

## Advanced Test Equipment Corp. www.atecorp.com 800-404-ATEC (2832)

# PIE

PIE 830 Process Calibrator

RACTICAL INSTRUMENT ELECTRONICS

VOLUTION

## Get more tools in a smaller calibrator

Carry eight single function calibrators **plus** a 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

## First calibrator with FIVE troubleshooting tools

#### Detect 'hidden' loop problems

Quickly diagnose troublesome ground faults & current leakage with patented **Loop Diagnostic** technology. These problems are undetectable with other instruments!

**Check all loop parameters at once with the LoopScope<sup>TM</sup>** 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*!

#### Automatically detect 2, 3 or 4 wire RTDs

Trouble shoot sensor connections and find broken wires with *patented technology.* LCD indicates which of the four wires are connected to an RTD sensor.

Swap out faulty transmitters to diagnose control issues Easily setup the 830 as a universal isolated transmitter for temperature, frequency, millivolt or pressure. If the loop is back under control you know the transmitter was faulty. Turn on the LoopScope to simultaneously see the loop current, power supply voltage and loop loads for troubleshooting.

#### 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 830 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.

Stop throwing away perfectly good transmitters only to find the problem is somewhere else in the loop. Setup the PIE Model 830 as an isolated universal transmitter and turn on the Loop Diagnostics. The display will tell you EXACTLY the sensor input, the current output and if there is any uncontrolled current in the loop due to a ground fault, corrosion bridge or moisture. If the control system sees no problem when the 830 is acting as a transmitter THEN you can replace the faulty transmitter. With RTDs the 830 automatically detects which of the 2, 3 or 4 wires are connected and unbroken quickly alerting you to a sensor problem. Diagnostic features are covered by US Patent #7,248,058.

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



**EXAMPLE 1 CALC CAL** 

#### 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.



Connections

#### Calibrate with Confidence

Accurate to ±0.02% of Reading + 0.01% Full Scale.

- Measure temperature sensors, frequency pickups, loop currents, voltage levels & 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<sup>™</sup> 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

#### • Easy to use

With the 830 you can check, calibrate and measure all of your current signal instruments in a 4 to 20 milliamp DC loop. It can be used at any access point in your loop. Source



& Read 0.000 to 24.000 mA, Simulate a 2 Wire Transmitter or use the 830 to simultaneously power your 2 Wire Transmitter and measure its output.

#### Source milliamps

Calibrate recorders, digital indicators, stroke valves or any instruments that get their input from a 4 to 20 mA loop. Easily set any value quickly to within 0.001 mA with the adjustable digital potentiometer "EZ-DIAL" or use preset 4.000 mA (0.00%) and 20.000 mA (100.00%) EZ-CHECK<sup>™</sup> settings.

#### Calibrate using loop power

Check loop wiring and receivers by using the 830 in place of a 2 Wire transmitter. Uses any loop power from 2 to 60 V DC.

#### Read loop current

Check controller outputs or measure the milliamp signal anywhere in the loop. The 830 measures 0.000 to 24.000 mA (-25.00 to 125.00%) signals with greater accuracy than a typical multimeter.

#### • Power & measure 2 wire transmitters

The 830 can simultaneously output 24V DC to power any and all devices in a process loop using the internal batteries and internal switching power supply, while measuring the output of a 2 Wire Transmitter and any other loop devices. Powers HART<sup>™</sup> transmitters with built-in 250 ohm resistor simplifying hookups with HART communicators.

• Source three ranges of mV & V dc With the 830 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.



## Voltage Calibrator

#### • Read DC volts

The 830 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.

#### Frequency Calibrator

Calibrate flow meters and frequency instruments

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.



#### • Checkout optical pickups

The 830 has a green LED that flashes in sync with the output frequency. Select a frequency and hold the calibrator up to the optical sensor.

#### Measure frequency signals

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

#### Thermocouple Calibrator

 Calibrate directly in temperature to 0.1°C & 0.1°F Stop carrying around a millivolt source and thermocouple tables. The 830 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 "EZ-DIAL" plus recall any three temperatures for instant recall with the EZ-CHECK<sup>™</sup> switch.



#### Measure thermocouple sensors

Trouble shoot sensor connections and find broken wires or corroded connections. Connect your thermocouple with a miniature thermocouple connector and the 830 measures the probe to 0.1 degree C or F. Check the values of your process sensors. Instantly recall MAX and MIN values to see process variability.

#### **RTD**, Resistance Calibrator

 Calibrate ALL your RTD instruments With the 830 you can check & calibrate all your RTD instruments and measure RTD Sensors.



 Calibrate directly in temperature (°C & °F) Stop carrying around a decade box and RTD resistance tables. The 830 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. Easily set any value guickly to within 0.1° with the adjustable digital potentiometer "EZ-DIAL" plus store any three temperatures for instant recall with the EZ-CHECK<sup>™</sup> switch. Or use like a decade box from 0.00 to 401.00 and from 0.0 to 4001.0 Ohms.

#### Compatible with ALL process instruments

No competitor's calibrator is compatible with as many process instruments! Connect directly to the RTD inputs of smart transmitters, PLCs, DCS and multichannel recorders and verify their outputs or displays. Works with older instruments with fixed excitation currents and newer multichannel instruments that switch the excitation current between input channels.

#### • Measure RTD sensors

Connect your two, three or four wire RTDs and the 830 measures the RTD within 0.1 degree C or F. The PIE 830 uses a patented circuit to automatically detect and measure 2, 3 or 4 wire RTD sensors. The connections are shown on the display to help you troubleshoot shorts or opens in the sensor's wiring.

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

#### **pH Simulator**

• Simulate pH probes into transmitters & analyzers 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

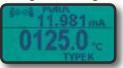
recommendations (typically 5%) it is time to replace the probe. The 830 simulates 0.000 to 14.000 pH @ 25°C corresponding to +414.12 to -414.12 mV.



#### **Calibrate 2 Wire Transmitters**

#### Power & measure 2 wire transmitters

The 830 can simultaneously simulate the temperature, frequency, pH or pressure input to a transmitter while outputting 24V DC to power the transmitter using the internal batteries and internal switching power supply while displaying the output of the 2 Wire Transmitter. Powers HART<sup>™</sup> transmitters with built-in 250 ohm resistor simplifying hookups with HART communicators. With LEAK DETECT enabled the 830 indicates when there is an ground fault in the loop or an internal problem with the transmitter allowing unregulated current to pass through causing offsets in the loop current.





#### **Continuity Checker**



#### **Troubleshoot Loop Problems**

#### • Find current leaks in loops before swapping instruments

Automatic indication of Loop Current and Leakage Current (US Patent #7,248,058). Measure ground current leakage from faulty wiring, flooded conduit and corrosion bridges to help you decide if there is a wiring problem in the loop (diagrams below).



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

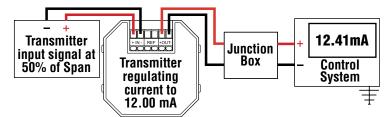
#### Typical problem found with Leak Detection

Have you ever replaced a "faulty" transmitter only to find the problem was somewhere else in the loop? And did you end up throwing the transmitter away after you fixed the other problem "just in case" the transmitter was faulty?

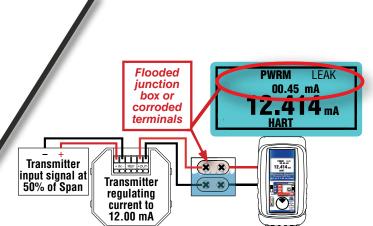
If you find a loop where the transmitter is calibrated correctly but all the readings elsewhere in the loop have a fixed offset this is due to a *Zero Shift*. This zero shift is typically caused by some current in the loop bypassing the transmitter. This might be caused by ground faults, moisture or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

If you have some loops that are erratic after it rains there may be moisture present in a junction box or where insulation has broken down. Turn on Ground Leak Detection and use the PIE 830 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 PIE 830 display. Undetected current leaks may cause calibration errors which can lead to dangerous operating conditions or catastrophic results.

The PIE 830 powers up the 2-Wire transmitter or loop and indicates the total current and the uncontrolled current. This provides information useful in troubleshooting loop errors.



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 the PIE 830 to power up the loop the technician detects a leakage of 0.45 mA - approximately the 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.

#### Become a Loop Detective - Locate hidden loop problems with LoopScope

When you need to find out why a loop is out of control and all the wiring seems to be in order turn on the 830's LoopScope and simultaneously see all the parameters of the loop. The LoopScope simultaneously displays the current, DC voltage and total resistance in the loop. Observing the SUPPLY (DC voltage) and the LOAD (resistance) lets you see if the loop power supply has enough capacity to power all the devices in the loop.

By observing all three signals at the same time you can see how the voltage and resistance respond as the current changes. If the voltage drops too far as the current goes up you may need a power supply with more capacity or the power supply itself may be failing. If the resistance in the loop is too high you may have more devices in the loop than the power supply can handle or there may be an instrument in the loop that is drawing too much power and requires replacement.

