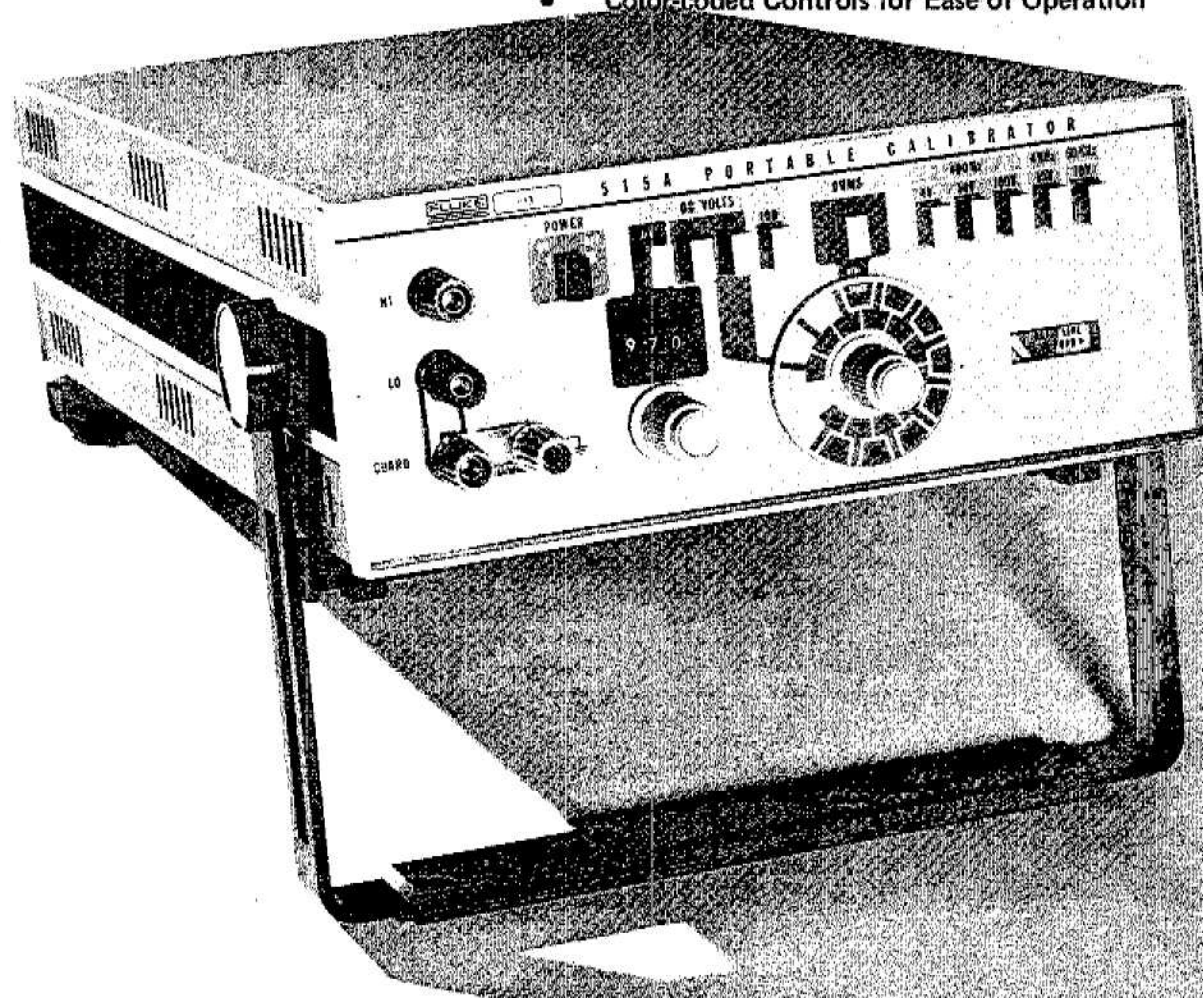




# Portable Calibrator 515A

## FEATURES

- AC Volts, DC Volts and Ohms
- 0.003% DC Accuracy
- One Set of Output Terminals for All Functions
- Built-in Rechargeable Battery Pack for On-Site Calibration
- Small, Lightweight
- Color-coded Controls for Ease of Operation



