

# PROCESS CALIBRATOR

## TechChek™

### Model 820

- **ONE VERSATILE TOOL- MULTIPLE FUNCTIONS**  
Calibrator - Milliamps, Voltage, RTD, T/C & Frequency  
Multimeter- Measure AC/DC Volts, Ohms & Continuity
- **TYPICAL ACCURACY TO  $\pm 0.025\%$**   
Accurate to 0.02 mA, V or Hz, 1°C, & 0.3 Ohms
- **DISPLAYS PROCESS SIGNALS**  
°C, °F, mA, % 4 to 20, V, mV, Ohms, Hz & CPM
- **DIGITAL ACCURACY WITH ANALOG SIMPLICITY**  
Speed sensitive digital pot for fast output adjustment
- **EASY TO LEARN - EASY TO USE**  
Simple, menuless operation
- **USER SETTABLE "QUIK-CHEK®" SWITCH**  
Set any Span and Zero
- **MINIMUM & MAXIMUM TRACKING**  
Instantly recall the highest & lowest measurements
- **STANDARD ALKALINE BATTERIES**  
Long battery life with quick battery changes
- **DESIGNED FOR SAFETY TO IEC 1010**  
Shielded banana jacks & test leads,  
Alligator Clips, Test Probes & Spade Lugs



## GENERAL INFORMATION

Lighten your load by taking the TechChek to every site. It's like bringing a cartload of test equipment from the shop to the control room or the field. The TechChek 820 sources & reads DC like a milliamp or voltage calibrator, simulates and measures T/Cs & RTDs like a temperature calibrator and generates and counts frequency & Counts-Per-Minute like a frequency calibrator. Troubleshooting? It checks continuity and measures AC line voltage like a multimeter!

The TechChek 820 is easy to use. Select a function, choose a range, and turn the knob for the precise output you need. Plus, you can store three output values per range for instant recall with the "QUIK-CHEK" switch.

### MILLIAMP CALIBRATION

Use at every point in your 4 to 20 mA loop. You can Source & Read 0.00 to 24.00 mA, Simulate a Two-Wire Transmitter or the use the TechChek 820 to simultaneously Power & Measure your Two-Wire Transmitters.

### VOLTAGE CALIBRATION

Calibrate all your DC millivolt and voltage instrumentation. Source from 0.00 to 110.00 mV and 0.00 to 10.25 V. Read up to 110.00 mV, 11.00 V and 200.0 VDC.

### THERMOCOUPLE CALIBRATION

Source and read directly in °C and °F for T/C types J, K, T & E with 1° resolution. Cold junction compensation automatically adjusts for ambient temperature changes.

### RTD CALIBRATION

Built-in Platinum 100 Ohm DIN/IEC 751 table displays in °C or °F. No more decade box and hard-to-read tables. Also reads and sources in Ohms.

### FREQUENCY CALIBRATION

Generate Zero Crossing square waves from 1 to 1000 Hz, 0.01 to 10.00 kHz and from 1 to 1000 CPM (Counts-Per-Minute). Also measures as a frequency counter.

### MEASURE AC VOLTAGE

Check your line voltage or mains from 0.0 to 250.0 volts AC. Great for troubleshooting power problems.

### CHECK CONTINUITY

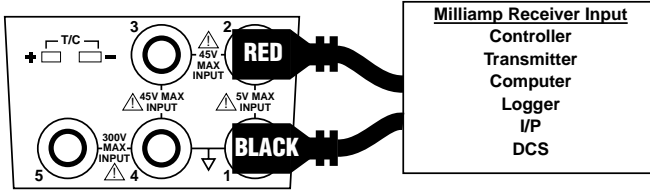
Locate pairs of wire, open connections and shorts with the built-in beeper.

# TYPICAL HOOKUPS

## SOURCE mA, mVDC, VDC, Hz or CPM

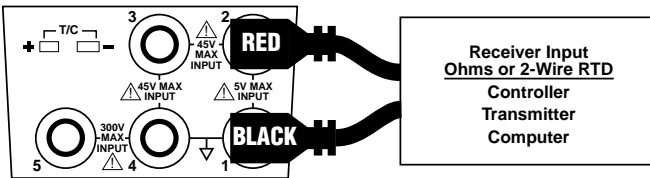
The Model 820 TechChek sources a wide variety of process control signals. You can store any three output values and use the QUIK-CHEK switch to *instantly* recall them.

