



PIE CALIBRATORS

The Altek* Replacements



PIE Calibrators are Evolutionary!

Did you know that Altek* Calibrator designs are over 15 years old? PIE Calibrators are entirely new designs that are more rugged, have longer battery life and are just as easy to use as the Altek* you have used for years. Is your Altek* Calibrator discontinued? Browse through this comparison guide and see how the PIE replacement for your favorite calibrator stacks up.

PIE Calibrators are designed and built by members of the same team that designed and built the calibrators now manufactured by Fluke* under the Altek* label.

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

Practical Instrument Electronics

82 East Main Street Suite 3.14 • Webster NY 14580

Tel: 585.872.9350 Fax: 585.872.2638 • sales@piecal.com www.piecal.com



PIE CALIBRATORS

The Altek* Replacements

PIE - Built for Calibration Professionals

Simplify your day-to-day calibration tasks

I & E technicians have to do more and more every day with less help and shrinking budgets. PIE Calibrators help you simplify your job with calibrators that are technician friendly. They are compact, easy to learn, simple to setup and accurate. PIE technician friendly calibrators are all about ease of use. PIE's unique and intuitive EZ-DIAL Double Click Menu makes them simpler to setup than larger calibrators with their complicated button filled panels and confusing menus. Use a PIE Calibrator right out of the box instead of wasting time learning to use more complex calibrators.

Technician suggested evolutionary design

PIE Calibrators include features requested by I & E technicians. They are designed and built by members of the same team that created the calibrators now manufactured by Fluke* under the Altek* label. We have been designing calibrators since the 1980s and for PIE since 2001. Improvements over other brands include simple "Double Click Menu", rubber boot with tilt stand, backlit displays with larger digits, rugged switches and battery compartments for fast battery changes. From simple thermocouple and RTD sources to multifunction calibrators PIE has what you are looking for at a price to fit your budget.

Support when you need it anywhere in the world

PIE Calibrators are made in the USA and are backed by a Three Year Warranty. All PIE Calibrators come with a free NIST Traceable Certificate that is signed and dated. Altek's come only with an unsigned Statement of Calibration Practices with a certificate of calibration available for an extra charge. We recommend annual recalibration of our products. Contact PIE or your local distributor for factory recalibration. Calibration may also be performed by your company's calibration laboratory or any of your qualified calibration vendors. Calibration procedures are posted on our website.



More Than a Simple Boot

Flip out the tilt stand and free up both hands for calibration adjustments

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PIE Model 820 Compared to Altek*

Multifunction Process Calibrator
mA • V • TC • Ω • RTD • Hz



Advantages of the PIE Model 820 over the Altek* Model 820

- **Automatic stepping & ramping**
Setup 2, 3, 5 & 11 steps or continuous ramp from 5 to 60 seconds to match your test procedures
- **Larger display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **More Thermocouple & RTD ranges with 0.1° resolution & better accuracy**
Compatible with smart transmitters, multichannel recorders, PLCs and DCSs (the Altek 820 RTD output is not compatible with many smart transmitters and system input cards)
- **Smaller & 25% lighter**
Pocket sized and easier to carry
- **LED for optical pickups & troubleshooting**
LED flashes green in synch with frequency output. Illuminates red for overload conditions



PIE Model 820 is smaller & 25% lighter



Deluxe 'Hands-Free' carrying case with zippered pocket for manual and test leads

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PIE Model 830 Compared to Altek*

Multifunction Process Calibrator
mA • V • TC • Ω • pH • RTD • Hz • Pressure
Loop Diagnostics • Transmitter Supply



Advantages of the PIE Model 830 over the Altek* Model 830

- **Higher Accuracy**
Accurate to 0.006 mA, Pt 100 Ohm RTD to 0.2°C/0.4°F, Type K to 0.3°C/0.6°F, pH to 0.003 pH
- **Loop Diagnostics - Unique to PIE**
Only multifunction calibrator that can power up a loop and tell you that there is moisture, corrosion or a ground fault causing current to leak to ground.
- **Simulates a pH probe**
Calibrate pH transmitters & analyzers before attaching probe to verify that each is working correctly
- **Isolated internal 24 V loop supply**
Calibrate 2-wire transmitter with electrical isolation between the input and the output for more accurate and stable readings.
- **Wider range of pressure modules & scales**
Choose from 32 different modules with up to 32 engineering units for greater compatibility with your processes.
- **Works with more instruments**
Compatible with smart transmitters, multichannel recorders, PLCs and DCSs - GUARANTEED!
More Thermocouple & RTD ranges with 0.1° resolution and better accuracy.
- **Smaller, 25% lighter and easier to hookup**
Pocket sized and easier to carry. Icons on the display indicate where to plug in the test leads.
- **LED for optical pickups & troubleshooting**
LED flashes green in synch with frequency output. Illuminates red for overload conditions



