FLUKE®
Calibration

Fluke Calibration products and services

Short form catalog

Precision, performance, confidence.™

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Electrical calibration

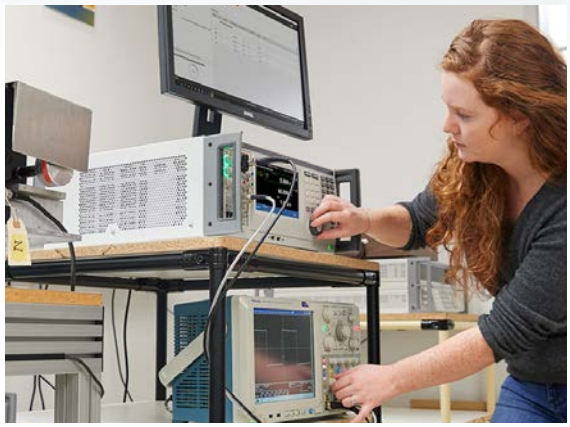
Electrical calibration refers to the process of verifying the performance of, or adjusting, any instrument that measures, sources, or tests electrical parameters. This discipline is usually referred to as dc and low frequency AC electrical metrology. Principal parameters include voltage, current, resistance, inductance, capacitance, time and frequency. Other parameters, including electrical power and phase, are also in this segment of metrology. Ratiometric comparisons of similar parameters are often performed to compare a known parameter to an unknown similar parameter.

Electrical calibration involves the use of precise devices that evaluate the performance of key properties for other devices called devices under test (DUTs). Because these precise devices have thoroughly known performance characteristics compared to the DUT, performance evaluation and/or calibration adjustment of the DUT to identify or minimize errors is possible. Typically, the performance of such precision devices should be four or more times better than the DUT.

These precision devices fall into two broad categories. Electrical signal sources are often referred to as either calibrators or standards. Precision measurement devices are often classified as reference digital multimeters, measurement standards, or ratio bridges.

Product highlights

5730A Multifunction Calibrator



5560A High-Performance Multi-Product Calibrator

The new gold standard in electrical calibration

The 5730A High Performance Multifunction Calibrator is the culmination of years of engineering development, customer research and industrial design, to bring to market the new gold standard in multifunction calibration. Like its predecessors, the 5700A and 5720A calibrators, the 5730A calibrates a wide range of digital multimeters, up to long-scale 8.5-digit DMMs, as well as a wide-range RF multimeters. This new model features improved specifications that will help you increase test uncertainty ratios (TURs) and improve test confidence.

- 6.5 inch VGA capacitive touchscreen with full color graphical user interface
- Menus and functions displayed in choice of nine languages
- Visual Connection Management™ terminals guide cable connections
- Extended operational reliability through the use of modern analog and digital components and state-of-the-art circuit board technologies
- Artifact Calibration—the process of using just three external standards—10 V, 1 ohm and 10 k ohm, to automatically adjust the entire instrument—optimizes performance to the best specified performance
- Cal Check—a process that tests all function and ranges for any drift since the most recent calibration—provides ongoing confidence in performance. Any output drift is measured and evaluated it with respect to specification.
- Compatible with 52120A and 5725A amplifiers
- Full MET/CAL® compatibility with 5700A and 5720A procedures (MET/CAL versions 7.3 and above)
- 30 MHz and 50 MHz wideband output options available

Most comprehensive workload coverage, latest technology, intuitive redesigned front panel, MET/CAL compatibility and much more

The 5560A calibrates the most popular benchtop 6.5-digit multimeters with better than 4:1 test uncertainty ratio (TUR), and clamp meters to 1500 A. Technical improvements include 30 A continuous current output with no duty cycle and synthesized inductance functionality. These improvements enable you to calibrate modern and full-functional benchtop multimeters and clamp meters. A large variety of thermocouple types and a new thermocouple connector enables easier connection and broadens the temperature workload coverage. The workload is expanded even further when the 5560A is used with a 52120A amplifier and appropriate coil to increase the current output to 6000 A, for calibrating high-current devices such as Rogowski coils.

- 4:1 test TUR for most popular 6.5-digit multimeters
- 30 A continuous current output extends AC/DC measurement ranges
- Calibrate meters that measure AC/DC voltage, resistance and capacitance
- Ranging optimized to better match your existing digital multimeter workload
- New optional 1-, 2-, 10-turn and redesigned 50-turn current coils expand workload coverage even further
- 17.8 centimeter (7-inch) color touch screen with new graphical user interface provides an intuitive calibration experience
- Optional DMM AUTOCAL Adapter to calibrate digital multimeters with minimal-to-no lead changes
- Visual Connection Management output terminals guide connections, preventing connection errors
- Reverse power protection prevents costly operator errors

Selection guide

	Multi-Product Calibrators				Multifunction Calibrators	Oscilloscope Calibrators	Electrical Tester Calibrator	Temperature/ Pressure Calibrator
								
Workload	**5080A**	**5540A**	**5550A**	**5560A**	**5730A**	**9500B**	**5322A**	**7526A**
Analog/panel meters								
High burden meters								
Low burden meters							V DC and V AC	V DC, I DC and R
DMMs								
Basic dc V accuracy	100 ppm	31 ppm	11 ppm	8 ppm	4.5 ppm	n/a	1000 ppm	40 ppm
3.5 digits (typ. ± 0.3 % dc V)							V DC and V AC	V DC and V AC
4.5 digits (typ. ± 0.025 % dc V)								
5.5 digits (typ. ± 0.015 % dc V)								
6.5 digits (typ. ± 0.0030 % dc V)								
7.5 digits (typ. ± 16 ppm dc V)								
8.5 digits (typ. ± 8 ppm dc V)								
Temperature/pressure								
RTD simulate								
RTD measure								
Thermocouple simulate								
Thermocouple measure								
Pressure modules								
Oscilloscopes	1 channel				1 to 5 channels			
200 MHz to 600 MHz	200 MHz opt	600 MHz Opt	600 MHz Opt	600 MHz Opt		600 MHz std		
1.1 GHz			1.1 GHz Opt	1.1 GHz Opt		9510 Head opt		
2.1 GHz				2.1 GHz Opt				
3.2 GHz						9530 Head opt		
6.4 GHz						9560 Head opt		
25 ps fast edge (14 GHz)						9550 Head opt		
Safety testers								
Hipot								
Megohm meters	MEG opt							
Installation								
PATs								
Continuity	MEG opt							
Loop impedance								
Leakage current								
Ground bond								
RCD/GFCI								
Medical safety								
Power/energy								
Wattmeters								
Harmonic analyzers								
Flicker meters								
Phase angle meters								
Power analyzers								
Power recorders								
Secondary energy stan- dards								
Watt-hour/energy meters								
Other								
Clamp meters								
LCR meters		RC only	LRC	LRC				
Process calibrators								
Data acquisition								
Non sine waveforms								
RF millivolt meters					30 and 50 MHz WB opt			
# of calibrator functions	**8**	**11**	**11**	**11**	**5**	**11+**	**9**	**9**

DC/LF electrical calibrators

5560A/5550A/5540A

5730A

5560A, 5550A and 5540A Multi-Product Calibrators

5560A: The next generation high-performing calibrator supporting the widest workload coverage.The 5560A High-Performance Multi-Product Calibrator defines a new class of high-performance multi-product calibrator, providing the broadest electrical workload coverage and highest accuracy for calibrating the most demanding modern workloads.

5550A: Optimized for your multimeter workload. The 5550A Performance Multi-Product Calibrator expands upon the capabilities of the 5522A. Adding new calibration ranges optimized to better match your existing digital multimeter workload in a modern, ruggedized instrument with an intuitive graphical interface.

5540A: The 5540A Multi-Product Calibrator extends the capabilities of the 5502A with better performance suited for on-site or mobile calibration.

5730A Multifunction Calibrator

The new gold standard in electrical calibration.

- The next generation high-performance multifunction calibrator
- Support instruments of up to 8.5 digits in measurement performance
- Artifact Calibration permits the lowest cost of support and highest confidence in performance
- New internal printed circuit boards with upgraded digital technology
- 6.5 inch VGA capacitive touchscreen with full color graphical user interface
- Menus and functions displayed in choice of nine languages
- Optional wideband outputs to 30 or 50 MHz


5080A

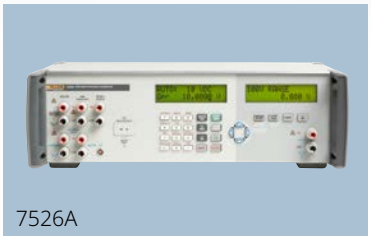
5080A High Compliance Multi-Product Calibrator

Solutions for your analog and digital workload.

- High compliance for difficult-to-calibrate analog instruments
- Robust protection circuits prevent costly damage from operator error
- Calibrates a wide workload, including analog meters and 3.5 and 4.5-digit DMMs
- Options for oscilloscope and megohm meter calibration

Specialty calibrators


5725A


7526A


5322A


52120A

5725A Amplifier

The Fluke 5725A Amplifier is a companion to the 57XX Series calibrators.

- Extends the calibrators' alternating volt-hertz product to 1100 V at 30 kHz and 750 V at 100 kHz
- Increases maximum direct and alternating current to 11 A

52120A Transconductance Amplifier

Tests and calibrates power standards, power and energy meters, PQ analyzers, high-current clamp meters and Rogowski coils. Delivers:

- 120 A stand-alone
- 240 A or 360 A with parallel operation
- 3000 A or 6000 A with accessory coils
- Industry-leading amplifier accuracy:
  - **100 PPM dc to 850 Hz**
  - **120 PPM dc and 260 PPM AC in stand-alone operation**
- Frequency capability, dc to 10 kHz

7526A Precision Process Calibrator

A process calibrator with versatility, precision and value, combined into a single bench-top tool.

- Simulates and measures nine RTD and thirteen thermo-couple types
- Accurately measures pres-sure up to 10 000 PSI (69 MPa) when combined with Fluke 700 Pressure Modules
- Sources and measures dc voltage to within 0.004 % of reading, dc resistance up to 4kΩ, and dc current from 0 mA to 100mA
- Combine with MET/CAL soft-ware for increased efficiency, calibration throughput, and automation.

5322A Electrical Safety Tester Calibrator

Calibrate all major types of electrical safety testers with just one calibrator.

- Calibrate insulation resis-tance testers; leakage current testers; multifunction installation testers; portable appliance testers (PATs); con-tinuity testers, earth (ground) resistance testers and many more types of electrical safety testers
- Complies with new regula-tory standards up to four times faster than traditional methods
- Compatible with MET/CAL software

Oscilloscope calibrators


9500B


55XX

9500B Oscilloscope Calibrator

The highest performance, fully automated, upgradeable oscilloscope calibration workstation.

- Full automation provides totally hands-free calibration
- Bandwidths of 600 MHz, 1,000 MHz, 3,200 MHz, and 6,400 MHz
- A fast edge of 25 ps to address bandwidths up to 14 GHz
- Connect up to five channels simultaneously

55XX Series Oscilloscope Calibration Options

Options for the 5540A, 5550A, and 5560A calibrators add capabilities to calibrate your digital and analog oscilloscopes with any of three different ranges of bandwidths.

- Leveled sine wave generator with optional bandwidths of 600 MHz, 1.1 GHz and 2.1 GHz for verifying oscilloscope bandwidth.
- DC and square wave voltage generators for calibrating voltage gain
- Horizontal time base calibration functions
- Edge is less than 175 ps for verifying dynamic response
- Fast edge risetime pulse generator (< 1 ns) for checking pulse response

Precision multimeters


8588A/8558A

8588A Reference Multimeter

The world's most stable digitizing reference multimeter.

- 8.5 digit resolution, exceptional linearity ad low noise and stability
- Guaranteed 3.5 ppm 1 year accuracy (99 %) analog performance without self-calibration
- AC rms measurement performance that is ten times faster, two times less noisy, and more sensitive for low level signals than other instruments in this class
- 0 to 10 s aperture setting allows industry's widest flexibility to control data capture window
- Intuitive menu structure and graphical display that enables instantaneous visualization of trend plot, statistical analysis, histogram and FFT
- GPIB, USBTMC, Ethernet allows industry standard selection of remote interface

8558A 8.5 Digit Multimeter

The industry's fastest direct 5 mega-samples-per-second digitizing for system automation in labs and manufacturing test environments.

- Digitizes at 5 MS/s, 18-bit resolution into memory for capturing complex, fast changing waveforms
- Up to 20 MHz bandwidth for voltage and 4 MHz for current retains high bandwidth content of the signal measured
- 4.5 digit data delivered to a PC at 100 kilo-readings/s


8808A

8808A Digital Multimeter

Versatile multimeter for manufac-turing, development and service applications.

- 5.5 digit resolution
- Basic V dc accuracy of 0.015 %
- Dual display, showing two different measurements at once
- Ultra low-burden current measurement mode

Electrical standards

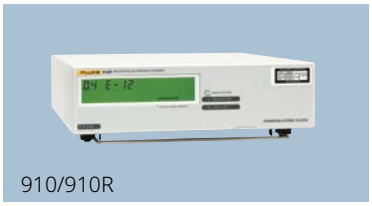

732C/734C


5790B


742A


A40B


752A


910/910R


908/909

732C/734C DC Reference Standards

The simple way to maintain and disseminate 10 V, 1.0 V and 0.1 V.