Common outputs are 4 to 20mA, 0 to 100% of 4 to 20 mA, 1 to 5 Volts, 0 to 100 mV plus square waves in Hz or CPM.



## SOURCE or READ Ohms and 2-Wire RTDs

Simulate resistance to 400 Ohms or 2-Wire Platinum 100 Ohm RTDs. Read Pt 100 Ohm RTDs and resistance to 1000 Ohms.

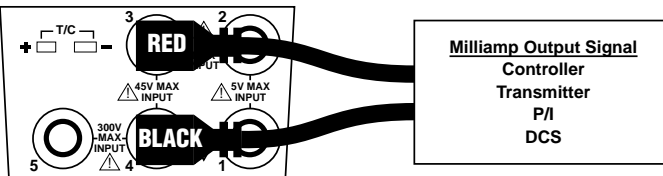


## READ mA, mVDC VDC

### Read VDC to 10.25V, Hz or CPM to 10.25 Vpeak

Easily measure process DC signals. Flip the QUIK-CHEK switch to recall the minimum and maximum readings.

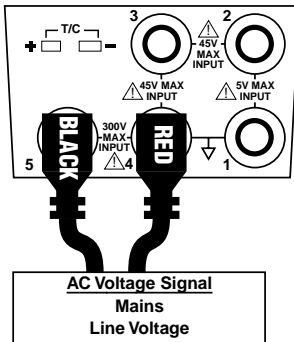
Put the Model 820 in series with the loop to measure 4 to 20 mA or across receiver inputs to measure the 1 to 5 volt signal. Read flow meter signals in Hz or CPM.



## READ to 250.0 VAC

### Read VDC to 200.0V, Hz or CPM to 250 Vpeak

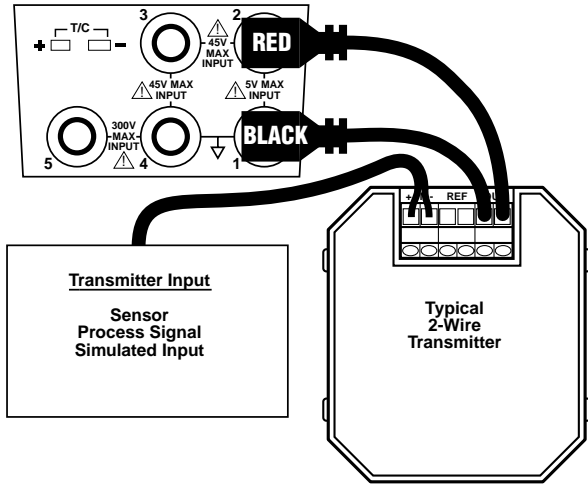
Check AC power (mains) to your panels without a voltmeter. Also measure power supplies, loop voltages & high amplitude frequency signals.



## POWER & MEASURE 2-WIRE TRANSMITTERS

Use the Model 820 TechChek to simultaneously supply power to a 2-Wire transmitter while displaying the 4 to 20 mA output of the transmitter.

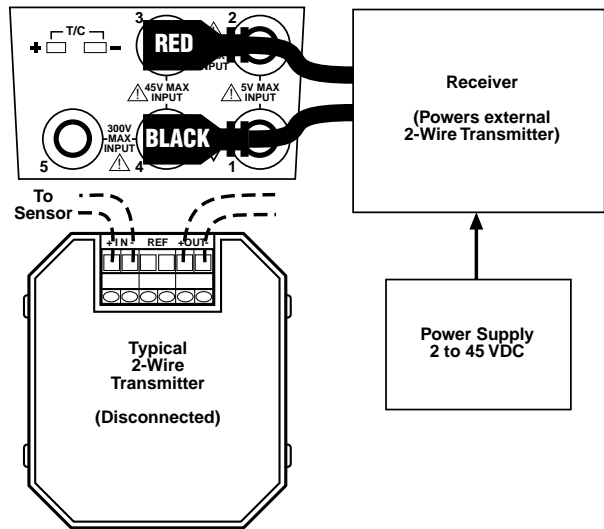
The Model 820 supplies a nominal 25 VDC and supports loads up to 1200 Ohms.



