

**FLUKE**®

**New!**

**Look  
inside for:**

**Loop Calibrators**

**Pressure Calibrators**

**Temperature  
Calibrators**

**Multifunction  
Process Calibrators**

**Intrinsically Safe  
Calibrators**

**Documenting  
Process Calibrators**

**ProcessMeter  
Calibration Tools**

**Industrial Test Tools**

**Hart Scientific  
Calibrators**

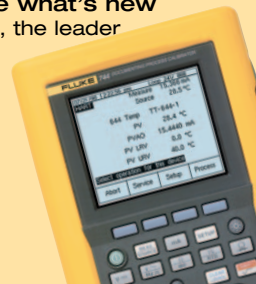
**Thermometers**

# Process Tools Selection Guide

for industrial instrumentation and electrical technicians

2005/2006

**Plus** see what's new  
from Fluke, the leader  
in process  
calibration  
tools



# What's New from Fluke



## Fluke 63, 66 and 68 – pistol grip infrared thermometers

The new Fluke 63, 66 and 68 pistol grip thermometers offer superb optics and accuracy for quickly measuring temperature in hard-to-reach, hot, rotating, or dangerous situations.

**See page 17 for more information**



## Fluke 710 Series – temperature, pressure and process calibrators

This upgraded line of handheld tools, designed to improve process technicians' productivity, includes improved source and measurement performance, better battery life with configurable power settings, an upgraded protective holster, flash firmware upgradeability, and a variety of other device-specific enhancements.

**See page 18 for more information**

## Fluke Ti30™ Thermal Imager

The Fluke Ti30™ Thermal Imager includes all necessary accessories, unlimited-use InsideIR software, and two days of professional thermography training, making it the best complete imaging solution available. It is an ideal tool for process troubleshooting and for predictive maintenance in a process environment.

**See page 37 for more information**



## Fluke 433 and 434 – power quality analyzers

The Fluke 433 and 434 three-phase power quality analyzers help you locate, predict, prevent and troubleshoot problems in power distribution systems. These easy-to-use handhelds are a "must have" for any person who maintains or troubleshoots three phase distribution.

**See page 38 for more information**

The Fluke 433 and 434 three-phase power quality analyzers help you locate, predict, prevent and troubleshoot problems in power distribution systems.

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**See page 38 for more information**

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## Fluke 744 Documenting Process Calibrator-HART

The newly upgraded model features additional HART calibration and configuration support for Micro Motion Coriolis Mass Flow Devices (models 9712, 9701, 9739, 2700, 2700\_IS) as well as improved support for controlling Hart Scientific Dry Blocks (models 9009, 9100, 9102, 9103, 9140, 9141, 9150) and Hart Micro-Baths (models 6102, 7102, 7103, 9011, 9105, 9107, 9122A, 9132, 514).

**See page 4 for more information**

## Fluke intrinsically safe products – a full line of IS tools

Fluke offers a full line of intrinsically safe tools to help keep you and your co-workers safe while working in potentially explosive environments. The NEW 725Ex Multifunction Calibrator along with the 718Ex pressure calibrator, the 707Ex Loop Calibrator and eight 700Ex pressure modules offer a complete solution to get your job done safely in hazardous environments.

**See page 13 for more information**



# Process Tools Selection Guide

FLUKE®

	Loop Calibrator	Pressure Calibrators	Temperature Calibrators	Multifunction Process Calibrator	Intrinsically Safe Calibrators	Documenting Process Calibrators	ProcessMeter™ Test Tools
<b>Model</b>	<b>715</b>	<b>718</b>	<b>724</b>	<b>725</b>	<b>725Ex</b>	<b>744</b>	<b>789</b>
<b>Measure</b>							
V dc	25 V		30 V	30 V	30 V	300 V	1000 V
V ac (true-rms)							1000 V
Resistance			3200 Ω	3200 Ω	3200 Ω	11 kΩ	40 MΩ
A dc	24 mA		24 mA	24 mA	24 mA	110 mA	30 mA, 1 A
A ac							•
Frequency				10 kHz	10 kHz	50 kHz	20 kHz
Pressure		100G: 100 psig/ 7 bar <sup>2</sup> ; 30G: 30psig/ 2 bar <sup>2</sup>		• <sup>1</sup>	• <sup>5</sup>	• <sup>1</sup>	
Temperature: RTDs			7 types	7 types	7 types	8 types	
Temperature: TCs			12 types	12 types	10 types	11 types	
<b>Source/Simulate</b>							
V dc	20 V		10 V	10 V	10 V	15 V	
Resistance			3200 Ω	3200 Ω	3200 Ω	11 kΩ	
mA dc/% scale	24 mA			24 mA	24 mA	22 mA	24 mA
mA source; auto step, auto ramp	•			•	•	•	•
Frequency				10 kHz	10 kHz	50 kHz	
Temperature: RTDs			7 types	7 types	7 types	8 types	
Temperature: TCs			12 types	10 types	10 types	13 types	
<b>Record</b>							
Min/Max		•				•	•
Hold		•					•
As Found/As Left results							
Log data							
Upload data to PC							
Remote operation				•			
<b>Features</b>							
24 V loop supply	•	•	•	•	12 V	•	•
Hart communication						•	
Integrated hand pressure pump		•					
Intrinsically safe (ATEX)					•		
Warranty	3 years	1 year	3 years	3 years	1 year	3 years	3 years
NIST traceable certification	•	•	•	•	•	•	
<b>Accessories</b>	A/B	C	A/B	A/B			A/B
Pressure enabled <sup>4</sup>		•		•	•	•	
<b>See Catalog Page</b>	15	18	8	8	13	4	10

1. Fluke 700 Pressure Modules required. 2. Either the internal sensor or a Fluke 700 Pressure Module may be used.

3. Accessories: A. Compatible with LockPak B. Compatible with ToolPak C. Accepts hanging straps from ToolPak D. Optional accessories

4. Fluke Process Calibrators in this guide displaying the Pressure Enabled symbol display readings from the 700 Series Pressure Modules.

5. Fluke 700PEX Pressure Module required.

# Documenting Process Calibrators



## 744 Documenting Process Calibrator. *Communicate, calibrate and configure HART instrumentation*

The Fluke 744 offers the ability to perform every day calibration, maintenance, and troubleshooting of HART® instrumentation with just one tool.

### With one powerful tool, you can:

- Monitor, control and calibrate HART instrumentation with integrated communication functions.
- Generate precision electrical, temperature or pressure signals for analog stimulus or sensor simulation.
- Simultaneously measure electrical, temperature or pressure signals from transmitter output.
- Interrogate HART devices to determine type, manufacturer, model and tag-ID.
- Read HART PV, smart transmitter digital output.
- Make field adjustments to ranging, damping and other top-level configuration settings.
- Change/assign the tag of HART transmitter smart transmitters.
- Re-configure HART temperature sensor (e.g., TC to RTD).
- Perform HART sensor trim and output trim.
- Perform loop test with simultaneous analog and digital mA readout.
- Control selected Hart Scientific Dry Blocks.



### Versatile HART protocol support (744 only)

The 744 supports these classes of instructions:

- Universal commands – such as “read manufacturer and device type,” “read primary variable (PV),” or “read current output and percent of span”
- Common practice commands – such as “read multiple variables,” “set damping time,” or “loop test”
- Device-specific commands – functions unique to a particular field device, like “sensor trim” or output trim

### Recommended accessories – 741B, 743B and 744 calibrators



**C789**  
Meter and  
Accessory Case  
See page 42



**80PK-8**  
Pipe Clamp  
Temperature  
See page 40



**Fluke-700Pxx**  
Pressure Modules  
See page 7



**80PK-25**  
SureGrip Piercing  
Temperature Probe



**TL220**  
SureGrip Industrial  
Test Lead Set

### 744 upgrades available

Fluke periodically releases new internal software for the Fluke 744. These upgrades include:

- New revisions of previously supported instruments.
- Device-specific command support for new instruments.
- New HART communication capability.

For details of the latest upgrade, see [www.fluke.com/744upgrade](http://www.fluke.com/744upgrade)

For more detailed information, go to [www.fluke.com/744](http://www.fluke.com/744)

**Summary one year specifications for Fluke 741, 743B and 744 calibrators**

Measure		Source	
Range (full scale)	Accuracy (% of reading + % of full scale)	Range (full scale)	Accuracy (% of reading + % of full scale)
<b>Volts dc</b>			
110.000 mV dc	0.025 % + 0.015 %	110.000 mV	0.01 % + 0.005 %
1.10000, 11.0000 V dc	0.025 % + 0.005 %	1.10000 V	0.01 % + 0.005 %
110.000, 300.00 V dc	0.05 % + 0.005 %		
<b>Volts ac</b>			
V ac, 20 to 40 Hz	2 % + 10 counts		
V ac, 40 to 500 Hz	0.5 % + 5		
V ac, 500 to 1 kHz	2 % + 10		
V ac, 1 kHz to 5 kHz	10 % + 20		
<b>mA</b>			
30.000 mA dc	0.01 % + 0.015 %	Source 22.000 mA	0.01 % + 0.015 %
110.00 mA dc	0.01 % + 0.015 %	Simulate 22.000 mA	0.02 % + 0.03 %
<b>Resistance</b>			
11.000 Ω	0.05 % + 50 mΩ	11.000 Ω	0.01 % + 20 mΩ
110.00 Ω	0.05 % + 50 mΩ	110.00 Ω	0.01 % + 40 mΩ
1.1000 kΩ	0.05 % + 0.5 Ω	1.1000 kΩ	0.02 % + 0.5 Ω
11.000 kΩ	0.1 % + 10 Ω	11.000 kΩ	0.03 % + 5 Ω
<b>Frequency</b>			
1.00 to 109.99 Hz	0.05 Hz	0.00 to 0.99 Hz	0.01 Hz
110.0 to 1099.9 Hz	0.5 Hz	11.00 to 109.99 Hz	0.1 Hz
1.100 to 10.999 kHz	5 Hz	110.0 to 1099.9 Hz	0.1 Hz
11.00 to 50.00 kHz	50 Hz	1.100 to 21.999 kHz 22.000 to 50.000 kHz	2 Hz 5 Hz
<b>Temperature</b>			
10 thermocouples	0.3 °C		0.2 °C
11 RTDs*	0.3 °C		0.1 °C

\*Addresses pulsed transmitters and PLCs with pulses as short as 1 ms. For pressure specifications, see page 7.

**General specifications for Fluke 741, 743B and 744 calibrators**

**Loop power:** Selectable, 24 V or 28 V; 22 mA max

**Environmental:** 741/743 specifications apply from +18 °C to +28 °C

**Operating temperature:** -10 °C to 50 °C (typical specs to -20 °C) Pressure modules are totally compensated and specs apply 0 °C to 50 °C

**Storage temperature:** -20 °C to 60 °C

**Safety:** Complies with CAN/CSA C22.2 No. 1010.1-92, ANSI/ISA S82.01-1994, UL3111 and EN610-1:1993. 300 V, Over-voltage Category II

**Size/weight:** 130 x 236 x 61 mm (5.1 x 9.3 x 2.4 in), weight 1.4 kg (3 lbs, 1 oz)

**Battery:** Internal battery pack NiCd, 7.2 V, 1700 mAh; NiMH (744 only) 7.2 V, 3500 mAh, typical usage, greater than 8 hours

**Warranty:** Three years

**Ordering information**

**Fluke-741B Documenting Process Calibrator**

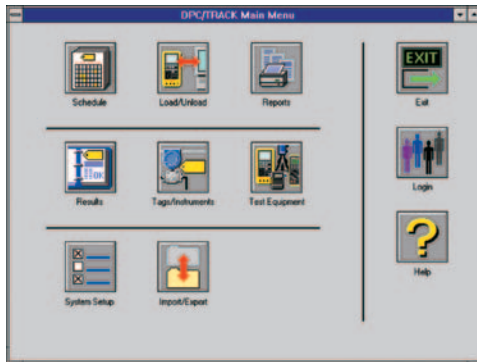
**Fluke-743B Documenting Process Calibrator**

**Fluke-744 Documenting Process Calibrator**

Each calibrator includes TL224 Industrial Test Leads (2 sets), AC220 Test Clips (2 sets), TP220 Test Probes (1 set), BP7217 Battery Pack, BC7217 Battery Charger, instruction manual, NIST traceable calibration certificate with data, three-year warranty, serial port cable (743B and 744 only), DPC/TRACK Sample Version with free PC communication utility software (743B and 744 only). With the 744 you also get a HART communication cable, HART Users Manual and a NiMH battery (instead of NiCad).



# 700SW DPC/TRACK Software



Fluke DPC/TRACK is an easy-to-use, single-user, entry-level instrumentation manager. For more sophisticated software, you may wish to investigate products from one of Fluke's software partners below.

**For more detailed information,  
go to [www.fluke.com/software](http://www.fluke.com/software)**

DPC/TRACK Software is a specialized database that can help you manage your instrumentation and address the documentation requirements of quality programs and regulations. With DPC/TRACK and a 743 or 744 DPC you can:

- Manage your inventory of tags and instruments.
  - Schedule tag IDs for calibration.
  - Create tag specific procedures, including instruction on how to locate an instrument and how to safely isolate and connect.
  - Load those procedures to your DPC.
  - Select and execute automated as found/as left procedures in the field, automatically capturing the results data.
  - Include comments as to Reasons for Work, Problems Found, and Actions taken (743 and 744 only).
  - Unload your results to a PC.
  - Print a selection of pre-formatted reports.
  - Examine the calibration histories of your tags and instruments.
  - Import instrument data and procedures as ASCII text.
  - Export instrument data, procedures, and results as ASCII text.
- DPC/TRACK operates in the same languages as the DPCs: English, French, German, Italian, and Spanish.

## 6 Ordering information

### Fluke-700SW DPC/ TRACK Software

Supports Fluke 743 and 744 Documenting Process Calibrators and include software CD-ROM, instruction manual, serial port cable and DB9 to DB25 adapter.

**Honeywell LovelandDocuMint**

**On Time  
Support**

**Prime  
Technologies**



**Cornerstone**  
*The Open Platform for Instrument Management*



AMS from Emerson Process  
Management,  
(formerly Fisher-Rosemount).



PRM (Plant Resource  
Manager) from Yokogawa  
Electric Corporation.