- A primary standard for traceability of dc voltage to better than 1 ppm
- Eliminates the need for external dividers
- Complete mechanical and electrical independence of each of its four 732C standards
- Battery powered for easy shipping

5790B AC Measurement Standard

Easiest way to make precision AC measurements.

- AC voltage measurement uncertainties as low as ± 24 ppm
- Works with A40B shunts for making precise absolute and relative current measurements without requiring manual current value calculations
- 30 MHz and 50 MHz wideband range options
- Statistics and peak-to-peak waveform functions
- Intuitive graphical interface
- Visual Connection Management™ terminals that light up to show the active terminals

742A Resistance Standard

High accuracy working standard for on-site resistance calibration.

- Small and rugged standard resistors with six-month stabilities to 2.5 ppm
- Open air use so no oil or air baths required
- 18 °C to 28 °C operating range
- Standard values from 1 ohm to 100 Megohms

A40B Series Precision Current Shunts

Precision, low inductance shunts for dc and AC current metrology.

- Simplifies calibration/verification of precision calibrators and current sources
- Shunts sized for current from 1 mA to 100 A
- Usable from dc to 100 kHz
- Ultra low phase shift to support power quality instrument metrology

752A Reference Divider

Setting the standard for ratio accuracy and ease of use.

- Key standard for calibrating 57xx Series Calibrators
- 10:1 and 100:1 divider outputs
- Output uncertainty 0.2 ppm and 0.5 ppm
- Built-in calibration bridge

910/910R GPS Controlled Frequency Standard

Cesium controlled frequency standard that uses GPS technology and connectivity to provide primary standard traceability from any location.

- Unique traceability feature means no more re-calibrations
- Two high-stability models to meet your application and fit your budget
- Built-in rubidium atomic clock (910R)
- Up to 13 outputs, maximizing cost efficiency

908/909 Frequency References

Stable frequency references for test systems and calibration labs.

- Accurate reference atomic clock in automated test systems
- Affordable and very cost effective
- Designed for portability with optional carrying case

RF calibration

RF and microwave calibration refers to the process of verifying the performance of, or adjusting/deriving corrections for, any instrument or component that will be used in the measurement or testing of RF and microwave parameters. This discipline is usually referred to as RF and microwave metrology. Principal parameters include RF voltage, RF power, impedance, modulation, distortion, time, frequency and phase. High dynamic range ratiometric comparisons are often performed and results are expressed in the logarithmic dB form.

As with any other calibration, RF and microwave calibration compares a device or unit under test (DUT or UUT) to a traceably calibrated standard or reference device. The process typically involves comparing a measuring DUT to a reference source; a sourcing DUT with a measuring reference; or quite commonly a measuring DUT with a measuring reference, using a stable but unknown source.

In each case, the uncertainty or stability of the reference should significantly exceed the specified performance of the device or device under test. RF metrologists typically look for performance margins of 4:1, however, test uncertainty ratios lower than this usual target are more frequently encountered in RF than in other calibration disciplines. Conversion from logarithmic (dB) to linear units is recommended practice when combining uncertainty contributions and considering test uncertainty ratios.

Precision devices that are commonly used in RF and microwave calibration fall broadly into four categories:

Sourcing instruments. Reference signals and/or modulation sources, frequency references, pulse or arbitrary waveform generators, reference attenuators.

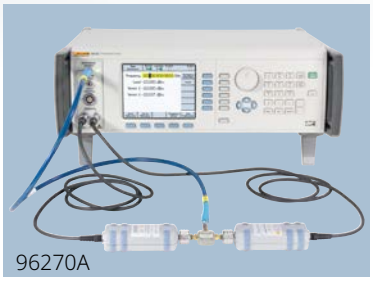
Measuring instruments. Power sensors, spectrum analyzers, measuring receivers, oscilloscopes, RF voltmeters, frequency counters.

Source-measure instruments. Vector or scalar network analyzers.

Precision components

- Power splitters, power dividers or couplers, attenuating pads
- Inter-series, polarity or sacrificial cables and adapters
- Short, open, load or sliding terminators
- Reflection bridges or directional couplers

RF references


96270A


96040A

96270A 27 GHz Low Phase Noise Reference Source

The simplest, most accurate and cost effective single instrument for calibrating spectrum analyzers, RF power sensors and more.

- Self-characterization lets you avoid calculating correction factors for each component in the signal delivery system
- What you set is what you get. Accurate signal delivery direct to the DUT input up to 27 GHz
- Covers a broad range of RF calibration workload
- Reduces the number of instruments and interconnections required for your RF calibration system
- Integrated 300 MHz frequency counter and dual power meter readout eliminate need for additional instruments
- Calibration-specific interface simplifies technician tasks
- Simplifies uncertainty calculations
- Lowers RF system maintenance costs
- With automation, reduces spectrum analyzer calibration times by as much as 50 % over manual methods
- Directly replaces and emulates legacy HP3335A, HP8662A, HP8663A, HP8340A, and HP8360B generators

96040A Low Phase Noise Reference Source

Simplify your RF calibration system by replacing many of the instruments and accessories that make up your current system.

- Covers a broad range of RF calibration workload
- Reduces the number of instruments and interconnections required for your RF calibration system
- What you set is what you get. Accurate signal delivery direct to the DUT input
- Integrated 50 MHz frequency counter eliminates need for an additional instrument
- Calibration-specific interface simplifies technician tasks
- Simplifies uncertainty calculations by delivering known signals direct to the device under test (DUT)
- Lowers RF system maintenance costs
- With automation, reduces spectrum analyzer calibration times by as much as 50 % over manual methods
- Directly replaces and emulates legacy HP3335A, HP8662A, and HP8663A generators

FLUKE®
Calibration

Temperature calibration

Temperature calibration refers to the calibration of any device used in a system that measures temperature. Most importantly, this usually means the temperature sensor, itself, which is typically a platinum resistance thermometer (PRT or PT-100), thermistor, or thermocouple. Readings from these thermometers are made by thermometer readout devices which measure their electrical outputs and convert them to temperature according to the International Temperature Scale of 1990 (ITS-90).

Thermometers are typically calibrated by placing them in a stable temperature environment (heat source) and comparing their output to that of a calibrated reference thermometer or standard thermometer. Fluke Calibration provides three general categories of heat sources: industrial heat sources (dry-well calibrators, portable calibration baths, Micro-Baths, etc.) for field use; fluid baths and thermocouple furnaces for laboratory use; and fixed-point cells for primary calibrations. Fluke Calibration also offers a variety of reference thermometers, including SPRTs, and thermometer readout instruments.

In addition, Fluke Calibration provides laboratory and field solutions for calibrating the electronics used in temperature measurement circuits.

Product highlights

6109A/7109A Portable Calibration Baths

Four times more calibration throughput with twice the accuracy of Micro-Baths and dry-block calibrators

Now there are portable calibration baths (6109A and 7109A) designed with the process manufacturing professional in mind. Process manufacturing plants for pharmaceuticals, biotechnology, and food production utilize many sanitary temperature sensors that require regular calibration. Production must stop during temperature sensor calibration. Therefore, more calibration throughput means less plant downtime.

The Fluke Calibration 6109A and 7109A Portable Calibration Baths are liquid baths that let process industry professionals calibrate four times more sanitary sensors per batch in less time and with twice the accuracy of other portable baths in this class. Larger than Micro-Baths, up to four tri-clamp sanitary sensors fit easily into these baths for calibration at ± 0.1 °C temperature display accuracy. Calibrate up to four tri-clamp sanitary sensors at the same time.

- Wide temperature ranges cover most process applications
  - **6109A: 35 °C to 250 °C**
  - **7109A: -25 °C to 140 °C**
- Excellent display accuracy of ± 0.1 °C provides 4:1 test uncertainty ratio for critical applications
- Stainless steel casing withstands harsh sterilizing chemicals and is rust proof
- NVLAP-accredited calibration included standard

1586A Super-DAQ Precision Temperature Scanner

The most accurate, flexible temperature data acquisition system

The 1586A is ideal for benchtop calibration of temperature sensors in secondary calibration labs, as well as temperature data acquisition applications in industries such as pharmaceutical, bio-technology, aerospace, food and energy where accurate temperature measurements are critical.

- Flexible configuration for the benchtop or factory using the DAQ-STAQ Multiplexer or internal High-Capacity Module
- Measure thermocouples, PRTs, thermistors, dc V, dc I, and resistance
- Best-in-class temperature measurement accuracy:
  - **PRTs: ± 0.005 °C (using DAQ-STAQ Multiplexer)**
  - **Thermocouples: ± 0.29 °C (using DAQ-STAQ Multiplexer and internal CJC for type K at 0 °C)**
  - **Thermistors: ± 0.002 °C**
- Connect up to 40 isolated inputs
- Scan speed of up to 10 channels per second
- Four modes of operation: Scan, Monitor, Measure, DMM
- Real-time color trending—chart up to four channels simultaneously
- Controls Fluke Calibration temperature sources such as dry-wells, furnaces or Micro-Baths for automated calibration routines
- MX + B scaling and channel offset zero function
- Built-in data security levels

Selection guides

Primary standards

Model	RTPW	Description
Standard platinum resistance thermometers (SPRTs)		
5681	25.5 Ω	–200 °C to 670 °C, quartz sheath
5683	25.5 Ω	–200 °C to 480 °C, quartz sheath
5684	0.25 Ω	0 °C to 1070 °C, quartz sheath
5685	2.5 Ω	0 °C to 1070 °C, quartz sheath
5698	25.5 Ω	–200 °C to 670 °C, working standard, quartz sheath
5699	25.5 Ω	–200 °C to 670 °C, high temperature, metal sheath
5686	25.5 Ω	–260 °C to 232 °C, glass capsule

ITS-90 fixed-point cells

Model	Description	Temperature
Triple point of water cells		
5901A-G	TPW Cell, 12 mm ID with handle, glass shell	0.01 °C
5901A-Q	TPW Cell, 12 mm ID with handle, quartz shell	0.01 °C
5901C-G	TPW Cell, 13.6 mm ID with handle, glass shell	0.01 °C
5901C-Q	TPW Cell, 13.6 mm ID with handle, quartz shell	0.01 °C
5901D-G	TPW Cell, 12 mm ID, glass shell	0.01 °C
5901D-Q	TPW Cell, 12 mm ID, quartz shell	0.01 °C
5901B-G	TPW Cell, mini, glass shell	0.01 °C
Standard size fixed-point cells		
5900E	TP mercury, SST	–38.8344 °C
5904	Freezing point of indium	156.5985 °C
5905	Freezing point of tin	231.928 °C
5906	Freezing point of zinc	419.527 °C
5907	Freezing point of aluminum	660.323 °C
5908	Freezing point of silver	961.78 °C
5909	Freezing point of copper	1084.62 °C
5943	Melting point of gallium, SST	29.7646 °C
Mini triple point of water and fixed-point cells		
5901B	Mini triple point of water	0.01 °C
5914A	Mini freezing point of indium	156.5985 °C
5915A	Mini freezing point of tin	231.928 °C
5916A	Mini freezing point of zinc	419.527 °C
5917A	Mini freezing point of aluminum	660.323 °C
5918A	Mini freezing point of silver	961.78 °C
5919A	Mini freezing point of copper	1084.62 °C
5944	Mini freezing point of indium, metal cased	156.5985 °C
5945	Mini freezing point of tin, metal cased	231.928 °C
5946	Mini freezing point of zinc, metal cased	419.527 °C
5947	Mini freezing point of aluminum, metal cased	660.323 °C

Model	Features/use
Maintenance apparatus	
7012	Maintains: triple point of water and gallium cells. Comparisons: –10 °C to 110 °C.
7037	Maintains: triple point of water and gallium cells. Comparisons: –40 °C to 110 °C.
7312	Maintains: two TPW cells. Compact size, runs quietly. Comparisons: –5 °C to 110 °C.
7341	Maintains: triple point of mercury cell. Comparisons: –45 °C to 150 °C.
9210	Maintains: mini triple point of water. Comparisons: –10 °C to 125 °C.
9230	Maintains: stainless steel gallium cell. Comparisons: 15 °C to 35 °C.
9260	Maintains: indium, tin, zinc, and aluminum cells. Comparisons: 50 °C to 680 °C.
9114	Maintains: indium, tin, zinc, and aluminum cells. Comparisons: 100 °C to 680 °C.
9115A	Maintains: aluminum and silver cells. Comparisons: 550 °C to 1000 °C.
9116A	Maintains: aluminum, silver, gold, and copper cells. Comparisons: 400 °C to 1100 °C.
9117	Anneals SPRTs, HTPRTs, and thermocouples to 1100 °C. Protects them against contamination from metal ions.
Boiling point of liquid nitrogen	
7196	Affordable substitute for a triple point of argon system. Provides for low-temperature comparison calibrations at approximately –196 °C with uncertainties of 2 mK.
Triple point of argon system	
5960A	Lowest uncertainty for any commercially available triple point of argon system.
Standard resistors	
742A	Excellent performance without oil or air baths. Values from 1 ohm to 19 megohm.