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Compact setup in upgraded carrying case saves space and is easier to carry than the Altek 830 with the pressure module and ModPack 91 pressure module holder.

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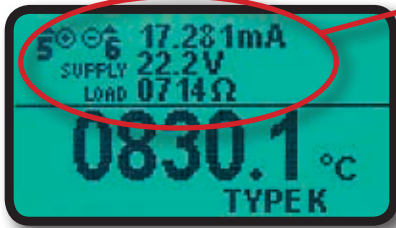


PIE Model 830

More tools in a Smaller Calibrator

Loop Diagnostics • Transmitter Supply
mA • V • pH • TC • Ω • RTD • Freq • Pressure

Unique features of the PIECAL 830

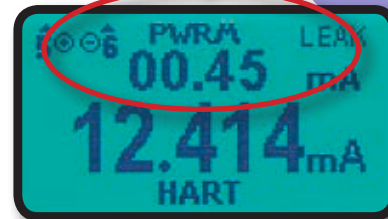


With LoopScope running the 830 simultaneously displays the sensor input along with the loop current, power supply voltage and loop load in ohms.

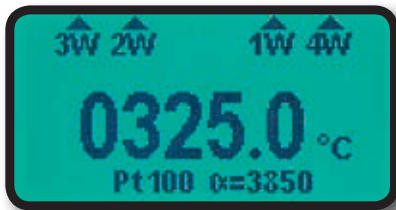
830 detects uncontrolled current in the loop due to a flooded junction box.

Use the PIE 830 as a Universal Isolated Transmitter

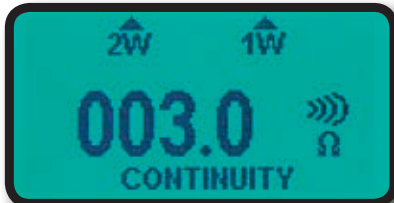
Swap out a faulty transmitter to diagnose control issues. If replacing the transmitter fixes the problem leave the 830 in place while you go to the shop to obtain and configure a replacement. Turn on LoopScope while running as a transmitter and see the status of the loop. Use the LoopScope to simultaneously display current, power supply voltage and loop resistance (load) in live loops.



Built-in troubleshooting tools
Detect hidden loop problems caused by ground faults & current leakages.

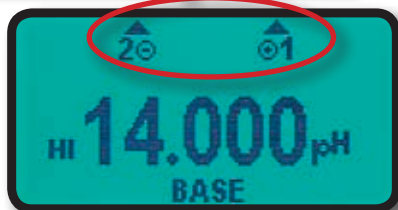


Automatically detect 2, 3 or 4 wire RTDs.



Continuity tester with beeper to find broken wires and shorts.

830 shows where to plug in the test leads for each connection.



Sources pH - 830 has a dedicated pH range as well as wider millivolt ranges



Hands free carrying case with pockets for the PIE 830 and the Pressure Module. Back of case has zipped pocket for the manual, test leads, hoses & pressure fittings.

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PIE Model 334 Compared to Altek* 4-20 mA Loop Calibrator



Advantages of the PIE 334 over the Altek* 334A

- **Backlit display with larger digits**
- **More resistant to accidental damage**
Rubber Boot and Stronger Switches
- **Separate battery compartment with 4 "AA" batteries**
No more removing housing with screwdriver to replace three expensive 9V batteries. Calibration seals remain intact.
- **Calibrate more devices between battery changes**
Drives more loop instruments (up to 1200 Ohms) for entire battery life



Do more than a 334. Step up to an automated calibrator with built-in Loop Diagnostics!