**beameX**

**INTERGRAPH**

# 700 Series Pressure Calibration Modules

FLUKE®



## Best accuracy available in handheld pressure modules

- 0.025 % reference uncertainty
- Rugged, chemical resistant packaging
- Temperature compensated using proprietary micro-technology linearized output
- Digital communication to calibrators, no analog losses or errors
- Broad selection of ranges

Models	Range/ resolution	Range (approx)/ resolution	Reference uncertainty (23 ± 3 °C)	Highside media	Low side media	Fitting material
<b>Differential</b>						
Fluke 700P00	1 in. H2O/0.001	0.25 kPa/0.0002	0.300 %	Dry	Dry	316 SS
Fluke 700P01*	10 in. H2O/0.01	2.5 kPa/0.002	0.200 %	Dry	Dry	316 SS
Fluke 700P02	1 psi/0.0001	6900 Pa/0.7	0.150 %	Dry	Dry	316 SS
Fluke 700P22	1 psi/0.0001	6900 Pa/0.7	0.100 %	316 SS	Dry	316 SS
Fluke 700P03	5 psi/0.0001	34 kPa/0.001	0.050 %	Dry	Dry	316 SS
Fluke 700P23	5 psi/0.0001	34 kPa/0.001	0.025 %	316 SS	Dry	316 SS
Fluke 700P04	15 psi/0.001	103 kPa/0.01	0.025 %	Dry	Dry	316 SS
Fluke 700P24*	15 psi/0.001	103 kPa/0.01	0.025 %	316 SS	Dry	316 SS
<b>Gage</b>						
Fluke 700P05*	30 psi/0.001	207 kPa/0.01	0.025 %	316 SS	N/A	316 SS
Fluke 700P06*	100 psi/0.01	690 kPa/0.07	0.025 %	316 SS	N/A	316 SS
Fluke 700P27*	300 psi/0.01	2070 kPa/0.1	0.025 %	316 SS	N/A	316 SS
Fluke 700P07	500 psi/0.01	3400 kPa/0.1	0.025 %	316 SS	N/A	316 SS
Fluke 700P08	1000 psi/0.1	6900 kPa/0.7	0.025 %	316 SS	N/A	316 SS
Fluke 700P09*	1500 psi/0.1	10 M Pa/0.001	0.025 %	316 SS	N/A	316 SS
<b>Absolute</b>						
Fluke 700PA3	5 psi/0.0001	34 kPa/	0.050 %	316 SS	N/A	316 SS
Fluke 700PA4*	15 psi/0.001	103 kPa/	0.050 %	316 SS	N/A	316 SS
Fluke 700PA5	30 psi/0.001	207 kPa/	0.050 %	316 SS	N/A	316 SS
Fluke 700PA6	100 psi/0.01	690 kPa/	0.050 %	316 SS	N/A	316 SS
<b>Vacuum</b>						
Fluke 700PV3	-5 psi/0.0001	-34 kPa/0.001	0.040 %	316 SS	Dry	316 SS
Fluke 700PV4	-15 psi/0.001	-103 kPa/0.01	0.040 %	316 SS	Dry	316 SS
<b>Dual</b>						
Fluke 700PD2	±1 psi/0.0001	±6900 Pa/0.7	0.150 %	316 SS	Dry	316 SS
Fluke 700PD3	±5 psi/0.0001	±34 kPa/0.001	0.040 %	316 SS	Dry	316 SS
Fluke 700PD4	±15 psi/0.001	±103 kPa/0.01	0.025 %	316 SS	Dry	316 SS
Fluke 700PD5	-15/30 psi/0.001	-100/207 kPa/0.01	0.025 %	316 SS	N/A	316 SS
Fluke 700PD6	-15/100 psi/0.01	-100/690 kPa/0.07	0.025 %	316 SS	N/A	316 SS
Fluke 700PD7	-15/200 psi/0.01	-100/1380 kPa/0.1	0.040 %	316 SS	N/A	316 SS
<b>High</b>						
Fluke 700P29*	3000 psi/0.1	20.7 M Pa/0.001	0.050 %	C276	N/A	C276
Fluke 700P30	5000 psi/0.1	34 M Pa/0.001	0.050 %	C276	N/A	C276
Fluke 700P31	10000 psi/1	69 M Pa/0.007	0.050 %	C276	N/A	C276

\* Intrinsically safe version available for use with 718Ex and 725Ex.



Fluke Process Calibrators in this guide displaying this symbol are Pressure Enabled units and display readings from these Precision 700 Series Pressure Modules.

Each pressure module includes NIST traceable certificate, metric adapter and instruction sheet.

# Multifunction Calibrators



## Fluke 725 Multifunction Process and 724 Temperature Calibrators. Compact multifunction calibrators

The Fluke 725 and 724 Multifunction Calibrators are versatile, easy-to-use field calibrators. Use them to test and calibrate almost anything with:

- Easy-to-read measure/source backlit screens let you view input and output simultaneously
- Perform fast linearity tests with auto step and auto ramp features
- Power transmitters with internal loop supply
- Store frequently-used test setups for later use

### In addition, the 725 can:

- Measure pressure and frequency to test sensors and transmitters
- Source/simulate mA, frequency and pressure to calibrate transmitters
- Measure pressure using any of the Fluke 700Pxx Pressure Modules
- Source mA with simultaneous pressure measurement to conduct valve and I/P tests



### Fluke 725 and 724

Simultaneous Function Capability	Channel A	Channel B
24.000 mA dc	M	M or S <sup>(1)</sup>
24.000 mA dc with 24 V loop supply	M	
100.00 mV dc		M or S
30.000 V dc measure	M	
20.000 V dc measure 10.000 V dc source		M or S
3200 Ohms		M or S
T/C: J, K, T, E, R, S, B, L, U, N, XK, BP		M or S
RTD Ni120; Pt100 (3926); Pt100 (JIS); Pt100, 200, 500, 1000 (385)		M or S
Pressure (requires Fluke 700Pxx Modules)	M <sup>(1)</sup>	M <sup>(1)</sup> used as S <sup>(1)</sup>
Frequency; squarewave, 1 CPM to 10 kHz; fixed amplitude 5 V p-p		M <sup>(1)</sup> or S <sup>(1)</sup>

M = Measure S = Source/Simulate <sup>(1)</sup> 725 only

### Ordering information

#### Fluke-725 Multifunction Process Calibrator

#### Fluke-724 Temperature Calibrator

Each calibrator includes TL75 Test Leads, AC70A Test Clips, one pair of stackable test leads, product overview manuals, users manuals on CD-ROM; NIST-traceable certificate of calibration; CE and CSA markings.

### Recommended accessories – 724 and 725 calibrators



**TL75**  
Hard Point  
Test Lead Set



**TL220**  
SureGrip Industrial  
Test Lead Set



**C125**  
Meter Case  
See page 43



**ToolPak**  
Meter Hanging Kit  
See page 43



**80PK-27**  
SureGrip Industrial  
Surface Temperature Probe  
See page 40

For more detailed information, go to [www.fluke.com/725](http://www.fluke.com/725)



**Summary specifications (18 °C to 28 °C for one year)**

(Fluke 724/725)

Function Measure or Source	Range	Resolution	Accuracy	Notes
Voltage	0 to 100 mV 0 to 10 V (source) 0 to 30 V (measure)	0.01 mV 0.001 V 0.001 V	0.02 % Rdg + 2 LSD	Max load, 1 mA
mA (724 measure only)	0 to 24	0.001 mA	0.02 % Rdg + 2 LSD	Max load, 1000 Ω
mV (TC terminals)	-10.00 mV to + 75.00 mV	.01 mV	0.025 % of range + 1 LSD	
Resistance	0 Ω to 3200 Ω (measure) 15 Ω to 3200 Ω (source)	0.01 Ω to 0.1 Ω	0.10 Ω to 1.0 Ω	
Frequency source (725 only)	2.0 to 1000.0 CPM 1 to 1000 Hz 1.0 to 10.0 kHz	0.1 CPM 1 Hz 0.1 kHz	±0.05 % of setting ±0.05 % of setting ±0.25 % of setting	For frequency source, waveform is 5 V p-p squarewave, -0.1 V offset
Frequency measure (725 only)	1 CPM to 10 kHz	5 digits	0.05 % Rdg + 1 count	1 V p-p min.
Loop Supply	24 V dc	N/A	10 %	

Temperature coefficient, -10 °C to 18 °C, 28 °C to 55 °C, ±0.05 % of range per °C.

**Thermocouple (T/C) accuracy specifications (Fluke 724/725)**

T/C	Measure or Source	
J	-200 to 0 °C 0 to 1200 °C	1.0 °C 0.7 °C
K	-200 to 0 °C 0 to 1370 °C	1.2 °C 0.8 °C
T	-200 to 0 °C 0 to 400 °C	1.0 °C 0.8 °C
E	-200 to 0 °C 0 to 950 °C	0.9 °C 0.7 °C
R	-20 to 0 °C 0 to 500 °C 500 to 1750 °C	2.5 °C 1.8 °C 1.4 °C
S	-20 to 0 °C 0 to 500 °C 500 to 1750 °C	2.5 °C 1.8 °C 1.5 °C
B	600 to 800 °C 800 to 1000 °C 1000 to 1800 °C	2.2 °C 1.8 °C 1.4 °C
L	-200 to 0 °C 0 to 900 °C	0.85 °C 0.7 °C
U	-200 to 0 °C 0 to 400 °C	1.1 °C 0.75 °C
N	-200 to 0 °C 0 to 1300 °C	1.5 °C 0.9 °C

Note: Accuracy specifications include 0.2 °C cold junction uncertainty.

T/C	Measure or Source	
XK	-200 to -100 °C -100 to 800 °C	0.5 °C 0.6 °C
BP	0 to 800 °C 800 to 2500 °C	1.2 °C 2.5 °C
Resolution		
J, K, T, E, L, N, U, XK, BP	0.1 °C, 0.1 °F	
B, R, S	1 °C, 1 °F	

**RTD ranges and accuracy specifications (Fluke 724/725)**

RTD Types, Ranges and Accuracies			
		Measure (4 wire)	Source
Ni 120	-80 °C to 260 °C	0.2 °C	0.2 °C
Pt 100 - 385	-200 °C to 800 °C	0.33 °C	0.33 °C
Pt 100 - 3926	-200 °C to 630 °C	0.3 °C	0.3 °C
Pt 100 - 3916	-200 °C to 630 °C	0.3 °C	0.3 °C
Pt 200 - 385	-200 °C to 250 °C 250 °C to 630 °C	0.2 °C 0.8 °C	0.2 °C 0.8 °C
Pt 500 - 385	-200 °C to 500 °C 500 °C to 630 °C	0.3 °C 0.4 °C	0.3 °C 0.4 °C
Pt 1000 - 385	-200 °C to 100 °C 100 °C to 630 °C	0.2 °C 0.2 °C	0.2 °C 0.2 °C
Resolution			
RTD	0.1 °C, 0.1 °F		

**General specifications for Fluke 724 and 725 calibrators**

**Maximum voltage:** 30 V

**Storage temperature:**  
-20 °C to 71 °C

**Operating temperature:**  
-10 °C to 55 °C

**Relative humidity:**  
90 % (10 °C to 30 °C);  
75 % (30 °C to 40 °C);  
45 % (40 °C to 50 °C);  
35 % (50 °C to 55 °C)

**Shock:**  
30 g, 11ms, half-sine shock

**Vibration:**  
Random, 2 g, 5-500 Hz

**Safety:** CSA C22.2 No.1010.1:1992

**EMC:** EN50082-1:1992 and EN55022:1994 Class B

**Size/weight:** 96 x 200 x 47 mm  
(3.8 x 7.9 x 1.9 in)  
650 g (23 oz)

**Battery:** Four AA alkaline batteries.

**Battery life:** 25 hours typical

**Warranty:** Three years

# ProcessMeter™ Test Tools



## Ordering information

### Fluke-789 ProcessMeter™ Test Tool

Includes TL71 Premium Test Lead Set plus Alligator Clips, 4 AA alkaline batteries (installed), product overview and users manual (CD-ROM) in 14 languages.

### Fluke-787 ProcessMeter™ Test Tool

Includes protective yellow holster with test lead storage, TL75 Test Lead Set plus AC70A Alligator Clips, one 9 V alkaline battery (installed), product overview and users manual (CD-ROM) in 14 languages.

## Multimeter and Loop Calibrator – all in one

### Fluke 789 ProcessMeter™ Test Tool

The Fluke 787 was the first tool in the industry to combine a loop calibrator with a DMM, giving process technicians double the power in one tool. Now it's even better.

The Fluke 789 has a display that's not only twice as large, but twice as bright. With its built-in selectable 250 ohm HART resistor, it eliminates the need to carry a separate resistor with you.

#### New features:

- 24 V loop power supply
- 20 mA drive into 1200 ohms
- Double sized dual display with two brightness settings
- 0-100 % mA Span Check buttons to toggle from 4-20 mA

- Infrared I/O serial port compatible with FlukeView® Software
- 5 V measurement capability on the 4 V range for precise 1-5 V measurements
- **PLUS** all the proven 787 features below

### Fluke 787 ProcessMeter™ Test Tool

- Simultaneous mA and % of scale readout on mA output
- 25 % Manual Step plus auto step and auto ramp on mA output
- Clear LCD with backlight; 4,000 counts (30,000 counts for dc current)
- Min, Max, Average, Hold, Relative modes
- CAT III 1000 V safety-rated multimeter

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## Recommended accessories – 787 and 789 ProcessMeter Test Tools



**TL220**  
SureGrip Industrial  
Test Lead Set



**ToolPak**  
Meter Hanging Kit  
See page 43



**C125**  
Meter Case  
See page 43



**PV350**  
Pressure Vacuum Module  
See page 40



**For more detailed information, go to  
[www.fluke.com/processmeters](http://www.fluke.com/processmeters)**

## 789 and 787 specifications (18 °C to 28 °C, one year)

Measurement function	Best accuracy range and resolution	(% of reading + LSD)	
V dc	400.0 mV, 4.000 V, 40.00 V, 400.0 V, 1000 V	0.1 % + 1	
V ac (true-rms) to 500 Hz	400.0 mV, 4.000 V, 40.00 V, 400.0 V, 1000 V	0.7 % + 2	
mA dc	30.000 mA	.05 % + 2	
A dc	1.000 A (0.440 A continuous)	0.2 % + 2	
A ac	1.000 A (0.440 A continuous)	1 % + 2	
Resistance	400.0 Ohms, 4.000 k, 40.00 k, 400.0 k, 4.0 M, 40 M	0.2 % + 1	
Frequency (0.5 Hz to 20 kHz)	199.99 Hz, 1999.9 Hz, 19.999 kHz	.005 % + 1	
Diode Test	<b>789:</b> 2.000 V (shows diode voltage drop) <b>787:</b> 2.400 V (shows diode voltage drop)	2 % + 1	
Continuity	Beeps for resistance < approx. 100 ohms		
Output function	Range and resolution	Drive capability	Accuracy (% of span)
DC current output (internal battery operation)	0.000 to 20.000 mA or 4.000 to 20.000 mA (selectable at power-up) Over-range to 24.000 mA	<b>789:</b> 24 V compliance or, 1200 Ω @ 20 mA <b>787:</b> 12 V compliance or, 500 Ω @ 24 mA	.05 %
DC current simulate (ext. 24 Volt loop supply)	0.000 to 20.000 mA or 4.000 to 20.000 mA, (selectable at power-up) Over-range to 24.000 mA	<b>789:</b> 15 V to 48 V <b>787:</b> 15 V to 30 V	.05 %
24 V loop supply	<b>789:</b> Minimum 24 V <b>787:</b> not available	≥ 24 V @ 24 mA, 1200 Ω (789 only)	
Current adjustment modes	Manual: Coarse, Fine, 25 % step (100 % step in 789) Automatic: Slow Ramp, Fast Ramp, 25 % step		