Thermometer readouts

Model	Probe types	Accuracy at 0 °C	Features
Intrinsically safe thermometers			
1551A Ex	100 Ω thin-film RTD	–50 °C to 160 °C (–58 °F to 320 °F)	Accuracy of ± 0.05 °C (± 0.09 °F) over full range. Intrinsically safe (ATEX and IECEx compliant). Two models to choose from (-50 °C to 160 °C or -80 °C to 300 °C)
1552A Ex	100 Ω wire-wound PRT	–80 °C to 300 °C (–112 °F to 572 °F)	
Precision digital thermometer readouts			
Tweener			
1502A	PRTs	± 0.006 °C	Resolution of 0.001 °C and accuracy to match; uses ITS-90, IPTS-68, CVD, or DIN (IEC 751) conversions
1504	Thermistors	± 0.002 °C	Reads thermistors from 0 to 500 KW; uses Steinhart-Hart and CVD
Handheld			
1523	PRTs, Thermistors, Thermocoouples	± 0.015 °C (PRTs)	Battery-powered, handheld reference thermometer; INFO-CON connector reads coefficients without programming; saves 25 readings on demand; graphs trends
1524	PRTs, Thermistors, Thermocoouples	± 0.015 °C (PRTs)	Handheld reference thermometer same as 1523 but with inputs for two thermometers; logs up to 15,000 readings and stores 25 more on demand
Chub-E4			
1529	PRTs, Thermistors, Thermocouples	± 0.006 °C (PRTs)	Four channels can all be measured simultaneously; battery-powered; logs up to 8,000 readings; flexible display
Super-Thermometers			
1594A	SPRTs, PRTs, Thermistors	± 0.00006 °C	Ratio accuracy of 0.8 ppm; temperature-controlled internal reference resistors; six input channels
1595A	SPRTs, PRTs, Thermistors	± 0.000015 °C	Ratio accuracy of 0.2 ppm; Ratio Self-Calibration; automated zero-power measurements
Multi-channel			
1586A	PRTs, Thermistors, Thermocouples	± 0.005 °C (PRTs)	40 channels with scan rate of 10 channels per second
1560	Accepts any combination of the modules below; all are easily added to and removed from the 1560 Black Stack base		
2560	SPRTs, PRTs	± 0.005 °C	2 channels of 25W or 100W PRTs
2561	HTPRTs	± 0.013 °C	2 channels to 1200 °C
2562	PRTs	± 0.01 °C	8 channels of 2-, 3-, or 4-wire RTDs
2563	Thermistors	± 0.0013 °C	2 channels of resolution to 0.0001 °C
2564	Thermistors	± 0.0025 °C	8 channels for data acquisition
2565	Thermocouples	± 0.05 °C	Reads most TC types with 0.0001 mV resolution
2566	Thermocouples	± 0.1 °C	Reads any combination up to 12 channels of virtually any type of TC
2567	1000 Ω PRTs	± 0.006 °C	2 channels of high-resistance PRTs
2568	1000 Ω PRTs	± 0.01 °C	8 channels of high-resistance PRTs
Thermo-hygrometer			
1620A	The DewK Thermo-Hygrometer	Two channels measure ambient temperature to ± 0.125 °C and %RH to ±1.5 %. Onboard memory holds up to two years of time/date-stamped readings. Visual and audio alarms. Detachable sensors contain their own calibration data for easy recalibrations. Ethernet and wireless capabilities.	

FLUKE®
Calibration

Thermometer probes

Model	Range	Size	Basic Accuracy†
Platinum resistance thermometers (PRTs)			
Secondary standard PRT			
5608-9-X	–200 °C to 500 °C	229 mm x 3.18 mm (9 in x 0.125 in)	Select from available calibration options
5608-12-X	–200 °C to 500 °C	305 mm x 3.18 mm (12 in x 0.125 in)	
5609-12-X	–200 °C to 670 °C	305 mm x 6.35 mm (12 in x 0.25 in)	
5609-15-X	–200 °C to 670 °C	381 mm x 6.35 mm (15 in x 0.25 in)	
5609-20-X	–200 °C to 670 °C	508 mm x 6.35 mm (20 in x 0.25 in)	
5609-300-X	–200 °C to 670 °C	300 mm x 6 mm (11.81 in x 0.24 in)	
5609-400-X	–200 °C to 670 °C	400 mm x 6 mm (15.75 in x 0.24 in)	
5609-500-X	–200 °C to 670 °C	500 mm x 6 mm (19.69 in x 0.24 in)	
5626	–200 °C to 661 °C	305 or 381 mm x 6.35 mm (12 or 15 in x 0.25 in)	± 0.007 °C at 0 °C
5628	–200 °C to 661 °C	305 or 381 mm x 6.35 mm (12 or 15 in x 0.25 in)	± 0.006 °C at 0 °C
Secondary reference PRT			
5615-6	–200 °C to 300 °C	152 mm x 4.76 mm (6 in x 0.19 in)	± 0.013 °C at 0.010 °C
5615-9	–200 °C to 420 °C	229 mm x 4.76 mm (9 in x 0.19 in)	± 0.013 °C at 0.010 °C
5615-12	–200 °C to 420 °C	305 mm x 6.35 mm (12 in x 0.25 in)	± 0.013 °C at 0.010 °C
Precision industrial PRT			
5627A-6	–200 °C to 300 °C	152 mm x 4.7 mm (6 in x 0.19 in)	± 0.05 °C at 0 °C
5627A-9	–200 °C to 300 °C	229 mm x 4.7 mm (9 in x 0.19 in)	± 0.05 °C at 0 °C
5627A-12	–200 °C to 420 °C	305 mm x 6.35 mm (12 in x 0.25 in)	± 0.05 °C at 0 °C
Fast response PRT			
5622-05	–200 °C to 350 °C	100 mm x 0.5 mm (3.94 in x 0.02 in)	± 0.04 °C at 0 °C
5622-10	–200 °C to 350 °C	100 mm x 1.0 mm (3.94 in x 0.04 in)	± 0.04 °C at 0 °C
5622-16	–200 °C to 350 °C	200 mm x 1.6 mm (7.87 in x 0.06 in)	± 0.04 °C at 0 °C
5622-32	–200 °C to 350 °C	200 mm x 3.2 mm (7.87 in x 0.125 in)	± 0.04 °C at 0 °C
Small diameter industrial PRTs			
5618B-6	–200 °C to 300 °C	152 mm x 3.2 mm (6 in x 0.125 in)	± 0.05 °C
5618B-9	–200 °C to 500 °C	229 mm x 3.2 mm (9 in x 0.125 in)	± 0.05 °C
5618B-12	–200 °C to 500 °C	305 mm x 3.2 mm (12 in x 0.125 in)	± 0.05 °C
Full immersion PRTs			
5606 Immersion PRT	–200 °C to 160 °C	50 mm x 3.2 mm (1.97 in x 0.125 in)	± 0.05 °C
5623B Freezer Probe	–100 °C to 156 °C	152 mm x 6.35 mm (6 in x 0.25 in)	± 0.05 °C
High temperature PRT			
5624	0 °C to 1000 °C	508 mm x 6.35 mm (20 in x 0.25 in)	± 0.055 °C
Thermistors			
Standards			
5640	0 °C to 60 °C	229 mm x 6.35 mm (9 in x 0.25 in)	± 0.0015 °C
5641	0 °C to 60 °C	114 mm x 3.2 mm (4.5 in x 0.125 in)	± 0.001 °C
5642	0 °C to 60 °C	229 mm x 3.2 mm (9 in x 0.125 in)	± 0.001 °C
5643	0 °C to 100 °C	114 mm x 3.2 mm (4.5 in x 0.125 in)	± 0.0025 °C
5644	0 °C to 100 °C	229 mm x 3.2 mm (9 in x 0.125 in)	± 0.0025 °C
Secondary probes			
5610	0 °C to 100 °C	152 or 229 mm x 3.2 mm (6 or 9 in x 0.125 in)	± 0.01 °C
5611A	0 °C to 100 °C	1.5 mm (0.06 in) tip dia.	± 0.01 °C
5611T	0 °C to 100 °C	28 mm x 3 mm (1.1 in x 0.12 in)	± 0.01 °C
5665	0 °C to 100 °C	76 mm x 3.2 mm (3 in x 0.125 in)	± 0.01 °C
Thermocouples			
Type R and S standards			
5649/5650-20	0 °C to 1450 °C	508 mm x 6.35 mm (20 in x 0.25 in)	± 0.7 °C at 1100 °C
5649/5650-20C	0 °C to 1450 °C	508 mm x 6.35 mm (20 in x 0.25 in)	± 0.7 °C at 1100 °C
5649/5650-25	0 °C to 1450 °C	635 mm x 6.35 mm (25 in x 0.25 in)	± 0.7 °C at 1100 °C
5649/5650-25C	0 °C to 1450 °C	635 mm x 6.35 mm (25 in x 0.25 in)	± 0.7 °C at 1100 °C

†"Basic Accuracy" includes calibration uncertainty and short-term repeatability. It does not include long-term drift.

Calibration baths

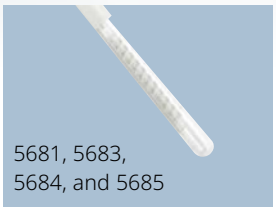
Model	Range	Stability	Depth
Compact calibration baths			
7340	–40 °C to 150 °C (-40 °F to 302 °F)	± 0.005 °C at –40 °C ± 0.005 °C at 25 °C	234 mm (9.25 in)
7380	–80 °C to 100 °C (-112 °F to 212 °F)	± 0.006 °C at –80 °C ± 0.010 °C at 0 °C	178 mm (7 in)
6331	35 °C to 300 °C (95 °F to 572 °F)	± 0.015 °C at 300 °C ± 0.005 °C at –20 °C	457 mm (18 in)
7341	–45 °C to 150 °C (-49 °F to 302 °F)	± 0.005 °C at –40 °C ± 0.005 °C at 25 °C	457 mm (18 in)
7381	–80 °C to 110 °C (-112 °F to 230 °F)	± 0.006 °C at –80 °C ± 0.005 °C at 0 °C	457 mm (18 in)
Standard size calibration baths			
7080	–80 °C to 110 °C (-112 °F to 230 °F)	± 0.0025 °C at –80 °C ± 0.0015 °C at 25 °C	305 mm (12 in)
7008	–5 °C to 110 °C (23 °F to 230 °F)	± 0.0007 °C at 25 °C ± 0.0008 °C at 0 °C	331 mm (13 in)
7011	–10 °C to 110 °C (14 °F to 230 °F)	± 0.0008 °C at 25 °C ± 0.0008 °C at 0 °C	305 mm (12 in)
6020	40 °C to 300 °C (104 °F to 572 °F)	± 0.005 °C at 300 °C ± 0.001 °C at 40 °C	305 mm (12 in)
6050H	180 °C to 550 °C (356 °F to 1022 °F)	± 0.007 °C at 500 °C ± 0.006 °C at –80 °C	305 mm (12 in)
Item	**Description**		
Other			
Bath accessories	Stands, rods, and clamps to suspend and support your probes and thermometers.		
Bath fluids	Silicone oils, salt, and cold fluids in convenient, small quantities.		
Rosemount bath controllers	Model 7900 controller designed by Hart integrates the features of Hart's 2100 controller and can be used in place of the Rosemount 915 controller with Rosemount-designed baths.		
Fluke Calibration bath controllers	Model 2100 and 2200 controllers can be integrated with homemade baths or other heat sources to achieve performance levels approaching Fluke Calibration baths.		