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**Sincerely,**

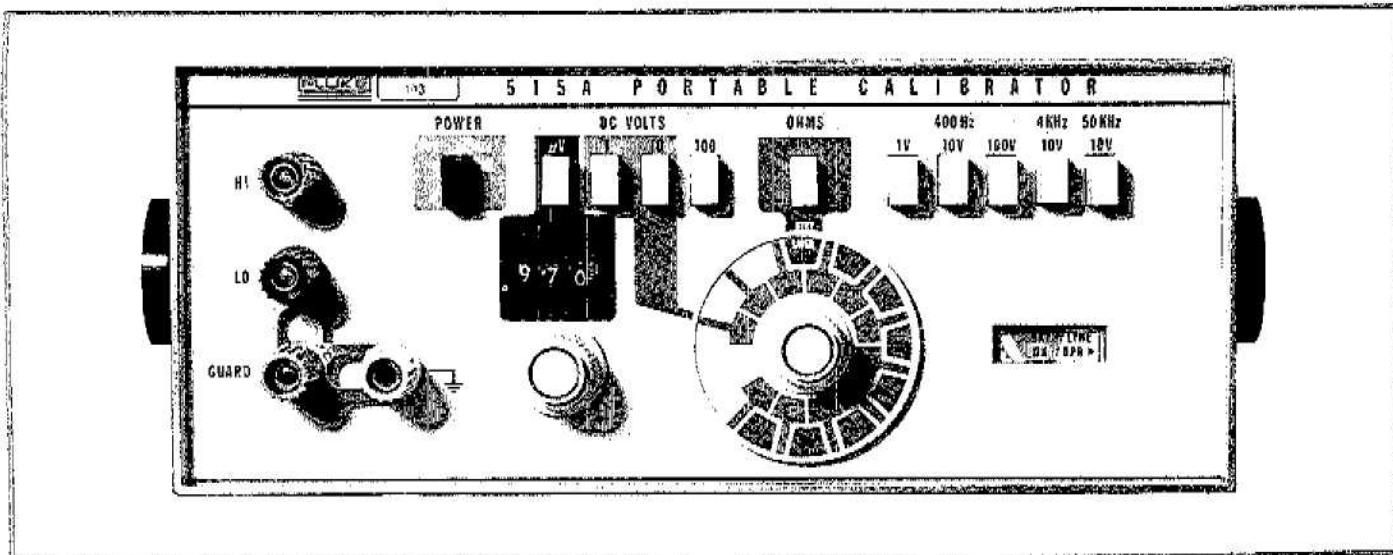
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## DESCRIPTION

The Model 515A Portable Calibrator is a precision voltage and resistance calibration source for on-site calibration of measuring instruments. The Model 515A provides dc voltage, ac voltage and resistance standards in a unit only 3½ inches high by 8½ inches wide by 16 inches deep. The instrument weighs just 13 pounds including the rechargeable battery back which eliminates warmup delays after transit and allows eight hours operation free of line power for true portability. The 515A basic calibration accuracy is specified over a temperature range of 18°C to 28°C for a one year period thus making it easy to use in production test and calibration lab environments without complex correction terms. The long calibration cycle also makes the 515A economical to own by minimizing maintenance overhead costs.

The 515A can be used effectively to test a wide range of characteristics in measuring instruments. Here are a few of the many applications.

<u>General</u>	<u>DC Volts</u>	<u>AC Volts</u>	<u>Resistance</u>
Zero Offset	Input Offset Current	Frequency Response	Linearity
Zero Stability	A/D Linearity	Converter Linearity	Residual Resistance
Autoranging	Absolute Accuracy	Residual Noise	Absolute Accuracy
Overranging		Absolute Accuracy	



MODEL 515A FRONT PANEL LAYOUT

All 515A outputs are made available at a single set of output terminals. Generally, connections to the test instrument may be made once for a complete series of tests. In addition to the HI and LO outputs, terminals are available to allow guarding and shielding of test leads in critical test situations.

Functional controls are conveniently organized and color coded for clarity. The POWER pushbutton applies power to the operating circuitry of the 515A. If the unit is connected to the ac line, the internal battery is placed on charge; otherwise, the 515A automatically operates from the battery and its state of charge is indicated on the meter to the right of the panel. Dual purpose feet on the rear of the unit provide a convenient storage location for the line cord.

DC VOLTS ranges include "μV" with a digital readout

and vernier control to provide 0 through 999 μV with 0.2 μV resolution. The "1" and "10" volt ranges, operating in conjunction with the multiplier dial, provide 10 voltage steps plus "0" in each range. The "100" volt range offers a single precise value of dc voltage.