Temperature range of 18 °C to 28 °C, for one year after calibration

## General specifications for the Fluke 789 and 787 ProcessMeter Test Tools

**Maximum voltage applied between any jack and earth ground:** 1000 V rms

**Storage temperature:** -40 °C to 60 °C

**Operating temperature:** -20 °C to 55 °C

**Temperature coefficient:**

0.05 x (specified accuracy) per °C (for temperatures < 18 °C or > 28 °C)

**Relative humidity:**

95 % up to 30 °C; 75 % up to 40 °C; 45 % up to 50 °C; 35 % up to 55 °C

**Vibration:** Random, 2 g, 5-500 Hz

**Shock:** One meter drop test

**Safety (789 and 787):** Designed in accordance with EN61010-1, ANSI/ISA S82.01-1994 and CAN/CSA C22.2 No. 1010.1-92 Over-voltage Category III

**Size/weight (789):** 50 mm H x 100 mm W x 203 mm L (1.97 in H x 3.94 in W x 8.00 in L), 600 g (1.3 lbs)

**Size/weight (787 with holster and test lead storage):** 52 mm H x 98 mm W x 201 mm L (2.06 in H x 3.86 in W x 7.93 in L), 22.5 oz

**Battery (787):** Single 9 V alkaline battery

**Battery life (787):** 12 to 50 hours typical

**Battery (789):** Four AA alkaline batteries

**Battery life (789):** 14 to 140 hours typical

**Warranty:** Three years

# Intrinsically Safe Products



## ATEX and NEC-500

ATEX is the directive concerning equipment and protective systems intended for use in potentially explosive atmospheres. Commonly called ATEX ("Atmosphères Explosibles"), a directive (94/9/EC) whose stated goal is to "help ensure the free movement of products in the European Union" by minimizing the number of safeguard clause applications, at least those originating from divergent interpretations. The ATEX rules were in place as a voluntary standard starting March 1, 1996 and are now mandatory on electrical and electronic equipment for use in environments subject to explosion hazard sold in the EU.



The NFPA (National Fire Protection Association) 70, National Electrical Code, also known as the NEC, is the basis for all electrical codes in the United States. Classifications and related product markings for hazardous areas are covered in NEC 500 and 505.

Two of the leading bodies that certify products as meeting these regulations are Factory Mutual (FM) and the Canadian Standards Association (CSA).

## Making sense of Factory Mutual certification

Fluke 707Ex is Factory Mutual-certified N.I. Class I, Div 2, Groups A-D T4 – but what exactly does that mean? Below is a brief explanation of the Factory Mutual designations.

**Example:** Fluke 707Ex is certified by Factory Mutual: N.I. Class I, Div, Groups A-D T4, Ta = -10 °C +50 °C

NEC-500 Marking	Type of protection
 APPROVED	The Factory Mutual Approved mark
NI	Non-incendive apparatus, internal energy is limited so a specified atmosphere cannot be ignited by its use
Class I	For use with gasses, vapors and liquids (not dust, fibers or filings)
Div 1	Certified for use in Zone 1, flammable material present continuously or intermittently
Div 2	Certified for use in Zone 2, explosive atmospheres not normally present, may rarely exist for short duration
Groups A-D	Rated for use with explosive gasses as defined by groups A-D, including acetylene, hydrogen acetylene and propane
Groups B-D	Rated for use with explosive gasses as defined by groups B-D, including acetylene, hydrogen acetylene, hydrogen and propane
T4	Temperature class gives the user the maximum temperature of a surface that may be in contact to the Ex-atmosphere under fault condition. T4 is rated at 135 °C
	The CSA mark for Canada and the U.S. with Certificate of Compliance master contact numbers (LR 110460 for the 718Ex, 725Ex and 221839 for the 700PEx)

For more information and detailed specifications, turn to the corresponding non-intrinsically safe product pages (Fluke 707, 718, 725) or go to [www.fluke.com/ex](http://www.fluke.com/ex)

# Intrinsically Safe Products

FLUKE®

New Product



**Fluke 725Ex**

## What is “intrinsically safe”?

Intrinsic safety is a protection method employed in potentially explosive atmospheres. Devices that are certified as “intrinsically safe” are designed to be unable to release sufficient energy, by either thermal or electrical means, to cause ignition of flammable material (gas or dust/particulates).

### Fluke 725Ex Multifunction Process Calibrator

The Fluke 725Ex Multifunction Process Calibrator offers all the features of the standard 725 plus an ATEX rating.

- Certified by CSA: I.S. Class I, Div. 1, Groups B-D 171 °C, Ta = -10 °C to +55 °C

### Fluke 707Ex Loop Calibrator

The Fluke 707Ex Loop Calibrator offers all the features of the standard 707 plus an ATEX rating.

- Certified by Factory Mutual: N.I. Class I, Div 2, Groups A-D T4, Ta = -10 °C to +50 °C

### Fluke 718Ex Pressure Calibrator and 700PEX Pressure Modules

The Fluke 718Ex Pressure Calibrator offers high performance in an ATEX-rated pressure calibrator. A complete, self-contained calibration and switch test solution.

- Certified by CSA: I.S. Class I, Div 1, Groups A-D T4, Ta = -10 °C to +55 °C (718Ex) and Ta = 0 °C to 50 °C (700PEX)



**Fluke 707Ex**



**Fluke 718Ex**



**Fluke 700PEX**  
(8 available ranges)

700PEX pressure modules enable the 725Ex to measure and source pressure and extend the pressure measurement of the 718Ex.

## Ordering information

Fluke-707Ex IS Loop Calibrator

Fluke-718Ex IS Pressure Calibrator

Fluke-725Ex Multifunction Process Calibrator

Fluke-700PEX Pressure Modules (700P01Ex, 700P05Ex, 700P06Ex, 700P09Ex, 700P24Ex, 700P27Ex, 700P29Ex and 700PA4Ex)



# Loop Calibrators



Fluke 705



Fluke 707



Fluke 715



## All Fluke mA – loop calibrators feature:

- Simultaneous mA and % readout for quick, easy, interpretation of readings
- Push button 25 % steps for fast, easy linearity checks
- Selectable ramp, step modes to provide smooth outputs for valve slewing and loop functional tests
- 24 V internal loop supply

## 715 Volt/mA Calibrator

- Source voltage to 200 mV or 20 V
- Measure loop current with 0.010 % accuracy and 0.001 mA resolution
- Measure voltage output process signals

## Summary specifications (18 °C to 28 °C, one year)

Function	705, 707, 715 Range	Resolution	705 Accuracy	707 Accuracy	715 Accuracy
mA measure	0 to 24 mA	.001 mA	.02 % Rdg + 2 LSD	.015 % Rdg + 2 LSD	0.01 % Rdg + 2 LSD
mA source <sup>1</sup>	0 to 24 mA	.001 mA	.02 % Rdg + 2 LSD	.015 % Rdg + 2 LSD	0.01 % Rdg + 2 LSD
mA simulate <sup>2</sup>	0 to 24 mA	.001 mA	.02 % Rdg + 2 LSD	.015 % Rdg + 2 LSD	0.01 % Rdg + 2 LSD
Voltage measure	0 to 28 V	.001 V	.025 % Rdg + 1 LSD	± (.015 % Rdg + 2 counts)	± (.01 % Rdg + 2 counts)
Voltage source (715 only)	0 to 10 V	.001 V (715)	N/A	N/A	0.01 % + 2 counts

Temperature coefficient, -10 to 18 °C, 28 to 55 °C, ± .005 % of range per °C

<sup>1</sup> Max load, 1200 Ohms; 950 Ohms at 20 mA in HART mode <sup>2</sup> Max applied voltage for simulation, 30 V

## 14 Ordering information

**Fluke-707 Loop Calibrator**

**Fluke-705 Loop Calibrator**

**Fluke-715 Volt/mA Calibrator**

Each calibrator includes test leads, test clips, holster, instruction sheets, NIST-traceable certificate of calibration; CE and CSA markings and 9 V alkaline battery.

## Recommended accessories – 707, 705 and 715 calibrators



**TL28A**  
Heavy Duty  
Test Lead Set



**TL220**  
SureGrip Industrial  
Test Lead Set



**C25**  
Large Soft Case  
See page 43



**C550**  
Tool Bag  
See page 42



**PV350**  
Pressure Vacuum  
Module  
See page 40

**For more detailed information, go to [www.fluke.com/loop](http://www.fluke.com/loop)**

# Temperature Calibrators

FLUKE®



## 712 RTD Calibrator Complete RTD calibration tool

- Measure temperature from RTD output
- Simulate RTD output
- Rosemount pulsed RTD transmitter compatible
- Operates with seven types of RTDs
- Auto step and auto ramp output function



## 714 Thermocouple Calibrator Complete thermocouple calibration tool

- Measure temperature from TC output
- Simulate TC output
- Nine types of thermocouples
- Auto step and auto ramp output function
- Calibrate linear TC transmitter with mV source function

### Summary specifications (18 °C to 28 °C, one year)

	Function	Range	Resolution	Accuracy	Notes
RTD (712)	Measure/simulate RTD(712)	-200 to 800 °C (Pt 100)	0.1 °C, 0.1 °F	0.2 °C, 0.4 °F (Pt 100)	Pt; 100 200 500 1000 (385); Pt 100 (3926); Pt 100 (3916) JIS; Ni 120 (672)
	Measure/simulate Resistance	15 Ω to 3200 Ω	0.1 Ω	0.025 % + 0.1 Ω to 0.5 Ω	
TC (714)	Measure/simulate Thermocouple	-200 to 1800 °C, depending on type (K,-200 to 1370 °C)	0.1 °C or °F (1 °C or °F; BRS)	0.5 °C or 0.9 °F (K,-200 to 1370 °C)	9 TC types; J K T E R S B per NIST, 175 and ITS-90 L U per DIN 43710 and IPTS-68
	Measure/simulate mV	-10 to 75 mV	0.01 mV	0.015 % + 1 count	

### General specifications for Fluke 712 and 714 calibrators

Maximum voltage: 30 V

Non-operating temp.: -40 °C to 60 °C

Operating temperature: -10 °C to 55 °C

Relative humidity: 95 % (10 °C to 30 °C);

75 % (30 °C to 40 °C); 45 % (40 °C to

50 °C); 35 % (50 °C to 55 °C)

Safety: CSA C22.2 No. 1010.1:1992

EMC: EN50082-1:1992 and EN55022:1994

Class B

Size/weight, (with holster): 201 mm L x

98 mm W x 52 mm D (7.93 in L x 3.86 in

W x 2.06 in D)/600 g (21 oz)

### Recommended accessories – 712 and 714 calibrators



**TL75 (712)**  
Hard Point  
Test Lead Set



**C550**  
Tool Bag  
See page 42



**ToolPak**  
Meter Hanging Kit  
See page 43



**C25**  
Large Soft Case  
See page 43



**80PK-24 (714)**  
SureGrip Air  
Temperature Probe

For more detailed information, go to [www.fluke.com/tempcal](http://www.fluke.com/tempcal)

### Ordering information

Fluke-712 RTD Calibrator

Fluke-714 Thermocouple Calibrator

Fluke-724 Temperature Calibrator

Each 71X calibrator includes: Protective yellow holster with test lead storage, test leads and alligator clips (excluding model 714), single 9 V alkaline battery and instruction sheet in 14 languages.

# Thermometers



## Fluke 54 Series II Contact Thermometer Lab accuracy in a field thermometer

- Accuracy:  $\pm (0.05 \% + 0.3 \text{ } ^\circ\text{C})$
- Large backlit dual display presents all the information you need at a glance
- Min, Max, and Avg – with time reference – captures major events
- Electronic Offset function maximizes overall accuracy by allowing you to compensate for thermocouple errors
- Supports a wide range of thermocouple types
- Temperature displayed in  $^\circ\text{C}$ ,  $^\circ\text{F}$ , or Kelvin (K)
- Splash and dust resistant case design

### Powerful data logging capabilities

- User-adjustable recording intervals
- Real-time clock captures the exact time of day of events
- Recall function allows logged data to be easily reviewed on the meter display
- For further analysis and graphing, data can be exported to optional FlukeView® PC software using the thermometer's IR communication port

### Specifications for 54-2 thermometer

Feature	54-2
Thermocouple types	K,J,T,E,N,R,S
Number of inputs	Dual
Time stamp	Time of day
Temperature measurement accuracy (for temperatures above -100 $^\circ\text{C}$ )	Type J,K,T,E,N: $\pm [0.05 \% + 0.3 \text{ } ^\circ\text{C} (0.5 \text{ } ^\circ\text{F})]$ Type R,S: $\pm [0.05 \% + 0.4 \text{ } ^\circ\text{C} (0.7 \text{ } ^\circ\text{F})]$
Measurement range (depending on thermocouple type)	-250 $^\circ\text{C}$ (-418 $^\circ\text{F}$ ) to 1767 $^\circ\text{C}$ (3212 $^\circ\text{F}$ )
Display resolution	0.1 $^\circ\text{C}$ / $^\circ\text{F}$ /K < 100°    1 $^\circ\text{C}$ / $^\circ\text{F}$ /K $\geq$ 1000°
Operating temperature	-10 $^\circ\text{C}$ to 50 $^\circ\text{C}$ (14 $^\circ\text{F}$ to 122 $^\circ\text{F}$ )
Storage temperature	-40 $^\circ\text{C}$ to 60 $^\circ\text{C}$ (-40 $^\circ\text{F}$ to 140 $^\circ\text{F}$ )
Humidity	0 % to 90 %; 0 $^\circ\text{C}$ to 35 $^\circ\text{C}$ (32 $^\circ\text{F}$ to 95 $^\circ\text{F}$ ), 0 % to 70 %; 0 $^\circ\text{C}$ to 50 $^\circ\text{C}$ (32 $^\circ\text{F}$ to 122 $^\circ\text{F}$ )

## Ordering information

**Fluke-54-2 Thermometer**  
Includes 80PK-1 bead thermocouples, batteries, overview manual and instructional guide on CD-ROM

Also available as 51-2, 52-2 and 53-2 models

## Recommended accessories – 54 Series II Thermometer



**TPak**  
ToolPak Meter  
Hanging Kit  
See page 43



**80PK-8**  
Pipe Clamp  
Temperature Probe  
See page 40



**80PK-22**  
SureGrip™ Immersion  
Temperature Probe  
See page 40



**80PK-25**  
SureGrip™ Piercing  
Temperature Probe



**FV-FV-SC1**  
FlukeView Forms  
Software

For more detailed information, go to [www.fluke.com/thermometers](http://www.fluke.com/thermometers)



**NEW! Fluke 68 Infrared Thermometer**  
Great for measuring temperature in dangerous situations

The new Fluke 68 pistol grip thermometer offers an easy-to-use solution for temperature measurement in hard-to-reach, hot, rotating or dangerous situations.