*Not for sale in Europe

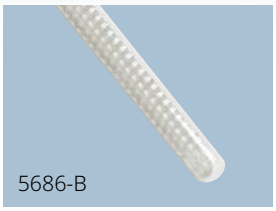
Industrial temperature calibrators

Model	Range	Accuracy
Field Metrology Wells		
9190A	-95 °C to 140 °C (-139 °F to 284 °F)	± 0.2 °C
9142	–25 °C to 150 °C (-13 °F to 302 °F)	± 0.2 °C
9143	33 °C to 350 °C (91 °F to 662 °F)	± 0.2 °C
9144	50 °C to 660 °C (122 °F to 1220 °F)	± 0.35 °C at 50 °C ± 0.35 °C at 420 °C ± 0.5 °C at 660 °C
Portable calibration baths		
6109A	35 °C to 250 °C (95 °F to 482 °F)	± 0.1 °C
7109A	-25 °C to 140 °C (-13 °F to 284 °F)	± 0.1 °C
Micro-Baths		
6102	35 °C to 200 °C (95 °F to 392 °F)	± 0.25 °C
7102	–5 °C to 125 °C (23 °F to 257 °F)	± 0.25 °C
7103	–30 °C to 125 °C (–22 °F to 257 °F)	± 0.25 °C
Handheld dry-wells		
9100S	35 °C to 375 °C (95 °F to 707 °F)	± 0.25 °C at 100 °C ± 0.5 °C at 375 °C
9102S	–10 °C to 122 °C (14 °F to 252 °F)	± 0.25 °C
Field dry-wells		
9009	–15 °C to 350 °C (5 °F to 662 °F)	Cold block: ± 0.2 °C Hot block: ± 0.6 °C
9103	–25 °C to 140 °C (–13 °F to 284 °F)	± 0.25 °C
9140	35 °C to 350 °C (95 °F to 662 °F)	± 0.5 °C
Infrared calibrators		
4180	–15 °C to 120 °C (5 °F to 248 °F)	± 0.40 °C at –15 °C ± 0.40 °C at 0 °C ± 0.50 °C at 50 °C ± 0.50 °C at 100 °C ± 0.55 °C at 120 °C
4181	35 °C to 500 °C (95 °F to 932 °F)	± 0.35 °C at 35 °C ± 0.50 °C at 100 °C ± 0.70 °C at 200 °C ± 1.20 °C at 350 °C ± 1.60 °C at 500 °C
9132	50 °C to 500 °C (122 °F to 932 °F)	± 0.5 °C at 100 °C ± 0.8 °C at 500 °C
9133	–30 °C to 150 °C (–22 °F to 302 °F)	± 0.4 °C
Metrology Wells		
9170	–45 °C to 140 °C (–49 °F to 284 °F)	± 0.1 °C
9171	–30 °C to 155 °C (–22 °F to 311 °F)	± 0.1 °C
9172	35 °C to 425 °C (95 °F to 797 °F)	± 0.1 °C at 100 °C ± 0.15 °C at 225 °C ± 0.2 °C at 425 °C
9173	50 °C to 700 °C (122 °F to 1292 °F)	± 0.2 °C at 425 °C ± 0.25 °C at 660 °C
Zero point dry-well		
9101	0 °C (32 °F)	± 0.05 °C
Dual block dry-well		
9011	50 °C to 670 °C (122 °F to 1238 °F)	± 0.2 °C at 50 °C ± 0.4 °C at 400 °C ± 0.65 °C at 600 °C
	–30 °C to 140 °C (–22 °F to 284 °F)	± 0.25 °C (insert wells) ± 0.65 °C (fixed wells)
Thermocouple furnaces		
9150	150 °C to 1200 °C (302 °F to 2192 °F)	± 5 °C
9118A	300 °C to 1200 °C (572 °F to 2192 °F)	± 5 °C

Standard platinum resistance thermometers (SPRTs)


5681, 5683,
5684, and 5685


5698-25


5686-B


5699

5681, 5683, 5684, and 5685 Quartz-Sheath SPRTs

The performance you expect from world-class SPRTs.

- Drift rates as low as 0.0005 K
- Proprietary gas mixtures ensures high stability
- Most experienced SPRT design team in the business

5698-25 Working Standard SPRT

High performance-to-price ratio.

- Conforms to ITS-90 SPRT Guidelines
- Drift rate typically 0.003 °C
- Calibration options by fixed point

5686-B Glass Capsule SPRT

Designed for metrology work requiring small SPRTs.

- Temperatures from -260 °C (13 K) to 232 °C
- Stability typically 0.001 °C over 100 °C range
- Miniature capsule package eliminates stem conduction

5699 High-Temperature Metal-Sheath SPRT

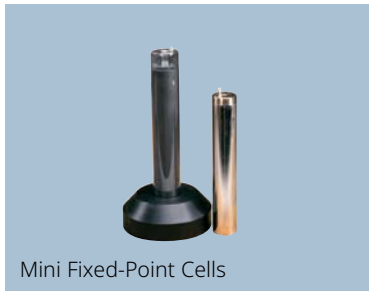
Affordable working standard SPRT.

- Range to aluminum point (660 °C)
- Inconel™ sheaths guard against contamination of sensor
- Drift rates less than 8 mK/year

ITS-90 fixed-point cells


5901


ITS-90


Mini Fixed-Point Cells

5901 Triple Point of Water Cells

Must-have, primary temperature standards.

- Easy-to-use, inexpensive standard with uncertainty better than ± 0.0001 °C
- Four sizes and two shells (glass and quartz) to choose from
- Isotopic composition of Vienna Standard Mean Ocean Water

ITS-90 Fixed-Point Cells

Best cell uncertainties commercially available.

- Every ITS-90 fixed point available from mercury to copper
- Plateaus last days (gallium for weeks and TPW for months)
- Manufactured and tested by Fluke Calibration's primary standards scientists

Mini Fixed-Point Cells

Least expensive, easiest-to-use fixed-point standards.

- Lower uncertainties than comparison calibrations
- All ITS-90 fixed points from TPW to copper
- Reduced equipment and annual recalibration costs

Cell maintenance apparatus


9114, 9115A, 9116A


9210


9230


9260


7312

9114, 9115A, 9116A Freeze-Point Furnaces

Designed for maximum-length plateaus.

- Designed to extend plateaus
- High-stability OEM controllers, RS-232 included
- External cooling coils

9210 Mini Triple Point of Water Maintenance Apparatus

Simple supercool-and-shake realization and maintenance of the 5901B Mini TPW Cell.

- Easy preprogrammed realization
- Inexpensive fixed-point solution
- Training complete in less than an hour

9230 Gallium Cell Maintenance Apparatus

Realize and maintain the melting point of the 5943 Gallium Cell.

- One week plateau duration
- No hassle automatic realizations
- Used daily in our Primary Lab

9260 Mini Fixed-Point Cell Furnace

Inexpensive, easy-to-use fixed-point maintenance apparatus.

- Realize and maintain In, Sn, Zn and Al fixed-point cells
- Good introduction to fixed-point calibration
- User friendly and inexpensive

7012/7312 Triple Point of Water Maintenance Baths

Keep your cells up and running reliably for weeks at a time.

- Maintains TPW cells for up to six weeks
- Optional immersion freezer for simple cell freezing
- Up to 496 mm (19.5 in) of immersion depth


9117


7196B

9117 Annealing Furnace

Keeps SPRTs and PRTs performing at their highest levels.

- Relieves mechanical strain
- Guards against contamination
- Anneals both SPRTs and HTSPRTs

7196B LN_2 Comparison Calibrator

Lowest-cost calibration to -196 °C.

- Simple to use
- Uncertainty less than 2 mK


1586A


DAQ-STAQ Multiplexer


1594A/1595A


1560


1529


1502A/1504


1523/1524


1551A Ex and 1552A Ex


1620A

Thermometer readouts

1586A Super-DAQ Precision Temperature Scanner and DAQ-STAQ Multiplexer

Best-in-class temperature measurement accuracy and up to 40 isolated input channels for measuring RTDs, thermocouples, thermistors, dc voltage, dc current, and resistance.

- PRTs: ± 0.005 °C; Thermocouples: ± 0.29 °C; Thermistors: ± 0.002 °C
- Scan speed of up to 10 channels per second
- Real-time color trending—chart up to four channels simultaneously
- Control Fluke Calibration temperature sources such as dry-wells or Micro-Baths for automated calibration routines

1594A/1595A Super-Thermometers

Thermometry bridge accuracy combined with time-saving features.

- Calibrate SPRTs, PRTs, RTDs and thermistors (0 Ω to 500 kΩ)
- Accuracy as good as 0.06 ppm (0.000015 °C)
- Ratio Self-Calibration verifies and calibrates resistance ratio accuracy

1560 Black Stack Thermometer Readout

Accurate, expandable and configurable readout.

- Reads SPRTs, RTDs, thermistors, and thermocouples
- Any configuration you like up to eight modules
- High-accuracy reference thermometer (to ± 0.0013 °C)

1529 Chub-E4 Standards Thermometer

Lab-quality accuracy on four channels for PRTs, thermistors and thermocouples.

- Four channels for PRTs, thermistors, and thermocouples
- Displays eight user-selected data fields from any channel
- Logs up to 8,000 readings with date and time stamps

1502A/1504 Thermometer Readouts

Best performance thermometers in their price range.

- Single-channel reference thermometers
- Two models to choose from—reading PRTs or thermistors
- Best price/performance package

1523/1524 Reference Thermometers

Measure, graph and record three sensor types with one tool.

- High accuracy: PRTs: ± 0.011 °C; Thermocouples: ± 0.24 °C; Thermistors: ± 0.002 °C
- A simple user interface to see trends quickly
- Smart connectors to load probe information automatically

1551A Ex and 1552A Ex Stik Thermometer

The best substitute for precision mercury-filled glass thermometers.

- Accuracy of ± 0.05 °C (± 0.09 °F) over full range
- Intrinsically safe (ATEX and IECEx compliant)
- Two models to choose from (-50 °C to 160 °C or -80 °C to 300 °C)

1620A Digital Thermometer-Hygrometer

The most accurate temperature and humidity graphical data logger on the market.

- Superior accuracy
- Network enabled
- Powerful logging and analysis tools

Secondary standard PRTs

5608/5609 Secondary PRTs

Very stable thermometer from –200 °C to 670 °C.

- 5608: –200 °C to 500 °C (80 mm minimum immersion)
- 5609: –200 °C to 670 °C (100 mm minimum immersion)
- Calibration not included, NVLAP-accredited calibration optional, lab code 200348-0

5615 Secondary PRT

Reference-grade platinum sensing element.

- –200 °C to 420 °C
- ± 0.012 °C accuracy at 0 °C
- Drift of ± 0.007 °C after 100 hours at max temperature

5626/5628 Secondary SPRT, PRT, Temperature Sensors

High-temperature secondary standards.

- -200 °C to 661 °C
- Meets all ITS-90 requirements for resistance ratios
- Rtp drift < 20 mK after 500 hours at 661°C

Thermistor standards

5640 Series Thermistor Standards Probes

High accuracy temperature probes with excellent stability.

- Accuracy to ± 0.001 °C
- Affordable system accuracy to ± 0.004 °C or better
- NIST-traceable calibration included from manufacturer

High temperature PRT

5624 Platinum Resistance Thermometer

Precision PRT accuracy at thermocouple temperatures.

- Temperature range of 0 °C to 1000 °C
- Accuracy of ± 0.05 °C to 962 °C (includes short-term stability and calibration uncertainty)
- Long-term drift of 0.01 °C at 0 °C after 100 hours at 1000 °C

Thermocouple standards

5649/5650 Type R and Type S Thermocouple Standards

Eight models to fit any type R or S thermocouple applications.

- 0 °C to 1450 °C
- Two sizes available, each with or without reference junction
- Optional fixed-point calibration, uncalibrated accuracy is the greater of ± 0.6 °C or ± 0.1 % of reading

Precision industrial PRTs

5627A Precision Industrial PRTs

Durable PRTs with temperature range to 420 °C and accuracy to 0.025 °C.

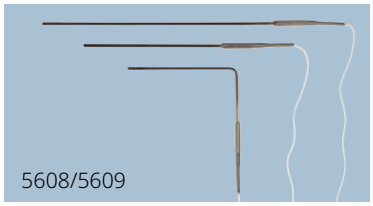
- Vibration and shock resistant
- NVLAP-accredited calibration included, lab code 200706-0

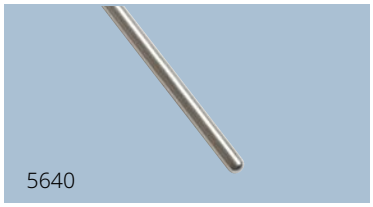
Fast response PRTs

5622 Fast Response PRTs

Designed for temperature measurements requiring fast response or short immersion over a wide range.

- Time constants as fast as 0.4 seconds
- Available as DIN/IEC Class A PRTs or with NVLAP-accredited calibration, lab code 200348-0
- Small probe diameters ranging from 0.5 mm to 3.2 mm


5608/5609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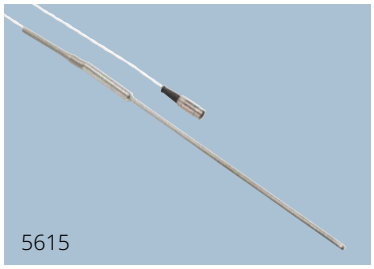
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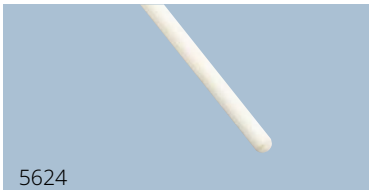
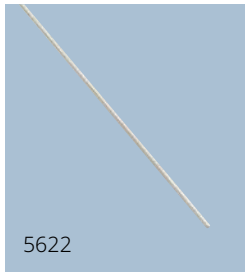

5624


5626/5628


5649/5650


5627A


5622

Small diameter industrial PRTs

5618B Small Diameter Industrial RTD

Secondary level performance with full ITS-90 calibration.

- Small diameter sheath, 3.2 mm (0.125 in)
- Excellent stability
- Includes ITS-90 coefficients

Full immersion PRTs

5606 Full Immersion PRT

PRTs for laboratory freezers, autoclaves, and furnaces.