#### **Troubleshoot Transmitter Problems**

#### • Find out if your control problems are due to a faulty transmitter

If a loop is having problems and you suspect the transmitter you can quickly swap it out for the PIE 830 configured as a *universal isolated transmitter*.

The PIE 830 is easily setup as a thermocouple, RTD, frequency, millivolt or pressure transmitter. Simply set it to read, choose your sensor type, select linearized, non-linearized or square root operation, upscale or downscale burnout, and store the endpoints into the XMTR MIN & MAX memories.

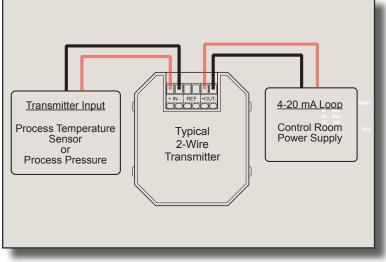
Now you can check out the loop, locally and at the control room, and see if replacing the transmitter fixed the problem. If the problem is fixed you may leave the PIE 830 in place while you go to the shop to obtain and configure a replacement transmitter.

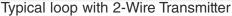


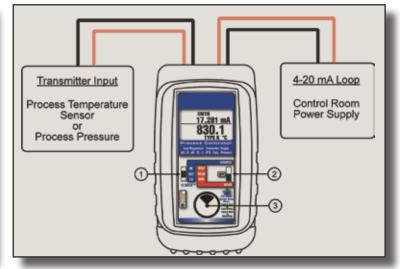
Use the 830 as an Emergency Transmitter Replacement to keep the loop running while you grab a replacement from stock and configure it.



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







Typical loop with PIE 830 in place of Transmitter

## Why buy a PIE calibrator with loop diagnostics Undiagnosed loop problems often cause calibration errors which can

lead to dangerous operating conditions or catastrophic results. The PIE 830 is the *only multifunction calibrator* that can detect and indicate these problems due to the patented troubleshooting features.

#### **Evolutionary Design**

#### • Designed for you by experienced calibrator manufacturers

PIE 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 830 improves upon other brands by including a rubber boot, backlit display with larger digits, troubleshooting tools, higher accuracy and more ranges for flexibility.