- Wide temperature range and quick response time
- Superb optics for measuring temperature of surfaces from a distance
- Adjustable emissivity for more accurate temperature measurement

**Fluke 61 and 65**

- Easy-to-use, one-button operation
- Easy targeting with bright laser
- Shock-absorbing holster increases ruggedness
- MIN/MAX readings provide variations in any measurement (65 only)
- Store and recall any single temperature (65 only)



Fluke 61 Infrared Thermometer



Fluke 65 Infrared Thermometer



**Specifications for 61, 65 and 68 infrared thermometers**

Feature	61	65	68
Response time	< 1 second		≤ 0.5 second (95% of reading)
Spectral response	7 to 18 μm	8 to 14 μm nominal	8 to 14 μm
Resolution	0.2 °C (0.5 °F)	0.1 ° up to 200°, 1° over 200 °	0.1 °C (0.1 °F)
Repeatability	± 2 °C or ± 2 %, whichever is greater	± 1 °C or ± 1 %, whichever is greater	± 0.5 % or ≤ ± 1 °C (± 2 °F), whichever is greater
Ambient operating temperature	0 to 50 °C (32 °F to 120 °F)		
Relative humidity	10 to 90 % RH non-condensing, at ≤ 50 °C (120 °F)	10 to 90 % RH non-condensing at <30 °C (86 °F) ambient	10 to 90 % RH non-condensing.
Storage temperature	-20 to 60 °C (-4 to 140 °F) without battery	-20 to 70 °C (-4 to 158 °F) without battery	-20 to 60 °C (-13 to 158 °F) without battery
Dimensions	190 x 51 x 41 mm (7.5 x 2 x 1.6 in)	185.4 x 63.5 x 38.1 mm (7.3 x 2.5 x 1.5 in)	200 x 160 x 55 mm (8 x 6 x 2 in)
Typical distance to target	1 m (3 ft)	1 m (3 ft)	8 m (25 ft)

**Recommended accessories – 61, 65 and 68 Thermometers**



**80PR-60**  
Temperature Probe  
(68 only)



**C550**  
Tool Bag  
See page 42



**C90**  
Meter Case



**C50**  
Meter Case



**LVD1**  
Volt Light

For more detailed information, go to [www.fluke.com/thermometers](http://www.fluke.com/thermometers)

**Ordering information**

**Fluke-68 Thermometer**

Includes carrying case, hand strap, instruction manual, users manual on CD-ROM and 9 V battery (also available in Fluke 63 and 66)

**Fluke-61 Thermometer**

Includes holster, instruction sheet and 9 V battery

**Fluke-65 Thermometer**

Includes holster, soft case, overview manual, users manual on CD-ROM and two AA batteries

# Pressure Calibrators



Fluke 718



Fluke 717



## Ordering information

**Fluke-718 30US  
Pressure Calibrator**

**Fluke-718 100US  
Pressure Calibrator**

**Fluke-717 30G  
Pressure Calibrator**

**Fluke-717 100G  
Pressure Calibrator**

Each calibrator includes protective holster, test leads and alligator clips, 9 V alkaline battery (two on the 718), product overview in 14 languages, users manual on CD-ROM (718 only), NIST-traceable certificate of calibration; CE and CSA markings. Fluke-718 includes protective in-line filter.

## Fluke 718 Pressure Calibrator. Compact, self contained calibration solutions

The 718 offers:

- Built-in pressure/vacuum hand pump, with vernier and bleed valve.
- Pressure measurement to 0.05 % of full span, with internal sensor.
- Pressure measurement to 10,000 psi /700 bar using any of the 29 Fluke 700Pxx Pressure Modules.
- Wide range of selectable measurement units.
- Current measurement with 0.025 % accuracy and 0.001 mA resolution.
- New pressure switch test.
- 24 volt loop power supply.
- 1/8 inch NPT female pressure fitting.

## 717 30G and 717 100G Pressure Calibrators

- Measure pressure and vacuum to 0.05 % of full scale with internal 30 psig sensor (717 30G) or internal 100 psig sensor (717 100G)
  - 1/8 NPT pressure fitting
  - Compatible with non-corrosive gases and liquids
- Measure pressure to 10,000 psi / 700 bar using one of the Fluke 700Pxx Pressure Modules
- Measure mA with 0.025 % accuracy and 0.001 mA resolution, while sourcing 24 V loop power
- New pressure switch test.

## Recommended accessories – 717 and 718 calibrators



**700ILF**  
In-Line Filter  
See page 41



**700LTP**  
Low Pressure  
Test Pump  
See page 41



**TL220**  
SureGrip Industrial  
Test Lead Set



**C25 (717 only)**  
Large Soft Case  
See page 43



**700HTP**  
Hydraulic Test Pump  
See page 41

**For more detailed information, go to [www.fluke.com/pressure](http://www.fluke.com/pressure)**



**Specifications (18 °C to 28 °C, one year)**

Pressure	717 100G	717 30G	718Ex/718 30G	718Ex/718 100G	Function	Range	Resolution	Accuracy	Notes
		•			Measure pressure <sup>1</sup> (internal sensor) Over pressure 3xF5	-12 to 30 psi (-83 to 207 kPa)	0.001 psi scale (0.01 kPa)	0.05 % full	Gases/liquids 717 only (non-corrosive) Use the 718 with non-corrosive gases only Zero, Min, Max, Hold, Damp
		•		•	Measure Pressure <sup>1</sup> (internal sensor) Over pressure 2xF5	-12 to 100 psi (-83 to 690 kPa)	0.01 psi (0.1kPa)	0.05 % full scale	Gases/liquids 717 only (non-corrosive) Use the 718 with non-corrosive gases only Zero, Min, Max, Hold, Damp
		•	•	•	Measure pressure <sup>1</sup> (with pressure modules, modules) Over pressure per pressure module specs <sup>2</sup>	29 Pressure 1.0 in. H <sub>2</sub> O/ 0.25 kPa to 10,000 psi/ 69 MPa	To 0.0001 psi, per pressure module specs <sup>2</sup>	To 0.05 % of full span, per pressure	Media compatibility per Pressure Module Specs <sup>2</sup> Zero, Min, Max, Hold, Damp
				•	Source pressure, built-in pump	-11 psig to full scale	N/A	N/A	Use the 718 with non-corrosive gases only
		•	•	•	Measure mA	0 to 24 mA	0.001 mA	0.025 % + 1 count	
		•	•	[718 only] [718 only]	Loop supply	24 V dc	N/A	± 10 %	Drive; 20 mA into 1000 Ω

1 Supported pressure units; psi, in. H<sub>2</sub>O (4 °C), in. H<sub>2</sub>O (20 °C), cm H<sub>2</sub>O (4 °C), cm H<sub>2</sub>O (20 °C), bar, mbar, kPa, inHg, mmHg, kg/cm<sup>2</sup>

2 Pressure module specifications, see page xx

**General specifications for all Fluke 717 and 718 calibrators**

**Maximum voltage:** 30 V

**Non-operating temperature:**  
-40 °C to 60 °C

**Operating temperature:**  
-10 °C to 55 °C

**Relative humidity:**  
95 % (10 °C to 30 °C); 75 %  
(30 °C to 40 °C); 45 % (40 °C to  
50 °C); 35 % (50 °C to 55 °C)

**Operating altitude:**  
3,000 m max

**Shock:** 1 m drop test

**Vibration:** Random, 2 g,  
5-500 Hz

**Safety:** CSA C22.2 No.  
1010.1:1992 (Call Fluke for  
718Ex safety ratings)

**EMC:** EN50082-1:1992 and  
EN55022:1994 Class B

**Size/weight, (717 with holster  
and Flex-Stand™):**

201mm L x 98 mm W x 52 mm D  
(7.93 in L x 3.86 in W x 2.06 in  
D) 600 g (21 oz)

**Size/weight, (718 with holster):**

216 mm L x 94 mm W x 66 mm  
D (8.50 in L x 3.72 in W x  
2.60 in D) 992 g (35 oz)

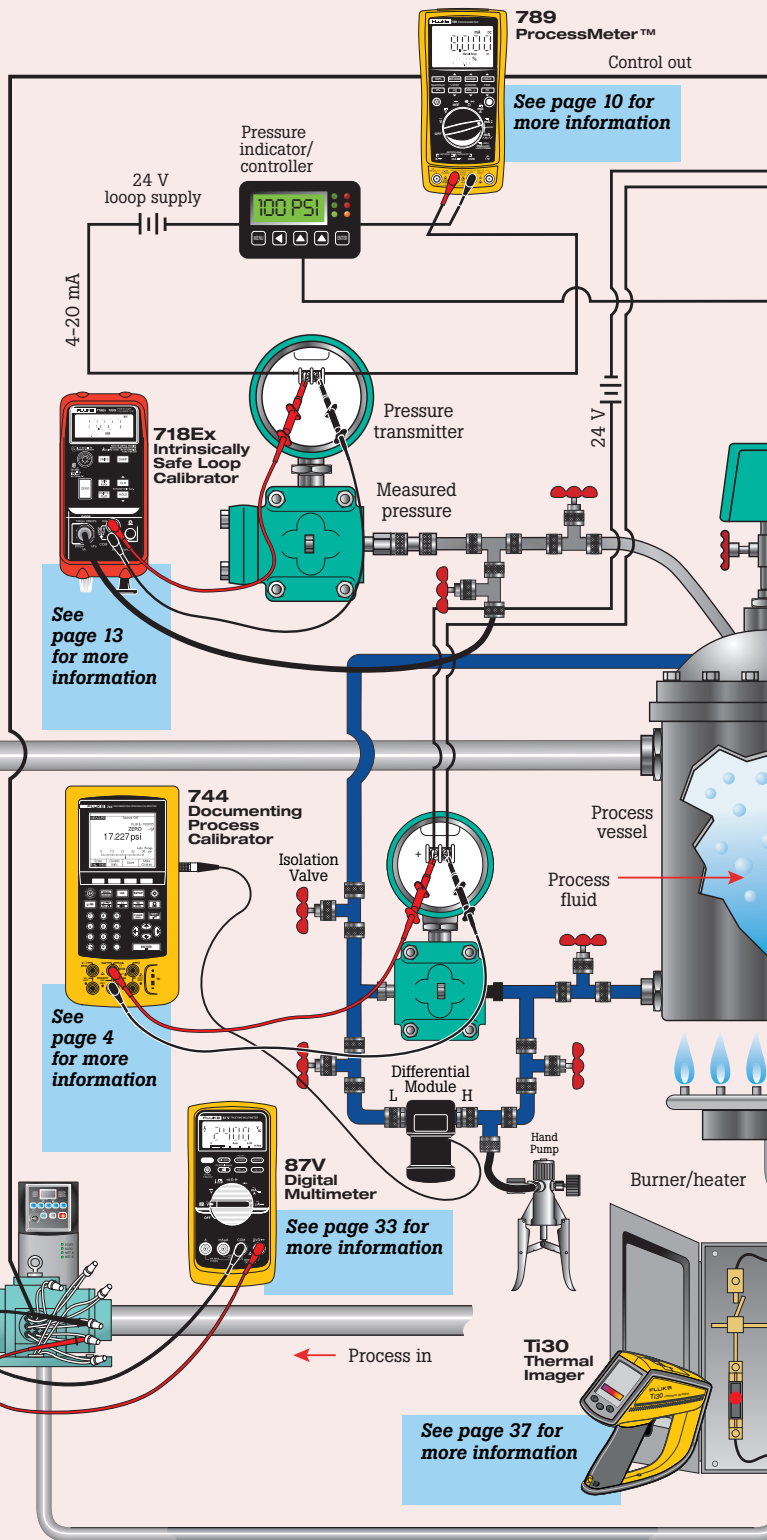
**Power:** 9 V battery ANSI/NEDA  
1604 A or IEC 6LR61 9V  
alkaline; two batteries in 718

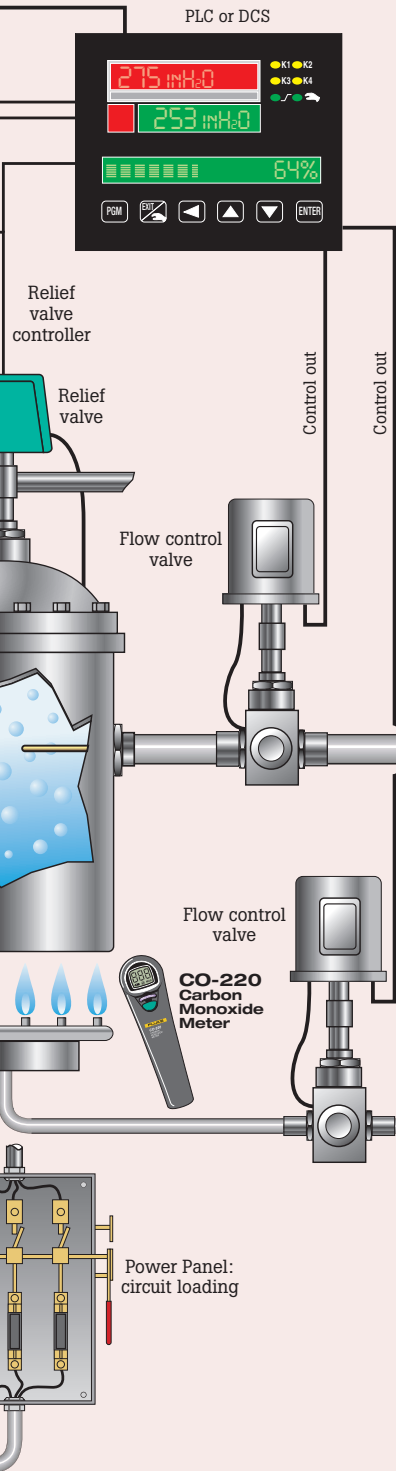
**Battery Life:** 4 to 20 hours, typi-  
cal, depending on functions used

**Warranty:** Three years (one year  
on pressure pump in Fluke 718);  
one year for 718Ex.

# Process Pressure Measurement

Regular process instrument maintenance and calibration can improve product quality, operational efficiency, safety, environmental compliance and corporate profitability. Fluke tools are designed to perform multiple functions to assist you in this effort. This diagram shows just a few examples of Fluke tools in use, measuring and servicing process pressures.





