

# Fluke 8845A/8846A Digital Multimeters

## Extended Specifications

The Fluke 8845A and 8846A 6.5 digit precision multimeters have the precision and versatility to handle your most demanding measurements, on the bench or in a system. These meters are both high performance and feature rich, yet also remarkably easy to use.



### Features at a glance

- 6.5 digit resolution
- Basic V dc accuracy of up to 0.0024 % (1 yr.)
- Dual display
- 100  $\mu$ A to 10 A current range, with up to 100 pA resolution
- Wide ohms ranges from 10  $\Omega$  to 1 G $\Omega$  with up to 10  $\mu\Omega$  resolution
- 2 x 4 ohms 4-wire measurement technique
- Both models measure frequency and period
- 8846A also measures capacitance and temperature
- USB memory drive port (8846A)
- Fluke 45 and Agilent 34401A emulation
- Graphical display
- Trendplot™ paperless recorder mode, statistics, histogram
- CAT I 1000 V, CAT II 600 V

These digital multimeters perform the functions you would expect to see in a multifunction DMM, including measuring volts, ohms, and amps, with performance that exceeds expectations. Basic V dc accuracy of up to 0.0024 %, 10 A current range, and a wide ohms range from 10  $\Omega$  to 1 G $\Omega$  with up to 10  $\mu\Omega$  resolution give you an unbeatable combination of measurement capability.

You can also use the 8845A and 8846A to measure temperature, capacitance, period, and frequency—the functions of a counter, capacitance meter, and thermometer are built in for unparalleled versatility. Extend the meters' utility even more with their graphical display modes, including Trendplot™ paperless recorder mode, statistics and histograms—features you won't find on other multimeters.

Of course, these meters are also durable and dependable, features you expect from any Fluke meter. This unique combination of features and performance makes the 8845A and 8846A an unbeatable value for a wide variety of applications, including manufacturing test, research and development, and service.

# General Specifications

**Power**

Voltage

100 V Setting.....	90 V to 110 V
120 V Setting.....	108 V to 132 V
220 V Setting.....	198 V to 242 V
240 V Setting.....	216 V to 264 V

Frequency..... 47 Hz to 440 Hz. Automatically sensed at power-on.

Power Consumption..... 28 VA peak (12 Watt average)

**Dimensions**

Height .....	88 mm (3.46 in.)
Width .....	217 mm (8.56 in.)
Depth.....	297 mm (11.7 in.)
Weight .....	3.6 kg (8.0 lbs.)
Shipping Weight .....	5.0 kg (11.0 lbs)

**Display**

Vacuum Fluorescent Display, dot matrix

**Environment**

Temperature

Operating.....	0 °C to 55 °C
Storage.....	-40 °C to 70 °C
Warm Up.....	1 hour to full uncertainty specifications

Relative Humidity (non-condensing)

Operating.....	0 °C to 28 °C <90 %
	28 °C to 40 °C <80 %
	40 °C to 55 °C <50 %
Storage.....	-40 °C to 70 °C <95 %

Altitude

Operating.....	2,000 Meters
Storage.....	12,000 Meters

Vibration and Shock.....Complies with Mil-T-28800F Type III, Class 5 (Sine Only)

**Safety**

Designed to comply with IEC 61010-1:2000-1, UL 61010-1A1, CAN/CSA-C22.2 No. 61010.1, CAT I 1000V/CAT II 600V

**EMC**

Designed to comply with IEC 61326-1:2000-11 (EMC) when used with shielded communications cables. This Meter has shown susceptibility to radiated frequencies greater than 1 V/m from 250 to 450 MHz in the 100 µA range.

**Triggering**

Samples per Trigger.....	1 to 50,000
Trigger Delay.....	0 S to 3600 S; in 10 µS increments
External Trigger Delay.....	<1 mS
External Trigger Jitter.....	<500 µS
Trigger Input .....	TTL Levels
Trigger Output.....	5 V maximum. (Open collector)

**Memory**

8845A .....	5,000 measurements, Internal only
8846A .....	5,000 measurements, Internal and up to 2 Gigabyte capacity with USB memory module (available separately. see "Accessories") through front-panel USB port

**Math Functions**

Zero, dBm, dB, MX+B, Trend-plot, Histogram, Statistics (min/max/average/standard deviation), and Limit Test

## Electrical

<b>Input Protection</b> .....	1000 V all ranges
<b>Overrange</b> .....	20 % on all ranges except 1000 V dc, 1000 V ac (8846A), 750 V ac (8845A), Diode, and 10 A ranges

## Remote Interfaces

RS-232 (RS-232 to USB cable available to connect the Meter to a PC USB port. See accessories)  
IEEE 488.2  
LAN

## Warranty

One year

# Electrical Specifications

Accuracy specifications are valid for 6½ digit mode after at least a 1-hour warm-up with Auto Zero enabled.