PIE Model 334 Plus Automated 4-20 mA Calibrator



Advantages of the PIE 334Plus over the Altek* 334 & 334A

- **Higher resolution display with backlight**
Full five digit display easily viewed in dark locations
- **250 Ω Hart compatible resistor**
No disassembly to move internal jumper
- **Detects loop current leakages**
Measure ground current leakage from faulty wiring, flooded conduit and corrosion bridges. Leakage appears as a zero shift and helps you decide if the transmitter needs calibration or if there is some problem in the loop wiring. *Patented and exclusive to PIE!*
- **Automatic stepping & ramping**
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Calibrate more devices between battery changes**
Drives more loop instruments (up to 1200 Ohms) for entire battery life



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PIE Model 434 Compared to Altek*

Automated Diagnostic 4-20 mA Calibrator



Advantages of the PIE Model 434 over the Altek* Model 434

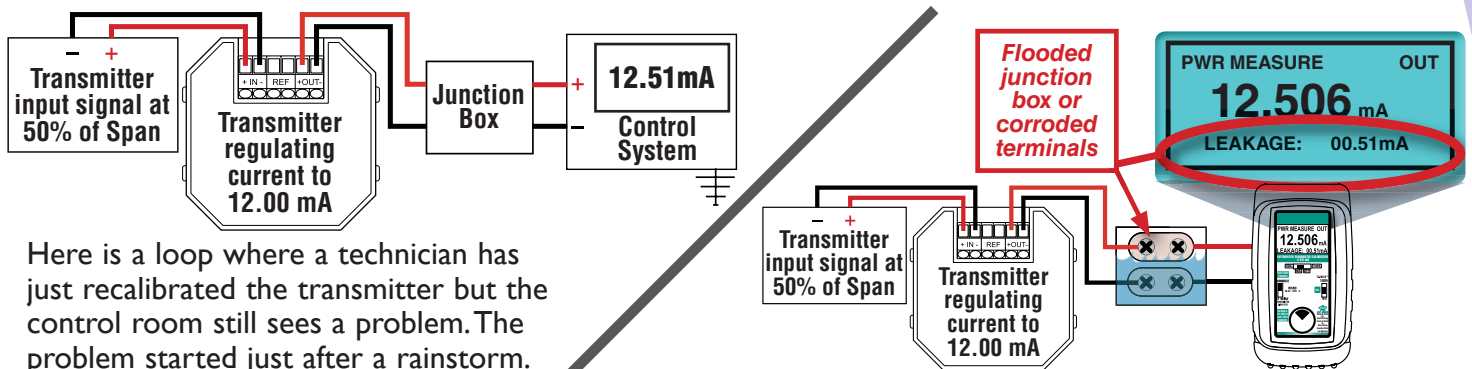
- **Larger display with backlight**
Easy viewing in dark locations
- **Easy selection of 250 Ω Hart compatible resistor**
No disassembly to move internal jumper
- **Detects loop current leakages**
Measure ground current leakage from faulty wiring, flooded conduit and corrosion bridges. Leakage appears as a zero shift and helps you decide if the transmitter needs calibration or if there is some problem in the loop wiring. *Patented and exclusive to PIE!*
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Less expensive battery changes**
Four versus six "AA" batteries
- **Simpler automatic stepping & ramping**
Stroke valves open or closed with fast dialing from 4 & 20 mA



Typical problem found with Loop Diagnostics

If you find a loop where the transmitter is calibrated correctly but all the readings elsewhere in the loop have a fixed offset this is due to a Zero Shift. This zero shift is typically caused by some current in the loop bypassing the transmitter. This might be caused by ground faults, moisture or corrosion.

Turn on Ground Leak Detection and use the PIE Model 334Plus, 434 or 532 to power up the loop. Any current that isn't controlled by the transmitter or other current control element will be indicated as leakage on the calibrator's display.



Here is a loop where a technician has just recalibrated the transmitter but the control room still sees a problem. The problem started just after a rainstorm.

Using a PIE Model 434 to power the loop the technician detects a leakage of 0.51 mA - the same offset seen in the control room. He walks the loop and opens a junction box releasing a stream of water. The loop is again in control.