**Pressure conversion chart**

to obtain multiply factor by number of	psi	bar	kPa	in H <sub>2</sub> O	ft H <sub>2</sub> O	m H <sub>2</sub> O	in Hg	torr (mm Hg)	kg/cm <sub>2</sub>	in H <sub>2</sub> O @ 60F	mm H <sub>2</sub> O
psi	1.000000	6.89476e-2	6.89476	27.67990	2.3066583	0.730696	2.036021	51.715095	7.030696e-2	27.707048	703.10138
bar	14.50377	1.000000	100.000	401.46293	33.455244	10.197162	29.52997	750.06375	1.019716	401.8647	1.019716e4
kPa	0.1450377	1.00000e-2	1.000000	4.0146293	0.3345524	0.1019716	0.2952997	7.5006375	1.019716e-2	4.018647	101.9716
in H <sub>2</sub> O	3.61272e-2	2.4808e-3	0.249089	1.000000	8.33333e-2	2.54000e-2	7.35559e-2	1.8683263	2.548169e-3	1.00100	25.400
ft H <sub>2</sub> O	0.4335264	2.98896e-2	2.989068	12.0000	1.000000	0.3048	0.8826708	22.4199156	3.057803e-2	12.012	304.8
m H <sub>2</sub> O	1.422334	9.80665e-2	9.80665	39.370064	3.2808387	1.000000	2.895901	73.556127	1.00000e-1	39.4095	1000.0
in Hg	0.4911541	3.38639e-2	3.38639	1 953.5	1.132925	0.3453156	1.000000	25.40000	3.45316e-2	13.6087	345.3157
torr	1.93367e-2	1.3332e-3	0.133322	0.5352384	4.46032e-2	1.3595e-2	25.40000	1.000000	1.35951e-3	0.535774	13.595
kg/cm <sub>2</sub>	14.223344	9.80665e-1	98.0665	392.43867	32.70322	1 00.00	28.95901	735.5589	1.000000	394.0946	10000.0
in H <sub>2</sub> O @ 60F	3.60919e-2	2.4884e-3	0.24884	0.999001	11.988	2.53746e-2	7.34824e-2	1.866459	2.53746e-2	1.000000	25.3746
mm H <sub>2</sub> O	1.42227e-3	9.80665e-5	9.80665e-3	3.93701e-2	3.28084e-3	1.000e-3	2.89590e-3	7.35559e-2	1.000e-4	3.94095e-2	1.000000

Process out →

63 Handheld Infrared Thermometer

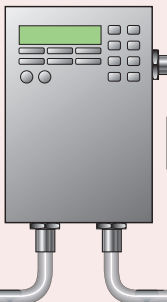


744 Documenting Process Calibrator



See page 4 for more information

Flow computer calibration



Natural gas in ←

Pressure module

# Calibrators Selection Guide

## Dry-Well Calibrators











## Field Dry-Well

## Thermocouple Furnace

								
<b>Model</b>	<b>9100S</b> Page 24	<b>9102S</b> Page 24	<b>9009</b> Page 25	<b>9141</b> Page 25	<b>9103</b> Page 25	<b>9140</b> Page 25	<b>9150</b> Page 25	<b>6100</b> Page 25
<b>Measure</b>								
Temperature RTD								
Temperature, thermometer								
Accuracy								
Resolution								
<b>Source/Simulate</b>								
Temperature, dry-well	35 °C to 375 °C	-10 °C to 122 °C	50 °C to 350 °C: Hot -15 °C to 110 °C: Cold	50 °C to 650 °C	-25 °C to 140 °C	35 °C to 350 °C	150 °C to 1200 °C	
Temperature bath								35 °C to 100 °C
Temperature infrared								
Stability	.07 °C	0.05 °C	.05 °C	.05 °C	0.02 °C	0.03 °C	0.5 °C	0.02 °C
Accuracy	0.25 °C	0.25 °C	0.6 °C: Hot 0.2 °C: Cold	0.5 °C	0.25 °C	0.5 °C	5.0 °C	0.25 °C
<b>Record</b>								
Min Max								
Upload data to PC								
Logging to PC								
Logging, internal memory								
<b>Features</b>								
Remote operation*	•	•	•	•	•	•	•	•
Serial interface	•	•	•	•	•	•	•	•
Warranty	2 years	2 years	1 year	1 year	1 year	1 year	1 year	1 year
NIST-Traceable certification	•	•	•	•	•	•	•	•
Power	Line	Line/Battery	Line	Line	Line	Line	Line	Line

\* Interface-*it* software, model 9930, is included with all dry-wells and baths in this selection guide. See page 37.

Fluke is pleased to offer a selection of Hart Scientific dry-wells and reference thermometers made specifically for industrial applications. See your local Fluke distributor or go to [www.fluke.com/hartscientific](http://www.fluke.com/hartscientific).

Micro-Baths		Infrared Calibrators			Thermometer Readouts			Thermo-Hygrometer	
									
7102 Page 30	7103 Page 30	7103 Page 30	9132 Page 27	9133 Page 27	1521 Page 29	1522 Page 29	1502A Page 28	1529 Page 28	1620-S Page 31
					•	•	•	•	
					-200 °C to 962 °C	-200 °C to 962 °C	-200 °C to 962 °C	-189 °C to 962 °C	0 °C to 50 °C
					0.025 °C to 0.15 °C	0.025 °C to 0.15 °C	0.004 °C to 0.024 °C	0.004 °C to 0.024 °C	0.25 °C 2.0 % RH
					0.001 °C	0.001 °C	0.001 °C	0.001 °C	0.001 °C 0.01 % RH
200 °C	-5 °C to 125 °C	-30 °C to 125 °C							
			50 °C to 500 °C	-30 °C to 150 °C					
°C	.015 °C	.003 °C	0.1 °C	0.1 °C					
°C	0.25 °C	0.25 °C	0.5 °C	0.4 °C					
					•	•		•	•
					•	•		•	•
						10,000 points		8,000 points	400,000 points
	•	•	•	•	•	•	•	•	•
Year	1 year	1 year	1 year	1 year	1 year	1 year	3 years	2 years	1 year
	•	•	•	•	•	•	•	•	•
Line	Line	Line	Line	Line	Battery	Battery	Line	Battery	Line



# Handheld Dry-Well



## Hart Scientific 9100S and 9102S Handheld Dry-Well Temperature Calibrators

**The smallest, lightest and most portable dry-wells in the world**

- 9100 model weighs only 2 pounds, 3 ounces (1 kilogram)
- Temperature ranges from -10 °C to 375 °C
- Stability during calibrations to  $\pm 0.05$  °C
- Fast and easy calibrations of RTDs and thermocouples
- Includes RS-232 interface, instrument control software
- Direct interface to the Fluke 744

### Ordering information

- 9100S-A-156** Dry-Well, Block A <sup>(1)</sup>  
**9100S-A-256** Dry-Well, Block A <sup>(2)</sup>  
**9100S-B-156** Dry-Well, Block B <sup>(1)</sup>  
**9100S-B-256** Dry-Well, Block B <sup>(2)</sup>  
**9100S-D-156** Dry-Well, Block D <sup>(1)</sup>  
**9100S-D-256** Dry-Well, Block D <sup>(2)</sup>  
**9300** Rugged Carrying Case, 9100  
**9102S-156** Dry-Well, -10 to 122 (2 Wells) <sup>(1) (3)</sup>  
**9102S-256** Dry-Well, -10 to 122 (2 Wells) <sup>(2) (3)</sup>  
**9320-156** Battery Pack, 9102 <sup>(1)</sup>  
**9320-256** Battery Pack, 9102 <sup>(2)</sup>

### 9102S and 9009 inserts

- 3102-1** Insert, AL 1/16 in (1.6 mm)  
**3102-2** Insert, AL 1/8 in (3.2 mm)  
**3102-3** Insert, AL 3/16 in (4.8 mm)  
**3102-4** Insert, AL 1/4 in (6.4 mm) (Standard)  
**3102-6** Insert, AL 3/8 in (9.5 mm) (Standard)  
**3102-7** Insert, AL 7/16 in (11.1 mm) (Standard)  
**3102-8** Insert, AL 5/32 in (4 mm) (Standard)  
**9308** Hard Carrying Case, 9102/9132

<sup>(1)</sup> 156 Blocks are 115 V 50/60 Hz

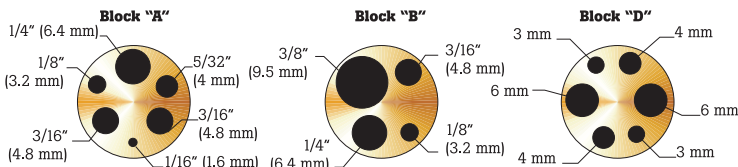
<sup>(2)</sup> 256 Blocks are 220 V 50/60 Hz

<sup>(3)</sup> Specify two 3102 inserts

### Summary specifications

	9100	9102
Range	35 °C to 375 °C (95 °F to 707 °F)	-10 °C to 122 °C (14 °F to 252 °F) at 23 °C ambient
Accuracy	$\pm 0.5$ °C	$\pm 0.25$ °C
Stability	$\pm 0.1$ °C at 100 °C $\pm 0.3$ °C at 375 °C	$\pm 0.05$ °C at 0 °C
Well-to-well Uniformity	$\pm 0.2$ °C with sensors of similar size at equal depths within wells	
Stabilization	5 minutes	7 minutes
Well depth	102 mm (4 in); 1.6 mm (1/16 in) hole is 89 mm (3.5 in) deep	102 mm (4 in)
Removable inserts	N/A	1/4 in, 3/16 in (Standard) 1/16 in, 1/8 in, 3/8 in (Optional)
Power	115 VAC ( $\pm 10$ %), 1.5 A or 230 VAC ( $\pm 10$ %, 0.8 A, specify, 50/60 Hz, 175 W	94-234 V AC ( $\pm 10$ %), 50/60 Hz, 60 W; or 12 V DC
Size	57 x 125 x 150 mm (2.25 H x 4.9 W x 5.9 in D)	99 x 140 x 175 mm (3.9 H x 5.5 W x 6.9 in D)
Weight	1 kg (2 lb. 3 oz.)	1.8 kg (4 lb.)
NIST-traceable calibration	Data at 50 °C, 150 °C, 200 °C, 250 °C, 300 °C and 350 °C	Data at -10 °C, 24 °C, 50 °C, 55 °C, 100 °C and 122 °C

### 9100 fixed-block options



# Field Dry-Well and Furnaces

FLUKE®

Hart Scientific

## Hart Scientific 9103, 9140 and 9141 Field Dry-Well and 9150 Thermocouple Furnace *Easy and productive to use*

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

The 9103 covers below-ambient temperatures as low as -25 °C. The 9140, weighing only 6 pounds (2.7 kg), has a temperature range of 35 °C to 350 °C and reaches its maximum temperature in 12 minutes. The 9141 upright dry-well unit calibrates up to 650 °C,

weighs only 8 pounds (3.6 kg) and heats up to 650 °C in 12 minutes.

You can control all functions from the front panel or connect it to your PC or Fluke 744 for fully automated temperature calibration.

Each dry-well has four removable well inserts available, an optional carrying case, a NIST-traceable calibration, and the best price in the industry.

The 9150 thermocouple furnace extends up to 1200 °C covering a wide range of T/C types.

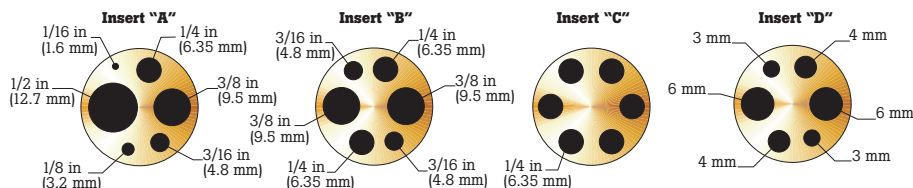


## Hart Scientific 9009 Industrial Dual-Block Calibrator *Double your productivity or cut your calibration time in half*

Hart's 9009 Dual-Block Calibrator lets you calibrate temperature probes from -15 °C to 350 °C. Each temperature well is independently controlled, so while you're checking your transmitter sensor at one temperature, the other well can be heating or cooling to your next set-point.

Everything you need to calibrate thermometers is self-contained in a rugged, watertight case including four removable inserts, power cord and removal tool. It's portable, covers a wide range and interfaces directly with the Fluke 744.

## 9103, 9140, 9141 and 9150 Insert Options



### Ordering information

**9103-X** Dry-Well, 110 V 50/60 Hz (specify X, X = A, B, C, or D included insert, also specify 110 V or 220 V)

**9140-X** Dry-Well, 110 V 50/60 Hz (specify X, X = A, B, C, or D included insert, also specify 110 V or 220 V)

**9141-X** Dry-Well, 110 V 50/60 Hz, (specify X, X = A, B, C, or D included insert, also specify 110 V or 220 V)

**9150-X** Thermocouple Furnace (specify X, X = A, B, C, or D included insert, also specify 110 V or 220 V)

**3150-1** Custom Insert

**3150-2** Insert A

**3150-3** Insert B

**3150-4** Insert C

**3150-6** Insert D

**9315** Rugged Carrying Case

**9009-B-110 V** Dry-Well, Industrial Dual-Block

See page 24 for inserts

# Field Dry-Well and Furnaces

## Summary specifications for 9103, 9140 and 9141

	9103	9140	9141
Range	-25 °C to 140 °C (-13 °F to 284 °F) at 23 °C ambient	35 °C to 350 °C (95 °F to 662 °F)	50 °C to 650 °C (122 °F to 1202 °F)
Accuracy	± 0.25 °C	± 0.5 °C (holes greater than 1/4 in [6.35 mm]: ±1°C)	± 0.5 °C to 400 °C; ± 1.0 °C to 650 °C (holes greater than 1/4 in: ± 2 °C)
Stability	± 0.02 °C at -25 °C, ± 0.04 °C at 140 °C	± 0.03 °C at 50 °C, ± 0.05 °C at 350 °C	± 0.05 °C at 100 °C, ± 0.12 °C at 500 °C, ± 0.12 °C at 650 °C
Well-to-well Uniformity	± 0.1 °C between similarly sized wells	± 0.1 °C with similarly sized wells	± 0.1 °C below 400 °C, ± 0.5 °C above 400 °C with similarly sized wells
Heating times	18 minutes from ambient to 140 °C	12 minutes from ambient to 350 °C	12 minutes from ambient to 650 °C
Cooling times	20 minutes from ambient to -25 °C	15 minutes from 350 °C to 100 °C	25 minutes from 650 °C to 100 °C
Stabilization time	7 minutes		
Immersion depth	4.875 in (124 mm)		
Power	115 VAC (± 10 %), 1.3 A or 230 VAC (± 10 %), 0.7 A, switchable, 50/60 Hz, 150 W	115 VAC (± 10 %), 4.4 A or 230 VAC (± 10 %), 2.2 A, switchable, 50/60 Hz, 500 W	115 VAC (±10 %), 8.8 A or 230 VAC (±10 %), 4.4 A, switchable, 50/60 Hz, 1000 W
Size	5.63 W x 10.25 H x 9.63 D in (143 x 261 x 245 mm)	6 W x 3.375 H x 7.75 D in (152 x 86 x 197 mm)	4.3 W x 9.3 H x 7.3 D in (109 x 236 x 185 mm)
Weight	12 lb. (5.7 kg)	6 lb. (2.7 kg)	8 lb. (3.6 kg)
Computer interface	RS-232 included with free Interface-it software		
NIST-traceable certificate	Data at -25 °C, 0 °C, 25 °C, 50 °C, 75 °C, 100 °C, and 140 °C	Data at 50 °C, 100 °C, 150 °C, 200 °C, 250 °C, 300 °C, and 350 °C	Data at 100 °C, 200 °C, 300 °C, 400 °C, 500 °C and 600 °C