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

Description       Part No         PIE Model 830 Process Calibrator       PIE Model 830         Included:       Pie Model 830         Four "AA" Alkaline batteries, Certificate of Calibration       020-0213         Blue Rubber Boot       020-0211         Evolution Hands Free Carrying Case       020-0211         Evolution mAV Test Leads       020-0207         1 Red & 1 Black Lead with Banana Plugs & Alligator Clips       020-0208         Evolution RTD Wire Kit       020-0208         2 Red & 2 Black Leads with Banana Plugs & Spade Lugs       020-0208         Optional       Three Year Repair/Replacement Warranty.       RP-WAR-B         Ni-MH 1 Hour Charger with 4 Ni-MH AA Batteries       020-023*         * This case will be substituted for the Hands Free Case without the Module Pocket.       020-023*         * This case will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module         Optional Hand Pumps, Tubing & Fitting Kits       020-0224         APOV 0-300 PSI/20.7 bar Pneumatic Scissor Hand Pump       020-0225         DPPV 0-125 PSI/8.6 bar Pressure, 23"/584 mm Hg Vacuum hand pump       020-0226         1/8" male NPT x Male Quick-Test <sup>TM</sup> Fitting With Cap       020-0227         Adapter kit (1/8" MNPTAFINPT, 1/4" MNPT, FINPT & Tube Adapter)       020-0220         <	Ordering Inform	nation			
Industry       Fund "A" A Read       IP20-0213         Four A" A Read       IP20-0213         Evolution mATO Free Carrying Case       IP20-0213         Evolution TED Kee Lead vith Banana Plugs & Allogator Clips       IP20-0213         Providence       IP20-0213         Evolution RTD Wire Kit       IP20-0213         Providence       IP20-0213         Intervisition RTD Strate Visit Repair/Replacement Warranty       IP20-0213         Intervisition RTD Strate Visit Repair/Replacement Warranty       IP20-0213         Intervisition RTD Strate Visition RTD Strate Visition Read Repair Repair/Replacement Warranty       IP20-0223         Intervisition RTD Strate Visition RTD Replace Repair/Replacement Warranty       IP20-0224         Providence Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/ReplaceStrate Replace/Re		D 1 1			
Four - XA* / Akaline batteries, Certificate of Calibration         020-0213           Evolution Hands Fros Carrying Case         020-0211           Evolution Hands Fros Carrying Case         020-0208           2 Red & 2 Black Leads with Barnane Plugs & Spade Lugs         020-0208           Pointion TTO Viers K1         020-0208           2 Red & 2 Black Leads with Barnane Plugs & Spade Lugs         020-0208           Pointion TTO Charger with A N-MI AA Batteries         020-0103           (100-120 V AC input for North America On)         020-0233*           "This case with be substituted for the Hands Free Case without the Module Pocket (020-0234*           "This case with be substituted for the Hands Free Case without the Module Pocket (020-0241           Phy 0-300 PSI/20, D ar Preumatic Scissor Hand Pump         020-0224           Phy 0-400 PSI/20, D ar Preumatic Scissor Hand Pump         020-0224           Phy 0-500 PSI/20, D ar Preumatic Scissor Hand Pump         020-0224           Phy 0-500 PSI/20, D ar Preumatic Scissor Hand Pump         020-0224           Phy 0-500 PSI/20, D ar Preumatic Scissor Hand Pump         020-0224           Phy 0-500 PSI/20, D ar Preumatic Scissor Hand Pump         020-0225           Phy 0-500 PSI/20, D ar Preumatic Scissor Hand Pump         020-0226           Phy 0-400 PSI/20, D ar Preumatic Scissor Hand Pump         020-0228           Phy 0-400 PSI/20, D	PIE Model 830 Process Calibrator	PIE Mode	el 830		
Blue Rubber Bod	Included: Four "AA" Alkaline batteries, Certificate of Calibration				
Evolution mAV Test Leads         020-0207           I Red & Slack Leads with Banana Plugs & Alligator Clips         020-0208           2 Red & 2 Black Leads with Banana Plugs & Spade Lugs         020-0208           Control           Optional           Three Year Repair/Replacement Warranty           RP-WAR-B           N-MAR-B           NAR-B           NAR-B <td colspan="2" nore-colspa<="" td=""><td>Blue Rubber Boot</td><td></td><td></td></td>	<td>Blue Rubber Boot</td> <td></td> <td></td>		Blue Rubber Boot		
1 Red & 1 Black Leads with Banana Pluge & Alligator Clips       020-0208         2 Red & 2 Black Leads with Banana Pluge & Spade Lugs       020-0208         Manage Spade Lugs         Manage Spade Lugs All					
Evolution RTD Wite Kit	Evolution mA/V lest Leads	020-0207			
2 Red & 2 Black Leads with Banana Plugs & Spade Lugs           Optional         Crccessories           Three Year Repair/Replacement Warranty.         RP-WAR-B           Ni-Wit H Hour Charger with 4 N-MI AA Batteries         020-0103           (100-120 V AC Input for North America Only)         020-0233*           "This case will be substituted for the Hand's Free Case without the Module Pocket.         020-0224           PMO 0-300 PSI/205 Plar Hydraulic Scissor Hand Pump.         020-0224           HPW 0-300 PSI/205 Plar Hydraulic Scissor Hand Pump.         020-0226           1/8" male WPT X Malo Quick-Test <sup>W</sup> Fitting with Cap.         020-0226           1/8" male WPT X Malo Quick-Test <sup>W</sup> Fitting with Cap.         020-0226           1/8" male WPT X Malo Quick-Test <sup>W</sup> Fitting with Cap.         020-0227           1/8" male WPT X Malo Quick-Test <sup>W</sup> Fitting with Cap.         020-0228           Quick-Test <sup>W</sup> 6900 psi/475 bar hose, 3tl (1 m).         020-0227           PKITI (202-0228 Hydr Scissor Pamp, 020-0228 Hose & 020-0227 fitting).         020-0230           PKITI (202-0228 Press/As P nump, 020-0228 Hose & 020-0227 fitting).         020-0230           PKITI (202-0228 Hydr Scissor Pamp, 020-0228 Hose & 020-0227 fitting).         020-0230           PKITI (202-0228 Press/As P nump, 020-0228 Hose & 020-0227 fitting).         020-0230           PKITI (202-0228 Press/As P nump, 020-0228 Hose & 020-0227 fitting).		020-0208			
Optional         Crecessories           Three Yare Repair/Replacement Warranty.         RP-WAR-B           Ni-MH 1 Hour Charger with 4 Ni-MH AA Batteries         020-0103           (100-120 VC Cliput for Noth America Only)         020-023*           "Thic scase will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module           Optional Hand Pumps, Tubing & Fitting Kits         PAPV0 4:300 PSI/262 D #P Arydraulic Scissor Hand Pump         020-0224           They Case will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module         Optional Hand Pumps, Tubing & Fitting Kits           APDV 0-300 PSI/26 D #A Pressure, 23'S84 nm Hg Vacuum hand pump         020-0225           Differential Wall Bouk-Fest <sup>W</sup> Fitting with Cap         020-0227           Atta Pressure Modules         020-0228           PKIT (020-0228 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT3 (020-0228 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT3 (020-0228 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT3 (020-0228 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)         020-031           PATO Therential, Non Isolated         0N00120           0-200 F3/20 T har fitternital, Non Isolated         0N00120           0-200 F3/2	2 Red & 2 Black Leads with Banana Plugs & Spade Lugs	020-0200			
Optimal         PP-WAR-B           Ni-MH 1 Hour Charger with 4 Ni-MH AA Batteries					
Three Year Repair/Repaicement Warranty.         RP-WAR-B           NI-MH 1 Hour Charger with A N-MH A& Batteries         020-0103           '100-120 V AC input for North America Only)         020-0233*           *This case will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module           Optional Hand Pumps, Tubing & Fitting Kits         020-0223           AP0V 0-300 PSI/200 s bar Hydraulic Scissor Hand Pump         020-0224           HP0V 0-3000 PSI/200 s bar Hydraulic Scissor Hand Pump         020-0226           1/4" MIPTAFMPT, 1/4" MMPT, FIPT 8 Tube Adapter)         020-0226           Quick-Test <sup>IM</sup> 6900 psi/475 bar hose, 31(1 m)         020-0227           Quick-Test <sup>IM</sup> 6900 psi/475 bar hose, 31(1 m)         020-0227           PKIT1 (020-0226 Press:020 Pump, 020-0228 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-0226 Press:020 Pump, 020-0228 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-0226 Press:020 Pump, 020-0229 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-0226 Press:020 Pump, 020-0229 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-0216 Press:020 Pump, 020-0229 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-0216 Press:020 Pump, 020-0229 Hose & 020-0227 fitting)         020-0233           PKIT1 (020-010 Fitternital, Non Isolated         DN0010		S			
Ni-M1 Hour Charger with 4 Ni-M1 AA Batteries	Uptional Three Vear Repair/Replacement Warranty		3		
(100-120 V AC input for North America Only)       020-0233*         **This case will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module         Optional Hand Pumps, Tubing & Fitting Kits       020-0224         HPV0 V 0-3000 PSI/200 ba Presumatic Scissor Hand Pump.       020-0226         HPV0 V-3000 PSI/200 ba Presumatic Scissor Hand Pump.       020-0226         JOPTV0 -125 PSI/86 bar Pressure, 23/584 mm Hg Vacuum hand pump.       020-0226         Adapter kit (16" MNPT&FHPT, 14" MMPT, FTP1 & Tube Adapter)       020-0226         JOPTV0 -125 PSI/86 bar Pressure, 23/584 mm Hg Vacuum hand pump.       020-0228         Quick-Test <sup>M</sup> 6900 psi/475 bar hose, 3ft (1 m)       020-0227         Mather Kits       6400-027 fitting)       020-0228         PKIT1 (020-0226 Press:07 Pump, 020-0228 Hose & 020-0227 fitting)       020-0233         PKIT2 (020-0226 Press:07 Pump, 020-0228 Hose & 020-0227 fitting)       020-0231         PKIT3 (020-0226 Press:07 Pump, 020-0228 Hose & 020-0227 fitting)       020-0231         PKIT3 (020-0226 Press:07 Pump, 020-0228 Hose & 020-0227 fitting)       020-0231         PKIT3 (020-0226 Press:07 Pump, 020-0228 Hose & 020-0227 fitting)       020-0231         Potional Pressure Module Media Compatibility       Non-isolated       Non-isolated DN sensors: clean, dry, nor-corrosive, non-condensing gases only         D-157/5 Jar J20 Efferential,	Ni-MH 1 Hour Charger with 4 Ni-MH AA Batteries	020-0103			
