

**FLUKE**<sup>®</sup>

Calibration

# 5730A High Performance Multifunction Calibrator



The new gold standard in  
electrical calibration



### 5730A features at a glance

- Improved performance specifications for ac voltage, ac current and resistance
- 6.5 inch VGA capacitive touch screen with full color graphical user interface
- Visual Connection Management™ terminals guide cable connections
- Choice of nine languages
- Compatible with 52120A and 5725A amplifiers
- Full MET/CAL® compatibility with 5700A and 5720A procedures
- Artifact Calibration using 10 V, 1  $\Omega$  and 10 k $\Omega$  external standards

## Introducing a new standard for multifunction calibration



1988



2013

Since 1988, the 5700A family has set the standard for multifunction calibrator performance in calibration laboratories around the world. Now the time has come to advance this best-in-class calibrator, taking advantage of twenty-first century technology and usability.

The Fluke Calibration 5730A High Performance Multifunction Calibrator is the culmination of years of engineering development, customer research and industrial design, to bring to market the new “gold standard” in electrical multifunction calibration.

## High performance for the future

Like its predecessors, the 5730A calibrates a wide range of digital multimeters, up to long-scale 8.5 digit DMMs, as well as RF voltmeters when equipped with the wideband option. But this new model features improved specifications that will

help you increase test uncertainty ratios (TURs) and increase test confidence. What's more, the improved specifications will reduce your need to guardband, giving you confidence and peace of mind in your calibrations.

### The calibrator for those who demand the best

The 5730A is designed for calibration professionals who require the most accurate dc/lf signals available in a multifunction calibrator, as well as those who simply want the best calibrator available. Metrologists in national laboratories, the military, third party calibration laboratories, and corporate users with high-end workload will value the performance and reliability of the 5730A.

All 5730A calibrators are traceable to international standards and are produced in the

factory with ISO/IEC 17025 accredited calibrations. Specifications are stated to the standard Fluke Calibration 99% confidence level (as well as 95% confidence level) to support easy measurement comparisons according to international quality standards. Specifications are absolute and include the uncertainty of the calibration standards used. No additional analysis is required.

### Updated features provide improvements inside and out

The 5730A calibrator incorporates the latest technology and usability features. Surface mount technology and modern digital components have enabled Fluke Calibration to advance the proven design of the 5700A/5720A and create the next generation of high performance multifunction calibrators. The 5730A provides more reliability and, ultimately, improved performance.

The 5730A keeps many of the front-panel details that characterize its predecessors, while adding a new full color touch screen display to enhance usability and help you calibrate more efficiently. Users enter values via a familiar, calculator-style keyboard, working naturally from left to right. A new graphical user interface features easy-to-read, easy-to-use menus, as well as access to common functions with just the touch of a finger. Status indicators for OPERATE, STANDBY, and HAZARDOUS VOLTAGE appear on the screen in bright letters or icons that you

can easily recognize from across the calibration lab. The touch screen messages are available in your choice of nine languages, including English, French, German, Spanish, Japanese, Chinese, Portuguese, Russian, and Korean.

The redesigned front panel features many new improvements, like Visual Connection Management™ output terminals that light up to show you which terminals are active, guiding the user to make the correct connections. The handles and dial are overmolded for comfort and feel. USB ports are placed both on the front and rear of the unit. Use the port at the front to download internal calibration constants; use the rear port for remote communication with a PC—or choose the LAN, IEEE or serial interfaces.

### Updated circuit board design

Comparing the new 5730A circuit board on the left with the older 5720A board on the right, it is easy to see the improvements enabled by modern digital componentry.



## Increased confidence, reduced cost of ownership

The 5730A calibrator features Artifact Calibration. Only three artifact standards—a 10 V dc reference and 1 ohm and 10 k ohm resistance references—are required to calibrate all ranges and functions to full specifications. Front panel GUI instructions prompt the operator to make connections and inputs each step of the way. The calibrator controls the process, which takes only about an hour, compared to several hours using traditional calibration methods. In addition to saving time and equipment costs, Artifact Calibration can extend time between calibrations of the 5730A to two years before a full verification check by a Fluke Service Center is required. And, because the 5730A can tolerate operating temperatures between 15 °C and 35 °C, it can be calibrated where it's used, rather than having to be shipped to a standards laboratory for calibration.