## Summary specifications for 9009

Range	
Hot block	50 °C to 350 °C (122 °F to 662 °F)
Cold block	-15 °C to 110 °C (5 °F to 230 °F) in 23 °C ambient (-8 °C with hot block at 350 °C)
Accuracy	
Hot block	± 0.6 °C
Cold block	± 0.2 °C
Stability	
Hot block	± 0.05 °C
Cold block	± 0.05 °C
Well-to-well uniformity	± 0.1 °C
Stabilization time	8 minutes
Well depth	4 inches (101.6 mm)
Removable inserts	Two 1.4 in (6.4 mm) and two 3/16 in (4.8 mm) inserts included; see ordering information for other available inserts
Power	115 V ac (± 10 %), 50/60 Hz; 230 V ac (± 1 %), 60/60 Hz; specify
Size	7 in H x 10.5 in W x 9.75 in D (178 x 267 x 248 mm)
Weight	10 lb. (4.5 kg)
7-point NIST Traceable Calibration	
Hot block	50 °C, 100 °C, 150 °C, 200 °C, 250 °C, 300 °C and 350 °C
Cold block	-18 °C, 0 °C, 25 °C, 50 °C, 75 °C, 100 °C and 122 °C

## Summary specifications for 9150

Range	
Temperature range	150 °C to 1200 °C (302 °F to 2192 °F)
Display resolution	0.1° to 999.9° 1° above 1000°
Stability	± 0.5 °C
Display accuracy	± 5 °C
Well diameter	1.25 in (32 mm)
Well depth	5.5 in (140 mm); (4 in [101 mm] in removable insert plus 1.5 in [38 mm] in insulator)
Heating time	35 minutes to 1200 °C
Cooling time	140 minutes with block
Well-to-well uniformity	± 0.5 °C to ± 1.0 °C (Insert "C" at 1200 °C)
Stabilization	20 minutes
Power	115 VAC (± 10 %), 10.5 A or 230 VAC (± 10 %), 5.2 A, switchable, 50/60 Hz, 1200 W
Size	12.4 H x 8.2 W x 12.4 D in (315 x 208 x 315 mm)
Weight	28 lb. (13 kg)
NIST-traceable calibration	Data at 150 °C, 300 °C, 450 °C, 600 °C, 800 °C, 1000 °C, and 1200 °C

# Infrared Calibrators

FLUKE®

Hart Scientific

## Hart Scientific 9132 and 9133 Infrared Calibrators Precision when you need it for infrared temperature calibration

Whether you're using in-line or handheld pyrometers, the 9132 Portable IR Calibrator can handle your workload to 500 °C (932 °F). For calibrating IR guns at cold temperatures, the 9133 Portable IR Calibrator reaches -30 °C (22 °F) in normal ambient conditions.

Simply "point and shoot" to check your IR guns. For higher precision, a well is located directly behind the blackbody

surface for contact calibration of the blackbody using a calibrated PRT and readout. The 2.25 in (57 mm) target offers a large field of view area for optical variations in infrared thermometers. Emissivity of the target is 0.95 ( $\pm 0.02$ ) and its temperature may be controlled in increments of 0.1 °C.

No other IR calibrators offer this performance in a compact package!



### Summary specifications for 9132 and 9133

	9132	9133
Temperature range	50 °C to 500 °C (122 °F to 932 °F)	-30 °C to 150 °C at 23 °C ambient (-22 °F to 302 °F at 73 °F ambient)
Accuracy	$\pm 0.5$ °C at 100 °C $\pm 0.8$ °C at 500 °C	$\pm 0.4$ °C
Stability	$\pm 0.1$ °C at 100 °C $\pm 0.3$ °C at 500 °C	$\pm 0.1$ °C
Target size	2.25 in (57 mm)	
Target emissivity	0.95 ( $\pm 0.02$ from 8 to 14 mm)	
Resolution	0.1 °	
Heating time	30 minutes (50 °C to 500 °C)	15 minutes (25 °C to 150 °C)
Cooling time	30 minutes (500 °C to 100 °C)	15 minutes (25 °C to -20 °C)
Power	115 VAC ( $\pm 10$ %), 3 A or 230 VAC ( $\pm 10$ %), 1.5 A, switchable, 50/60 Hz, 340 W	115 VAC ( $\pm 10$ %), 1.5 A, or 230 VAC ( $\pm 10$ %), 1.0 A, switchable, 50/60 Hz, 200 W
Size	4 H x 6 W x 7 D in (102 x 152 x 178 mm)	6 H x 11.25 W x 10.5 D in (152 x 286 x 267 mm)
Weight	4 lb. (1.8 kg)	10 lb. (4.6 kg)
Computer interface	RS-232 included with free Interface- <i>it</i> software	
NIST-traceable contact calibration	Data at 50 °C, 100 °C, 200 °C, 250 °C, 300 °C, 400 °C and 500 °C	Data at -30 °C, 0 °C, 25 °C, 75 °C, 100 °C, 125 °C and 150 °C

### Ordering information

**9132-156** IR Calibrator, 110 V  
50/60 Hz

**9132-256** IR Calibrator, 220 V  
50/60 Hz

**9133-156** IR Calibrator, 110 V  
50/60 Hz

**9133-256** IR Calibrator, 220 V  
50/60 Hz

**9308** Hard Carrying Case  
(9132)

**9302** Hard Carrying Case  
(9133)

# Thermometer Readout

## Ordering information

**1529** Chub-E4, 2 TC and 2 PRT/Thermistor Inputs

**1529-R** Chub-E4, 4 PRT/Thermistor Inputs

**1529-T** Chub-E4, 4 TC Inputs

(Specify 110V or 220V power)

**2506-1529** IEEE Option

**9322** Rugged Carrying Case

**1502A-156** "Tweener" PRT Thermometer (110 V)

**1502A-256** "Tweener" PRT Thermometer (220 V)

**2502** DC Power Option

**2506** IEEE Option

**2508** Serial Cable Kit

**9313** Battery Pack

**9301** Carrying Case, fits Tweener and 12 in. probe

**9308** Carrying Case, fits Tweener and 6 in. probe

## Hart Scientific 1529 Chub-E4 Thermometer *Lab-quality accuracy on four channels*

- Four channels for PRTs, thermistors and thermocouples
- Displays eight user-selected data fields
- Logs up to 8,000 readings
- Battery provides eight hours of continuous operation



## Hart Scientific 1502A "Tweener" Thermometer *Best performance thermometer in its price range*

- PRT readout with accuracy to  $\pm 0.006$  °C
- Reads both 100  $\Omega$  and 25  $\Omega$  probes
- 0.0001 °C resolution
- Optional battery pack available
- Compatible with LogWare and MET/TEMP II software

## Summary specifications for 1502A and 1529

	PRT / RTD	Thermistor	Thermocouple	Tweener
Inputs	2 channels PRT/thermistor and 2 channels TC, or 4 channels PRT/thermistor, or 4 channels TC, specify when ordering; PRT/thermistor channels accept 2, 3, or 4 wires; TC inputs accept B, E, J, K, N, R, S, T, and Au-Pt TC types			
Temperature range	-189 °C to 960 °C (-308 °F to 1760 °F)	-50 °C to 150 °C (-58 °F to 302 °F)	-270 °C to 1800 °C (-454 °F to 3272 °F)	-200 °C to 962 °C (-328 °F to 1764 °F)
Measurement range	0 to 400 $\Omega$	0 to 500 K $\Omega$	-10 to 100 mV	0 to 400 $\Omega$
Characterizations	ITS-90, IEC-751 (DIN "385"), Callendar-Van Dusen	Steinhart-Hart, YSI-400	NIST Monograph 175, 3-point deviation function applied to NIST 175, 6th-order polynomial	ITS-90 subranges 4, 6 thru 11, IPTS-68 Callendar-Van Dusen
Temperature accuracy, typical (meter only)	$\pm 0.006$ °C at 0 °C $\pm 0.009$ °C at 100 °C	$\pm 0.0025$ °C at 0 °C $\pm 0.025$ °C at 100 °C	Ext. RJC: Int. RJC: K at 600 °C $\pm 0.15$ °C: $\pm 0.4$ °C T at 200 °C $\pm 0.1$ °C: $\pm 0.3$ °C	$\pm 0.006$ °C at 0 °C $\pm 0.009$ °C at 100 °C
Temperature resolution	0.001°	0.0001°	0.01 to 0.001°	0.001 °C
Operating range	16 °C to 30 °C			
Logging intervals	0.1, 0.2, 0.5, 1, 2, 5, 10, 30, or 60 seconds; 2, 5, 10, 30, or 60 minutes			
Communications	RS-232 (tweener) and IR ports included, IEEE-488 (GPIB) optional			
Size (HxWxD)	4.0 x 7.5 x 8.2 in (102 x 191 x 208 mm)			2.4 x 5.6 x 7.1 in (61 x 143 x 181 mm)
Weight	4.5 lb (2 kg)			2.2 lb (1.0 kg)
Calibration	Accredited NIST-traceable resistance calibration and NIST-traceable voltage calibration provided			

# Handheld Thermometer Readouts

**FLUKE**®

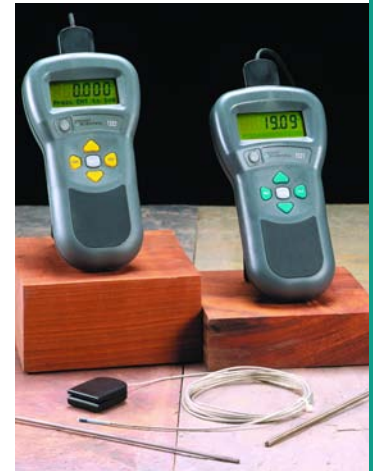
Hart Scientific

## Hart Scientific 1521 and 1522 Handheld Thermometers *Highest precision available in a battery-powered, handheld thermometer*

These handheld thermometers feature measurement accuracy to  $\pm 0.005\text{ }^{\circ}\text{C}$  and  $.001^{\circ}$  resolution. Accept inputs from RTDs or thermistors and with Hart's INFO-CON connector there's no need to program probe coefficients into the meter. All data is stored in the

INFO-CON and conveniently downloaded when connected to the 1521 and 1522.

The 1522 is also a data logger. Log up to 10,000 readings. Download logged data via RS-232 with Hart's 9934 LogWare software.



### Summary specifications for 1521 and 1522

	Pt 25 to Pt 100	Thermistor
Temperature range	-200 °C to 962 °C (-328 °F to 1764 °F)	-50 °C to 150 °C (-58 °F to 302 °F)
Resistance range	0 Ω to 400 Ω	0 Ω to 500 KΩ
Temperature accuracy (meter only)	-200 °C to 100 °C: $\pm 0.025\text{ }^{\circ}\text{C}$ 100 °C to 400 °C: $\pm 0.05\text{ }^{\circ}\text{C}$ 400 °C to 800 °C: $\pm 0.1\text{ }^{\circ}\text{C}$	0 °C to 50 °C: $\pm 0.005\text{ }^{\circ}\text{C}$ 50 °C to 75 °C: $\pm 0.01\text{ }^{\circ}\text{C}$ 75 °C to 100 °C: $\pm 0.02\text{ }^{\circ}\text{C}$
Excitation current	0.5 mA	5 μA
Operating range	0 °C to 40 °C	
Memory	<b>1521</b> – Stores 6 readings in "Hold" mode <b>1522</b> – Logs 10,000 readings in "Auto Logging" mode, 100 readings in "Demand Logging" mode	
Power	Rechargeable nickel-metal-hydrate batteries (ac adapter included)	
Size	7.75 in H x 4.2 in W x 1.5 in D (197 x 107 x 38 mm)	
Weight	1 lb. (0.4 kg)	
Calibration	10-point, NIST-traceable resistance calibration provided	

### Ordering information

#### 1521-156

Thermometer, handheld,  
1 channel, 110 V

#### 1521-256

Thermometer, handheld,  
1 channel, 220 V

#### 1522-156

Thermometer, handheld,  
1 channel data logger, 110 V

#### 1522-256

Thermometer, handheld,  
1 channel data logger, 220 V

#### 9934-S

Software, LogWare  
1-channel, single user

#### 9934-M

Software, LogWare  
1-channel, multi user

#### 9318

Case, 1521/1522,  
probe carrying

**Included:** Adapter/charger



# Micro-Baths

## Ordering information

**7103** Micro-Bath, 30 °C to 125 °C (includes a transport seal lid and a 2085 test lid)

**7102** Micro-Bath, -5 °C to 125 °C (includes a transport seal lid and a 2082-P test lid)

**6102** Micro-Bath, 35 °C to 200 °C (includes a transport seal lid and a 2082-M test lid)

(Specify 110V or 220V power)

**5010-L** Silicone oil, type 200.05, 1 liter (usable range: -40 °C to 130 °C)

**5013-L** Silicone oil, type 200.20, 1 liter (usable range: 10 °C to 230 °C)

**9317** Carrying case for 7103

**9310** Carrying case for 6102

**9311** Carrying case for 7102



## Hart Scientific 6102, 7102 and 7103 Micro-Baths *Portability and extreme stability*

- Stability to  $\pm 0.015$  °C
- Ranges from -30 °C to 200 °C
- Accepts oddly shaped sensors
- Exceptional bath portability
- Direct interface to Fluke 744

## Summary specifications

	6102	7102	7103
Range	35 °C to 200 °C (95 °F to 392 °F)	-5 °C to 125 °C (23 °F to 257 °F)	-30 °C to 125 °C (-22 °F to 257 °F)
Accuracy	$\pm 0.25$ °C		
Stability	$\pm 0.02$ °C at 100 °C (oil 5013) $\pm 0.03$ °C at 200 °C (oil 5013)	$\pm 0.015$ °C at -5 °C (oil 5010) $\pm 0.03$ °C at 121 °C (oil 5010)	$\pm 0.03$ °C at -25 °C (oil 5010) $\pm 0.05$ °C at 125 °C (oil 5010)
Operating temperature	5 °C to 45 °C		
Heating time	25 °C to 200 °C: 40 minutes	25 °C to 100 °C: 30 minutes	25 °C to 100 °C: 35 minutes
Cooling time	200 °C to 100 °C: 35 minutes	25 °C to 0 °C: 30 minutes	25 °C to -20 °C: 45 minutes
Well size	2.5 in dia. x 5.5 in deep (64 x 139 mm) (access opening is 1.9 in [48 mm] in diameter)		
Size	5.5 W x 10.38 H x 8 D in (14 x 26 x 20 cm)	7.2 W x 12 H x 9.5 D in (18 x 31 x 24 cm)	9 W x 13.2 H x 10.5 D in (23 x 34 x 26 cm)
Weight	10 lb. (4.5 kg) with fluid	15 lb. (6.8 kg) with fluid	22 lb. (9.8 kg) with fluid
Power	115 VAC, 230 VAC ( $\pm 10$ %)	115 VAC, 230 VAC ( $\pm 10$ %)	94-234 VAC ( $\pm 10$ %)
Computer interface	RS-232 included with free Interface-it software		
NIST-traceable calibration	Data at 50 °C, 100 °C, 150 °C, and 200 °C	Data at -5 °C, 25 °C, 55 °C, 90 °C, and 121 °C	Data at -25 °C, 0 °C, 25 °C, 50 °C, 75 °C, 100 °C, and 125 °C