Evolution Hands Free Carrying Case with Pressure Module Pocket.       020-0231*         *This case will be substituted for the Hands Free Case without the Module Pocket (020-0211) when the 830 is ordered with a pressure module         Optional Hand Pungs, Tubing & Fitting Kits         APRV 0-300 PSI/205 Dar Pneumatic Scissor Hand Pump       020-0225         DEVV 0-125 PSI/8.6 bar Pressure, 237:/584 mm Hg Vacuum hand pump       020-0226         Direct Fitting & Tubing & Fitting Kits       020-0227         Adapter kit (1/2" MUPT&FIT, 14" MINET, FIPT & Tube Adapter)       020-0228         Quick-Test"* Bido Direct Psi/N Bido Tabes, 31 (1 m)       020-0227         PKIT1 (020-0224 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0228         PKIT1 (020-0224 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0223         PKIT1 (020-0224 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0223         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0231         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0231         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0231         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0231         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227 Titting)       020-0231         PKIT1 (020-024 Pneu Scissor Pump, 020-0229 Hose & 020-0227		020 0100			
Optional Hand Pumps, Tubing & Fitting Kits         APPV0 0-300 PSI/205 Dar Pneumatic Scissor Hand Pump       020-0225         HPV 0-300 PSI/205 Dar Mydrault Scissor Hand Pump       020-0226         Like Mark Privatult Scissor Pump, 020-0229       020-0227         Mark Privatult (Vie MWP12R/NF), 14' MWP1, FNPT & Tube Adapter)       020-0228         PUTT (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0228         PVT1 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-010-029 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-010-029 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-010-029 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-010-029 Hose & 020-0227 fitting)       020-0231         PVT11 (020-0226 Hydr Scissor Pump, 020-010-029 Hose & 020-0229 Hose & 020-0227 Hose & 020-0231       Non-isolated DN sensors: any media         0-10 P	Evolution Hands Free Carrying Case with Pressure Module Pocket				
AP0V 0-300 PSI/200 Jan Freumatic Scissor Hand Pump         020-0224           HPVV 0-120 PSI/206 Jan Hydraulic Scissor Hand Pump         020-0225           DPPV 0-122 PSI/8 bar Pressure, 23'/584 mm Hg Vacuum hand pump         020-0226           1/8' male NPT X MAB Quick-Test <sup>™</sup> Stifue Mass.         020-0226           Quick-Test <sup>™</sup> 8000 psi/475 bar hose, 3tt (1 m)         020-0221           PKIT1 (020-0224 Phus Scisor Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT2 (020-0226 Press/Xeo Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT3 (020-0226 Press/Xeo Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           Optional Pressure Modules         DN0010           0-107/24.9 mbar H20 Differential, Non Isolated         DN0010           0-28'/69.7 mbar H20 Differential, Non Isolated         DN0010           0-107/24.9 mbar D20 Differential, Non Isolated         DN0010           0-107/24.9 mbar D20 Differential, Non Isolated         DN0200           0-15 PSI/A ar Mar Differential, Isolated         DN0010           0-56 PSI/34.7 mbar Differential, Isolated         D100015           0-57 PSI/44.9 mbar Differential, Isolated         D100015           0-500 PSI/20.7 har Differential, Isolated         D100015           0-500 PSI/20.7 har Differential, Isolated         D100015           0-500 PSI/20.7 har Gauge, Isolated	*This case will be substituted for the Hands Free Case without the Module Po	ocket (020-0	211) when the 830 is ordered with a pressure module		
AP0V 0-300 PSI/200 Jan Freumatic Scissor Hand Pump         020-0224           HPVV 0-120 PSI/206 Jan Hydraulic Scissor Hand Pump         020-0225           DPPV 0-122 PSI/8 bar Pressure, 23'/584 mm Hg Vacuum hand pump         020-0226           1/8' male NPT X MAB Quick-Test <sup>™</sup> Stifue Mass.         020-0226           Quick-Test <sup>™</sup> 8000 psi/475 bar hose, 3tt (1 m)         020-0221           PKIT1 (020-0224 Phus Scisor Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT2 (020-0226 Press/Xeo Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           PKIT3 (020-0226 Press/Xeo Pump, 020-0229 Hose & 020-0227 fitting)         020-0231           Optional Pressure Modules         DN0010           0-107/24.9 mbar H20 Differential, Non Isolated         DN0010           0-28'/69.7 mbar H20 Differential, Non Isolated         DN0010           0-107/24.9 mbar D20 Differential, Non Isolated         DN0010           0-107/24.9 mbar D20 Differential, Non Isolated         DN0200           0-15 PSI/A ar Mar Differential, Isolated         DN0010           0-56 PSI/34.7 mbar Differential, Isolated         D100015           0-57 PSI/44.9 mbar Differential, Isolated         D100015           0-500 PSI/20.7 har Differential, Isolated         D100015           0-500 PSI/20.7 har Differential, Isolated         D100015           0-500 PSI/20.7 har Gauge, Isolated	Antional Hand Dumne, Tubing & Fitting Kite				
HP0V 0-3000 PSI/206.9 bar Hydraulic Scissor Hand Pump         020-022           DPVV 0-125 PSI/8 bar Pressure, 237/84 mm Hg Vacuum hand pump         020-022           Adapter kit (1/8" MNPT KNPT; 1/4" MNPT, FNPT & Tube Adapter)         020-022           Adapter kit (1/8" MNPT KNPT; 1/4" MNPT, FNPT & Tube Adapter)         020-022           PKIT2 (020-0225 Hydr Scisor Pump, 020-0229 Hose & 020-0227 fitting)         020-023           PKIT3 (020-0226 Hydr Scisor Pump, 020-0229 Hose & 020-0227 fitting)         020-023           Optional Pressure Modules         0-107/24 Pmbar H20 Differential, Non Isolated         DN0010           0-107/24 Pmbar H20 Differential, Non Isolated         DN0010         Non-isolated DN sensors: clean, dry, no-corrosive, non-condensing gases only           0-1175/1 bar H20 Differential, Isolated         DN0010         DN0210           0-15 PSK/1 har Differential, Isolated         DN0010           0-15 PSK/1 har Differential, Isolated         D10015           0-15 PSK/1 har Differential, Isolated         D10015           0-15 PSK/1 har Differential, Isolated         D10010           0-16 PSK/5 bar Cauge, Isolated         D10050           0-178 PSK/1 har Differential, Isolated         D10050           0-16 PSK/1 har Differential, Isolated         D10050           0-16 PSK/1 har Differential, Isolated         D10050           0-16 PSK/1 har Gauge, Isolated <td></td> <td> 020-0224</td> <td></td>		020-0224			
DPPV 0-125 PSI/8.6 har Pressure, 32*/584 mm Hg Vacuum hand pump.         020-0226           1/8* maie NPT X Male Quick-Test <sup>TM</sup> Kitting with Cap.         020-0228           Quick-Test <sup>TM</sup> Selfor Set Varth 20:0-0229 Hose & 020-0227         020-0228           Quick-Test <sup>TM</sup> Selfor Varth 20:0-0229 Hose & 020-0227 fitting).         020-0228           PKIT1 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting).         020-0231           PKIT3 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting).         020-0231           Optional Pressure Modules         DN0010           0-10*/24.9 mbar H20 Differential, Non Isolated.         DN00200           0-415*/1 bar H20 Differential, Non Isolated.         DN0200           0-415*/1 bar H20 Differential, Non Isolated.         DN0200           0-15 PSI/1 bar Differential, Non Isolated.         DN0010           0-16 PSI/26 bar Differential, Isolated.         D10001           0-17 PSI/88 9 mbar Differential, Isolated.         D10001           0-18 PSI/1 bar Differential, Isolated.         D10010           0-19 PSI/2 bar Differential, Isolated.         D10010           0-100 PSI/2.07 bar Differential, Isolated.         D10010           0-100 PSI/2.07 bar Differential, Isolated.         D10010           0-100 PSI/2.07 bar Differential, Isolated.         G10030           0 to 15 PSI/1 bar Gauge, Isolated.	HPOV 0-3000 PSI/206.9 bar Hydraulic Scissor Hand Pump	020-0225			
1/8" male NPT x Male Duick-Test <sup>™</sup> Fitting with Cap.       020-0227         Adapter kit (1/8" MNPTR-KNPT: 1/4" MNPT. FMPT 8: Tube Adapter).       020-0228         Quick-Test <sup>™</sup> 6900 psi/475 bar hose, 3ft (1 m)       020-0220         PKIT1 (020-0225 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0231         PKIT3 (020-0226 Hydr Scissor Pump, 020-0229 Hose & 020-0227 fitting)       020-0231         Optional Pressure Modules       DN0010         0-10"/24.9 mbar H20 Differential, Non Isolated.       DN0020         0-200"/498 mbar H20 Differential, Non Isolated.       DN0020         0-215 //24.9 mbar H20 Differential, Non Isolated.       DN0010         0-200"/5 bar H20 Differential, Isolated.       DN0010         0-17 /24.9 mbar Differential, Isolated.       DN0010         0-18 //24.7 mbar Differential, Isolated.       D100050         0-16 //24.7 bar Differential, Isolated.       D100050         0-10 //24.9 bar Differential, Isolated.       D100300         0-10 //24.9 bar Differential, Isolated.       D100300         0-10 //24.9 bar Gauge, Isolated.       G10030         0 to 10 PSI/20 har Gauge, Isolated.       G10030         0 to 10 PSI/20 har Gauge, Isolated.       G10300         0 to 30 PSI/20.7 har Compound, Isolated.       G10300         0 to 30 PSI/20.7 har Compound, Isolated.       G10300 <td>DPPV 0-125 PSI/8.6 bar Pressure, 23"/584 mm Hg Vacuum hand pump</td> <td> 020-0226</td> <td></td>	DPPV 0-125 PSI/8.6 bar Pressure, 23"/584 mm Hg Vacuum hand pump	020-0226			
Quick-Test <sup>14</sup> 6900 psi/475 bar hose, 3ft (1 m)	1/8" male NPT x Male Quick-Test™ Fitting with Cap	020-0227			
PKIT1 (020-0224 Preus Scissor Pump, 020-0229 Hose & 020-0227 fitting)      020-0231         PKIT3 (020-0226 Press/Vac Pump, 020-0229 Hose & 020-0227 fitting)      020-0231         PKIT3 (020-0226 Press/Vac Pump, 020-0229 Hose & 020-0227 fitting)      020-0231         0-10'/24.9 mbar H20 Differential, Non Isolated       DN0026         0-28'/69.7 mbar H20 Differential, Non Isolated       DN0026         0-415'/1 bar H20 Differential, Non Isolated       DN0200         0-415'/1 bar H20 Differential, Non Isolated       DN0200         0-415'/1 bar H20 Differential, Non Isolated       DN0200         0-5 PSi//4.47 mbar Differential, Isolated       DN0010         0-5 PSi//4.47 mbar Differential, Isolated       D10005         0-100 PSi/6.9 bar Differential, Isolated       D10005         0-100 PSi/6.9 bar Differential, Isolated       D10005         0-500 PSi/2.0 Far Gauge, Isolated       D10050         0 to 15 PSi/1 bar Gauge, Isolated       D10050         0 to 100 PSi/6.9 bar Gauge, Isolated       G10050         0 to 30 PSi/2.0 Far Gauge, Isolated       G10050         0 to 30 PSi/2.0 Far Gauge, Isolated       G10050         0 to 30 PSi/2.0 Far Gauge, Isolated       G10050         0 to 100 PSi/6.9 bar Gauge, Isolated       G10050         0 to 00 PSi/2.0 Far Gauge, Isolated       G10050					
PKIT3 (020-0225 Hydr Scissor Pump), 020-0229 Hose & 020-0227 fitting)					