## Save time and support costs with Artifact Calibration

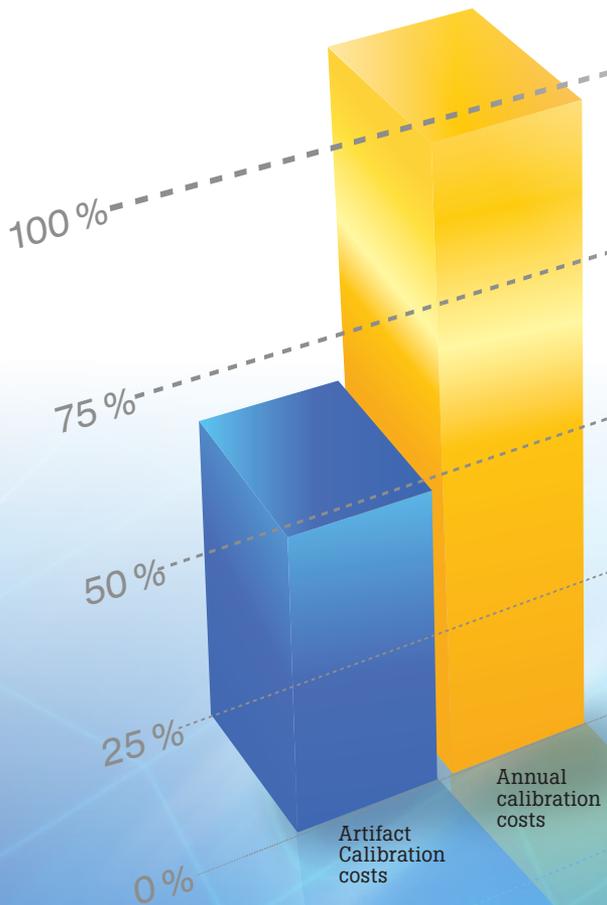
When Artifact Calibration was first introduced in the Fluke 5700A, customers asked many questions about traceability because they were surprised that you could calibrate so many ranges and functions with only three external standards. However, thanks in part to considerable testing and evaluation by three national laboratories in Europe, Artifact Calibration is fully validated by the metrology community. Today many metrologists rely on Artifact Calibration to maintain their Fluke calibrators at 90-day specifications for up to two years. Significant savings can be realized in calibration costs by only performing a full verification at a certified Fluke Service Center every two years. The time savings are also significant, as Artifact Calibration allows the 5730A to remain in service and conducting calibrations when it would otherwise be unavailable due to shipping and service time. Speak to a Fluke Calibration representative today to learn how to embrace this advantageous approach to maintaining the traceability of your 5730A.

## Cal Check monitors performance between calibrations

For extra confidence that the 5730A calibrator stays within its specifications between calibrations, the built-in automated Cal Check function checks every range and function against a set of dedicated internal standards to monitor the drift of each. These Cal Check results can be downloaded to a computer via the USB port conveniently placed on the front of the unit to develop control charts predicting the calibrator's long-term performance. It may surprise many to learn that the internal standards built into every 5730A are the functional and design equivalents of a Fluke 732B 10 V reference plus two fully characterized metrology-grade resistance standards. These standards—totally separated from the output circuitry—are not used in normal operation and are provided solely to provide a check.

## Improving calibration of 8.5 digit DMMs

The improved performance of the new Fluke Calibration 5730A allows calibration professionals the best ability to calibrate the most demanding workloads. The most prevalent long-scale digital multimeters in the world are the Fluke Calibration 8508A and the Agilent 3458A. Due to the high level of accuracy of these two 8.5 digit DMMs, there are





several points where calibration professionals are forced to use a technique known as guardbanding. This method decreases the measurement uncertainty for a particular value in order to guarantee the calibrated value falls within the appropriate 99 % or 95 % confidence interval. In designing the new 5730A, Fluke Calibration worked diligently to bring its customers even better performance specifications to help address some of these “problem points.”