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PIE Model 532 Compared to Altek 934*

ma/V Loop Calibrator with Loop Diagnostics



Advantages of the PIE Model 532 over the Altek* Model 934

- **Troubleshoot problems with advanced diagnostics**
Quickly find current leaks and loop errors with simultaneous display of loop current, voltage and resistance along with stray AC voltages. Patented and exclusive to PIE!
- **Detect HART signals without an oscilloscope**
Indicates HART PRESENT when a HART signal is found & flashes a ♥ when the HART is polling.
- **Easier to setup**
Easy push button menu instead of holding and pushing buttons to change settings
- **Simpler & easier battery changes**
Single 9V battery vs. 6 'AA' batteries.
- **Smaller and lighter**
Easier to carry and hold in your hand
- **Simpler automatic stepping & ramping**

LOOP POWER MEASURE DIAG	
CURRENT	= 20.00 mA
VOLTAGE	= 24.2 V
RESISTANCE	= 01210 Ω
GND FAULT ERROR	= 00.16 mA
AC V	= 0.0 V
HART® COMM DETECTED	



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PIE Model 134 Compared to the Altek Model 134-2

Pocket-Mate 4-20 mA Loop Calibrator



Advantages of the PIE Model 134 over the Altek* Model 134-2

- **Larger display with bargraph**
Built-in belt clip
- **Drives more devices in a loop**
Full 24 Volt supply versus 18 Volt supply
- **Easy selection of 250 Ω HART compatible resistor**
Requires disassembly to move internal jumper
- **Separate battery compartment**
No more removing housing with screwdriver to replace batteries. Calibration seals remain intact.



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PIE Model 541 Compared to Altek* 942 & 40A Frequency Calibrator



Advantages of the PIE Model 541 over the Altek* Model 942

- **Easier to setup**
Easy push button menu instead of turning the calibrator off and back on to change settings
- **Simpler & easier battery changes**
Single 9V battery vs. 6 'AA' batteries. Auto-Off saves batteries.
- **Smaller and lighter**
Easier to carry and hold in your hand
- **Calibrate optical pickups**
LED flashes in sync with frequency output. LED also flashes in synch with reading for fast adjustment of trigger level.

Advantages of the PIE Model 541 over the Altek* Model 40A

- **Generates & Measures Frequency**
Altek is limited to 40 set output frequencies with no display. The PIE Model 541 outputs and measures a wider range of frequencies.
- **Outputs Sine Waves**
Outputs Sine Waves, Zero based Square Waves and Zero Crossing Square Waves



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Keep Power Plant 10-50 mA loops up with the Model 535

4-20 / 10-50 mA/V Loop Calibrator



- **Calibrate Milliamp & Voltage Instruments**
*Source & Read 0.000 to 52.000 mA & -25.00 to 125.00% of 10-50 and 4-20 mA with five digit display
Source 0.000 to 20.000 V & Read -99.99 to 99.99 V, Simulate 2-Wire Transmitters, Power & Read Transmitters
Menu selectable 250 Ohm resistor for HART compatibility*
- **Stroke 10-50 mA valves and power transmitters**
Built-in 45 Volt power supply delivers the power to operate your I/Ps where other calibrators fail
- **Popular with many nuclear power plants**
Fully compatible with Foxboro and other 10-50 mA instruments
- **Calibrate with Lab Accuracy**
Accurate to $\pm(0.025\%$ of Reading + 4 lsd) - within 0.01 mA

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PIE Models 322-1 & 422 Compared to Altek*

Thermocouple Calibrators



Advantages of the PIE Model 322-1 over the Altek* Model 322-1

- **Automatic stepping**
- **Larger display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Separate battery compartment**
No more removing housing with screwdriver to replace batteries. Calibration seals remain intact.
- **Easily change thermocouple types**
Reconfigure without resetting calibrator



Do you have T/C types other than J, K, T & E? Check out the PIE 422!