PKIT3 (020-0226 Press/Vac Pump, 020-0229 Hose & 020-0227 fitting)       020-0232         Optional Pressure Modules       0         0-10":249 mbar H20 Differential, Non Isolated.       DN0010         0-28":69.7 mbar H20 Differential, Non Isolated.       DN0020         0-415":14 har H20 Differential, Non Isolated.       DN0010         0-415":14 har H20 Differential, Isolated.       DN0010         0-415":14 har H20 Differential, Isolated.       DN0010         0-5 PSI/34.7 mbar Differential, Isolated.       D10001         0-5 PSI/34.7 mbar Differential, Isolated.       D10001         0-100 PSI/05 bar Differential, Isolated.       D100030         0-100 PSI/05 bar Differential, Isolated.       D10030         0-100 PSI/05 bar Differential, Isolated.       D10030         0-100 PSI/05 bar Differential, Isolated.       D10300         0-100 PSI/05 bar Gauge, Isolated.       G10030         0 to 15 PSI/1 bar Gauge, Isolated.       G10030         0 to 15 PSI/2 bar Gauge, Isolated.       G10300         0 to 15 PSI/2 bar Gauge, Isolated.       G10300         0 to 300 PSI/20.7 bar Gauge, Isolated.       G10100         0 to 300 PSI/20.7 bar Gauge, Isolated.       G10300         0 to 10 PSI/64 bar to +15 PSI/1 bar Gauge, Isolated.       G10300         0 to 10 00 PSI/64 bar to +50 PSI/63.4 bar Compound, Isolated.<					
Optional Pressure Modules         0-10°/24.9 mbar H20 Differential, Non Isolated       DN0010         0-28°/69.7 mbar H20 Differential, Non Isolated       DN0200         0-415°/1 bar H20 Differential, Non Isolated       DN0200         0-415°/1 bar H20 Differential, Non Isolated       DN0210         0-415°/1 bar H20 Differential, Non Isolated       DN0210         0-1 PSI/68.9 mbar Differential, Isolated       D10001         0-5 PSI/344.7 mbar Differential, Isolated       D10005         0-30 PSI/2 bar Differential, Isolated       D10030         0-30 PSI/2 bar Differential, Isolated       D10030         0-500 PSI/2.07 bar Differential, Isolated       D10030         0-500 PSI/2.07 bar Differential, Isolated       D10030         0 to 15 PSI/1 bar Gauge, Isolated       G10015         0 to 30 PSI/2.07 bar Gauge, Isolated       G10050         0 to 10 PSI/6.9 bar Gauge, Isolated       G10050         0 to 10 PSI/6.9 bar Gauge, Isolated       G10050         0 to 00 PSI/2.0 T bar Gauge, Isolated       G10500         0 to 10 PSI/6.9 bar Gauge, Is	PKIT3 (020-0226 Press/Vac Pump, 020-0229 Hose & 020-0227 fitting)	020-0232			
0-28'/69.7 mbar H20 Differential, Non Isolated.       DN0028         0-200''/498 mbar H20 Differential, Non Isolated.       DN0210         0-415''/1 bar H20 Differential, Non Isolated.       DN0210         0-415''/1 bar H20 Differential, Isolated.       DN0210         0-5 PSI/34.7 mbar Differential, Isolated.       D10005         0-15 PSI/1 bar Differential, Isolated.       D10005         0-300 PSI/2 bar Differential, Isolated.       D10015         0-300 PSI/2 bar Differential, Isolated.       D10300         0-500 PSI/34.5 bar Differential, Isolated.       D10300         0-500 PSI/34.5 bar Differential, Isolated.       D10300         0-500 PSI/34.5 bar Gauge, Isolated.       G10030         0 to 300 PSI/20 To Ra Gauge, Isolated.       G10300         0 to 300 PSI/20 To Ra Gauge, Isolated.       G10300         0 to 300 PSI/20 To Ra Gauge, Isolated.       G10300         0 to 300 PSI/20 To Ra Gauge, Isolated.       G10300         0 to 300 PSI/20 To Ra Gauge, Isolated.       G10300         14.7 PSIG/1 bar to +15 PSIG/1 bar Compound, Isolated.       C10015         -14.7 PSIG/1 bar to +300 PSIG/20 To Bar Compound, Isolated.       C10030         -14.7 PSIG/1 bar to +300 PSIG/20 Far Compound, Isolated.       C10100         -14.7 PSIG/1 bar to +300 PSIG/20.5 bar Compound, Isolated.       C10300         -1	Optional Pressure Modules				
0-200'/498 mbar H20 Differential, Non Isolated.       DN0200         0-415'/1 bar H20 Differential, Non Isolated.       DN0415         0-200'/5 bar H20 Differential, Non Isolated.       DN0415         0-1 PSI/68.9 mbar Differential, Isolated.       D10001         0-5 PSI/344.7 mbar Differential, Isolated.       D10001         0-30 PSI/20 bar Differential, Isolated.       D10001         0-30 PSI/20 bar Differential, Isolated.       D10030         0-300 PSI/20.7 bar Differential, Isolated.       D10030         0-500 PSI/20.7 bar Differential, Isolated.       D10030         0-500 PSI/20.7 bar Differential, Isolated.       D10050         0 to 15 PSI/1 bar Gauge, Isolated.       G10015         0 to 300 PSI/20.7 bar Gauge, Isolated.       G10050         0 to 100 PSI/6.9 bar Gauge, Isolated.       G10050         0 to 100 PSI/6.9 bar Gauge, Isolated.       G10500         0 to 100 PSI/6.9 bar Gauge, Isolated.       G10500         0 to 100 PSI/6.9 bar Gauge, Isolated.       G10500         1 to 1.000 PSI/6.9 bar Gauge, Isolated.       G10050         1 to 1.000 PSI/6.9 bar Compound, Isolated.       C10015 <td></td> <td></td> <td>Pressure Module Media Compatibility</td>			Pressure Module Media Compatibility		
0-415"/1 bar H20 Differential, Non Isolated       DN0415         0-2000"/5 bar H20 Differential, Non Isolated       DN20415         0-5 PSI/344.7 mbar Differential, Isolated       D10005         0-5 PSI/344.7 mbar Differential, Isolated       D10005         0-15 PSI/1 bar Differential, Isolated       D10015         0-300 PSI/2 bar Differential, Isolated       D10030         0-100 PSI/6.9 bar Differential, Isolated       D10300         0-300 PSI/2 bar Gauge, Isolated       D10300         0-300 PSI/2.0 T bar Differential, Isolated       D10300         0-500 PSI/34.5 bar Differential, Isolated       D10300         0 to 15 PSI/1 bar Gauge, Isolated       G10050         0 to 00 PSI/20.7 bar Gauge, Isolated       G10050         0 to 00 PSI/24.5 bar Gauge, Isolated       G10300         0 to 500 PSI/34.5 bar Gauge, Isolated       G10300         0 to 500 PSI/20.7 bar Gauge, Isolated       G10300         0 to 300 PSI/20.7 bar Gauge, Isolated       G10300         0 to 300 PSI/20.7 bar Gauge, Isolated       G10300         14.7 PSIG/1 bar to +15 PSIG/1 bar Compound, Isolated       C10051         -14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       C10050         -14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       C10050         -14.7 PSIG/1 bar to +300 PSIG/20.7 bar Compound, Isolated </td <td></td> <td></td> <td>· · · · · · · · · · · · · · · · · · ·</td>			· · · · · · · · · · · · · · · · · · ·		
0-2000"/5 bar H20 Differential, Non Isolated.       DN2000         0-1 PSI/68.9 mbar Differential, Isolated.       D10001         0-5 PSI/344.7 mbar Differential, Isolated.       D10015         0-15 PSI/1 bar Differential, Isolated.       D10015         0-300 PSI/2 bar Differential, Isolated.       D10030         0-300 PSI/20.7 bar Differential, Isolated.       D10300         0-500 PSI/24.5 bar Differential, Isolated.       D10300         0-500 PSI/20.7 bar Differential, Isolated.       D10300         0-500 PSI/24.5 bar Differential, Isolated.       D10300         0-500 PSI/20.7 bar Differential, Isolated.       D10300         0-500 PSI/20.7 bar Gauge, Isolated.       G10015         0 to 15 PSI/1 bar Gauge, Isolated.       G10030         0 to 150 PSI/2.6 bar Gauge, Isolated.       G10300         0 to 500 PSI/20.7 bar Gauge, Isolated.       G10300         0 to 100 PSI/6.9 bar Gauge, Isolated.       G10300         0 to 1,000 PSI/20.6 & bar Gauge, Isolated.       G10300         14.7 PSIG/1 bar to +15 PSIG/1 bar to enpound, Isolated.       C10030         -14.7 PSIG/1 bar to +30 PSIG/2 bar Compound, Isolated.       C10030         -14.7 PSIG/1 bar to +300 PSIG/2.4 bar Compound, Isolated.       C10030         -14.7 PSIG/1 bar to +300 PSIG/2.4 bar Compound, Isolated.       C10030         -14.7 PSIG/1 b			Non-isolated DN sensors: clean, dry,		
0-5 PSI/344.7 mbar Differential, Isolated       DI0005         0-15 PSI/1 bar Differential, Isolated       DI0015         0-30 PSI/2 bar Differential, Isolated       DI0030         0-100 PSI/6.9 bar Differential, Isolated       DI0030         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0-500 PSI/20.7 bar Differential, Isolated       DI0300         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0 to 15 PSI/1 bar Gauge, Isolated       GI0300         0 to 50 PSI/3.4 bar Gauge, Isolated       GI0300         0 to 500 PSI/3.4 bar Gauge, Isolated       GI0300         0 to 3,000 PSI/20.7 bar Gauge, Isolated       GI0300         0 to 3,000 PSI/20.8 bar Gauge, Isolated       GI0300         14.7 PSIG/1 bar to +15 PSIG/1 bar Compound, Isolated       CI0030         14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +100 PSIG/6.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +300 PSIG/2.0 far Compound, Isolated <td></td> <td></td> <td>non-corrosive, non-condensing gases only</td>			non-corrosive, non-condensing gases only		
0-5 PSI/344.7 mbar Differential, Isolated       DI0005         0-15 PSI/1 bar Differential, Isolated       DI0015         0-30 PSI/2 bar Differential, Isolated       DI0030         0-100 PSI/6.9 bar Differential, Isolated       DI0030         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0-500 PSI/20.7 bar Differential, Isolated       DI0300         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0 to 15 PSI/1 bar Gauge, Isolated       GI0300         0 to 50 PSI/3.4 bar Gauge, Isolated       GI0300         0 to 500 PSI/3.4 bar Gauge, Isolated       GI0300         0 to 3,000 PSI/20.7 bar Gauge, Isolated       GI0300         0 to 3,000 PSI/20.8 bar Gauge, Isolated       GI0300         14.7 PSIG/1 bar to +15 PSIG/1 bar Compound, Isolated       CI0030         14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +300 PSIG/2.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +100 PSIG/6.9 bar Compound, Isolated       CI0300         14.7 PSIG/1 bar to +300 PSIG/2.0 far Compound, Isolated <td>0-1 PSI/68 9 mbar Differential Isolated</td> <td>DI0001</td> <td></td>	0-1 PSI/68 9 mbar Differential Isolated	DI0001			
0-15 PSI/1 bar Differential, Isolated       DI0015         0-30 PSI/2 bar Differential, Isolated       DI0030         0-100 PSI/6.9 bar Differential, Isolated       DI0100         0-300 PSI/20.7 bar Differential, Isolated       DI0300         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0-500 PSI/34.5 bar Differential, Isolated       DI0300         0 to 15 PSI/1 bar Gauge, Isolated       GI0015         0 to 30 PSI/2 bar Gauge, Isolated       GI0050         0 to 15 PSI/1 bar Gauge, Isolated       GI0050         0 to 15 PSI/2 bar Gauge, Isolated       GI0050         0 to 15 PSI/3 bar Gauge, Isolated       GI0050         0 to 500 PSI/34.5 bar Gauge, Isolated       GI0300         0 to 500 PSI/34.5 bar Gauge, Isolated       GI0500         0 to 1,000 PSI/69 bar Gauge, Isolated       GI0500         0 to 1,000 PSI/20.7 bar to +15 PSIG/1 bar to +15 PSIG/1 bar to bescore, Isolated       GI0300         -14.7 PSIG/1 bar to +15 PSIG/2 bar Compound, Isolated       CI0030         -14.7 PSIG/1 bar to +50 PSIG/2.0 F bar Compound, Isolated       CI00300         -14.7 PSIG/1 bar to +50 PSIG/2.5 bar Compound, Isolated       CI0300         -14.7 PSIG/1 bar to +100 PSIG/20 F bar Compound, Isolated       CI0300         -14.7 PSIG/1 bar to +100 PSIG/20 bar Compound, Isolated       CI03000         -14					
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0-100 PSIA/6.9 bar Absolute, IsolatedAl0100					
0-1,000 PSIA/69 bar Absolute, Isolated	0-100 PSIA/6.9 bar Absolute, Isolated	AI0100			
	0-1,000 PSIA/69 bar Absolute, Isolated	Al1000			