**High current output to 120 A**

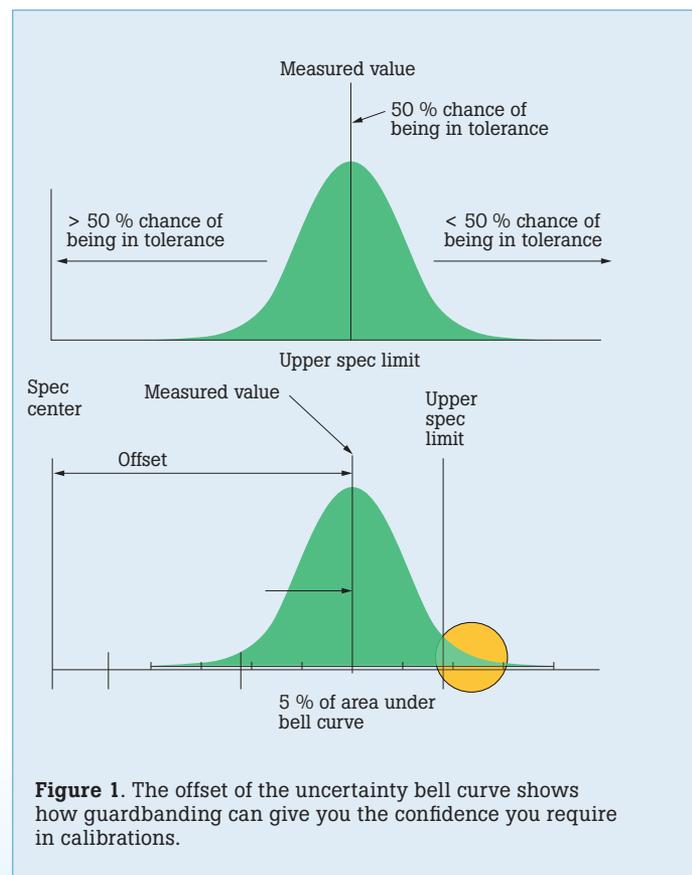
Paired with a Fluke Calibration 52120A Transconductance Amplifier, the 5730A can output up to 120 A and display the output on the 5730A touch screen display. Operating in closed-loop mode with the 52120A, the 5730A maintains the best current accuracy over the widest range of calibration workload.

The new 5730A is also compatible with the Fluke Calibration 5725A Boost Amplifier.

**Guardbanding: Helping you to sleep well at night**

As mentioned earlier, it has become increasingly difficult to always meet the industry-recognized test uncertainty ratio (TUR) of 4:1. To minimize the chance of approving an out-of-tolerance (OOT) condition

during calibration, the practice of guardbanding is employed. As all measurements are subject to error, most measurements assume a normal distribution commonly referred to as a “bell curve.” When the TUR is less than 4:1, the error band of the unit under test (UUT) is small enough that the calibrator cannot guarantee that the measurement is within specification. In Figure 1, the uncertainty bell curve is shown at the upper specification limit of a UUT. There is a 50 percent chance that the measurement is OOT, and 50 percent that it is in tolerance. To protect the metrologist, guardbanding moves the specification limit closer to the nominal value in order to “guard” against the possibility of approving an OOT condition. As shown in Figure 1, the measured value must now fall within a smaller offset from the nominal value, providing 95 percent confidence that the actual value is within the new specified band. This gives the metrologist the confidence that the measurement is accurate. The new 5730A calibrator is the most accurate dc/lf calibrator available, but it still requires the use of guardbanding for the most demanding long-scale multimeters. Use the following equation and guardbanding to sleep well, knowing your calibrations are a sure thing.



**Figure 1.** The offset of the uncertainty bell curve shows how guardbanding can give you the confidence you require in calibrations.

$$\text{New In Tolerance Test Limit} = UUT_{\text{Spec}} - (Fluke\ 5730A_{\text{Spec}}/2) * 1.6448$$

# Complete calibration solution that sets new standards for usability

Visual Connection Management™ output terminals light up to indicate active terminals, helping you know which connection to make

Quickly select between OPERATE and STANDBY modes with a press of a single button. STANDBY mode disconnects output and sense terminals, allowing the calibrator to share a common output cable with other calibration equipment



Auxiliary current output for meters with separate current terminals

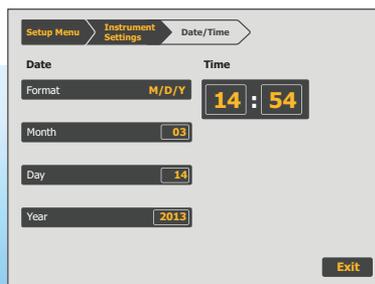
External sense minimizes lead resistance errors

Quick, easy single key decade output adjustments

Low-loss Type-N connector supports a wideband voltage option that provides flat, low-noise alternating voltage output from 10 Hz to 30 MHz to handle RF voltmeters

Touch screen display with easy-to-read, intuitive menu structure that lets you access any feature within three button presses or less

Calibration constants can be stored on USB memory sticks for easy transfer to a PC



Real-time date and clock indicators.