## SIMULATE 2-WIRE TRANSMITTERS

Simulate a 2-Wire Transmitter output from 1.00 to 24.00 mA or from -18.8 to 125.0% of 4 to 20 mA. Operates in loops with power supply voltages from 3 to 45 VDC.

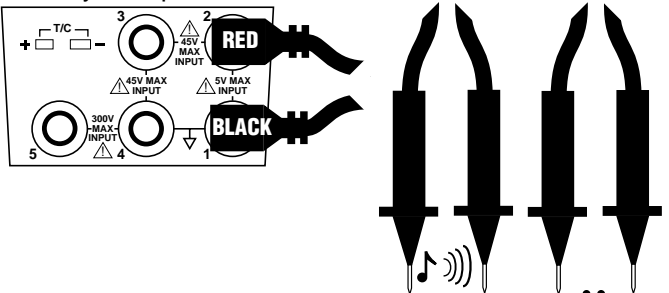
Substitute the Model 820 for any transmitter to check all the other devices in the loop. Or use to temporarily replace



## CHECK CONTINUITY

A tone sounds when the resistance between the terminals is less than approximately 100 Ohms.

Continuity is useful to find open connections, shorts or to identify wire pairs.

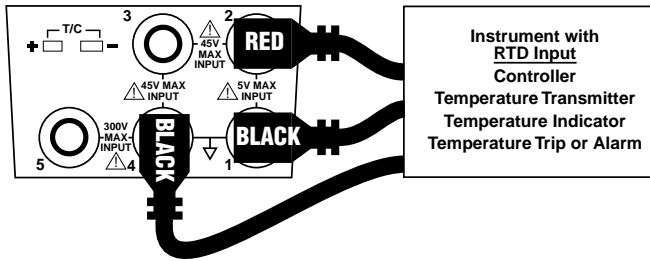


## TYPICAL HOOKUPS

### SIMULATE AN RTD SENSOR

Simulate a Platinum 100 Ohm (385) RTD sensor directly in °C or °F. Three test leads and spade lugs are included with the 820 for easy hookups.

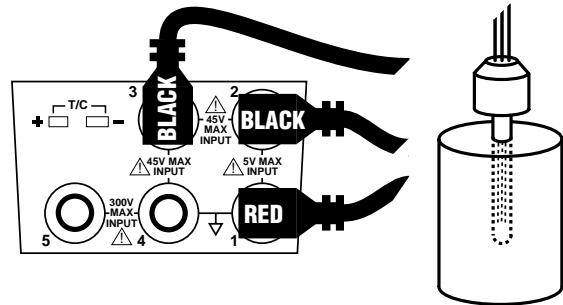
Eliminates holding a bulky decade box while reading RTD vs. resistance tables.



### READ 3-WIRE RTDs

Measure any Platinum 100 Ohm (385) RTD sensors in °C or °F. Three wire hookup lets you read typical process control sensors including ones with long cable runs.

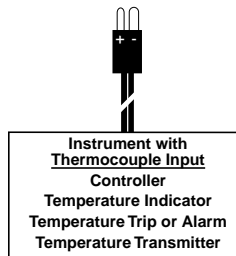
Minimum and maximum temperatures let you track temperatures to find control drift.



### SIMULATE A THERMOCOUPLE

Dial in any temperature to simulate the output of a Type J, K, T or E thermocouple. Store three values on the QUIK-CHEK switch to instantly output any temperature in °C or °F.

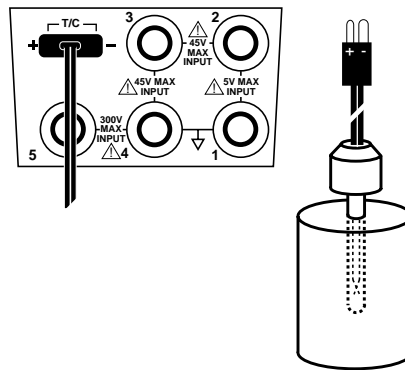
Cold junction compensation automatically adjusts the millivolt output as the ambient temperature changes.