- Transition junction designed to withstand full temperature range of probe
- 5606: -200 °C to 160 °C
- Calibration accuracy of ± 0.05 °C

Secondary thermistor probes

5610/5611/5611T/5665 Secondary Reference Thermistor Probes

Lab-grade thermistors probes for accurate work across a narrow temperature range.

- Short-term accuracy to ± 0.01 °C; one-year drift < ± 0.01 °C
- Accredited NVLAP calibration optional
- Flexible Teflon and silicone coated fast-response models


5618B


5606


5610/5611/
5611T/5665

Compact calibration baths

7340/7380 Compact Temperature Calibration Baths

Compact baths with the stability and uniformity required for thermometer calibration.

- Stability and uniformity each better than ± 0.008 °C
- Metrology-level performance in lab-friendly sizes
- Convenient use on benchtops or on matching carts

6331/7341/7381 Deep-Well Compact Baths

Ample immersion depth and great stability, in a high value compact bath.

- 457 mm (18 in) of depth with just 15.9 liters (4.2 gal) of fluid
- Perfect for liquid-in-glass thermometers with optional LIG kit
- Fast, quiet, compact (yet deep), and economical

7312 Triple Point of Water Maintenance Bath

Keep your cells up and running reliably for weeks at a time.

- Maintains TPW cells for up to six weeks
- Optional immersion freezer for simple cell freezing
- Independent cutout circuit protects cells from breaking


7340/7380


6331/
7341/
7381


7312

Standard calibration baths


6020

6020 High Temperature Calibration Oil Bath

Stable, uniform heat sources for calibrations up to 300 °C.

- Stability as good as 0.001°C
- Large-capacity tanks for higher productivity
- Built-in cooling coils for external cooling sources


6050H

6050H Extremely High Temperature Calibration Salt Bath

Designed for high-temperature calibration—up to 550 °C.

- Eliminates messy sand baths
- Electronically adjustable temperature cutouts
- Stability of ± 0.008 °C at 550 °C


7008/7040/7037/7012/7011

7008/7040/ 7037/ 7012/7011 Cold Temperature Calibration Baths

High stability means low calibration uncertainties—no other bath performs this well.

- Stability to ± 0.0007 °C
- Best digital temperature controller available
- Super Tweak function provides set-point resolution to 0.00003 °C


7080

7080 Really Cold Temperature Calibration Baths

Cool to –40 °C, –60 °C, or –80 °C without external coolants.

- Self-contained refrigeration—no LN2 or chiller required
- Temperatures as low as –80 °C in real metrology baths
- Stability of ± 0.0025 °C at –80 °C

Special application baths

7009/7108/7015 Resistor Baths

Three size options for any quantity of resistors.

- Stability to ± 0.0007 °C
- Independent high- and low-temperature cutout circuit


7009/7108/7015

Bath controllers

2100 and 2200 Benchtop Temperature Controllers

Most stable temperature controllers available.

- Resolution as high as 0.00018 °C
- RS-232 interface included for automating applications


2100 and 2200

Metrology Wells

9170/9171/9172/9173 Metrology Well Calibrators

Accurate enough for lab use yet rugged and portable.

- Best-performing industrial heat sources (accuracy, stability, uniformity) in the world
- –45 °C to 700 °C
- Immersion depth to 203 mm (8 in)
- Optional ITS-90 reference input reads PRTs to ± 0.006 °C

Field Metrology Wells

9190A Ultra-Cool Field Metrology Well

Ultra-cool dry-block calibrator with best-in-class stability.

- Wide temperature range from –95 °C to 140 °C
- Best-in-class stability: ± 0.015 °C full range
- Accuracy using built-in reference thermometer readout: ± 0.05 °C full range
- Display accuracy: ± 0.2 °C full range

9142/9143/9144 Field Metrology Wells

Small dry wells for big field applications.

- Lightweight, portable, and fast
- Cool to –25 °C in 15 minutes and heat to 660 °C in 15 minutes
- Built-in two-channel readout for PRT, RTD, thermocouple, 4-20 mA current

Dual-block dry-well

9011 High-Accuracy Dual-Well Calibrator

Widest temperature range available in a single dry-well.

- Combined range from –30 °C to 670 °C, one unit—two blocks
- Two independent temperature controllers (hot and cold side)
- Stability to ± 0.02 °C

Field dry-well calibrators

9103/9140 Field Dry-Well Calibrators

Great performance in portable instruments.

- Lightweight and very portable
- Accuracy to ± 0.25 °C
- RS-232 and Interface-it software included

Micro-Baths

6102/7102/7103 Micro-Bath Thermometer Calibrators

Portable and extremely stable.

- Small portable calibration baths
- Calibrates sensors of different size or shape
- Accuracy ± 0.25 °C

Portable calibration baths

6109A/7109A Portable Calibration Baths

Four times more calibration throughput and twice the accuracy of Micro-Baths and dry-block calibrators.

- Calibrate up to four tri-clamp sanitary sensors at the same time
- Wide temperature ranges cover most process applications
  – 6109A: 35 °C to 250 °C
  – 7109A: -25 °C to 140 °C
- Excellent display accuracy of ±0.1 °C provides 4:1 test uncertainty ratio for critical applications
- Stainless steel casing withstands harsh sterilizing chemicals and is rust proof
- NVLAP-accredited calibration included standard

6109A/7109A


9011


9170/9171/
9172/9173


9190A


9142/9143/9144


9103


6102/7102/7103

FLUKE®
Calibration

Handheld calibrators

9100S/9102S Handheld Dry-Wells

Small, light, and portable dry-wells.

- Ranges from –10 °C to 375 °C
- Accuracy to ± 0.25 °C, stability of ± 0.05 °C at 0 °C

9009 Industrial Dual-Block Thermometer Calibrator

Double your productivity or cut your calibration time in half.

- Temperatures from –15 °C to 350 °C in one unit
- Two wells in each block for simultaneous comparison calibrations
- Rugged, lightweight, water-resistant enclosure

Infrared calibrators

4180/81 Precision Infrared Calibrators

Accredited performance for point-and-shoot calibrations.

- Calibrated radiometrically for meaningful, consistent results
- Accredited calibration included
- Accurate, reliable performance from –15 °C to 500 °C
- Supported in MET/CAL software

9132 and 9133 Portable Infrared Calibrators

Precision when you need it for infrared temperature calibration.

- Certify IR pyrometers from –30 °C to 500 °C (–22 °F to 932 °F)
- Large 57 mm (2.25 in) blackbody target
- RTD reference well for contact temperature measurement

Zero-point dry-well

9101 Series Metrology Well Calibrators

Ice-point reference without the ice.

- ± 0.005 °C stability in a portable ice-point reference
- Easy re-calibration for long-term reliability
- Ready light frees user's time and attention

Thermocouple furnaces

9150 Thermocouple Furnace

Convenient, portable thermocouple furnace.

- 150 °C to 1200 °C
- Stability of ± 0.5 °C over full range
- NIST-traceable calibration included
- RS-232 port standard

9118A Thermocouple Calibration Furnace

High performance furnace for thermocouple calibrations to 1200 °C. The Fluke Calibration 9118A Thermocouple Calibration Furnace is a horizontal, open-ended tube furnace with a temperature range of 300 °C to 1200 °C.

- Wide temperature range
- Calibrates many thermocouple types
- Best-in-class temperature stability and uniformity
- Automated setpoint control


9100S/9102S


9132 and 9133


9009


9101


4180/81


9150


9118A

Humidity calibration

Humidity affects many properties of air and the materials that are exposed to it. Monitoring and measuring humidity is important wherever there is a need to prevent condensation, corrosion, mold, warping or spoilage of products. For example, it's important to measure humidity in industries that manufacture and distribute foods, pharmaceuticals, chemicals, fuels, wood, textiles, and paper.

The sensors that measure humidity need to be calibrated regularly to ensure they continue to operate within their specifications. Humidity sensor calibration is typically done using an instrument called a humidity generator.

Most humidity generators are based on one of two designs. A mixed-flow generator controls humidity by using the split-stream method. In this method, dry gas is drawn into the generator and divided into two parts. One part is partially or completely saturated with water vapor; the other part is mixed in until the targeted humidity output is reached. The humidity depends on the wet air's humidity and the mixing ratio. A high-volume fan in the test chamber keeps the temperature and humidity uniform.

A two-pressure generator has two chambers. The first, called the saturator, contains air saturated with water vapor at a high pressure. The air passes from the saturator to the second chamber, called the test chamber. The test chamber is at a lower pressure. As the air passing into the test chamber reduces in pressure, its relative humidity also drops.

A mixed-flow generator is faster than a typical two-pressure generator, and is also more portable, which makes this type of calibrator a good solution for work in the lab or on-site in the field.

Product highlights

5128A RHapid-Cal Humidity Generator

Fast, portable humidity probe and logger calibration with accredited 1 % RH system accuracy

- Best-in-class system accuracy for dependable humidity probe calibration
- Rapid humidity and temperature stabilization time for high calibration throughput
- Supports on-site, multi-point calibration of humidity probes
- Versatile design accommodates a large workload
- Compact size and lightweight for easy transport
- ISO 17025 accredited system calibration included standard
- Easy to maintain
- Supported in MET/CAL software

Pressure calibration

Pressure calibration is the comparison of the output of a device used to measure pressure with that of another pressure measurement device, or pressure measurement standard. This usually involves plumbing the device under test (DUT) to the standard device and generating a common pressure in the measurement circuit. The outputs of the devices are compared at one or more pressures, typically from the lowest to highest readings of the DUT's full scale range, or the range over which it is normally used.

The comparison process can be performed in a chain from the highest level of fundamental pressure realization down to everyday pressure measurement devices, such as analog gauges, transducers and transmitters, to ensure that pressure measurements are accurate and comply with accepted or mandated standards.

The test fluid inside a pressure calibration system may be liquid or gas depending on the application. In general, gas (usually compressed nitrogen or air) is used for cleanliness and precision at lower pressures, and liquids (usually oil or water) are often used for safety, leak integrity, and ease of pressure generation at higher pressures above 7 MPa to 40 MPa (1,000 psi to 6,000 psi). There is a great deal of overlap in the actual ranges for which liquid or gas may be used practically, as reflected in the range of Fluke Calibration instruments that are specialized for each type of test fluid.

Product highlights

8270A/8370A Modular Pressure Controllers/ Calibrators

Widest workload coverage in an automated high-pressure controller

The 8270A and 8370A are automated pneumatic pressure controllers that calibrate a wide workload of pressure sensors, covering twice the pressure ranges at twice the speed of other high-pressure controllers. Two models let you balance price and performance:

- The 8270A measures and controls pressures from vacuum to 44 MPa (6400 psi). It can be configured with ranges as low as 100 kPa (15 psi).
- The 8370A measures and controls pressures from atmosphere to 107 MPa (15,500 psi). It can be configured with ranges as low as 700 kPa (100 psi).

Fluke Calibration's unique control technology enables you to use these calibrators at low or high pressures, all in the same instrument. Control precision is 0.002 % of active range. Expand workload coverage to both gas and liquid filled devices by using the optional Contamination Prevention System (CPS).

6270A Modular Pressure Controller/Calibrator

Calibrate a wide range of pressure gauges and sensors with a single instrument

- Modular configuration makes this a versatile and expandable solution
- Easy to operate and maintain
- Wide measurement range—vacuum to 3000 psi (20 MPa)
- Three levels of accuracy—0.02 % FS, 0.01 % reading from 50 % to 100 % span, or 0.01 % reading from 30 % to 100 % span.—let you balance performance and budget
- High speed, stable pressure control
- Localized graphical user interface in choice of ten languages
- Can be fully automated with COMPASS® for Pressure software
- Optional contamination prevention system keeps valves clean and free from debris

Selection guide

Gas Pressure Calibrators

This selection guide presents only some of the Fluke Calibration gas pressure calibration line. Other higher accuracy solutions are available for all pressure ranges.