OFFSET and SCALE keys make it easy to compensate for zero offset and scale errors and permit direct display of linearity errors at any scale level.

A simple, calculator-style keyboard makes it easy to enter values quickly

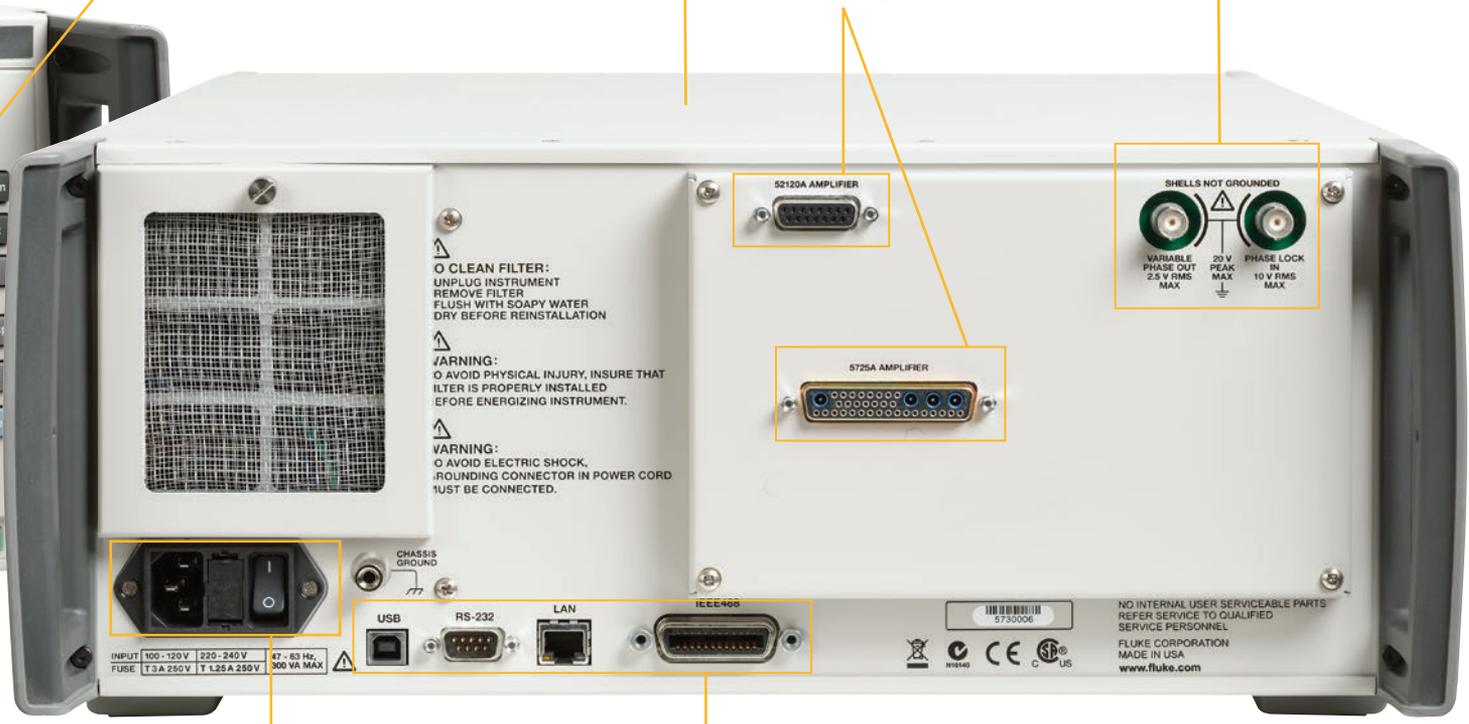
18 discrete resistance values in x1.0 and x1.9 decades



Internal printed circuit boards feature latest digital technology

Compatible with the Fluke Calibration 52120A and 5725A Amplifiers

Phase-in and phase-out ports allow you to lock two calibrators together to accurately simulate power



**CLEAN FILTER:**  
UNPLUG INSTRUMENT  
REMOVE FILTER  
FLUSH WITH SOAPY WATER  
DRY BEFORE REINSTALLATION

**WARNING:**  
AVOID PHYSICAL INJURY, INSURE THAT FILTER IS PROPERLY INSTALLED BEFORE ENERGIZING INSTRUMENT.

**WARNING:**  
AVOID ELECTRIC SHOCK. ROUNDING CONNECTOR IN POWER CORD MUST BE CONNECTED.



A new power switch automatically senses and adapts to the incoming mains power and frequency