### READ A THERMOCOUPLE

Connect any J, K, T or E thermocouple and read directly in °C or °F.

Flip the QUIK-CHEK switch to display the minimum and maximum measured temperatures. Monitor an independent sensor to tune the deadband adjustment of controllers.



## ADDITIONAL INFORMATION

### THREE YEAR WARRANTY

Our equipment is guaranteed against defective material and workmanship (excluding batteries) for a period of three years from date of shipment. Claims under guarantee can be made by returning the equipment prepaid to our factory. The equipment will be replaced, repaired or adjusted at our option. The liability of Altek 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 Altek be held liable for any special, incidental or consequential damage.

### OTHER PRODUCTS

Altek designs and manufactures fast, accurate instruments for measurement, generation and simulation of virtually every process control signal. Consult our factory directly or contact your local stocking representative to order precise, low cost Milliamp Calibrators, Voltage Sources, Thermocouple Sources, RTD Simulators, Frequency Calibrators and Pressure Pumps, Indicators & Calibrators. Altek also produces calibrators for custom ranges and unique applications. New models are frequently added to the Altek family to meet all of your critical calibration requirements. Altek products are made in the USA.

### ORDERING INFORMATION

### Part No.

**MODEL 820 TechChek  
PROCESS CALIBRATOR**

**820**

Included with each Model 820 are:

Carrying Case with belt loop and shoulder strap

Test Lead Kit (Part No. KIT-3)

NIST Traceable Certificate and Three Year

Warranty

### OPTIONAL ACCESSORIES

### Part No.

#### PLUG IN WIRE KITS

##### Thermocouple Wire Kit

**KIT-1**

Contains T/C wires for types J, K, T & E  
1 Meter long, terminated at one end with a miniature T/C connector

##### Replacement 820 Lead Kit

**KIT-3**

Contains Pair of Red & Black leads with right angle & straight sheathed banana plugs  
Pair of safety insulated alligator clips, uninsulated alligator clips, test probes and spade lugs  
Extra Black lead and spade lug for 3-Wire RTD connections

# SPECIFICATIONS

(Unless otherwise indicated, specifications are for 1 year in  $\pm\%$  of Span @ 23°C)

## GENERAL

**TYPICAL 90 DAY ACCURACY:**  $\pm(0.025\%$  of Full Scale + 1 LSD)<sup>1</sup>

**1 YEAR ACCURACY:**  $\pm(0.05\%$  of Full Scale + 1 LSD)

**WARM UP TIME:** 10 seconds to specified accuracy, 2 minutes to maximum accuracy

**TEMPERATURE EFFECT:**  $\pm 0.01\%/^{\circ}\text{C}$  based on  $23^{\circ}\pm 25^{\circ}\text{C}$

**BATTERIES:** Six "AA", (R6) batteries (Alkaline supplied and recommended)

**BATTERY LIFE:**

MILLIAMP SOURCE & 2-WIRE MODES: Nominal 50 hours at 12 mA, 20 hours at 20 mA with 250 Ohm load