The OHMS pushbutton and the associated positions on the multiplier dial make fixed decade resistance values from 10 MΩ down to 10Ω available with a "0" position provided for residual resistance tests without disturbing test lead connections.

AC voltage tests may be made at three frequencies. At 400 Hz, the unit offers 1V, 10V, and 100V rms sine wave while 10V rms is available at 4 kHz and 50 kHz.

All output function pushbuttons are interlocked for safety.

# Specifications

## DC Voltage

<b>Range:</b>	
$\mu\text{V}$ :	0 to 999 $\mu\text{V}$ continuous (0.2 $\mu\text{V}$ resolution)
1V:	0.0 to 1.0V in 0.1V steps
10V:	0 to 10V in 1V steps
100V:	100V cardinal point

**Accuracy:** (@23°C  $\pm 5^\circ\text{C}$  for 1 year; 30 minute warmup)

$\mu\text{V}$ Range:	$\pm 2 \mu\text{V}$
1V, 10V and 100V ranges:	$\pm(0.003\%$ of setting or 30 $\mu\text{V}$ , whichever is greater)

### Ripple:

$\mu\text{V}$ Range:	< 10 $\mu\text{V}$ rms
1V, 10V and 100V Ranges:	< 0.01% of range rms

**Load Regulation:** Load R Output Change (% of setting)

$\mu\text{V}$ , 1V, and 10V Ranges:	> $10^8 \Omega$	- 0.0%
	10 M $\Omega$	- 0.003%
	1 M $\Omega$	- 0.03%

100V Range:  $\pm 5$  ppm (no load to full load)

**Output Current:** Function of source resistance, except 100V range which is limited at approximately 0.5 mA. No damage to instrument with short circuit on output.

<b>Source Resistance:</b>	
$\mu\text{V}$ , 1V, 10V Ranges:	300 ohms
100V Range:	< 1 ohm (up to 0.5 mA load)

**Line Regulation:** ( $\pm 10\%$  line voltage change)

$\mu\text{V}$ Range:	< 1 $\mu\text{V}$
1V, 10V Ranges:	< 1 ppm of range
100V Range:	< 10 ppm of range

**Temperature Coefficient** (0°C to 18°C, 28°C to 50°C)

$\mu\text{V}$ Range:	$\pm 0.1 \mu\text{V}/^\circ\text{C}$
1V, 10V Ranges:	$\pm 5 \text{ ppm}/^\circ\text{C}$
100V Range:	$\pm 8 \text{ ppm}/^\circ\text{C}$

## AC VOLTAGE

**Voltage Range:** 1V, 10V, 100V cardinal points

### Output Frequencies:

10V	400 Hz, 4 kHz, 50 kHz
1V, 100V	400 Hz

**Accuracy:** (@23°C  $\pm 5^\circ\text{C}$  for 1 year; 30 minute warmup)

<b>Voltage:</b>	
1V:	$\pm 0.05\%$
10V:	$\pm 0.04\%$ - 400 Hz and 4 kHz $\pm 0.1\%$ - 50 kHz
100V:	$\pm 0.06\%$
<b>Frequency:</b>	$\pm 1\%$ except @ 50 kHz; $\pm 5\%$

### Total Harmonic Distortion and Noise:

400 Hz and 4 kHz:	< 0.03%
50 kHz:	< 0.05%

### Load Regulation:

10V outputs (0 to 10 mA)	$\pm 0.004\%$ except @ 50 kHz; $\pm 0.008\%$
1V output (< 1 $\Omega$ Source Z)	-0.005% (20 k $\Omega$ ); -0.01% (10 k $\Omega$ )
100V output (< 30 $\Omega$ Source Z)	-0.006% (500 k $\Omega$ ); -0.015% (200 k $\Omega$ )

**Output Current:** (For load regulation as stated above)

1V, 10V output	0 to 10 mA rms
100V output	0 to 0.5 mA rms

*NOTE: Current limiting protects the 515A output from damage due to short circuit on output.*

**Line Regulation** ( $\pm 10\%$  line voltage change)

All Voltages at all frequencies:	< $\pm 10$ ppm
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**Temperature Coefficient:** (0°C to 18°C, 28°C to 50°C)

All Voltages at all frequencies:	< $\pm 25 \text{ ppm}/^\circ\text{C}$
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## RESISTANCE

