



PIE 10-50 mA Calibrators

Keep Your Nuclear Power Plant Running

PIE 10-50mA Calibrators have the power to calibrate your instruments

- **10-50 mA Instrumentation**

The 10-50 milliamp control signal began back in the days of vacuum tubes where high line voltages were required to power up the circuitry. The high voltage (45 to 90 V dc) loop power supplies remained as solid state instruments gradually replaced those with vacuum tubes. The solid state transmitters and positioners use components in their circuits designed to operate at these high voltages.

- **Obsolete Calibrators & inadequate replacements**

The original calibrators designed to work with the 10-50 milliamp signals, such as the Transmation* 1040 and 1080, have long since been discontinued. Some plants are still using these with a multimeter in series for increased resolution and accuracy. The suggested replacement from Transcat is the Transmation 1048. The Transmation 1048, along with the similar Martel* PSC-4010-50, do not adequately replace these calibrators. They are basically 4-20 milliamp calibrators with their ranges extended to cover 10-50 milliamps. Their internal power supplies are only capable of generating 24 V dc which is not enough power to drive the 10-50 mA instruments. The only way to use these calibrators to fully drive a loop is to place them into a powered loop and have them act as a transmitter simulator. Other calibrator manufactures, such as Fluke* and GE Sensing/Druck* do not offer models that source 10-50 milliamps.

- **PIE Calibrators power up 10-50 mA instruments**

The PIE Models 535 & 850 were designed specifically to work with 10-50 milliamp loops. The internal dual mode power supply will generate over 43 volts when outputting 10-50 milliamps. This allows the PIE calibrators to fully power up 10-50 milliamp transmitters and drive 10-50 milliamp positioners. The PIE Models 535 & 850 can also operate as a 4-20mA calibrator using its dual mode power supply to automatically adjust its internal voltage to 24 V dc for compatibility with instruments in 4-20mA loops. If you have any instruments that require 10-50 mA at 48V we offer the 535-50 which has an internal power supply boosted to supply 50V at 50 mA!

Not only can the PIE Models 535 & 850 source or power and measure the 10-50mA instruments but typically two additional loop loads as well. The competitor's devices, without the ability to power a 10-50mA loop, become a very expensive read only calibrator. They are *NOT* a full function 10-50mA calibrator.

- **PIE Calibrators handle high voltage loops**

The 2-Wire transmitter simulator function of the PIE Models 535 & 850 operate with loop voltages from 2 to 90 V dc where the competitive models are rated for 5 to 60 V dc. If the competitive calibrators are connected to a loop with an older power supply with greater than 60 V dc they will blow an internal fuse.



Model 850
4-20 / 10-50 mA
Multifunction Calibrator



Model 535
4-20 / 10-50 mA and
Voltage Calibrator

* PIE Calibrators are not manufactured or distributed by Fluke Corp or Altek Industries Inc, manufacturers of Altek, Fluke, Martel & Transmation Calibrators. Druck Calibrators are manufactured by GE Sensing.



PIE Model 850

A Multifunction Calibrator Designed
for Nuclear Power Plants

Get more tools in a smaller calibrator

Carry eight single function calibrators
plus a 4-20/10-50 milliamp calibrator with loop supply
plus a loop troubleshooter in the palm of your hand!

*Milliamp • Voltage • Frequency • pH
Ohms • Thermocouples • RTDs • Pressure
Loop Diagnostics • Transmitter Supply*

10-50 mA Multifunction Calibrator with troubleshooting tools

- 1** **Detect 'hidden' loop problems** Quickly diagnose troublesome ground faults & current leakage with patented **Loop Diagnostic** technology. *These problems are undetectable with other instruments!*
- 2** **Check all loop parameters at once with the LoopScope™** Simultaneously displays current, voltage and resistance to let you know the condition of a live loop. Finds problems with power supplies & loops with too many loads. *Patented by PIE!*
- 3** **Troubleshoot wiring problems without a multimeter** Built in continuity checker with 'beeper' quickly finds broken wires or shorts in instrumentation wiring. Also handy for checking operation of relays and controller outputs.

The PIE Model 850 is more than a multifunction calibrator. It is also a loop detective that is able to diagnose common problems that other test equipment just can't find. Have a flooded junction box or unknown ground faults? Our Loop Diagnostic technology will detect it. Or use the *LoopScope* to see at a glance all the parameters - milliamps, voltage and resistance - in the loop.

Become a troubleshooting technician with Patented Diagnostic Technology - *Available only with PIE Calibrators!*



Practical Instrument Electronics

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PIE Model 850 - An easy to use Multifunction Calibrator

• Technician friendly operation

Intuitive *EZ-DIAL Double Click Menu* makes it easier to setup than other multifunction calibrators. As easy to use as single function PIE Calibrators. Turn on the backlight to easily see the display in dark areas of the plant. Connections diagrams are indicated on the display for each function along with a labeled connector and a help chart behind the tilt stand.

• Calibrate with Confidence

Accurate to $\pm 0.02\%$ of Reading + 0.01% Full Scale.

• Measure temperature sensors, frequency pickups, loop currents, voltages & pressures

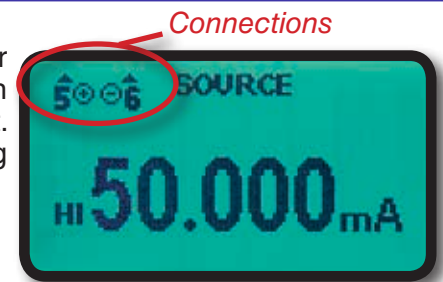
Check the values of your process sensors. Instantly recall MAX and MIN values to see process variability.