# Thermo-Hygrometer

FLUKE®

Hart Scientific

## Hart Scientific 1620 Graphical temperature/humidity logger

- Two channels measure ambient temperature to  $\pm 0.25$  °C and relative humidity to  $\pm 2$  %
- On-board memory holds up to 400,000 time/date-stamped readings; PC card holds millions more
- Detachable probes contain their own calibration data for easy recalibrations
- Optional software logs in real time or shows graphical/statistical data
- User configurable display for trend graphs and data
- Visual and audio alarms for numerous alarm or fault conditions

### Summary specifications

	Description
Temperature range	0 °C to 50 °C (32 °F to 122 °F)
Temperature accuracy	15 °C to 35 °C: $\pm 0.25$ °C (calibrated) 0 °C to 15 °C, 35 °C to 50 °C: $\pm 0.5$ °C (uncalibrated typical)
Delta temperature accuracy	$\pm 0.025$ °C for $\pm 1$ °C changes within 15 °C to 35 °C
Temperature resolution	User selectable up to 0.001 °C
RH range	0 % to 100 % RH
RH accuracy	20 % to 70 % RH: $\pm 2$ % RH (calibrated) 0 % to 20 % RH, 70 % to 100 % RH: $\pm 3$ % RH
Delta humidity accuracy	$\pm 1.0$ % for $\pm 5$ % changes within 20 % to 70 % RH
RH resolution	User selectable up to 0.01 %
Inputs	Up to two sensors, each measuring temperature and relative humidity; remotable
Display	LCD, displays data graphically, numerically and statistically; 16 setups are included
Memory (internal)	400,000 typical individual time-stamped readings
Alarms	Visual and audio alarms for temperature, temperature rate, RH, RH rate, and fault conditions
Communications	RS-232 and IrDA
PC card interface	64 MB flash memory for downloading data to a PC
Power	12 V dc from external 100-240 VAC power supply
Operating range	0 °C to 50 °C
Size (DewK)	4.9 H x 8.3 W x 2.0 D in (125 x 211 x 51 mm)
Weight	1.5 lb. (0.7 kg)
Calibration	Certificate of NIST-traceable calibration included



### Ordering information

**1620-S** The "DewK"  
Thermo-Hygrometer (includes probe, wall mount bracket and RS-232 cable)

**1621-S** Standard Accuracy Value Kit (includes Models 1620-S, 2627-S and 9936-S)

**2626-S** Spare Probe

**2627-S** Spare Probe Kit, 1620-S (includes standard-accuracy DewK probe, probe case, probe wall mount bracket, and 25-foot [7.6 m] extension cable)

**2628** Cable, 25-foot (7.6 m) extension cable

**2629** Cable, 50-foot (15.2 m) extension cable

**2632-64** PC Card, 64 MB

**2607** Protective Case, Spare Probe

**9328** Protective Case, for 1620

**2361** Spare Power Supply, 100-240 V ac to 12 V dc

**9936-S** LogWare III, single-PC license

**LIC-9936** LogWare III License (for additional PCs)

# Software and Optional Probes

## Ordering information\*

**9938** MET/TEMP II Software (package includes CD-ROM, RS-232 emulator box, adapter, and PC cable), (specify 110 V or 220 V)

**9934** LogWare

**9935** LogWare II

\* Requires Windows® 98 or higher

## Hart Scientific MET/TEMP II Software

### **Easy-to-use temperature calibration automation software**

- Fully automated calibration of RTDs, thermocouples, thermistors and many heat sources
- Calibrates up to 100 sensors at up to 40 points
- Performs coefficient calculations and generates tables and reports
- Reports conform to ANSI and NCSL standards

## Hart Scientific LogWare Data Logging and Analysis Software

### **Turns any Hart Scientific thermometer readout into a real-time data logger**

- Calculates statistics and displays customized graphs
- User-selectable alarms, delayed start times, and sample intervals
- Logging intervals from 1 second to 24 hours
- User-settable alarm functions

### **Each probe includes:**

- Individual report of calibration
- Probe linearization coefficients
- Resistance vs. temperature table
- Termination to match your thermometer readout (see spec chart)

## Summary specifications

Model	Type	Range	Size	Basic Accuracy
5626-12-X	High-Temp PRT, 100 ohm	-200 to 661 °C (-328 to 1221 °F)	1/4 in x 12 in (6.35 x 305 mm)	± 0.007°C at 0 °C
5614-12-X	Secondary PRT, 100 ohm	-200 to 420 °C (-328 to 788 °F)	1/4 in x 12 in (6.35 x 305 mm)	± 0.018 °C at 0 °C
5613-6-X	Secondary PRT, 100 ohm	-200 to 300 °C (-328 to 572 °F)	3/16 in x 6 in (4.76 x 152 mm)	± 0.018 °C at 0 °C
5612-9-X	Secondary PRT, 100 ohm	-200 to 420 °C (-328 to 788 °F)	3/16 in x 9 in (4.76 x 229 mm)	± 0.018 °C at 0 °C
5627-6-X	RTD, 100 ohm	-200 to 300 °C (-328 to 572 °F)	3/16 in x 6 in (4.76 x 152 mm)	± 0.050 °C at 0 °C
5627-9-X	RTD, 100 ohm	-200 to 420 °C (-328 to 788 °F)	3/16 in x 9 in (4.76 x 229 mm)	± 0.050 °C at 0 °C
5627-12-X	RTD, 100 ohm	-200 to 420 °C (-328 to 788 °F)	1/4 in x 12 in (6.35 x 305 mm)	± 0.050 °C at 0 °C
5618A-9-X	PRT, 100 ohm	-200 to 500 °C (-328 to 932 °F)	1/8 in x 9 in (3.2 x 229 mm)	± 0.050 °C at 0 °C
5622-05-X	Fast-response RTD	-200 to 350 °C (-328 to 662 °F)	0.02 in x 4 in (0.5 x 100 mm)	± 0.15 °C at 0 °C, uncalibrated; ± 0.04 °C, calibrated*
5610-9-X	Thermistor, Stainless	0 to 100 °C (32 to 212 °F)	1/8 in x 9 in (3.2 x 229 mm)	± 0.015 °C at 0 °C
5611-X	Thermistor, Bare Silicone Bead	0 to 100 °C (32 to 212 °F)	0.07 in x 0.55 in (1.8 x 14 mm)	± 0.015 °C at 0 °C

\*These probes do not come with an individual certificate if a calibration is not ordered separately. Order calibration 1923-4-N if needed, (186 to 300 °C). Model Info: X = I for 1521 or 1522, D for 1502A, L for 1529. 5610 and 5611 not applicable for 1502A.

# Industrial Multimeters

FLUKE®

## Fluke 87V Industrial Multimeter Designed to troubleshoot adjustable speed drives

The new Fluke 87V has improved measurement functions, troubleshooting features, resolution and accuracy to solve more problems on motor drives, plant automation, power distribution, and electro-mechanical equipment.

- Unique function for accurate voltage and frequency measurements on adjustable speed motor drives.
- Built-in thermometer.
- Measures A and mA.
- Large display with bright white backlight.

## Fluke 189 Logging Multimeter Designed to solve complex problems

The Fluke 189 can measure and log electrical parameters required to troubleshoot problems in power distribution and industrial automation.

- Built-in data logger to record voltage, current, temperature and other parameters unattended.
- Recorded data can be transferred to a PC with optional FlukeView® Forms software.
- Measure and display two parameters simultaneously. Monitor VAC and frequency at the same time.



87V and 189 capabilities	87V	189
Built-in data logger		•
Optically isolated serial port		•
Selectable filter for accurate voltage and frequency measurements on motor drives	•	
True-rms ac voltage and current for accurate measurements on non linear signals	•	•
True-rms ac + dc mode to measure composite signals		•
Basic dc accuracy	0.05 %	0.025 %
High resolution for precise readings	10 $\mu$ V	1 $\mu$ V
AC bandwidth for high frequency signals	20 KHz	100 KHz
Built-in thermometer lets you carry one less tool	•	•
10,000 uF capacitance range for components and motor caps	•	•
Peak capture to record transients as fast as 250 $\mu$ s	•	•
Resistance, continuity and diode test	•	•
Frequency and % duty cycle	200 KHz	1 MHz
Db and pulse width		•
Min/Max and average recording to capture variations automatically	•	•

## Ordering information

**Fluke 87-5 Industrial Multimeter**

**Fluke 189 Logging Multimeter**

Both meters include test leads, alligator clips, batteries (installed), Getting Started manual, operators manual and application notes on CD. Model 87V includes a temperature probe.

**Also available:**

**BP189 Extended Life Battery Pack**

**87V/E Combo Kit**

# Industrial Electrical Tools



## ScopeMeter® 120 Series Handheld Oscilloscope For industrial electrical, electronic and process troubleshooting applications

The compact ScopeMeter® 124 is the rugged solution for industrial troubleshooting and installation applications. This is a truly integrated test tool, with oscilloscope, multimeter and “paperless” recorder in one affordable, easy-to-use instrument. Find fast answers to problems in machinery, instrumentation, control, industrial control networks and power systems.

- Dual-input 40 MHz or 20 MHz digital oscilloscope
- Two 5,000-count true-rms digital multimeters
- A dual-input TrendPlot™ recorder
- Connect-and-View™ trigger simplicity for hands-off operation
- Shielded test leads for oscilloscope, resistance and continuity measurements
- Up to seven hours battery operation
- 600 V CAT III safety certified
- Rugged compact case

### Summary specifications

Bandwidth	40 MHz and 20 MHz
Max. real time sample rate	25 MS/s
Max. equivalent time sample rate	up to 2.SGS/s
Number of inputs/digitizers	2
Glitch capture	40 ns
Trigger types	Connect-and-View™, Free run, Single Shot, Edge, Video
Scope measurements	26 automatic measurements
Cursors	Yes
Dual input TrendPlot	Yes
Memory for screens and set-ups	20
True-rms multimeter	5000 counts, Volts, Amps, Ohms, Continuity, Diode, Temp
Safety certified (EN61010-1)	600 V CAT III (instrument and included accessories)
Battery (installed)	Fluke 124: 7 hr NiMH
Line power	Adapter / battery-charger included
Size	232 x 115 x 50 mm (9.2 x 4.5 x 2 in)
Weight	1.2 kg
PC and printer interface	Using optional Optically Isolated RS-232 adapter / cable
Warranty	3 years on main instrument, 1 year on the standard accessories

### Ordering information

#### Fluke 124/S

Industrial ScopeMeter Handheld Oscilloscope, 40 MHz, with SCC120

#### Fluke 124

Industrial ScopeMeter Handheld Oscilloscope, 20 MHz

Fluke 124S includes Hard-shell carrying case, optically isolated RS-232 adapter/cable and FlukeView for ScopeMeter Windows® software

# Industrial Electrical Tools

FLUKE®

## Fluke 337 Clamp Meter

**The Fluke 337 is the ultimate clamp meter for troubleshooting variable speed drives and motors**

- Inrush current function for measuring starting current for motors, lighting, etc.
- Small body and jaws fit perfectly in your hand and into tight places
- Improved low current measurement accuracy from new microprocessor technology
- Meter controls are positioned so current measurements can be done with one hand (index finger on clamp opening lever and thumb on rotary switch)
- Large, backlit display is easy to see
- Auto shut-off maximizes battery life so the meter works when you need it
- Handy display hold keeps measurements on the display
- Backed by Fluke technical phone support, repair, parts and calibration service
- Three-year warranty

Features	337
Backlight	•
Amps ac	999.9
Amps dc	999.9
True-rms	•
Volts ac/dc	600.0
Basic current accuracy	2 %
Resistance (Ohms)	600.0/6 K
Continuity beeper	•
Frequency (Hz)	400.0
Min/Max capture	•
Inrush current	•
DC zero button	•
Jaw size	1.7 in/43mm
Maximum wire size	750 MCM



## Recommended accessories – 337 clamp meter



**TL223**  
SureGrip™ Electrical  
Test Lead Set



**H3**  
Clamp Meter Holster



**LVD1**  
Volt Light



**TL71**  
Premium Test Lead Set



**AC72**  
Alligator Clips

**For more detailed information, go to [www.fluke.com/clamps](http://www.fluke.com/clamps)**

## Ordering information

### Fluke 337

Meter includes soft carrying case, test leads, two batteries, instruction card and safety information.



# Industrial Electrical Tools



## **Fluke 1550B MegOhmMeter** **Digital insulation testing from 250 to 5000 volts for** **troubleshooting and preventive maintenance**

The Fluke 1550B is a versatile, rugged digital MegOhmMeter capable of testing switchgear, motors, generators, and cables at up to 5000 V dc, making it a powerful preventive and predictive maintenance tool.

- Standard test voltages of 250 V, 500 V, 1000 V, 2500 V and 5000 V
- Programmable test voltages available in 50 volt steps from 250 to 1000 volts and 100 volt steps from 1000 to 5000 volts
- High capacity batteries allow longer testing between recharge
- Automatic calculation of Dielectric Absorption and Polarization Index with no additional setup, reduces testing time
- Improved ramp function (0 to 5000 V dc) for breakdown testing
- Measures resistances up to one teraohm
- Measures cable or insulation capacitance and leakage current
- Warning voltage function alerts the user that voltage is present and gives the voltage reading up to 600 V ac or dc
- Auto discharge of capacitance voltage

## **36 Ordering information**

### **Fluke 1550B MegOhmMeter**

Includes test leads, 5000 V-rated probes, alligator clips, interface adapter and cable, FlukeView® Forms Basic software, line cord, soft carrying case and user's manual

## **Recommended accessories – 1550B MegOhmMeter**



**FVF-UG**  
FlukeView Forms  
Software Upgrade



**TL1550EXT**  
25 Foot Extension  
Test Lead Set



**L206**  
Deluxe LED Hat Light

**For more detailed information, go to [www.fluke.com/1550](http://www.fluke.com/1550)**

# Thermal Imager

FLUKE®

## Fluke Ti30™ Thermal Imager Everything needed for everyday imaging

- **Complete imaging solution** – The Ti30 thermal imager is packaged with all necessary accessories, unlimited-use InsideIR™ companion software, and two days of professional thermography training.
- **Lowest cost of ownership** – An exceptional value for a high-performance imager, the Ti30 also offers affordable instrument service and calibrations.
- **Fast and easy predictive maintenance inspection routing** – Plan your equipment inspection route, load it once into the imager, and then follow the easy, on-camera instructions each time you perform inspections.