**Range:** 10 $\Omega$  through 10 M $\Omega$  in decade steps + zero setting.

**Accuracy:** (@23°C  $\pm 5^\circ\text{C}$  for 1 year; referred to "0" ohms position)

0 $\Omega$ :	Residual Resistance; < 0.15 $\Omega$
10 $\Omega$ - 100 $\Omega$ :	$\pm 0.06\%$
1 k $\Omega$ - 1 M $\Omega$ :	$\pm 0.015\%$
10 M $\Omega$ :	$\pm 0.075\%$

# 515A Specifications Continued

**Power Rating:** 0.2 Watt or 100V (DC or RMS), whichever is less

**Temperature Coefficient:** (0°C to 18°C, 28°C to 50°C) referred to residual resistance

0Ω: < +0.4%/°C  
 10Ω – 100 Ω: < ±10 ppm  
 1 kΩ – 1 MΩ: < ±5 ppm  
 10 MΩ: < ± 10 ppm

**Relative Humidity:** < 70%, 0°C to 45°C

**Input Power:** 100/115/200/230V ac, ±10%, < 10 Watts, 50 – 440 Hz, single phase or internal batteries. Eight hours operation from batteries when fully charged. Charging is automatic during line operation. Front panel meter indicates condition of charge and battery/line operation.

## GENERAL

**Size:** 3½" H x 8½" W x 16" D

**Weight:** 13 lbs.

**Operating Temperature:** 0°C to 50°C

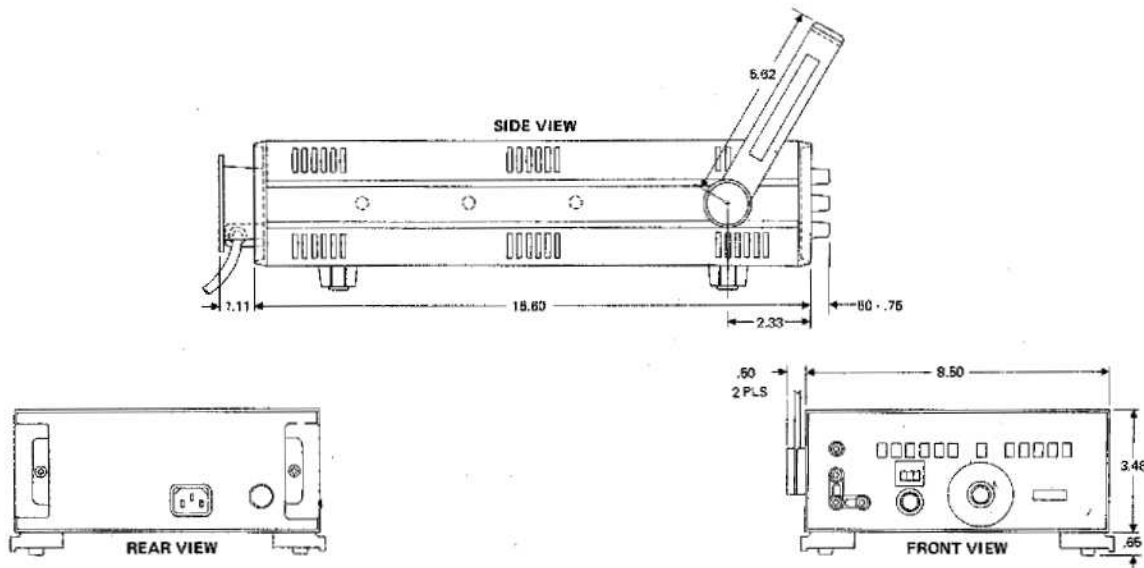
**Storage Temperature:** -40°C to +50°C; to +60°C with batteries removed.

**Output Connectors:** 4 binding posts for HI, LO, GUARD and CHASSIS

**Shock:** 20g., 11 msec half-sine wave.

**Vibration:** 4.5g, 10 Hz to 55 Hz

**Altitude:** 0 to 10,000 feet operating  
 50,000 feet non-operating



### Price:

515A (Including batteries and charging circuit) . . . . \$1995

### Accessories:

M00-200-618 Side-By-Side Rack Mount . . . . . 30

M00-200-619 Offset Rack Mount . . . . . 35

M00-200-620 Panel Mounting Frame . . . . . 25

M03-203-700 Front Panel Cover . . . . . 10

### FLUKE REPRESENTATIVE



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