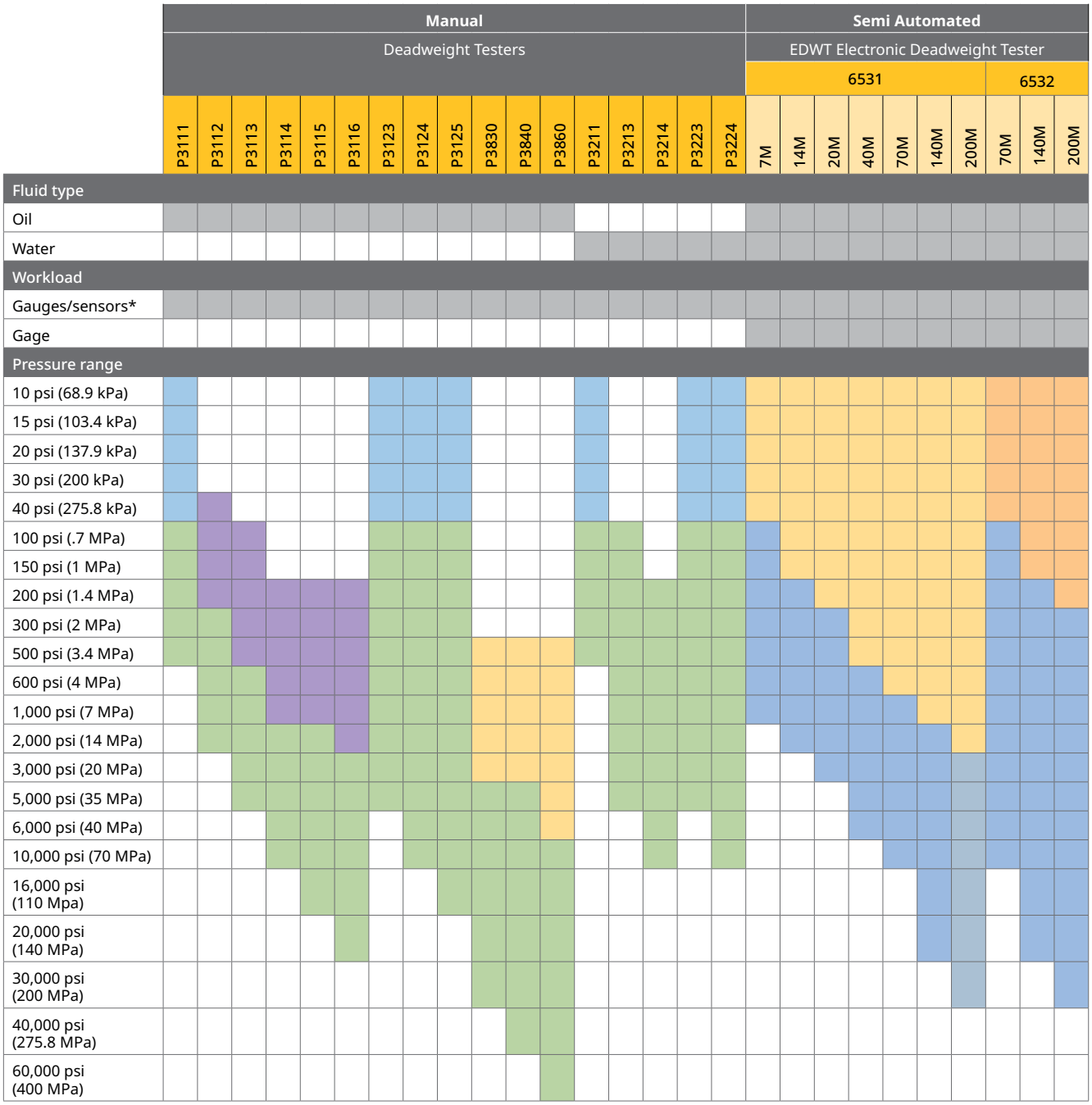
	Manual									
	Deadweight testers									
	P3011	P3012	P3013	P3014	P3015	P3022	P3023	P3025	P3031	P3032
Workload										
Gauges/sensors										
Gage										
Bidirectional*										
Pressure range										
Vacuum										
90 % vacuum										
Positive gage pressure										
5 inH_2O (1.5 kPa)										
12 inH_2O (3 kPa)										
1.5 psi (10.3 kPa)										
2 psi (13.8 kPa)										
2.2 psi (15 kPa)										
3 psi (20.7 kPa)										
5 psi (34.4 kPa)										
10 psi (68.9 kPa)										
15 psi (103.4 kPa)										
20 psi (137.9 kPa)										
30 psi (200 kPa)										
40 psi (275.8 kPa)										
100 psi (.7 MPa)										
150 psi (1 MPa)										
200 psi (1.4 MPa)										
300 psi (2 MPa)										
500 psi (3.4 MPa)										
600 psi (4 MPa)										
1,000 psi (7 MPa)										
2,000 psi (14 MPa)										
Accessories										
Hand pump	o				o	o	o	o		
Fine Inc. Weights				o	o	o	o	o		

*Requires vacuum pump
o=Optional
0.0015 % FS
0.015 % reading uncertainty

Selection guide

Hydraulic Pressure Calibrators

This selection guide presents only some of the Fluke Calibration hydraulic pressure calibration line. Other higher accuracy solutions are available for all pressure ranges.



0.015 % reading uncertainty
0.002 % full scale uncertainty
0.0015 % full scale uncertainty
0.0075 psi (0.05 kPa) uncertainty
0.0002 % span uncertainty

Gas pressure controllers/calibrators

6270A

7250LP

7250/7250i

7252/7252i

PPC4

6270A Modular Pressure Controller/Calibrator

Calibrate a wide range of pressure gauges and sensors with a single instrument.

- Modular configuration makes this a versatile and expandable solution
- Wide measurement range—vacuum to 3000 psi (20 MPa)
- Three levels of accuracy—0.02 % FS, 0.01 % reading from 50 % to 100 % span, or 0.01 % reading from 30 % to 100 % span—let you balance performance and budget
- Can be fully automated with COMPASS™ for Pressure software
- Optional contamination prevention system keeps valves clean and free from debris

7250LP Low Pressure Controller/Calibrator

Specialized measurement and control for very low draft pressure range.

- Precision: 0.005 % of reading
- Control stability: 0.004 % of each range
- Resolution to 0.0001 in H2O
- Full scale ranges from 0 to 10 in H2O (2.5 kPa) to 0 to 100 in H_2O (25 kPa)

7250/7250i Gas Pressure Controllers/Calibrators

Combining advanced precision, stability, speed and affordability.

- Pressure ranges from 0 to 40 kPa and to 21 MPa (0 to 5 psi and to 3000 psi, 0 to 400 mbar and to 210 bar)
- Model 7250i provides precision of 0.005 % of reading
- Model 7250 provides 0.003 % of full scale precision
- Stability: 0.0075 % of reading per year
- Time to setpoint: 15 seconds with no overshoot

7250xi High Performance Gas Pressure Controllers/Calibrators

Unmatched precision and speed.

- Pressure ranges from 0 to 40 kPa and to 17 MPa (0 to 5 psi and to 2500 psi, 0 to 400 mbar and to 170 bar)
- Advanced precision of 0.005 % of reading from 5 % to 100 % of full scale
- Stability: 0.0075 % of reading per year
- Time to setpoint: 15 seconds with no overshoot

7252/7252i Dual Output Gas Pressure Controllers

A unique and flexible approach to performing automated calibrations over a wide pressure range.

- Two independent pressure measurement and control modules
- Two performance models available, 7252i and 7252
- Fast control: <15 seconds with zero overshoot
- Full scale ranges from 0 to 2.5 kPa and to 21 MPa (0 to 0.36 psi and to 3,000 psi)

PPC4 Gas Pressure Controller/Calibrator

Wide rangeability and flexibility in a single controller. Ranges and accuracy classes can be selected to best suit the application.

- Up to two internal Quartz Reference Pressure Transducers (Q-RPTs) from absolute (vacuum) to 14 MPa (2000 psi)
- Full-scale standard class Q-RPTs provide 0.015 % full scale of selected range measurement uncertainty
- Standard class Q-RPTs provide 0.01 % reading measurement uncertainty
- Premium class Q-RPTs provide 0.008 % reading measurement uncertainty
- 4 ppm control precision as low as 1 kPa (0.15 psi) with large turndown
- Can use RPM4 reference pressure monitors as integrated remote pressure references for additional Q-RPT ranges

High pressure controllers/calibrators

8270A/8370A Modular Pressure Controllers/ Calibrators

Widest pressure calibration workload coverage with twice the speed of other high-pressure controllers.

- 8270A covers a wide range of vacuum to 44 MPa (6300 psi). It can be configured with ranges as low as 100 kPa (15 psi).
- 8370A covers a wide range of atmosphere to 107 MPa (15000 psi). It can be configured with ranges as low as 700 kPa (100 psi).
- Three levels of accuracy, 0.02 % FS, 0.01 % reading from 50 % to 100 % of span or 0.01 % reading from 30 % to 100 % of span
- Can be fully automated with COMPASS for Pressure software
- Optional contamination prevention system keeps valves clean and free from debris

PPCH Hydraulic Pressure Controller/Calibrator

Wide rangeability and flexibility with precise high pressure hydraulic control.

- Ranges to 200 MPa (30 k psi)
- One or two internal Q-RPTs with large range turndown
- High precision control over wide range
- Can use RPM4 reference pressure monitors as integrated remote pressure references for additional Q-RPT ranges

8270A/8370A

PPCH

Reference pressure indicators

RPM4 Reference Pressure Monitor

Premium measurement performance in a compact and rugged instrument.

- One or two independent quartz reference pressure transducer modules (Q-RPTs) with individual self-defense systems (SDS™) to prevent over-pressure
- Infinite Ranging and AutoRange™
- Differential measurement mode (channel 1- channel 2)
- Dedicated version available for air data ranges units and features, RPM4-AD
- Can be used as integrated external reference pressure transducer for PPC pressure controller/calibrators

7050 Series Digital Pressure Indicators

Unmatched precision with long term stability.

- Pressure ranges from 0 to 10 in H_2O and 0 to 1,500 psi (0 to 25 mbar and 0 to 100 bar)
- Model 7050i provides precision of 0.005 % of reading
- Model 7050 provides 0.003 % of full scale precision
- Active matrix color screen with enhanced navigation menus
- Model 7050LP provides precision of 0.005 % reading for very low draft pressure ranges

RPM4

7050

Piston gauges

PG7601 Absolute Gas Piston Gauge

Gas piston gauge with vacuum reference for defining absolute pressures.

- Gas pressure from 5 kPa to 7 MPa (0.7 psi to 1,000 psi) gauge or absolute pressure
- Onboard measurement of test conditions, and real-time calculation and display of test pressure
- Compatible with PPC4 pressure controller and AMH-38 Automated Mass Handler

PG7202 High Pressure Gas Piston Gauge

Gas piston gauge with oil-lubricated piston-cylinder for operation in high pressure gas or oil.

- Gas pressures from 100 kPa to 110 MPa (15 to 16,000 psig), oil pressures from 100 kPa to 200 MPa (15 to 30,000 psig)
- Gas operated, liquid lubricated for robust operation and low piston sink rates
- Onboard measurement of test conditions, and real-time calculation and display of test pressure
- Compatible with 8370A pressure controller and AMH-100 Automated Mass Handler

PG7302 Piston Gauge

Oil piston gauge for measurement of high gauge pressures.

- Oil pressures from 100 kPa to 500 MPa (15 psi to 75,000 psig)
- Onboard measurement of test conditions, and real-time calculation and display of test pressure
- Compatible with PPCH pressure controller and AMH-100 Automated Mass Handler

PG7000-AMH Automated Mass Handler

Automated Mass Handler for PG7000 Piston Gauges.

- Add to PG7000 Series piston gauge to fully automate pressure testing in gauge or absolute mode
- Designed and tested to provide years of reliable, maintenance free operation
- Reduce wear and possible mass value changes caused by manual mass handling


PG7601


PG7202


PG7302


PG7000-AMH

National Metrology Institute piston gauges

PG9607 Gas Piston Gauge

Fully automated primary pressure reference for absolute and gauge pressures to 500 kPa.

- Gauge and absolute pressures from 11 kPa to 500 kPa with a single piston-cylinder
- Large diameter 50 mm piston-cylinder with improved geometry allows direct traceability to dimensional measurements with very low uncertainties

PG9602 Gas Piston Gauge

Fully automated primary pressure reference for absolute and gauge pressures to 11 MPa.

- Gauge and absolute pressures from 10 kPa to 11 MPa
- Up to 100 kg mass load under vacuum bell jar for large turndown and overlap of piston-cylinder ranges


PG9607/ PG9602

Manual pressure generation and control

3990 Gas Pressure Control Pack

Precise, manual absolute and gauge pressure control for gas piston gauges and indicators.

- Models from vacuum to 7 MPa and 20 MPa (1,000 psi and 3,000 psi)
- Self-contained for intuitive, easy use

GPC1 High Gas Pressure Controller

Precise, assisted manual control for high pressure gas piston gauges and indicators.

- Models to 70 MPa and 110 MPa (10 k psi and 16 k psi)
- Precise control to full pressure with simple, ergonomic push-button operation

MPG2 Hydraulic Pressure Generator/Controller

Precise, manual control for hydraulic piston gauges and indicators.

- Models to 100 MPa and 200 MPa (15 k psi and 30 k psi)
- Self-contained for intuitive and easy generation and precise control to full pressure

OPG1 Hydraulic Pressure Generator/Controller

Precise, assisted manual control for hydraulic piston gauges and indicators.

- Pressure to 200 MPa (30 k psi)
- Precise generation and control to full pressure with simple, ergonomic push-button

700HPPK Pneumatic Test Pump Kit

Generate 21 MPa (3,000 psi) easily in the field, without liquid contamination or the hazard of a pressurized gas cylinder.