Ethernet, RS-232, GPIB and USB interfaces

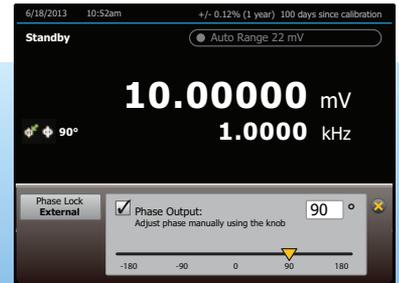
To adjust the reading, simply rotate the output dial and the error is displayed directly in ppm or percent



Plain language display in choice of nine languages.



Product features like Boost and Wideband are easily activated via the five-button toolbar located at the bottom of the output screen.



Synchronize and adjust the phase between two calibrators for power meter applications.

# Automation, training and support



## Automate the calibration process and manage assets with MET/CAL<sup>®</sup> Plus software

Quality standards impose stringent requirements for documenting, reporting, and controlling calibration processes and results. Using MET/CAL Calibration Management Software can help you meet these requirements easily while also enabling you to increase throughput and streamline your calibration processes.

We recognize that many 5700A and 5720A users have invested significant resources to develop calibration procedures using MET/CAL software and other automation programs. We have developed the 5730A with “Device Mapping” capability, enabling the 5730A to replace an existing 5700A or 5720A in an automated calibration system utilizing existing 57XX procedures. This capability enables you to upgrade from existing 5700A/5720A calibrators while avoiding the hassle of changing procedure code. Users upgrading to MET/CAL version 8.2 or later will be able to use the improved 5730A specifications in new procedures.

## Manage calibration assets with MET/TEAM software

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

## CarePlans help you manage cost of ownership

Fluke Calibration offers one-year, three-year and five-year Priority Gold CarePlans that enable you to schedule downtime effectively. Your Priority Gold CarePlan puts you in control of downtime and your business. CarePlan features include an annual standard or accredited calibration of your 5730A calibrator, with guaranteed three-day in-house turnaround<sup>1</sup> plus free repairs with guaranteed ten-day in-house repair (includes calibration).

Two-year and four-year Silver CarePlans are available for those customers who only want extended warranty coverage.



Gold CarePlans	Silver CarePlans
Annual calibration	Extended warranty coverage beyond original factory warranty
Free repairs with guaranteed turnaround time	Calibration included on repair
Pre-paid priority freight on return of instrument	Free product updates performed at time of repair
Priority Gold telephone help line	Discounts on regular calibrations and out-of-plan service charges
Free product updates	
Discounts on product upgrades	
Discounts on training	

<sup>1</sup> Three-day in-house turnaround not available in all countries; contact your local Fluke Calibration representative for details. Priority shipping times vary by country.



# Summary Specifications



	5700A	5720A	5730A
<b>Functionality</b>			
<b>DC voltage</b>	•	•	•
Range:	0 to $\pm 1100$ V		
Best one year, 95 % specification:	7 ppm + 3.5 $\mu$ V	3.5 ppm + 2.5 $\mu$ V	3.5 ppm + 2.5 $\mu$ V
<b>AC voltage</b>	•	•	•
Range:	220 mV to 1100 V 10 Hz to 1 MHz		
Best one year, 95 % specification:	75 ppm + 6 $\mu$ V	45 ppm + 8 $\mu$ V	42 ppm + 8 $\mu$ V
<b>DC current</b>	•	•	•
Range:	0 to $\pm 2.2$ A Fluke Calibration 5725A: 0 to $\pm 11$ A Fluke Calibration 52120A: 0 to $\pm 100$ A		
Best one year, 95 % specification:	50 ppm + 8 nA	35 ppm + 7 nA	35 ppm + 7 nA
<b>AC current</b>	•	•	•
Range:	9 $\mu$ A to 2.2 A, 10 Hz to 10 kHz Fluke Calibration 5725A: 9 $\mu$ A to 11 A Fluke Calibration 52120A: 9 $\mu$ A to 120 A		
Best one year, 95 % specification:	140 ppm + 16 nA	120 ppm + 8 nA	103 ppm + 8 nA
<b>Resistance</b>	•	•	•
Range:	0 to 100 M $\Omega$ , 18 values in x1 and x1.9		
Best one year, 95 % specification:	12 ppm	8.5 ppm	6.5 ppm
<b>Wideband option</b>	•	•	•
Range:	300 $\mu$ V to 3.5 V, 10 Hz to 30 MHz		
Best one year, 95 % specification:	$\pm 0.4$ % of setting	$\pm 0.4$ % of setting	$\pm 0.4$ % of setting