OTHER FUNCTIONS: Nominal 50 hours

**LOW BATTERY INDICATION:** "BAT" indication on the display at approximately 4 hours left

**OVERLOAD PROTECTION:** Three fuses, 250 mA???

**NOISE:**  $\pm 1$  LSD at frequencies less than 10 Hz

**NORMAL MODE REJECTION RATIO:** 50 dB @ 50/60 Hz

**OPERATING TEMPERATURE RANGE:** -5 to  $+130^{\circ}\text{F}$  (-20 to  $+55^{\circ}\text{C}$ )

**STORAGE TEMPERATURE RANGE:** -13 to  $+130^{\circ}\text{F}$  (-25 to  $+55^{\circ}\text{C}$ )

**RELATIVE HUMIDITY:** 10 to 90%, non-condensing for 24 hours from 0 to  $35^{\circ}\text{C}$

**OVERALL SIZE:** 158.1 x 83.1 x 49.3 mm (6.23 x 3.27 x 1.94 inches)

**WEIGHT:** 0.6 kg (1 lb, 5 oz)

## MILLIAMP SOURCE

**RANGES:**

0.00 to 24.00 mA; -25.0 to 125.0 % of 4 to 20 mA

**ACCURACY:**  $\pm(0.05\%$  of 24 mA Span + 0.01 mA) = 0.02mA

**TYPICAL DRIVE CAPABILITY:** 1200 Ohms @ 20.00 mA

**COMPLIANCE VOLTAGE:** nominal 25 V @ 20 mA

## POWER & MEASURE 2-WIRE TRANSMITTERS

**RANGES & ACCURACY:** Same as for MILLIAMP SOURCE

**OUTPUT CURRENT:** up to 24.00 mA

**TYPICAL DRIVE CAPABILITY:** 1200 Ohms @ 20.00 mA

**COMPLIANCE VOLTAGE:** nominal 25 VDC @ 20 mA

## 2-WIRE TRANSMITTER SIMULATOR

**RANGES:**

1.00 to 24.00 mA; -18.8 to 125.0% of 4 to 20 mA

**ACCURACY:** Same as for MILLIAMP SOURCE

**LOOP VOLTAGE LIMITS:** Minimum, 3 VDC; Maximum 45 VDC

**OVERLOAD PROTECTION:** Current limited to 25 mA nominal

## MILLIAMP READ

**RANGES:**

0.00 to 24.00 mA; -25.0 to 125.0 % of 4 to 20 mA

**ACCURACY:** Same as for MILLIAMP SOURCE

**OVERLOAD PROTECTION:** Current limited to 25 mA nominal

**VOLTAGE BURDEN:** 0.9V at 4 mA, 1.2V at 20 mA, 1.9V at 24 mA

## DC VOLTAGE SOURCE

**RANGES:**

0.00 to 110.00 mV; 0.00 to 10.25V

**ACCURACY:**

$\pm(0.05\%$  of 110 mV+ 0.01mV) =  $\pm 0.07$  mV

$\pm(0.05\%$  of 10.25 V + 0.01V) =  $\pm 0.02$ V

**SOURCE CURRENT:** >20 mA

**SINK CURRENT:** >20 mA

**OUTPUT IMPEDANCE:** <0.3 Ohms

**SHORT CIRCUIT DURATION:** Infinite

## MEASURE DC VOLTS

**RANGES:**

0.00 to 110.00 mV; 0.00 to 10.25 V; 0.0 to 200.0 V

**ACCURACY:**

$\pm(0.05\%$  of 110 mV+ 0.01mV) =  $\pm 0.07$  mV

$\pm(0.05\%$  of 10.25 V + 0.01V) =  $\pm 0.02$ V

$\pm(2\%$  of 200.0 V + 0.1V) =  $\pm 4.1$  V

**INPUT RESISTANCE:** >1 Meg Ohm to 10.25V, >5 Meg Ohm to 200V

**SOURCE RESISTANCE EFFECT:** 0.01% per 100 Ohms

## MEASURE AC VOLTS

**RANGE:** 0.0 to 250.0 V True RMS

**ACCURACY:** From 10 to 250 VAC  $\pm(2\%$  of 250.0 VAC + 0.1 VAC) =  $\pm 5.1$  VAC

**MAXIMUM CREST FACTOR:** < 3

<sup>1</sup> Typical 90 day accuracy can be estimated by dividing the 1 year % of full scale accuracy by 2. Additions to the specification, such as + 1 LSD, remain constant.