- Generate and adjust pneumatic pressures up to 21 MPa (3,000 psi)
- Rugged, portable and stable enough to go anywhere—on any surface
- Reaches pressure in 20 seconds to full scale into a 30 cm^3 volume
- Detachable pressure adjustment system for adjusting pressure, connecting reference and test devices on bench and in the field, and isolating and venting pressure


OPG1


700HPPK


3990


GPC1


MPG2

Industrial deadweight testers


P3000

P3000 Pneumatic Deadweight Tester

High performance gas deadweight testers, with unique suspended piston design for vacuum calibration.

- 0.015 % of reading accuracy standard (0.008 % optional)
- 3 to 500 psi (0.2 to 35 bar) pressure
- Optional low range 0.03 to 1 bar vacuum (1 to 30 inHg)
- Integrated vacuum and pressure pump available to 2 MPa (300 psi)


P3100

P3100 Hydraulic Deadweight Tester

Highly accurate oil deadweight tester, with quick and easy-to-use single and dual piston deadweight models.

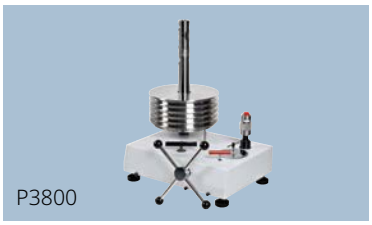
- Pressure ranges to 140 MPa (20 k psi, 1400 bar)
- 0.015 % of reading accuracy standard (0.008 % optional)
- Built-in pressure generation and adjustment
- Single or dual piston formats


P3200

P3200 Hydraulic Deadweight Tester

Hydraulic deadweight tester specially designed to use water as a test medium.

- Pressure ranges to 70 MPa (10 k psi, 700 bar)
- 0.015 % of reading accuracy standard (0.008 % optional)
- Built-in pressure generation and adjustment is standard
- Single or dual piston formats
- Water media


P3800

P3800 Hydraulic Deadweight Tester

High performance and simplicity for very high pressure hydraulic calibration.

- Pressure ranges to 400 MPa (60 k psi, 4,000 bar)
- 0.02 % of reading accuracy standard (0.015 % optional)
- Includes hand pump and intensifier for generating and adjusting high pressures

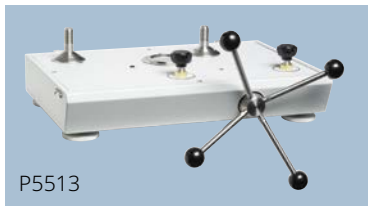
Pressure comparators


P5510

P5510 Pneumatic Pressure Comparator*

Precise, cost effective solution for checking pressure measuring instruments to 300 psi (20 bar).

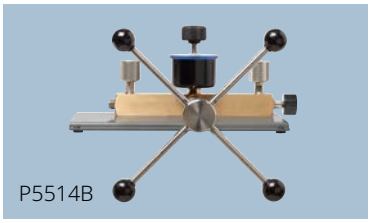
- Dual pressure/vacuum capability
- Pressure to 21 MPa (300 psi, 20 bar)
- Vacuum from 0 to 80 kPa (0 to 24 inHg, 800 mbar)
- Built-in pressure and vacuum generation


P5513

P5513 Pneumatic Pressure Comparator*

Precise, cost effective solution for checking pressure measuring instruments to 3,000 psi (210 bar).

- Pressure range 0 to 21 MPa (3 k psi, 210 bar)
- High pressure pneumatic operation
- Screw press for fine pressure adjustments
- High quality needle valves for fine control


P5514B

P5514B and P5515 Series Hydraulic Pressure Comparators*

Quick and easy solutions for checking pressure measuring instruments to 10,000 psi (700 bar).

- Compatible with a wide range of fluids
- P5514 Test Pump generates pressures to 70 MPa (10 k psi, 700 bar)
- P5515 Test Pump generates pressures to 140 MPa (20 k psi, 1,400 bar)
- P5515 has a built-in hand pump for system priming and large volume applications


P5515

***** Can be used with the 2700G Reference Pressure Gauge to provide a complete calibration solution

Pressure calibrators

E-DWT-H Electronic Deadweight Tester

A digital alternative to the traditional dead-weight tester.

- Set and measure pressure precisely without limitation of mass loading resolution
- Pressure measurement is insensitive to local gravity and orientation
- One year uncertainty of ± 0.02 % of reading
- Run onboard test routines and store calibration data for review and export to a PC

2700G Series Reference Pressure Gauges

Best-in-class measurement performance in a rugged, easy-to-use, economical package.

- Precision pressure measurement from 100 kPa (15 psi) to 70 MPa (10,000 psi)
- Accuracy to 0.02 % of full scale
- Easy-to-use, rugged construction for reliable performance
- Combine with the 700PTPK or 700HTPK pump kits for a complete portable pressure testing solution for up to 4 MPa (600 psi) with the PTP-1 pneumatic pump and up to 70 MPa (10,000 psi) with the HTP-2 hydraulic pump
- Combine with the P5510, P5513, P5514, or P5515 Pressure Comparators for a complete bench top pressure calibration solution
- Test port is 1/4 NPT Male.
  1/4 BSP and M20 X 1.5
  adapters are included standard
- USB communications cable and universal power supply included standard

Air data calibration

7750i Air Data Calibrator

Air data test set with unequalled precision and long term stability and superior pressure control technology.

- High accuracy, RVSM compliant
- Accuracy to ± 2 feet, 0.02 knots
- True differential sensor for airspeed (Qc)

RPM4-AD Reference Pressure Monitor

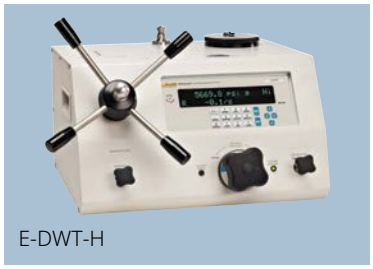
Specialized pressure indicator for the absolute and differential pressure ranges in air data instruments.

- Fixed wing and rotary wing range versions
- True Pt, Ps, Qc operation

Pressure calibration systems

Custom Pressure Calibration Systems

Engineered custom systems integrate standard Fluke Calibration products into a complete system based on the user's specific requirements. These are often multi-range systems that include pressure generation and supply accessories, data acquisition hardware and software and/or test instrument connection manifolds. Custom systems include but are not limited to turn-key pressure calibration rack systems, portable calibration carts and automated pressure calibration bench systems.


E-DWT-H

7750i

2700G

RPM4-AD

Gas flow calibration

Gas flow calibration refers to the calibration of a flow sensing device such as a flow meter or flow controller by comparing its measurement against a flow measurement reference. Typically, the device, or device under test (DUT), is pneumatically connected in series with the flow reference so they measure the same gas flow; then the indications of the two devices are compared.

molbloc™/molbox™ system components

Fluke Calibration's molbloc/molbox gas flow calibration system consists of molbloc flow elements that connect to a flow terminal (either molbox1+ or molbox RFM) so the terminal can use pressure and temperature measurements from around the flow element, combined with gas properties and prior molbloc calibration data, to determine and display the gas flow rate.

Mass flow vs. volume flow

A frequent topic of discussion and confusion surrounding gas flow measurement is that of mass flow versus volume flow. Flow meters and flow units used for flow measurements are used to measure and express either the amount of volume of gas or the amount of mass (number of moles or molecules) passing through the device. When performing a gas flow calibration, it is nearly always beneficial to use a mass flow reference measurement, because the mass flow rate stays constant throughout a flow system in steady state. Since gas is compressible, the volume flow rate varies at different locations in a flow system due to changes in density caused by changing temperature and pressure. Fluke Calibration molblocs are mass flow standards, which allow reliable comparisons to other flow devices. The molbox terminal is also able to calculate and express the flow rate in terms of volume flow at another point in the system to allow testing of volume-based devices.

Gas flow standards

molbox1+ Flow Terminal

0.125 % of reading—lowest uncertainty for gas flow calibration.

- Allows coverage of flow range from less than 1 sccm to over 5000 slm with a single user interface and transportable system
- Real-time flow measurements makes adjusting analog flow devices fast and easy
- Perform fully-automated flow calibrations using molbox terminal with COMPASS for Flow software
- Updated design

molboc-L Laminar Flow Element

Laminar flow elements for flow from 1 sccm to 100 slm.

- Traceable to primary gravimetric mass flow measurements
- Multiple gases supported
- Useable with existing molbox1+ and molbox RFM mass flow terminals and COMPASS software
- Integrated filter to protect against contamination
- Integral gas temperature conditioning and measurement
- No moving parts that cause pressure/flow fluctuations or threaten reliability

molbloc-S Sonic Nozzle Flow Element

Sonic nozzle based molblocs for gas flow up to 5,000 slm.

- Covers ranges up to 5,000 slm in N2 and air
- Multiple gases supported
- Useable with molbox1+, or existing molbox1 and molbox RFM mass flow terminals and COMPASS software
- Proven critical flow venturi (sonic) nozzle operating principle traceable to primary gravimetric flow measurements


molbox1+


molboc-L


molbloc-S

molstic Mounting Systems

Used to conveniently mount and protect molbloc elements, connect to devices under test and provide flow and pressure control.

molstic-L used for molboc-L mass flow elements.

- Quick connector input
- 2 micron (0.5 micron for low flow) filter to protect the downstream components
- Adjustable regulator protects the molbox transducers

molstic-S used for molbloc-S mass flow elements.

- Available in 1/2 inch or 1/4 inch system plumbing sizes
- Integrated flow shut-off/ metering valves

Gas Flow Automation Accessories

MFC-CB™ Control Box

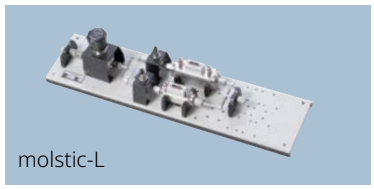
Stand-alone unit for setting/ reading analog mass flow controllers (MFCs) and mass flow meters (MFMs).

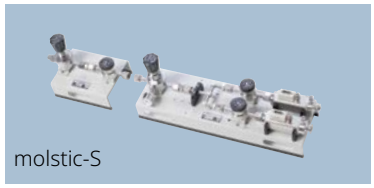
- Set and read 0 to 5 V or 4 to 20 mA on two (2) channels
- Complete front panel local control and remote operation via RS-232 and IEEE-488 interfaces

MFC Switchbox™

Supplies power and switches between up to five MFCs or MFMs on one molbox1+ or MFC–CB channel.

- Duplicates MFC channel without switching cables


molstic-L


molstic-S


MFC-CB™


MFC Switchbox

Calibration software

Calibration software automates all or part of a calibration process via computer control. Calibration software also allows users to manage their calibration and asset data.

If you've heard about the benefits of automated calibration and asset management but are puzzled about how everything fits together, call on Fluke Calibration for solutions.

Other types of calibration software from Fluke Calibration include data-logging software, software that generates calibration constants and references, and various add-on and plug-in software programs.

Why use calibration software?

Using software to automate all or part of the calibration process offers several important advantages.

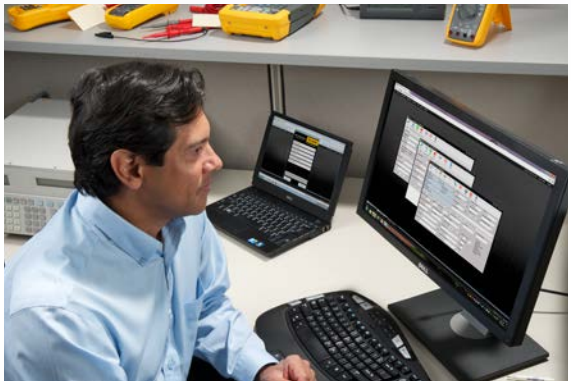
Consistency—Software automation ensures that calibrations can be performed exactly the same way by multiple operators in multiple locations. This improves the quality of results, reduces errors and standardizes methods.

Efficiency—Automating the calibration process allows technicians to set up tests and then go on to perform other tasks, making more efficient use of their time. Calibrations are typically completed much more quickly, saving time and money. If the software is capable of calibrating multiple devices under test simultaneously, automation increases throughput as well.

Documentation and reports—Calibration automation software typically includes features for documenting calibration procedures, storing calibration data, and producing reports, allowing users to eliminate paper records or spreadsheets.

Because Fluke Calibration software does such a good job of keeping accurate records of all parts of the calibration process, it also supports compliance with a wide variety of quality standards.

Product highlights



MET/TEAM™ Test Equipment Asset Management Software

MET/TEAM software is a powerful, flexible, and scalable calibration management software solution for managing your calibration assets. Designed by metrologists for metrology, it is ideal for calibration professionals who need to manage workflow through the calibration laboratory.