#### **Measure Pressure**

#### • Easily measure pressure with a plug in pressure module

Purchase any of the pressure modules from the table below along with one of the three hand pumps and tubing kits for a complete pressure calibration system.

Sensor Code	Application	Ranges Available
DNxxxx	Differential, Non-isolated	0 to 0010*, 0028, 0200, 0415, 2000" H2O
DIxxxx	Differential, Isolated	0 to 0001, 0005, 0015, 0030, 0100, 0300, 0500 PSID
GIxxxx	Gauge, Isolated	0 to 0015, 0030, 0050, 0100, 0300, 0500, 1000, 3000 PSIG
CIxxxx	Compound, Isolated	-14.7 to +0015, 0030, 0050, 0100, 0300, 0500, 1000, 3000 PSIG
Alxxxx	Absolute, Isolated	0 to 0017, 0038, 0100, 1000 PSIA

#### **Media Compatibility**

Non-isolated DN sensors: clean, dry, non-corrosive, non-condensing gases only Isolated DI sensors: any media compatible with 316L SS & Viton® Isolated GI, CI & AI sensors: any media compatible with 316L SS

#### Accuracy

 $\pm 0.025\%$  of full scale including all effects of linearity, repeatability and hysteresis from -20° to +50°C (-4° to +122°F) \* The DN0010 sensor accuracy is  $\pm 0.050\%$  of full scale

#### 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 830 with Pressure Module, Pressure/Vacuum Pump & Hose

#### Hand Pumps, Tubing & Fitting Kits

#### • Generate pressure with a full set of hand pumps

Choose from a selection hand pumps, tubing & fittings made in the USA by Ralston Instruments. All pumps have two pressure ports - one port & hose go the PIE pressure module and the other to the pressure input of your instrument.



Pneumatic Scissor Hand Pump 0 to 300 psi







#### Quick-test<sup>™</sup> Hoses

Microbore hoses provide a very quick, low volume, high pressure way of connecting any pressure instrumentation to the hand pump and pressure module.



Pressure Fitting Kit Adapts from Quick-test<sup>™</sup> hose to 1/4" male & female NPT, 1/8" male & female NPT and 1/4" tube fitting





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.



Hands free carrying case with pockets for the PIE 830 and the Pressure Module.

Designed to be worn around your neck so that you can safely use both hands to calibrate.

#### PIE 830 Specifications (Unless otherwise indicated all specifications are rated from a nominal 23°C, 70% RH for 1 year from calibration)

General	
Operating Temperature Range	-20 to 60 °C (-5 to 140 °F)
Storage Temperature Range	-30 to 60 °C (-22 to 140 °F)
Temperature effect	≤ ± 0.005 %/°C of Full Scale; 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
Isolation: Voltage Common Mode	60V rms between all milliamp functions/Read V DC and Source V DC/Thermocouple/RTD/Ohms/ Frequency/Pressure 50/60 Hz, 100 dB
Normal Mode Rejection	50/60 Hz, 50 dB
Noise	$\leq \pm \frac{1}{2}$ Least Significant Digit from 0.1 to 10 Hz
Size	$5.63 \times 3.00 \times 1.60$ in, 143 x 76 x 41mm (L xW x H)
Weight	12.1 ounces, 0.34 kg (including boot & batteries)
Batteries	Four "AA" Alkaline 1.5V (LR6)
Optional NiMh Rechargeable	120 VAC for North America Only; charger, four
battery kit	NiMh batteries, AC & DC cords [Part # 020-0103]
Battery Life	Read Functions $\geq$ 20 hours; Read Pressure $\geq$ 7 hours Source mA $\geq$ 14 hours @ 12 mA into 250 $\Omega$ Pwr/Meas mA $\geq$ 12 hours at 20 mA Source V, $\Omega$ , T/C, pH, RTD & Hz $\geq$ 20 hours
Low Battery	Low battery indication with nominal I hour of operation left
Protection against misconnection	Over-voltage protection to 60 vrms (rated for 30 seconds). Red LED indicates OVERLOAD or out of range conditions
Display	High contrast graphic liquid crystal display with 0.35" (9 mm) high digits on main & 0.2" (5 mm) on mA display. LED backlighting for use in low lit areas.

Read mA	
Ranges and Resolution	0.000 to 24.000 mA or -25.00 to 125.00% of 4-20 mA
Accuracy	≤ ± (0.02 % of Reading + 0.003 mA)
Voltage burden	≤ 2V at 24 mA
Overload/Current limit protection	25 mA nominal

Source mA / Power & Measure Two Wire Transmitters & PWRM LEAK		
Ranges and Resolution	0.000 to 24.000 mA or -25.00 to 125.00% of 4-20 mA	
Accuracy	$\leq$ ± (0.02 % of Reading + 0.003 mA)	
Loop compliance voltage	≥ 24 DCV @ 20.00mA	
Loop drive capability	1200 $\Omega$ at 20 mA for 15 hours nominal; 950 $\Omega$ with Hart Resistor or leak detection running	

mA 2-Wire Transmitter Simulation		
Accuracy	Same as Source/Power & Measure	
Voltage burden	≤ 2V at 20 mA	
Overload/Current limit protection	24 mA nominal	
Loop voltage limits	2 to 60 VDC (fuse-less protected from reverse polarity connections)	

Voltage Read			
Range and Resolution	$\pm 99.999$ mV, $\pm 999.99$ mV, 0 to 10.250 V, 0.00 to 60.00 V DC		
Accuracy	$\leq$ ± (0.02 % of Reading + 0.01% Full Scale)		
Input resistance	≥ I MΩ		

Specifications subject to change without notice.