**FREQUENCY RANGE:** 45 to 800 Hz

## SOURCE THERMOCOUPLES

**RANGES:**

Type J -100 to  $1200^{\circ}\text{C}$ ; -148 to  $2192^{\circ}\text{F}$

Type K -100 to  $1371^{\circ}\text{C}$ ; -148 to  $2500^{\circ}\text{F}$

Type T -100 to  $400^{\circ}\text{C}$ ; -148 to  $752^{\circ}\text{F}$

Type E -100 to  $1000^{\circ}\text{C}$ ; -148 to  $1832^{\circ}\text{F}$

**ACCURACY:**

$1^{\circ}\text{C}$  for temperatures above  $0^{\circ}\text{C}$

$2^{\circ}\text{C}$  for temperatures below  $0^{\circ}\text{C}$

**COLD JUNCTION ACCURACY:**  $\pm 1^{\circ}\text{C}$

**COLD JUNCTION EFFECT:** within  $0.05^{\circ}\text{C}$  per  $^{\circ}\text{C}$  change

**OVERLOAD PROTECTION:** Fused

**OUTPUT IMPEDANCE:** <0.3 Ohms

**SOURCE CURRENT:** >20 mA

## READ THERMOCOUPLES

**RANGES & ACCURACY:** Same as for SOURCE THERMOCOUPLES

**INPUT IMPEDANCE:** > 1 Meg Ohm

**OPEN THERMOCOUPLE DETECTION:** 450 millisecond pulse. Nominal threshold, 10 K Ohms.

## SOURCE RTD & OHMS

**RANGE OHMS:** 0.0 to 400.0 Ohms

**ACCURACY:**  $\pm 0.05\%$  of Full Scale + 0.075 mV/mA Excitation Current

**ACCURACY OHMS:**  $\pm(0.05\%$  of 400.0 Ohms + 0.1 Ohm) =  $\pm 0.3$  Ohms

**RTD Type:** Pt 100 Ohm DIN/IEC 751, Alpha = 1.3850 (0.00385)

**RANGE RTD:** -100 to  $850^{\circ}\text{C}$ ; -148 to  $1562^{\circ}\text{F}$

**ACCURACY RTD:**  $\pm 1^{\circ}\text{C}$

**TEMPERATURE EFFECT:**  $\pm((0.035 \text{ mV}/^{\circ}\text{C}) * (1/\text{mA Excitation Current}))$

**ALLOWABLE EXCITATION CURRENT:** 0.125 to 2.0 mA continuous DC

## READ RTD & OHMS

**RANGE OHMS:** 0.0 to 1000.0 Ohms

**ACCURACY:**  $\pm(0.05\%$  of 1000.0 Ohms + 0.1 Ohm) =  $\pm 0.6$  Ohms

**RTD RANGE & ACCURACY:** Same as for SOURCE RTDs

**EXCITATION CURRENT SUPPLIED:** 1 mA, nominal

## FREQUENCY SOURCE

**RANGES:** 1 to 1000 CPM (Count-Per-Minute); 1 to 1000 Hz, 0.01 to 10.00 kHz

**ACCURACY:**

$\pm(0.05\%$  of 1000 CPM + 1 CPM) =  $\pm 2$  CPM

$\pm(0.05\%$  of 1000 Hz + 1 Hz) =  $\pm 2$  Hz

$\pm(0.05\%$  of 10.00 kHz + 0.01 kHz) =  $\pm 0.02$  kHz

**OUTPUT WAVEFORM:** Square Wave, Zero Crossing, -1V to +5V  $\pm 10\%$

**RISETIME:** Hz <5 microseconds; CPM <100 microseconds

**OUTPUT IMPEDANCE:** <100 Ohms

**SOURCE CURRENT:** >1 mA at 10 kHz

**SHORT CIRCUIT DURATION:** Infinite

## MEASURE FREQUENCY

**RANGES & ACCURACY:** Same as for FREQUENCY SOURCE

**TRIGGER LEVEL:** 1 V RMS, DC coupled

**INPUT IMPEDANCE:** > 1Meg Ohm + 60 pF

## CONTINUITY CHECKING

**TEST CURRENT:** Nominal 1 mA

**THRESHOLD:** 100 Ohm  $\pm 20\%$

**INDICATION:** Steady tone & Symbol on LCD plus Ohm Reading

*Specifications subject to change without notice*

## AVAILABLE FROM

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Edison, NJ 08820  
732-632-6400  
support@instrumentation2000.com  
<http://www.instrumentation2000.com>