- Browser-based software enables access that is convenient, yet secure
- Fully featured for tracking and managing assets
- Fully integrated with the Runtime function of industry leading MET/CAL software
- Replaces MET/TRACK as the recommended data-base engine for MET/CAL software
- Popular Microsoft SQL server database for reliable, affordable, non-proprietary data storage
- Workflow management
- Highly customizable fields and labels
- Shortcuts (quick links) for easy navigation
- Promotes quality processes to support accreditation
- Customizable reports with Crystal Reports Professional
- Automated email alerts and recall escalation
- Mobile module for on-site calibration
- Customer web portal to allow read-only access for remote customers
- Commerce module for quoting, billing, and contract pricing
- Designed for metrology by metrologists
- Backed by Fluke Calibration, expert in calibration instrumentation and software
- Collect and store manual calibration data

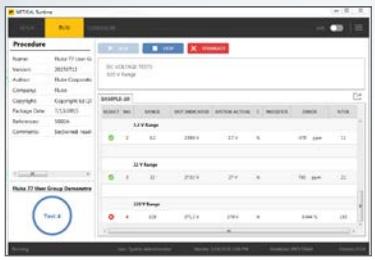
MET/CAL™ Calibration Management Software

MET/CAL software automates the calibration process to help you manage your workload more efficiently and consistently. The MET/CAL suite of applications includes MET/CAL software, the industry leader for automated calibration; plus MET/TEAM software for asset management.

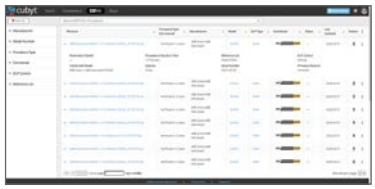
An updated Runtime interface offers better visibility into the calibration process. An updated Procedure Editor interface lets users view test results in a graphical user interface.

MET/CAL software provides you with the tools you need to:

- Perform automated calibration on all kinds of test and measurement tools and equipment, including DC/LF, RF and microwave instruments
- Create, edit, test, and document calibration procedures, quickly and easily
- Configure and report a wider range of measurement uncertainty parameters and include verification data to provide an audit trail and support further analysis
- Track asset information including calibration and maintenance history and status, traceability, users, customers, and location
- Analyze and report asset information; produce customized printed certificates and reports.
- Make data available to other corporate systems
- Import asset and calibration data into MET/CAL software
- Help meet the requirements of quality standards like ISO 9000, ISO/IEC 17025, NRC 10 CFR, ANSI Z540.3, and others



MET/CAL



Warranted Procedures for MET/CAL

Electrical/RF calibration software

MET/CAL™ Calibration Software

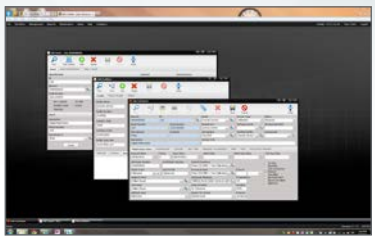
The complete solution for automating calibration processes plus managing and reporting measurement assets.

- Perform fast, repeatable, and powerful calibration
- Full storage of calibration data
- Rich reporting capabilities
- Configure and report a wider range of measurement uncertainty parameters

Warranted Procedures for MET/CAL

Fully tested, ready-to-go procedures designed to satisfy your needs.

- Optional calibration procedures for MET/CAL Calibration Software
- Warranted by Fluke Calibration to produce valid calibrations on the intended device under test (DUT) for the specified model and revision level
- These procedures automate the calibration process under MET/CAL control



MET/TEAM

Calibration asset management software

MET/TEAM™ Test Equipment Asset Management Software

Manage more workload with less work with MET/TEAM software.

- Browser-based calibration asset management software
- Fully integrated with MET/CAL Software
- Microsoft SQL Server database
- Highly customizable
- Email automation
- On-site calibration
- Work flow management
- Pricing/billing/invoicing
- Customer web portal
- Installation and training services

MET/CONNECT™ Calibration Integration Software

MET/CONNECT™ is the hub of a fast-growing community of mainline calibration software providers. These companies have partnered with Fluke Calibration to support MET/CAL automation. Whatever calibration management system you use, MET/CONNECT unlocks calibration and workflow automation in your lab.

MET/CONNECT partners:

- Indysoft
- AssetSmart
- Qualer
- MET/TEAM™

MET/SUPPORT

Software support programs

MET/SUPPORT℠ Gold

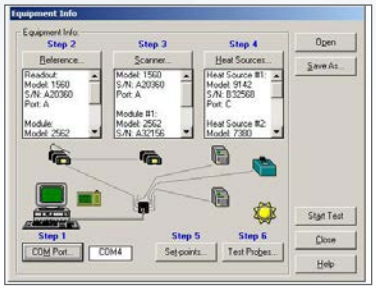
Annual support programs for MET/CAL and MET/TEAM software. These premier support services help you maximize your software investment.

- Premium support and services to help you maximize productivity with MET/CAL and MET/TEAM software
- Access to warranted procedure library
- Prioritized technical support
- Software updates and upgrades
- Priority web content
- Discounts on a variety of services

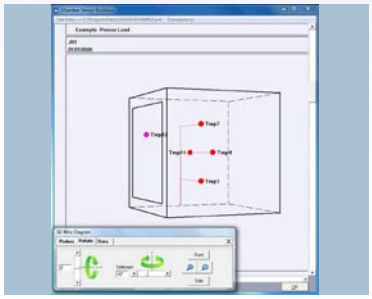
Software Training and Services

A range of services to help you maximize your investment in calibration software.

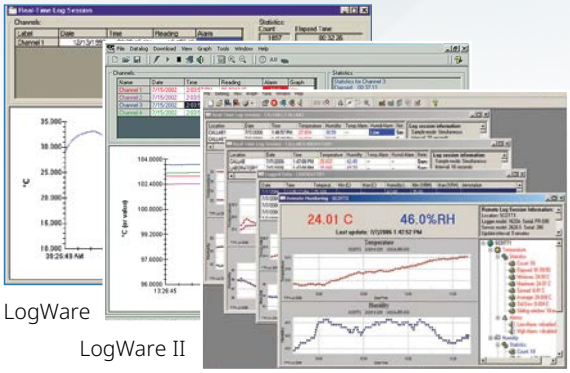
- MET/TEAM software installation and startup
- MET/TEAM data migration and import
- Classroom or onsite training classes:
  - **MET/CAL procedure writing**
  - **Advanced procedure writing**
  - **MET/TEAM Asset Management**
  - **Crystal Reports Writing**
- Custom MET/CAL procedures
- Custom software services



9938 MET/TEMP II Temperature Calibration Software v5



TQSoft and TQAero Thermal Validation Software



LogWare

LogWare II

LogWare III

Temperature calibration software

9938 MET/TEMP II Temperature Calibration Software v5

New version of the proven solution for automated temperature calibration.

- Compatible with Windows 7 and 8 operating systems
- Adds support for 9190A Field Metrology Well and 9118A Thermocouple Furnace
- Calibrate PRTs, SPRTs, thermistors, thermocouples, and even liquid-in-glass (LIGs), bimetallic thermometers, and connected sensors that can't be attached to a readout
- Supports multiple temperature sources and reference probes in the same test for faster calibration and extended test range

TQSoft and TQAero Thermal Validation Software

For FDA 21 CFR Part 11 and AMS 2750 Compliant Data Collection.

- Support for Fluke 2638A and 1586A, for enhanced data collection and reporting in regulated industries
- Easy menu system and toolbar
- Test equipment preparation and sensor calibration
- Data security, audit trail, and compliance reports

Log*Ware*

Turn a Fluke Calibration single-channel handheld or 1502A/1504 readout into a real-time data logger.

- Collects real-time data
- Calculates statistics and displays customizable graphs
- Allows user-selected start times, stop times and sample intervals

Log*Ware II*

Turn any Fluke Calibration multi-channel thermometer readout into a real-time data logger.

- Collects real-time data using Fluke Calibration multi-channel readouts
- Calculates statistics and displays customizable graphs
- Allows user-selected start times, stop times and sample intervals

Log*Ware III*

Remotely monitor and log a virtually unlimited number of concurrent log sessions into a central data repository.

- Up to two temperature and two humidity inputs for each DewK
- Customize your graph trace color, alarms, and statistics as you go

Pressure/Flow calibration software

COMPASS™ for Pressure

Universal platform for automating pressure calibration.

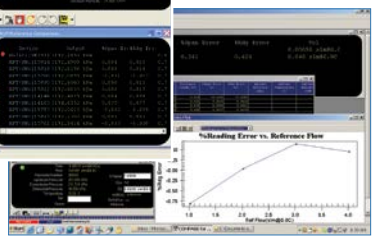
- Integrated piston gauge support
- Runs complete automated calibration sequences
- Supports multiple units under test
- Automates virtually any pressure standard or device under test

COMPASS for Flow

Macro-enabled mass flow calibration software package.

- Fully customizable
- Supports non Fluke Calibration flow references
- Performs complex real time flow computations, and allows you to alter test scenarios based on data collected

COMPASS for Pressure



COMPASS for Flow

Fluke Premium Care

For Fluke 5560A, 5550A, 5540A Multi-Product Calibrators

Coverage to reduce unexpected downtime, provide best calibration accuracy with priority access to Fluke experts, and increase the value of your Fluke Calibration instrument.

Expedited calibration and repair

First on-bench service, expedited shipping and dedicated technical support

Reduce downtime by a week

Access to Fluke's metrology expertise

Post-calibration check conversations on your equipment

Increase confidence in your measurements

Annual instrument calibration and updates

Available primary-level 17025 accredited calibrations

Reduce your risks and uncertainties

Maximize your return on investment

Remove worries about unexpected expensive repairs

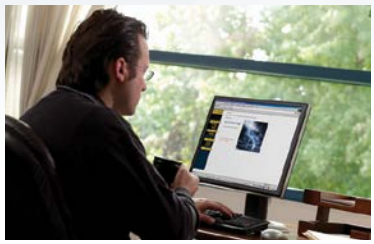
Maximize your savings

Get the best performance from your instruments

- Fluke maintains the highest quality standards for calibration and repair, because our world class metrologists, calibration technicians, and facilities design and perform the services.
- We don't cut corners! We check every calibration point to ensure you get the best performance from your instruments.
- Get free product updates for every product covered by Fluke Premium Care
- One-, two-, three-, four- and five-year durations are available.

Get peace of mind for years — save money too

- Opportunities for additional savings:
  - Save 10 % with the purchase of a covered instrument
  - Save 15 % on any out-of-plan service charges for a covered product
  - Save 20 % off any Fluke Calibration scheduled training course
  - Unexpected repairs can be costly. Ask your Fluke Calibration sales representative for additional information about how Fluke Premium Care can maximize your return on investment



Register your Fluke Calibration product online

Visit **us.flukecal.com/register-product** to register your product today!

Authorized Fluke Calibration Service Centers

Fluke Calibration offers calibration and repair services and support through our flagship metrology laboratories and service partners worldwide. To find the best solution for your calibration product you can visit **us.flukecal.com/service-centers**, call us at **877-355-3225**, or email us at **service@flukecal.com**.

Training

Calibration and metrology training from Fluke Calibration can help you and your staff become more knowledgeable in a wide variety of disciplines. Instructors are experts who work in electrical, temperature, pressure and flow calibration, and who really want to help you learn the foundation and techniques of metrology that you can put to immediate use in your workplace. Fluke Calibration offers introductory, intermediate, and advanced level courses in a variety of formats to meet your needs.

Instructor-led classroom courses

Our instructor-led courses cover a variety of metrology topics and range from two to five days in length. Held in various locations around the world, training from Fluke Calibration is a great way to maximize your investment in your calibration product.

Instructor-led web-based training

Our instructor-led web-based trainings offer the same great access to Fluke Calibration software experts, with the added benefit of not having to travel. Instructor-led web-based trainings are designed to fit into your schedule, without disrupting your workflow. Courses are set up in anywhere from one to five parts, two hours each, held on consecutive days.

Self-paced online training

Our self-paced calibration and metrology training courses were developed by technical experts in the metrology community using proven instructional design components. At the start of each module, a brief tutorial describes how the course is laid out. The learning objectives are clearly stated. Topics are selected from easy-to-navigate menus and sub-menus. Embedded questions are presented frequently to increase retention. Engaging graphics, photos, formulas and tables support text material. A final post-test provides proof of competency. Tests are shuffled after each use. Most importantly, a certificate of completion satisfies documentation requirements.

Self-paced training tools

In addition to self-paced online training, Fluke Calibration offers additional self-paced training tools for dc/low frequency metrology. Fluke Calibration offers the only comprehensive text book on dc/low frequency metrology, *Calibration: Philosophy in Practice, Second Edition*. It covers real world concepts and applications, and is designed and written for the working technician.

On-site training

Fluke Calibration instructor-led courses may also be taught at your facility. If you have a large number of students, or if the material you wish to discuss is considered confidential, you may find On-Site Training an attractive alternative. Contact your local Fluke Calibration representative to discuss specific requirements and arrangements, or email training@flukecal.com for a Fluke Calibration representative to contact you.

For up-to-date course schedules, pricing and training resources visit: **us.flukecal.com/training**

Installation and training supplemental services

Fluke Calibration offers expert consulting to help you configure and use your calibration products as productively and cost-effectively as possible. We can help:

- Minimize downtime
- Make sure your equipment runs efficiently
- Confirm that systems are operating properly
- Train you and your staff at your site with your newly acquired Fluke equipment.

FLUKE®
Calibration

Fluke Calibration. *Precision, performance, confidence.*™

Electrical | RF | Temperature | Humidity | Pressure | Flow | Software

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