PIE Model 422 Automated T/C Calibrator for 14 T/C Types



Advantages of the PIE Model 422 over the Altek* Model 422

- **Automatic stepping**
- **Larger display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Separate battery compartment**
No more removing housing with screwdriver to replace batteries. Calibration seals remain intact.
- **Easily change thermocouple types**
Reconfigure without resetting calibrator
- **Verify cold junction temperature & output**
Secondary display of compensated millivolt setting and cold junction temperature



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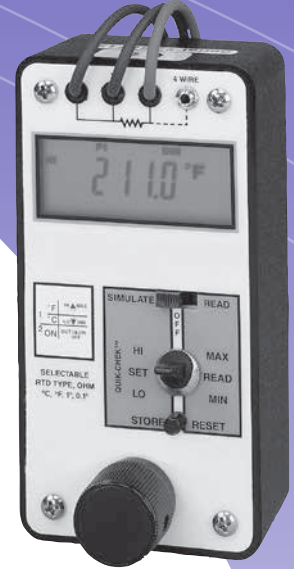
PIE Model 211 & 311 Compared to Altek*

Automated RTD Calibrator



Advantages of the PIE Model 211 over the Altek* 211

- **Compatible with newer instrumentation**
Works with Rosemount & Honeywell smart transmitters, PLCs, DCSs, multi-channel recorders and other pulsed excitation devices. Higher accuracy at low excitation currents.
- **Automatic stepping**
- **Larger display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Separate battery compartment**
No more removing housing with screwdriver to replace batteries. Calibration seals remain intact.
- **Easily change RTD types**
Reconfigure without resetting calibrator



Do you have 1000 Ohm RTDs?
Check out the PIE Model 311
with secondary display of Ohms!

PIE Model 311 Automated Universal RTD Calibrator

Advantages of the PIE Model 311 over the Altek* Model 311

- **Compatible with newer instrumentation**
Works with Rosemount & Honeywell smart transmitters, PLCs, DCSs, multi-channel recorders and other pulsed excitation devices. Higher accuracy at low excitation currents.
- **More RTD ranges**
Pt 1000 Ohm curves - outputs up to 4000 Ohms
- **Automatic stepping**
- **Larger display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Rubber boot and stronger switches
- **Separate battery compartment**
No more removing housing with screwdriver to replace batteries. Calibration seals remain intact.
- **Easily change RTD types**
Reconfigure without resetting calibrator
- **Verify RTD temperature & output**
Secondary display of ohms to check RTD tables



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PIE Models 510B & 511B Compared to Altek 11*

RTD Simulator



Advantages of the PIE Model 510B over the Altek* Series 11

- **Continuously select output temperatures**
Works with all instrument ranges across the full range in °C & °F. Not limited to 11 temperature steps!
- **Single Type - Works with Pt 100 & 1000 Ohm, Cu or Ni RTDs**
One simulator replaces ALL the ranges for any single RTD type of the Altek 11
- **Instantly select output three temperatures**
Flip the EZ-Check™ switch to calibrate zero, span and mid-point
- **LCD display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Optional rubber boot for extra protection



PIE Model 511B RTD Simulator

Advantages of the PIE Model 511B over the Altek* Series 11

- **Continuously select output temperatures**
Works with all instrument ranges across the full range in °C & °F. Not limited to 11 temperature steps!
- **10 RTD Types - Works with Pt 100 & 1000 Ohm, Cu & Ni RTDs**
One simulator replaces ALL the types and ranges of the Altek 11
- **Instantly select output three temperatures**
Flip the EZ-Check™ switch to calibrate zero, span and mid-point
- **LCD display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Optional rubber boot for extra protection



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PIE Models 520B & 521B Compared to Altek 22*

Thermocouple Source



Advantages of the PIE Model 520B over the Altek* Series 22

- **Continuously select output temperatures**
Works with all instrument ranges across the full range in °C & °F. Not limited to 22 temperature steps!
- **Single TC Type - Works with types J, K, T, E, R, S, B, N, G, C, D, L, U, or P**
One source replaces ALL the ranges for any single TIC type of the Altek 22
- **Instantly select output three temperatures**
Flip the EZ-Check™ switch to calibrate zero, span and mid-point
- **LCD display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Optional rubber boot for extra protection

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PIE Model 521B Thermocouple Source



Advantages of the PIE Model 521B over the Altek* Series 22

- **Continuously select output temperatures**
Works with all instrument ranges across the full range in °C & °F. Not limited to 22 temperature steps!
- **14 TC Types - Works with types J, K, T, E, R, S, B, N, G, C, D, L, U and P**
One source replaces all the ranges for all types of the Altek 22
- **Instantly select output three temperatures**
Flip the EZ-Check™ switch to calibrate zero, span and mid-point
- **LCD display with backlight**
Easy viewing in dark locations
- **More resistant to accidental damage**
Optional rubber boot for extra protection