Source V dc	
Ranges and Resolution	-20.000 to 99.999 mV, -500.00 to 999.99 mV, 0.000 to 10.250V
Accuracy	$\leq$ ± (0.02 % of Reading + 0.01% Full Scale)
Source Current	≥ 20 mA
Sink Current	> 16 mA
Output Impedance	< .3 Ohms
Short Circuit Duration	Infinite
pH Source	
Accuracy in mV Accuracy in pH	≤ ± (0.02 % of Reading in mV + 0.1 mV) ≤ ± 0.003 pH @ 25°C
Thermocouple Source	
Accuracy	≤ ± (0.02 % of Reading + 0.01 mV)
Cold Junction Compensation	± 0.05°C - Thermistor traceable to NIST for 11 years
Output Impedance	< I Ohm
Source Current	> 20 mA (drives 80 mV into 10 Ohms)
Thermocouple Read	
Accuracy & Cold Junction Compensation	Same as Thermocouple Source
Input Impedance	> I Megohms
Open TC Threshold; Pulse	10K Ohms; <5 µamp pulse for 300 milliseconds (nominal)
RTD, OHMS and Conti	nuity Read
Resistance Ranges	0.00 to 401.00, 0.0 to 4010.0 Ohms
Accuracy	±(0.025% of Reading + 0.075 Ohms)
Excitation Current	1.0 mA to 401 Ohms, 0.5 mA to 4010 Ohms (nominal)
Continuity	0.0 to 401.0 Ohms; Beeps from 0.0 to 100.0 Ohms
RTD and OHMS Source	e
<b>3 Wire &amp; 4 Wire Accuracy</b> From 1 to 10.2 mA External Excitation Current	±(0.025% of Reading + 0.075 Ohms) 0.025 mV
Below I mA of External Excitation Current	±(0.025% of Reading+0.075 Ohms + $\frac{0.025 \text{ mV}}{\text{mA Excitation Current}}$ )
2 Wire Accuracy	Add 0.1 Ohms to 3 Wire & 4 Wire Accuracy
Resistance Ranges	0.00 to 401.00 to 4010.0 Ohms
Allowable Excitation Current Range	<401 Ohm:10.2 mA max; steady or pulsed/intermittent 401 to 4000 Ohms: I mA max; steady or pulsed/intermittent
Pulsed Excitation Current Compatibility	DC to 0.01 second pulse width

Frequency Source	
Ranges	I to 2000 CPM, 0.01 to 999.99 Hz, 0.1 to 9999.9 Hz, 0.001 to 20.000 kHz
Accuracy	±(0.02% of Reading + 0.01% of Full Scale)
Output Waveform	Square Wave, Zero Crossing -1.0 to +5 V peak-to-peak ±10%
Risetime (10 to 90% of amplitude)	< 10 microseconds
Output Impedance	< I Ohm
Source Current	> I mA rms at 20 kHz
Short Circuit Duration	Infinite
Optical Coupling	Green LED (HZ SYNC) flashes at output frequency
Frequency Read	
Ranges & Accuracy	Same as Frequency Source
Accuracy	±(0.02% of Reading + 0.01% of Full Scale)
Trigger Level	I V rms, dc coupled
Input Impedance	> I Meg Ohm + 60 pF

## Thermocouple Ranges & Accuracies @ 23°C

T/C	Degrees C	°C	Degrees F	°F	T/C
	Range		Range		Material
J	-200.0 to -50.0	±0.5°	-328.0 to -58.0	±1.0°	+lron Connotantan
	-50.0 to 300.0	±0.2°	-58.0 to 572.0	±0.4°	-Connstantan
	300.0 to 900.0	±0.3°	572.0 to 1652.0	±0.6°	
	900.0 to 1200.0	±0.4°	1652.0 to 2192.0	±0.8°	
K	-230.0 to -50.0	±1.2°	-382.0 to -58.0	±2.2°	+ Chromel®
	-50.0 to 550.0	±0.3°	-58.0 to 1022.0	±0.6°	-Alumel®
	550.0 to 1000.0	±0.5°	1022.0 to 1832.0	±0.8°	
	1000.0 to 1371.1	±0.6°	1832.0 to 2500.0	±1.1°	
Т	-260.0 to -230.0	±2.9°	-436.0 to -382.0	±5.2°	+Copper -Constantan
	-230.0 to -210.0	±1.0°	-382.0 to -346.0	±1.9°	-GONSLAINAN
	-210.0 to -50.0	±0.8°	-346.0 to -58.0	±1.4°	
	-58.0 to 50.0	±0.3°	-58.0 to 122.0	±0.6°	
	50.0 to 400.0	±0.2°	122.0 to 752.0	±0.4°	
E	-240.0 to -200.0	±0.9°	-400.0 to -328.0	±1.7°	+Chromel
L.	-240.0 to -200.0	±0.5°	-328.0 to 32.0	±1.7 ±0.8°	-Constantan
	0.0 to 350.0	±0.3 ±0.2°	32.0 to 662.0	±0.0°	
	350.0 to 1000.0	±0.2°	662.0 to 1832.0	±0.6°	
	000.0101000.0	10.0	002.0 10 1002.0	10.0	
R	-18.3 to 100.0	±2.1°	-1.0 to 212.0	±3.8°	+Pt/13Rh
	100.0 to 500.0	±1.3°	212.0 to 932.0	±2.4°	-Platinum
	500.0 to 1400.0	±1.0°	932.0 to 2552.0	±1.8°	
	1400.0 to 1767.8	±1.2°	2552.0 to 3214.0	±2.0°	
S	-18.3 to 100.0	±2.0°	-1.0 to 212.0	±3.7°	+Pt/10Rh
	100.0 to 350.0	±1.4°	212.0 to 662.0	±2.5°	-Platinum
	350.0 to 1600.0	±1.1°	662.0 to 2912.0	±2.0°	
	1600.0 to 1767.8	±1.3°	2912.0 to 3214.0	±2.4°	
В	315.6 to 600.0	±3.2°	600.0 to 1122.0	±5.7°	+Pt/30Rh
	600.0 to 850.0	±1.7°	1122.0 to 1562.0	±3.1°	-Pt/6Rh
	850.0 to 1100.0	±1.3°	1562.0 to 2012.0	±2.4°	
	1100.0 to 1820.0	±1.1°	2012.0 to 3308.0	±2.0°	