• Guaranteed Compatibility with process inputs

Compatible with the instruments you use including all brands of smart transmitters and PLCs with 14 T/C and 9 RTD types to 0.1°C and 0.1°F

• Quickly set any three outputs plus automatic stepping & ramping

Easily set any value with the adjustable "DIAL" plus store any three output settings for instant recall with the EZ-CHECK™ switch. 2, 3, 5 & 11 steps automatically increment output in 100%, 50%, 25% or 10% of span plus continuous ramp. Set step/ramp time to 5, 6, 7, 8, 10, 15, 20, 25, 30 & 60 seconds.



Milliamp Calibrator

With the 850 you can check, calibrate and measure all of your current signal instruments in 4 to 20 & 10 to 50 milliamp DC loops. It can be used at any access point in your loop. Source & Read 0.000 to 24.000 or 52.000 mA, Simulate a 2 Wire Transmitter or use the 850 to simultaneously power your 2 Wire Transmitter and measure its output.

The 850 has an internal 40 V power supply which is able to drive transmitters and positioners in 10-50 mA loops. Some other brands of calibrators have a 24 V supply which are unable to supply the power required to properly drive these control devices.

Thermocouple & RTD Calibrator

Stop carrying around a millivolt source or decade box and thermocouple or RTD tables. The 850 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). The 850 works with the RTDs you use including Platinum 100 (alpha = 3850, 3902, 3916, 3926) & 1000 (alpha = 3850) Ohm, Copper 10 & 50 Ohm, Nickel 100 and 120 Ohm. Or use like a decade box from 0.00 to 401.00 and from 0.0 to 4010.0 Ohms. Easily set any value quickly to within 0.1° with the adjustable digital potentiometer "EZ-DIAL" plus recall any three temperatures for instant recall with the EZ-CHECK™ switch.

Frequency Calibrator

Generate zero crossing square waves to check, calibrate and measure all the frequency signal instruments in your plant. Source and read frequencies from 1 to 2000 CPM (Counts-Per-Minute), 0.01 to 999.00 Hz, 0.1 to 9999.9 Hz and 0.001 to 20.000 kHz.

Voltage Calibrator

With the 850 you can check, calibrate and measure all your voltage, millivolt and pH signal instruments in your plant. Source 0.000 to 10.250 V dc, -500.00 to 999.99 mV and -20.000 to 99.999 mV.

The 850 can measure from 0.000 to 10.250 V, -999.99 to 999.99 mV, -99.999 to 99.999 mV and 0.00 to 60.0 VDC. Use it to check loop power supplies, I/V converters, 1 to 5 Volt signals, and other voltages.

pH Simulator

Use the pH simulator to verify proper operation of pH devices before you place a probe into a calibrated buffer. Adjusting the pH transmitter or analyzer without a probe allows you to make sure the device is calibrated and doesn't require too much offset with the probe. If the probe requires more than the manufacturer's recommendations (typically 5%) it is time to replace the probe. The 850 simulates 0.000 to 14.000 pH @ 25°C corresponding to +414.12 to -414.12 mV.

Measure Pressure

Purchase any of the 32 available pressure modules for gauge, differential, compound and absolute pressure along with one of the three hand pumps and tubing kits for a complete pressure calibration system.

32 Engineering Units:

PSI • inches, feet, mm, cm and meter of H₂O @ 4°C, 20°C & 60°F • inches, meter, cm and mm of Hg @ 0°C;

torr • kg/cm² • kg/m² • Pa • hPa • kPa • MPa • Bar • mBar • ATM • oz/in² • lb/ft²



PIE Model 535

A 4-20 / 10-50 mA & 24 V

Calibrator Designed for Nuclear Power Plants

- **Calibrate 10 to 50 mA instruments**

Source and Read 0.000-50.000 mA
Simulate 2-Wire Transmitters
Power 2-Wire Transmitters with up to 42 V dc (optional 535-50 to 50 V dc)
Read 0.000-50.000 mA
Display current in mA or -25.00 - 105.00 % of 10-50 mA

- **Calibrate 4 to 20 mA instruments**

Source and Read 0.000-24.000 mA
Simulate 2-Wire Transmitters
Power 2-Wire Transmitters and Read 0.000-24.000 mA
Display current in mA or -25.00 - 125.00 % of 4-20 mA

- **Verify voltage instruments**

Source 0.000 to 24.000 V dc
Read 0.00 to ± 30.00 V dc with 4X over range ability

- **Adjust precisely**

Milliamp accurate to $\pm(0.025\%$ of Reading + 0.004 mA)
Source Voltage accurate to $\pm(0.025\%$ of Reading + 0.004 V)

- **Easy to read 5 digit display**

High contrast graphic display with bar graph for quick reference of input and output level

- **Fast calibration with automatic output stepping**

Easily adjust output by 0.001 mA (0.01 %) or 0.100 mA (1.00 %)
3-position tactile switch with push button for true one-handed calibrations
Push button for stepping through calibration points with 16 different step sizes
Hands-free auto step and auto ramp modes with selectable soak and step time for working with valves

- **Dependable and easy to use**

Comes with a three year warranty and a handy carrying case.
Industry standard banana jacks on top panel for use with included test leads
Uses 4 AA Alkaline Batteries in an easy access compartment for superior battery life of 10 hours in source mode and greater than 40 hours battery life in read mode.
Fuse-less protection from accidental misuse and is 240 V ac Tolerant
Lightweight and rugged with a solid feel with a convenient Velcro® hand strap for a firm confident grip or attachment to pipes and ladders.



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PIE 10-50 mA Calibrators keep you nuclear power plant running 800-0410 Rev A 9 June 2015
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