<b>User interface/Display/Ergonomics</b>			
6.5 inch touchscreen display			•
Visual Connection Management™ (VCM) Terminals			•
Soft Touch Ergonomical Handles			•
Local Language Support			•

<b>Connectivity</b>			
Copper beryllium terminals	•	•	•
USB Cal Check data storage			•
Phase lock in and output	•	•	•
IEEE interface	•	•	•
RS-232 interface	•	•	•
USB bus			•
Ethernet port			•

<b>Hardware</b>			
Soft power (Mains power sensing)			•
Redesigned PCAs			•



	5700A	5720A	5730A
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Amplifier support/Ports			
52120A			•
5725A	•	•	•

Options			
Wideband option	•	•	•
Rear output option	•	•	

Support			
Artifact Cal	•	•	•
Cal Check	•	•	•

5730A general specifications	
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Warm up time	Twice the time since last warmed up, to a maximum of 30 minutes
Settling time	Less than 5 seconds for all functions and ranges except as noted
Standard interfaces	IEEE-488 (GPIB), RS-232, USB 2.0 Device, Ethernet, 5725A, 52120A, phase lock in (BNC), phase reference out (BNC)
Temperature performance	Operating: 0 °C to 50 °C Calibration: 15 °C to 35 °C Storage: -40 °C to 75 °C
Relative humidity	Operating: <80 % to 30 °C, <70 % to 40 °C, <40 % to 50 °C Storage: <95 %, non-condensing
Operating altitude	2000 m maximum
Safety	IEC 61010-1: CAT II, 300 V Pollution Degree 2
Guard isolation	20 V
EMC	IEC 61326-1: Controlled
Line power	Line frequency: 47 Hz to 63 Hz; ± 10 % 100 V, 110 V, 115 V, 120 V, 200 V, 220 V, 230 V, 240 V
Power consumption	300 VA
Calibration documentation	17025 accredited report of calibration included
Dimensions	Height: 17.8 cm (7 in), standard rack increment, plus 1.5 cm (0.6 in) for feet Width: 43.2 cm (17 in), standard rack width Depth: 64.8 cm (25.5 in), overall; 59.4 cm (23.4 in), rack depth
Weight (w/o options)	27 kg (62 lb)
Absolute uncertainty definition	5730A uncertainty specifications include stability, temperature coefficient, linearity, line and load regulation, and the traceability of the external standards used for calibration. You do not need to add anything to determine the total uncertainty of your calibrator for the temperature range indicated.
Specification confidence interval	99 % and 95 %



**FLUKE**®

Calibration

**The broadest range of calibration solutions**

Fluke Calibration provides the broadest range of calibrators and standards, software, service, support and training in electrical, temperature, pressure, RF and flow calibration.

Visit [www.flukecal.com](http://www.flukecal.com) for more information about Fluke Calibration products and services.

**Ordering Information**

**Model**

- 5730A Multifunction Calibrator
- 5730A/O3 Multifunction Calibrator with Wideband AC Voltage Option
- 5730A/S Multifunction Calibrator with no front panel USB port

**Accessories**

- 52120A Transconductance Amplifier
- 5725A Amplifier
- 5730A-7002 Low Thermal EMF Cables with Banana Plugs
- 5730A-7003 Low Thermal EMF Cables with Spade Connectors
- Y5737 5730A Rack Mount Kit
- Y5738 5730A Rack Ear Kit
- 57XX/CASE 5730A Durable Travel Case

**Additional standards**

- 5790A AC Measurement Standard
- 734A Voltage Reference and DC Voltage Standard
- 732B Direct Voltage Standard
- 742A Resistance Standards
- 792A AC/DC Transfer Standard

**Software**

- MET/CAL MET/CAL Plus Calibration Management Software
- MET/TEAM MET/TEAM Test Equipment Asset Management Software

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

Electrical	RF	Temperature	Pressure	Flow	Software
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 Printed in U.S.A. 7/2013 4265253A\_EN

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