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PIE Model 525 Thermocouple & RTD Calibrator

**High Resolution & Accuracy
Thermocouple & RTD Simulator**
*It's like a Model 422 & 311 combined into
one pocket sized calibrator*



- **Calibrate with Precision**
High resolution to 0.1° and 0.01° F & °C; Accurate to 0.2°
- **Source and Read Multiple Thermocouple Types plus mV**
J, K, T, E, R, S, N and B; -13.000 to 80.000 mV
- **Source and Read Multiple RTD Curves plus Ohms**
*Platinum 100Ω: $\alpha=1.3850, 1.3902, 1.3926$; Copper 10 & 50Ω;
Nickel 110 & 120Ω 0.000 to 400.000 Ohms*
- **Automatically Detect 2, 3 & 4 Wire Connections**
Troubleshoot sensor connections & find broken wires with patented technology
- **Guaranteed Compatible with all Instrumentation**
*Works with Rosemount & Honeywell Smart Transmitters, PLCs, DCSs, Multi-Channel Recorders
and other pulsed excitation devices*
- **Faster Calibrations**
*Instantly select 3 outputs with EZ-CHECK switch; 2 speed EZ-DIAL; Auto
Stepping.*

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Calibration Certificates and Warranties

PIE Calibrators come calibrated & certified

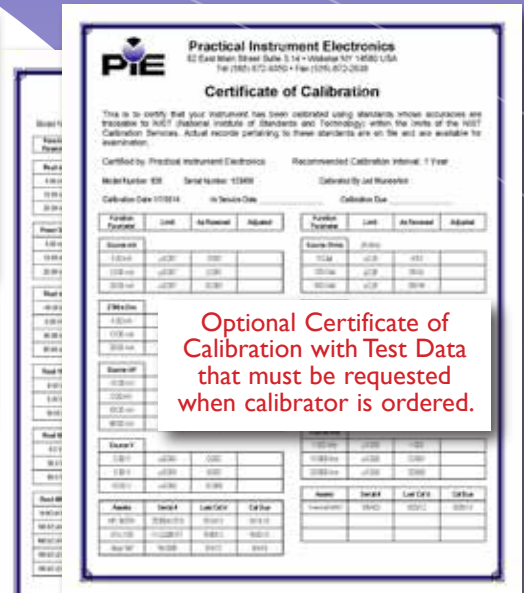
Did you know that Altek Calibrators come standard with an undated, unsigned Statement of Calibration Practices without a serial number. When ordered from a distributor you have the option of *paying* for various levels of calibration and certificates.

PIE Calibrators are made in the USA and come standard with a Certificate of Calibration Card and a Three Year Warranty. You may optionally purchase a Certificate of Calibration with Test Data. The test data must be requested when the calibrator is ordered.

We recommend annual recalibration of our products. Contact PIE or your local distributor for factory recalibration. Calibration may also be performed by your company's calibration laboratory or by any of your qualified calibration vendors. Calibration procedures are posted on our website.



Standard Certificate of Calibration Card included free with each calibrator purchased.



Optional Certificate of Calibration with Test Data that must be requested when calibrator is ordered.

Standard Three Year Warranty

Three years of protection from any defects in materials or workmanship - included with every calibrator. If your calibrator should fail, and is physically undamaged, we will repair it free of charge under our Standard Warranty.

Repair/Replacement Three Year Warranty (-RW)

Available for a small additional charge at time of purchase. Three years of protection from any defects in materials or workmanship PLUS Three years of protection from physical damage . If you use calibrators frequently and under extreme conditions, the Repair/Replacement Warranty is the best choice. This warranty provides for the repair or replacement of the covered calibrator during the first three years no matter what happens to the calibrator! If the calibrator is dropped, run over, or is abused until it ceases to function, we will repair or replace it no charge. *No questions asked.*

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PIE Calibrators



Frequency



**Thermocouple
and RTD**



Milliamp



Multifunction

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PIE Evolution Competitive Advantages Rev K 8 April 2014

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