	
	750.0 to 1600.0	±0.5°	1382.0 to 2192.0	±0.9°	
	1600.0 to 1767.8	±0.6°	2192.0 to 3214.0	±1.1°	
S	-18.3 to 100.0	±1.2°	-1.0 to 212.0	±2.1°	+Pt/10Rh -Platinum
	100.0 to 400.0	±0.8°	212.0 to 752.0	±1.4°	
	400.0 to 1700.0	±0.6°	752.0 to 3092.0	±1.1°	
	1700.0 to 1767.8	±0.7°	3092.0 to 3214.0	±1.3°	
B	315.6 to 550.0	±1.8°	600 to 1022.0	±3.2°	+Pt/30Rh -Pt/6Rh
	550.0 to 900.0	±1.1°	1022.0 to 1652.0	±2.0°	
	900.0 to 1150.0	±0.7°	1652.0 to 2102.0	±1.3°	
	1150.0 to 1820.0	±0.6°	2102.0 to 3308.0	±1.1°	

T/C	Degrees C Range	°C	Degrees F Range	°F	T/C Material
N	-230.0 to -180.0	±1.0°	-382.0 to -292.0	±1.8°	+Nicrosil -Nisil
	-180.0 to -50.0	±0.5°	-292.0 to -58.0	±0.9°	
	-50.0 to 1100.0	±0.2°	-58.0 to 2012.0	±0.4°	
	1100.0 to 1300.0	±0.3°	2012.0 to 2372.0	±0.5°	
G (W)	100.0 to 150.0	±1.2°	212.0 to 302.0	±2.2°	+Tungsten -W26/Re
	150.0 to 400.0	±0.8°	302.0 to 752.0	±1.4°	
	400.0 to 1700.0	±0.4°	752.0 to 3092.0	±0.7°	
	1700.0 to 2320.0	±0.7°	3092.0 to 4208.0	±1.3°	
C (W5)	-1.1 to 1500	±0.5°	30.0 to 2372.0	±0.9°	+W5/Re -W26/Re
	1500 to 1900	±0.6°	2372.0 to 3452.0	±101°	
	1900.0 to 2100.0	±0.7°	3452.0 to 3812.0	±1.3°	
	2100.0 to 2320.0	±0.9°	3812.0 to 4208.0	±1.6°	
D (W3)	-1.1 to 50.0	±0.6°	30.0 to 122.0	±1.1°	+W3/Re -W25/Re
	50.0 to 1400.0	±0.4°	122.0 to 2552.0	±0.7°	
	1400.0 to 1800.0	±0.5°	2552.0 to 3272.0	±0.9°	
	1800.0 to 2320.0	±0.9°	3272.0 to 4208.0	±1.6°	
P Platinel®	0.0 to 1000.0	±0.2°	32.0 to 1832.0	±0.4°	+Pd55/Pt31/Au14 -Au65/Pd35
	1000.0 to 1395.0	±0.3°	1832.0 to 2543.0	±0.5°	
DIN Colors					
L J-DIN	-200.0 to -50.0	±0.2°	-328.0 to -58.0	±0.4°	+Iron -Connstantan
	-50.0 to 500.0	±0.1°	-58.0 to 932.0	±0.2°	
	500.0 to 900.0	±0.2°	932.0 to 1652.0	±0.4°	
U T-DIN	-200.0 to -75.0	±0.3°	-328.0 to -103.0	±0.5°	+Copper -Constantan
	-75.0 to 100.0	±0.2°	-103.0 to 212.0	±0.4°	
	100.0 to 600.0	±0.1°	212.0 to 1112.0	±0.2°	

Note: Doesn't include cold junction error of ±0.05°C

Accessories

Included:

Rubber Boot, Four “AA” Alkaline batteries, Certificate of Calibration
Deluxe Hands Free Carrying Case Part No. 020-0211
Standard Test Leads (Included with calibrator) Part No. 020-0207
Three feet (1 meter) of wire with an alligator clip on one end and a banana plug on the other end.

Optional:

Ni-MH 1 Hour Charger with 4 Ni-MH AA Batteries Part No. 020-0103
(100-120 V AC input for North America Only)
T/C Wire Kit 1 for Types J, K, T & E Part No. 020-0202
T/C Wire Kit 2 for Types B, R/S & N Part No. 020-0203
Three feet (1 meter) of T/C extension wire, stripped on one end with a miniature T/C male connector on the other end.

Warranty

Our equipment is warranted against defective material and workmanship (excluding batteries) for a period of three years from the date of shipment. Claims under warranty 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 warranty. 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.

Additional Information

PIE Calibrators are manufactured in the USA. This product is calibrated on equipment traceable to NIST and includes a Certificate of Calibration. Test Data is available for an additional charge.

Practical Instrument Electronics recommends a calibration interval of one year. Contact your local representative for recalibration and repair services.

Practical Instrument Electronics

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