



TECHNICAL DATA

5790B AC Measurement Standard





Key features

- Multi-purpose AC measurement and transfer standard: accuracy of a thermal transfer standard with the ease of use of a digital multimeter.
- Absolute AC voltage measurement uncertainties as low as ± 24 ppm (one year, $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$).
- Alternating voltage range of $600\text{ }\mu\text{V}$ to 1000 V , and a frequency range of 10 Hz to 1 MHz , with options to extend to 30 or 50 MHz .
- Combine with A40B Current Shunts for direct, absolute, or relative current measurements without the need for calculations.
- 6.5 -inch, full-color, capacitive touch screen display.
- Use alone or as a transfer standard when compared to external DC source, performing all necessary switching and calculations automatically.

Product overview: 5790B AC Measurement Standard

Updated features provide improvements inside and out

Since its release in 1990, the 5790A has developed an unmatched reputation of being the most precise ac measurement standard in the industry. The technology behind the 5790A and the patented Fluke RMS sensor has made it the measurement standard of choice for calibration laboratories around the world. The 5790B retains the innovative technical features of its predecessor and adds many new capabilities and functions which expand the capable workload and reliability of the product.

Absolute and relative current measurement

The Fluke A40B series shunt resistors provide a very cost effective method to expand the 5790B's functionality to measure absolute and relative ac current to calibrate an ac current source. The 5790B's new user interface allows you to input and save current shunts to its memory. Up to 150 shunts can be stored along with the shunts' serial numbers, calibration constant values (24 ac/dc , five loading error points) and calibration dates. After the shunt information is loaded, the 5790B can be set up to take a direct absolute or relative ac current measurement within seconds by hooking up the shunt and simply selecting the appropriate shunt from the main menu. When using a current shunt, 5790B displays both the voltage and current measurements on the display along with the shunt information. Legacy Fluke A40 and A40A current shunts can be loaded and used to make relative current measurements.

Expanded wideband range (50 MHz)

The "/3" wideband input and function, with ranges of 2.2 mV to 7 V , 10 Hz to 30 MHz , is retained from the 5790A model. A new "/5" wideband option extends the bandwidth even further, to 10 Hz to 50 MHz . The expanded wideband range extends the workload of the product to calibrate precision 50 MHz power reference outputs found on most RF power meters.

Improved specifications

A direct-readout-mode graphical user interface displays specifications for measuring common non-sinusoidal

waveforms plus peak-to-peak computation (assumes THD <1 %.) This allows for instantaneous information when it is needed the most. Unlike the vacuum-fluorescent display on the 5790A, the new 6.5-inch capacitive touch screen display allows you to see more information on screen, reducing the need to switch between menus. The 5790B now specifies absolute dc voltage measurement uncertainties as low as ± 24 ppm (one year, $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$), providing more confidence in transfer measurements. A dedicated special purpose 50 MHz, 225 mV, 50 ohm input function is available as an option for measuring RF power meter power reference outputs. The option is “spot calibrated” at the end of a precision level/phase stable metrology grade cable. It calculates the measured power with a 50 ohm load.

Statistics and peak-to-peak waveform functions

Statistics showing number of samples, standard deviation, average, min and max are calculated using the displayed readings as the basis. As a benefit of the large touch screen display, the statistics data can be viewed while the main measurement is still visible on the screen. The 5790B now does peak-to-peak waveform calculations for you. You can select one of four waveforms: sine, square, triangle, and truncated. Some of these waveforms are difficult and time consuming to calculate. The 5790B performs all the calculations for you based on the measurement, significantly reducing time and possible errors.

Easy-to-use graphical interface and ergonomic features

The graphical user interface features easy-to-read menus, as well as access to common functions with just the touch of a finger. Quickly select the range and input using the hard keys on the front panel. A bright red status indicator for HAZARDOUS VOLTAGE is located on front panel, letting you know immediately when hazardous voltage is present at the terminals. Like the new 5730A Multi- Product Calibrator, the front panel features Visual Connection Management™ terminals that light up to show you which terminals are active, guiding you to make the correct connections.

Precision you can depend on

The 5790B is based on the patented Fluke Solid-State Thermal RMS Sensor, which has been proven since 1979 in a variety of Fluke products like the 792A AC/ DC Transfer Standard. The Fluke RMS Sensor is a true thermal converter, not an electronic converter that calculates the RMS value. Because its output voltage is 2 V rather than the 7 mV to 10 mV of traditional thermocouples, the RMS sensor exhibits excellent signal-to-noise characteristics and minimal reversal errors. With a higher output voltage, more accurate measurements can be made. And because of its small size, the RMS sensor stabilizes quickly and operates over a wide temperature range. The 5790B also features hermetically sealed thin-film resistor networks to minimize ac measurement errors and enhance temperature coefficient. The RMS sensor and thin-film resistor networks are designed by Fluke to be rugged and reliable. Each is built to exacting standards by the Fluke Microelectronics Group to maintain quality and consistency part after part.

Versatility that keeps you productive

The variety of inputs and connection types allows you to use the one that best suits your application. There are four sets of input terminals on the 5790B, two Type-N connectors and a set of five-way binding posts. One Type-N and one set of binding posts are dedicated to the ac measurement and transfer modes. AC or dc voltages may be applied to either input connection over the 5790B's full range, allowing you to perform automated ac/dc transfer measurements. The 5790B determines automatically whether the applied voltage is ac or dc.