-230.0 to -150.0 -150.0 to -50.0 -50.0 to 950.0	±1.9° ±0.7°	-382.0 to -238.0		
	±0.2°	2.52.0.10 200.0	±3.4°	+Nicrosil
-50.0 to 950.0	10.7	-238.0 to -58.0	±1.2°	-Nisil
	±0.4°	-58.0 to 1742.0	±0.8°	
950.0 to 1300.0	±0.5°	1742.0 to 2372.0	±1.0°	
100.0 to 250.0	. 1 70	010.0 to 000.0	.0.08	Tungatan
				+Tungsten -W26/Re
				1120/110
	-		-	
2000.0 to 2320.0	±1.1°	3632.0 to 4208.0	±2.1°	
-1.1 to 100.0	±0.8°	30.1 to 212.0	±1.4°	+W5/Re
100.0 to 1000.0	±0.7°	212.0 to 1832.0	±1.3°	-W26/Re
1000.0 to 1750.0	±1.2°	1832.0 to 3182.0	±2.1°	
1750.0 to 2320.0	±2.0°	3182.0 to 4208.0	±3.5°	
				+W3/Re
150.0 to 1100.0	±0.7°	302.0 to 2012.0	±1.3°	-W25/Re
1100.0 to 1750.0	±1.0°	2012.0 to 3182.0	±1.8°	
1750.0 to 2320.0	±2.0°	3182.0 to 4208.0	±3.6°	
0.0 to 600.0	±0.3°	32.0 to 1112.0	±0.6°	+Pd55/Pt31/
600.0 to 900.0	±0.4°	1112.0 to 1652.0	±0.8°	Au14
900.0 to 1200.0	±0.6°	1652.0 to 2192.0	±1.1°	-Au65/Pd35
1200.0 to 1395.0	±0.7°	2192.0 to 2543.0	±1.2°	
-200.0 to -50.0	±0.4°	-328.0 to -58.0	±0.7°	+Iron
-50.0 to 300.0	±0.2°	-58.0 to 572.0	±0.4°	-Connstantan
300.0 to 900.0	±0.3°	572.0 to 1652.0	±0.5°	
-200.0 to -50.0	+0.6°	-328.0 to -58.0	+1.1°	+Copper
				-Constantan
50.0 to 550.0	±0.2°	122.0 to 1022.0	±0.4°	
550.0 to 600.0	±0.3°	1022.0 to 1112.0	±0.5°	
	100.0 to 350.0 350.0 to 1700.0 1700.0 to 2000.0 2000.0 to 2320.0 2000.0 to 2320.0 100.0 to 1000.0 1000.0 to 1750.0 1750.0 to 2320.0 1750.0 to 2320.0 100.0 to 1750.0 150.0 to 1750.0 100.0 to 1750.0 1750.0 to 2320.0 100.0 to 2320.0 100.0 to 1200.0 200.0 to 1200.0 200.0 to 1200.0 200.0 to 1200.0 200.0 to 1395.0 -50.0 to 300.0 300.0 to 900.0 -50.0 to 550.0	100.0 to 350.0         ±1.7°           350.0 to 1700.0         ±0.8°           1700.0 to 2000.0         ±1.0°           2000.0 to 2320.0         ±1.1°           -1.1 to 100.0         ±0.8°           100.0 to 1750.0         ±1.2°           100.0 to 1750.0         ±1.2°           1750.0 to 2320.0         ±2.0°           -1.1 to 150.0         ±1.2°           1750.0 to 2320.0         ±2.0°           -1.1 to 150.0         ±1.0°           150.0 to 1750.0         ±1.0°           150.0 to 1750.0         ±1.0°           150.0 to 1750.0         ±1.0°           150.0 to 1300.0         ±0.7°           100.0 to 1750.0         ±1.0°           1200.0 to 1395.0         ±0.3°           600.0 to 900.0         ±0.4°           900.0 to 1300.0         ±0.2°           300.0 to 900.0         ±0.2°           300.0 to 900.0         ±0.3°           -200.0 to -50.0         ±0.6°           -50.0 to 50.0         ±0.3°           -50.0 to 50.0         ±0.3°           -50.0 to 50.0         ±0.3°	100.0 to $350.0$ $\pm 1.7^{\circ}$ 212.0 to $662.0$ $350.0$ to $1700.0$ $\pm 0.8^{\circ}$ $662.0$ to $3092.0$ $1700.0$ to $2000.0$ $\pm 1.0^{\circ}$ $3092.0$ to $3632.0$ $2000.0$ to $2320.0$ $\pm 1.1^{\circ}$ $3632.0$ to $4208.0$ $-1.1$ to $100.0$ $\pm 0.8^{\circ}$ $30.1$ to $212.0$ $100.0$ to $1000.0$ $\pm 0.7^{\circ}$ $212.0$ to $1832.0$ $100.0$ to $1750.0$ $\pm 1.2^{\circ}$ $1832.0$ to $3182.0$ $1000.0$ to $1750.0$ $\pm 1.2^{\circ}$ $3182.0$ to $4208.0$ $-1.1$ to $150.0$ $\pm 1.0^{\circ}$ $30.1$ to $302.0$ $1750.0$ to $2320.0$ $\pm 2.0^{\circ}$ $3182.0$ to $4208.0$ $-1.1$ to $150.0$ $\pm 1.0^{\circ}$ $30.1$ to $302.0$ $1750.0$ to $2320.0$ $\pm 2.0^{\circ}$ $3182.0$ to $4208.0$ $1100.0$ to $1750.0$ $\pm 1.0^{\circ}$ $30.1$ to $302.0$ $1750.0$ to $2320.0$ $\pm 2.0^{\circ}$ $3182.0$ to $4208.0$ $0.0$ to $600.0$ $\pm 0.7^{\circ}$ $32.0$ to $1112.0$ $600.0$ to $900.0$ $\pm 0.3^{\circ}$ $32.0$ to $1112.0$ $600.0$ to $1395.0$ $\pm 0.7^{\circ}$ $2192.0$ to $254$	100.0 to $350.0$ $\pm 1.7^{\circ}$ $212.0$ to $662.0$ $\pm 3.0^{\circ}$ $350.0$ to $1700.0$ $\pm 0.8^{\circ}$ $662.0$ to $3092.0$ $\pm 1.5^{\circ}$ $1700.0$ to $2000.0$ $\pm 1.0^{\circ}$ $3092.0$ to $3632.0$ $\pm 1.8^{\circ}$ $2000.0$ to $2320.0$ $\pm 1.1^{\circ}$ $3632.0$ to $4208.0$ $\pm 2.1^{\circ}$ $-1.1$ to $100.0$ $\pm 0.8^{\circ}$ $30.1$ to $212.0$ $\pm 1.4^{\circ}$ $100.0$ to $1000.0$ $\pm 0.7^{\circ}$ $212.0$ to $1832.0$ $\pm 1.3^{\circ}$ $1000.0$ to $1750.0$ $\pm 1.2^{\circ}$ $1832.0$ to $3182.0$ $\pm 2.1^{\circ}$ $1750.0$ to $2320.0$ $\pm 2.0^{\circ}$ $3182.0$ to $4208.0$ $\pm 3.5^{\circ}$ $-1.1$ to $150.0$ $\pm 1.0^{\circ}$ $30.1$ to $302.0$ $\pm 1.8^{\circ}$ $150.0$ to $1100.0$ $\pm 0.7^{\circ}$ $302.0$ to $2012.0$ $\pm 1.8^{\circ}$ $150.0$ to $1100.0$ $\pm 0.7^{\circ}$ $302.0$ to $2012.0$ $\pm 1.8^{\circ}$ $1750.0$ to $2320.0$ $\pm 1.0^{\circ}$ $3182.0$ to $4208.0$ $\pm 3.6^{\circ}$ $1100.0$ to $1750.0$ $\pm 1.0^{\circ}$ $302.0$ to $2012.0$ $\pm 1.8^{\circ}$ $1750.0$ to $2320.0$ $\pm 1.0^{\circ}$ $3182.0$ to $4208.0$ $\pm 3.6^{\circ}$ $0.0$ to $600.0$ $\pm 0.3^{\circ}$ $32.0$ to $1112.0$ $\pm 0.6^{\circ}$ $600.0$ to $900.0$ $\pm 0.4^{\circ}$ $1122.0$ to $2543.0$ $\pm 1.2^{\circ}$ $-200.0$ to $-30.0$ $\pm 0.4^{\circ}$ $-328.0$ to $-58.0$ $\pm 0.7^{\circ}$ $-50.0$ to $300.0$ $\pm 0.4^{\circ}$ $-328.0$ to $-58.0$ $\pm 0.4^{\circ}$ $-200.0$ to $-50.0$ $\pm 0.6^{\circ}$ $-328.0$ to $-58.0$ $\pm 1.1^{\circ}$ <tr <td=""><math>-50.0</math> to <math>550.0</math><math>\pm 0.3^</math></tr>

Table based on Thermocouple Accuracy  $\leq \pm (0.02 \text{ \% of Reading in mV } +0.01 \text{ mV})$ Note: Doesn't include cold junction error of  $\pm 0.05^{\circ}C$ 

RTD	Ranges	& Accuracies	
	manges	a Accuracios	

RTD	Alpha	Degrees C		Degrees F	
Туре		Range	°C	Range	°F
Pt 100 Ohm	1.3850	-200.0 to 0.0	±0.2°	-328.0 to 32.0	±0.4°
DIN/IEC/JIS 1989	(0.00385)	0.0 to 340.0	±0.3°	248.0 to 644.0	±0.6°
Based on ITS-90		340.0 to 640.0	±0.4°	644.0 to 1184.0	±0.8°
		640.0 to 850.0	±0.5°	1184.0 to 1562.0	±1.0°
Pt 100 Ohm	1.3902	-200.0 to 10.0	±0.2°	-328.0 to 50.0	±0.4°
(Burns)	(0.003902)	10.0 to 350.0	±0.3°	50.0 to 662.0	±0.6°
		350.0 to 650.0	±0.4°	662.0 to 1202.0	±0.8°
		650.0 to 850.0	±0.5°	1202.0 to 1562.0	±0.9°
Pt 100 Ohm	1.3916	-200.0 to 20.0	±0.2°	-328.0 to 68.0	±0.4°
(Old JIS 1981)	(0.003916)	20.0 to 360.0	±0.3°	68.0 to 680.0	±0.6°
		360.0 to 650.0	±0.4°	680.0 to 1202.0	±0.8°
		650.0 to 850.0	±0.5°	1202.0 to 1562.0	±0.9°
Pt 100 Ohm	1.3926	-200.0 to 20.0	±0.2°	-328.0 to 68.0	±0.4°
(US Lab)	(0.003926)	20.0 to 360.0	±0.3°	68.0 to 680.0	±0.6°
		360.0 to 660.0	±0.4°	680.0 to 1220.0	±0.8°
		660.0 to 850.0	±0.5°	1220.0 to 1562.0	±0.9°

RTD Type	Alpha	Degrees C Range	°C	Degrees F Range	°F
Pt 1000 Ohm DIN/IEC/JIS 1989	1.3850 (0.00385)	-200.0 to 0.0 0.0 to 340.0 340.0 to 640.0 640.0 to 850.0	±0.2° ±0.3° ±0.4° ±0.5°	-328.0 to 32.0 248.0 to 644.0 644.0 to 1184.0 1184.0 to 1562.0	±0.4° ±0.6° ±0.8° ±1.0°
Copper 10 Ohm (Minco)	1.4274 (0.004274)	-200.0 to 260.0	±2.0°	-328.0 to 500.0	±3.6°
Copper 50 Ohm	1.4280 (0.00428)	-50.0 to 150.0	±0.4°	-58.0 to 302.0	±0.8°
Ni 120 Ohm (Pure)	1.6720 (0.00672)	-80.0 to 260.0	±0.1°	-112.0 to 500.0	±0.3°
Ni 110 (Bristol 7 NA)	1.5801 (0.005801)	-100.0 to 260.0	±0.2°	-148.0 to 500.0	±0.4°

Table based on 3 & 4 Wire RTD Accuracy:  $\leq \pm$  (0.025 % of Reading +0.075 Ohms)

#### **Standard 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.

Pressure sensors that have been damaged by over pressurization or contaminated by process chemicals are not covered by our warranty. Pneumatic pumps that are contaminated with process chemicals are also not covered by our warranty.

#### **Optional Repair/Replacement Warranty**

Under our Repair/Replacement Warranty (RP-WAR-B), our equipment is warranted against ANY damage or malfunction that may cause the unit to fail for a period of three (3) years from the date of shipment.

This warranty is limited to one complete replacement against any damage or malfunction during the warranty period. If replaced, the new calibrator will carry our Standard Warranty for the remainder of the three (3) years or a minimum of one (1) year from the date of shipment.

#### 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.



Flip out stand for bench use



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