### Summary specifications for Ti30™ Thermal Imager

Detector	
Detector type	120 x160 thermal element uncooled focal plane array microbolometer
NETD (Noise equivalent temp. difference)	200 mK
Thermal	
Temperature range	-10 °C to 250 °C (14 °F to 482 °F)
Accuracy	±2 % or ±2 °C (+/- 3 % or 3 °C from -10 to 0 °C)
Optical	
Optical resolution	90:1
Minimum diameter measurement spot	7 mm (0.27 in) at 61cm (24 in)
Field of view (FOV)	17° Horizontal x 12.8° Vertical
Target sighting	Single laser dot (Meets IEC Class 2 & FDA Class II requirements)
Controls and adjustments	
Focus	Focusable, 61cm (24 in) to infinity
Temperature scale	°C or °F selectable
Palettes	Gray, ironbow or rainbow
Measurement modes	Automatic, semi-automatic or manual
Adjustable emissivity	0.10 to 1.00 by 0.01
Reflected background temperature	-50 °C to 460 °C (-58 °F to 860 °F)
Environmental	
Ambient operating temperature	-10 °C to 50 °C (14 °F to 122 °F)
Relative humidity	10 to 90 % non-condensing
Storage temperature	-25 °C to 70 °C (-13 °F to 158 °F) [without batteries]
Other	
Storage capacity	100 images
Power	Rechargeable battery pack or 6AAs (not included)
Battery life	Minimum 5 hours continuous use
Image frame rate	20 Hz
Thermal analysis software	InsideIR (included)
PC software operating systems	Microsoft® Windows® 98®, 2000® or XP®
Weight (includes batteries)	1 kg (2.2 lb)
Warranty	1 year (U.S. only)

New



### Ordering information

#### Fluke Ti30™ Thermal Imager

Includes docking station with universal power adapter and USB connection, hardshell carrying case, USB field cable, rechargeable battery pack, interactive CD, training presentation CD, carrying pouch, wrist strap and quick reference card.

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#### Optional:

NIST Calibration Certificate  
The Fluke Ti30 Thermal Imager is sold exclusively through thermography representatives. To request a demonstration or order a Ti30 imager, visit [www.fluke.com/thermography](http://www.fluke.com/thermography) or call (800) 866-5478.

# Power Quality Analyzers

New



## Fluke 433 and 434 Power Quality Analyzers Three-phase power quality analyzers

The Fluke 433 and 434 three-phase power quality analyzers help you locate, predict, prevent and troubleshoot problems in power distribution systems for process plants.

These easy-to-use handhelds are a “must have” for any person who maintains or troubleshoots three phase distribution. The new IEC standards for flicker and power quality are built right in to take the guesswork out of monitoring.

### 433 and 434 feature:

- Four voltage and four current channels
- Captures waveform data on all phases simultaneously
- System-Monitor: Six power quality parameters on one dashboard
- Autotrend – Analyze trends using cursors and zoom while background recording continues
- Minimal setup required with intuitive menus
- Highest safety rating in the industry
- Rugged, handheld recorder
- Transfer data files to your PC for reporting and analysis using FlukeView software

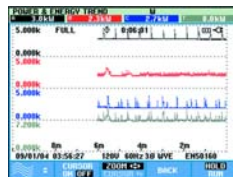
## Ordering information

### Fluke-433 Power Quality Analyzer (three-phase)

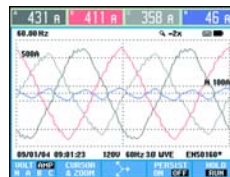
### Fluke-434 Power Quality Analyzer (three-phase)

Includes four dual-range (40 A and 400 A) current clamps, five voltage test leads and clips, line adapter/battery charger, color localization input decals, color wire clips for test leads, carrying case, manual and quick start guide.

### Fluke-433UGK Upgrade Kit for Fluke 433



- Automatic transient display: never miss an event
- Auto trend: don't waste time setting up recordings



- Four voltage and four current channels.
- Captures waveform data on all phases simultaneously



- System-Monitor: Six power quality parameters on one dashboard

**Summary specifications for 433 and 434 power quality analyzers**

Function	433	434
Application	Three-phase	
Inputs	4 voltage and 4 current (for 3 phases and ground)	
<b>Measurements</b>		
Vrms, Arms, Hz, W, VAR, VA, PF, Cos φ (DPF), Crest Factors	•	•
Harmonics and THD (V,A,W), k-factor	•	•
Inter-harmonics	Optional*	•
kWh and kVARh (forward and reverse), kVAh, demand interval	Optional*	•
Flicker (Plt, Pst, PF5)	•	•
Unbalance	•	•
Recorder/AutoTrend	•	•
System-Monitor	•	•
Real time scope/phasor diagrams	•	•
Dips and swells/half cycle based	•	•
Transient display	Optional*	•
Inrush current	Optional*	•
EN50160 compliance	•	•
IEC61000-4-30 compliance	•	•
Memory (screens/data)	25/5 standard 50/10 Optional*	50/10
FlukeView® software and interface cable	Optional*	•

\* Optional functionality can be added with upgrade kit. For details see ordering information.

**Recommended accessories**



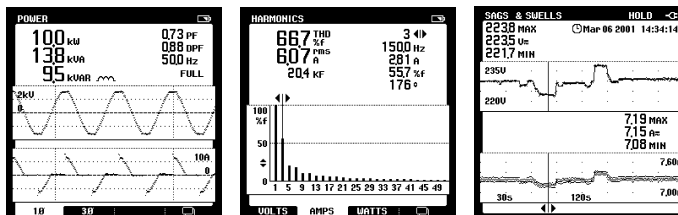
**i2000PQ4**  
4 pack i2000A Flexclamp



**Fluke 43B Power Quality Analyzer**  
*Power quality analysis plus a scope and a multimeter*

**The Fluke 43B features:**

- Voltage and current waveforms displays
- Watts, power factor, VA and VARs
- Voltage, current and power harmonics up to 51st
- Record V and A on a cycle by cycle basis
- Catch and display up to 40 transients
- Calculates 3-phase power on balanced loads



**Ordering information**

**Fluke 43B Power Quality Analyzer**

Includes a hard case, voltage and current probes, FlukeView® PC software and power quality instructional CD, interface cable, line voltage adapter/battery charger and user's manuals.

# Accessories — Test Leads and Probes, Temperature & Pressure



## TL224 SureGrip™ Silicone Insulated Test Leads

- 1.5 m silicone-insulated wire resists heat and cold
- CAT III 1000 V, 10 A, CAT IV 600 V, 10 A



## TP220 SureGrip™ Industrial Test Probes

- Sharp, 1/2 in. stainless steel tip provides reliable contact
- CAT III 1000 V, 10 A, CAT IV 600 V, 10 A



## AC280 SureGrip™ Hook Clips

- Profile narrows to .22 in. at tip
- CAT III 1000 V, CAT IV 600 V, 3 A



## AC283 SureGrip™ Pincer Clips

- 4.5 in. flexible, insulated shaft
- CAT III 1000 V, CAT IV 600 V, 1 A



## TLK-225 SureGrip™ Master Accessory Kit

- AC220 plunger style alligator clips
- AC280 plunger style hook clips
- AC283 plunger style pincer clips
- AC285 large jaw alligator clips
- TP220 sharp test probes
- TL224 right to straight test leads
- 6-pocket storage pouch



## L200 Probe Light

- Small, rugged light easily attaches to any Fluke test probe
- Bright white LED never burns out
- 120 hours of battery life

## 80PK-8 Pipe Clamp Temperature Probe

- Designed for pipe surfaces from 6.4 mm (1/4 in) to 34.9 mm (1-3/8 in) diameter
- Measurement range: -29 °C to 149 °C



## 80PK-27 SureGrip™ Industrial Surface Temperature Probe

- For flat or slightly curved surfaces
- Compatible with K-Type instruments
- Measurement range: -127 °C to 600 °C



## 80PK-22 SureGrip™ Immersion Temperature Probe

- For use in liquids or gels
- Compatible with K-Type instruments
- Measurement range: -40 °C to 1090 °C



## 80PK-24 SureGrip™ Air Temperature Probe

- For air and non-caustic gas measurements
- Compatible with K-Type instruments
- Measurement range: -40 °C to 816 °C



## PV350 Pressure Vacuum Module

- Digital pressure and vacuum measurements in a single module
- Measures HVAC/R, hydraulic and pneumatic pressures to 350 psig/2413 kPa
- Measures to 29.9 in Hg/76 cm Hg vacuum



## MeterCleaner Wipes

- Industrial strength cleaning formula removes surface dirt, oil and grease
- Comes in two sizes: 6-pack (MC60) and 50-pack (MC50)



# Accessories — Test Pumps and Hoses

FLUKE®

## Fluke 700PMP Pressure Pump

The Fluke 700PMP is a hand-operated pressure pump to provide pressures up to 150 psi/1000 kPa. Output fitting is 1/8 FNPT.

## Fluke 700PTP Pneumatic Test Pump

The Fluke 700PTP is a handheld pressure pump designed to generate either vacuum to -11.6 psi/-0.8 bar or pressure to 600 psi/25 bar.

## Fluke 700HTP Hydraulic Test Pump

The Fluke 700HTP is designed to generate pressures up to 10,000 psi/700 bar. Use the Fluke-700PRV adjustable relief valves to limit pressures to 1360 psi and 5450 psi.

## Fluke 700HTH Hydraulic Test Hose

The Fluke 700HTH is a 10,000 psi, 700 bar test hose that connects to a calibration unit under test from a Fluke 700HTP hydraulic test pump.

## Fluke 700LTP Low Pressure Test Pump

The Fluke 700LTP is designed to generate either vacuum to -12 psi/-0.85 bar or pressures to 30 psi/2000 mbar. The Fluke 700 LTP is primarily intended for low pressure applications and features a fine adjust vernier and an adjustable slow-bleed relief valve.

## Fluke 700ILF In-Line Filter

The Fluke 700ILF can be used to isolate the calibrator from incidental contact with fluids. Particularly useful with the 718 calibrator to help keep moisture or oils from contaminating the on-board pump.

## 87-Retrofit Kit for 787, 83, 85, 87-3 meters

Breathe new life into your old meter.

- Replacement holster, DR80 LCD display upgrade kit, TL71 premium DMM test leads, AC72 slide-on style alligator clips, F1 and F2 replacement fuses, MeterCleaner Wipes



Fluke 700PMP



Fluke 700HTP



Fluke 700PTP



Fluke 700HTH



Fluke 87-Retrofit Kit



Fluke 700ILF



Fluke 700LTP



# Accessories — Cases, Storage, Shunts and Battery Packs



Carrying cases



Fluke 700-IV



Battery pack



Fluke C550 Tool Bag

## **C700 Hard Carrying Case (700 Series)**

Hard carrying case with custom-cut foam liner

## **C781 Soft Carrying Case**

Rugged, close-fitting fabric carrying case for documenting process calibrator. A separate, detachable pouch holds test leads and accessories.

## **C789 Soft Carrying Case**

Rugged, three-compartment fabric carrying case for documenting process calibrator and accessories

## **C550 Tool Bag**

- Steel reinforced frame
- Rugged ballistic cloth with heavy duty hardware
- Large zippered storage compartment with 25 pockets
- Weather resistant
- Carry all your tools to the job

## **Fluke 700-IV Current Shunt**

**Conversion factor:** 10 mV = 1 mA

**Accuracy (% of input, 1 year):** 0.025 %

**Input current:** 0 to 55 mA

**Input resistance:** 250  $\Omega$  nominal

**Output resistance:** 10  $\Omega$  nominal Accuracy specification applies from +18 °C and 28 to 50 °C

**Maximum input voltage:** 30 V dc

## **BP7235 NiMH Battery Pack**

7.2 V 3500 mA-hour rechargeable NiMH battery pack

## **BP7217 NiCd Battery Pack**

7.2 V 1700 mA-hour rechargeable NiCd battery pack

## **80PK-8 Pipe Clamp Temperature Probe**

Type-K thermocouple for fast temperature and super heat measurements of pipe surfaces. Measurement range: -29 to 149 °C (-20 to 300 °F) for pipe surfaces from 6.4 mm to 34.9 mm.

## **i1010-Kit**

- i1010 1-600 A ac rms, 1-1000 A dc current clamp
- Zippered vinyl carry case with moveable divider



Fluke i1010 Kit

# Accessories Compatibility Chart

	743B, 744	741B	725	717, 718	712	714	724	715	707	705	78X	61, 65	51/52, 53/54	87V	433, 434	43B
700Pxx Pressure Modules	•	•	•	•												
BP7217 NiCd Battery Pack	•	•														
BP7235 NiMH Battery Pack	•	•														
BE9005 Battery Eliminator	•	•														
BC7217 Battery Charger	•	•														
700BCW Bar Code Wand	•															
700BCA Bar Code Adapter	•				•											
TPAK Magnetic Hangar			•	717	•	•	•				•		•	•		
700TC1 and TC2 Thermocouple Plug Kits	•	•	•			•	•						•			
80CJ-M or 80CK-M Mini-connectors	•	•	•			•	•						•	• <sup>3</sup>		
80PK Thermocouple Probes (all)	•	•	•			•	•						•	• <sup>3</sup>		
700-IV Current Shunt	•	•														
700ILF In-line Filter				•												
700LTP Low-pressure Test Pump	•	•	•	•												
700PMP Pressure Pump	•	•	•	• <sup>2</sup>												
700PTP Pneumatic Test Pump	•	•	•	• <sup>2</sup>												
700HTH Hydraulic Test Hose	•	•	•	• <sup>2</sup>												
700HTP Hydraulic Test Pump	•	•	•	• <sup>2</sup>											•	
i400 AC Current Clamp														•		
i410 AC/DC Current Clamp	•	•							•		•	• <sup>1</sup>		•	•	•
i1010 AC/DC Current Clamp	•	•							•		•	• <sup>1</sup>		•	•	•
C10 Holster, C12A Case				•		•	•	•		•	•			•		
C25/C100 Cases			•	•	•	•	•	•	•	•	•			•		
C781 Soft Carrying Case	•	•														
C789 Soft Carrying Case	•	•														•
C700 Hard Carrying Case	•	•														
C120/C125 Cases			•				•				•			•		
C510 Leather Case			•	•	•	•	•	•	•	•	•	•	•	•		
C530 Leather Accessory Case	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
C550 Tool Bag	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
PV350 Pressure Vacuum Module	•	•						•	•	•	•			•	•	
Fiber Optic Meter FOM	•	•						•	•	•	•			•		

1. 20 amps ac minimum 2. External pump required only when using high pressure modules 3. Requires 80AK adapter

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