The second Type-N input connection supports the optional wideband mode. The input connection is easily selected

with the touch of a key on the 5790B front panel. An LED indicates which terminals are active.

Whether you are using the 5790B as a voltmeter or a transfer standard, input voltage and frequency are always indicated on the measurement display. In the transfer mode, the ac/dc or ac/ac difference is always indicated on the control display in ppm, %, volts or ratio.

The 5790B is a fully autoranging instrument and it selects the best voltage range for the measurement you are making. You may also select and lock in ranges manually. Robust 1200 V input protection is active on all voltage ranges.

Using the trigger keys, the 5790B can switch from continuous to single measurements of the input voltage, making it easy to take sample readings at predetermined intervals.

When using the 5790B in transfer mode, the reference voltage is stored, and all ac/dc or ac/ac difference measurements are made relative to it. You may also store the average of two voltages as a reference to eliminate dc reversal errors, for example.

The intuitive front panel layout of the 5790B makes manual operation fast and simple. Keys and selections are logically arranged and labeled. And messages and menus are displayed clearly on the 5790B's bright, touch screen display.

USB, GPIB/IEEE-488, Ethernet and RS-232 interfaces are included and all functions of the instruments can be controlled by a PC. Using an available instrument driver, the 5790B can be integrated into automated systems operating with MET/CAL® Calibration Software.

Specifications: 5790B AC Measurement Standard

Summary Specifications	
AC and dc voltage	Best 99%, absolute specification: ± 24 ppm (one year, 23 °C to ± 5 °C)
Inputs	Input 1: 600 μ V to 1000 V (5% over-range) Input 2: 600 μ V to 1000 V (5% over-range) Aux input: 250 mV to 500 mV WB input: <7 V rms wideband
Warm-up time	30 minutes
Relative humidity	Operating: 45% to 50 °C 75% to 45 °C 95% to 30 °C Storage: <95% non-condensing
Altitude	Operating: 3,050 meters (10,000 feet) Non-operating: 12,200 meters (40,000 feet)
Temperature	Operating: 0 °C to 50 °C Calibration: 15 °C to 35 °C Storage: -40 °C to 70 °C
Electromagnetic Compatibility (EMC)	
Intentional	IEC 61326-1: Cooled Electromagnetic Environment - CISPR 11: Group 1, Class A

Korea (KCC)	Class A Equipment (Industrial Broadcasting & Communication Equipment)
USA (FCC)	47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.
Surge	ANSI C62.41-1980, Category A
Reliability	MIL-T-2880D, paragraph 3.13.3
General Specifications	
Dimensions	Height: 17.8 cm (7 in) standard rackmount + 1.5 cm (0.6 in) Width: 43.2 cm (17 in) Depth: 62 cm (24.8 in)
Maximum power requirements	5790B: 100 VA
Weight	5790B: 24 kg (53 lb) With wideband: 24.5 kg (54 lb)
Line power	50 Hz or 60 Hz; 100 V - 120 V, 220 V - 240 V 100V, 110 V, 115 V, 120 V, 200 V, 220 V, 230 V, 240 V
Safety	Complies with UL1244 and IEC 348-1976 and IEC 1010 and CSA C22.2 No. 231 and ANSI/ISA 582
Remote interfaces	RS-232, IEEE-488
Confidence level	99% unless otherwise specified
5790B/AF	
<p>The 5790B/AF has enhanced absolute accuracy to $\pm 0.23\%$ of voltage (1 year after factory calibration, $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$, at 95 % confidence level) at 50 MHz and 223.61 mV, using a serialized one meter cable, characterized at that point for RF power meter 0 dBm reference output measurement. In the RF power measurement mode, the accuracy is specified to the end of the serialized cable with a curve fit for the other ranges and frequencies that is a first order correction for cable loss.</p>	

Ordering information



5790B

AC Measurement Standard

5790B/3

AC Measurement Standard +30 MHz Wideband Option

5790B/5

AC Measurement Standard _ 50 MHz Wideband Option

5790B/AF

AC Measurement Standard + 50 MHz Wideband Option Calibrated with WB Cable

A40B-001MA

1 milliamp Current Shunt

A40B-010MA

10 milliamp Current Shunt

A40B-020MA

20 milliamp Current Shunt

A40B-050MA

50 milliamp Current Shunt

A40B-100mA

100 milliamp Current Shunt

A40B-200mA

200 milliamp Current Shunt

A40B-500mA

500 milliamp Current Shunt

A40B-1A

1 amp Current Shunt

A40B-2A

2 amp Current Shunt

A40B-5A

5 amp Current Shunt

A40B-10A

10 amp Current Shunt

A40B-20A

20 amp Current Shunt

A40B-50A

50 amp Current Shunt

A40B-100A

100 amp Current Shunt



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Fluke Corporation
PO Box 9090, Everett, WA 98206 U.S.A.

Fluke Australia
Unit 26, 7 Anella Ave
Castle Hill, NSW 2154 Australia
Phone: 61 2 8850-3333
www.fluke.com.au

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