24-hour specifications are relative to calibration standards and assume a controlled electromagnetic environment per EN 61326-1:2000-11

## DC Voltage Specifications

<b>Maximum Input</b> .....	1000 V on any range
<b>Common Mode Rejection</b> .....	140 dB at 50 or 60 Hz ± 0.1 % (1 kΩ unbalance)
<b>Normal Mode Rejection</b> .....	60 dB for NPLC of 1 or greater with dc filter off and power line frequency ±0.1 % 100 dB for NPLC of 1 or greater with dc filter on and power line frequency ±0.1 %
<b>Measurement Method</b> .....	Multi-ramp A/D
<b>A/D Linearity</b> .....	0.0002 % of measurement + 0.0001 % of range
<b>Input Bias Current</b> .....	<30 pA at 25 °C
<b>Autozero Off Operation</b> .....	Following instrument warm-up at calibration temperature ±1 °C and less than 10 minutes, add error: 0.0002 % range additional error + 5 μV.
<b>Settling Considerations</b> .....	Measurement settling times are affected by source impedance, cable dielectric characteristics, and input signal changes.

## Input Characteristics

Range	Full Scale (6½ Digits)	Resolution			Input Impedance
		4½ Digits	5½ Digits	6½ Digits	
100 mV	100.0000 mV	10 μV	1 μV	100 nV	10 MΩ or >10 GΩ <sup>[1]</sup>
1 V	1.000000 V	100 μV	10 μV	1 μV	10 MΩ or >10 GΩ <sup>[1]</sup>
10 V	10.00000 V	1 mV	100 μV	10 μV	10 MΩ or >10 GΩ <sup>[1]</sup>
100 V	100.0000 V	10 mV	1 mV	100 μV	10 MΩ ±1%
1000 V	1,000.000 V	100 mV	10 mV	1 mV	10 MΩ ±1%

[1] Inputs beyond ±14 V are clamped through 200 kΩ typical. 10 MΩ is default input impedance.

## 8846A Accuracy

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 mV	0.0025 + 0.003	0.0025 + 0.0035	0.0037 + 0.0035	0.0005 + 0.0005
1 V	0.0018 + 0.0006	0.0018 + 0.0007	0.0025 + 0.0007	0.0005 + 0.0001
10 V	0.0013 + 0.0004	0.0018 + 0.0005	0.0024 + 0.0005	0.0005 + 0.0001
100 V	0.0018 + 0.0006	0.0027 + 0.0006	0.0038 + 0.0006	0.0005 + 0.0001
1000 V	0.0018 + 0.0006	0.0031 + 0.001	0.0041 + 0.001	0.0005 + 0.0001

## 8845A Accuracy

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 mV	0.003 + 0.003	0.004 + 0.0035	0.005 + 0.0035	0.0005 + 0.0005
1 V	0.002 + 0.0006	0.003 + 0.0007	0.004 + 0.0007	0.0005 + 0.0001
10 V	0.0015 + 0.0004	0.002 + 0.0005	0.0035 + 0.0005	0.0005 + 0.0001
100 V	0.002 + 0.0006	0.0035 + 0.0006	0.0045 + 0.0006	0.0005 + 0.0001
1000 V	0.002 + 0.0006	0.0035 + 0.0010	0.0045 + 0.0010	0.0005 + 0.0001

**Additional Errors**

Digits	NPLC	Additional Noise Error
6½	100	0 % of range
6½	10	0 % of range
5½	1	0.001 % of range
5½	.2	0.001 % of range + 20 µV
4½	0.02	0.01 % of range + 20 µV

**AC Voltage Specifications**

AC Voltage specifications are for ac sinewave signals >5 % of range. For inputs from 1 % to 5 % of range and <50 kHz, add an additional error of 0.1 % of range, and for 50 to 100 kHz, add 0.13 % of range.

**Maximum Input**.....750 V rms or 1000 V peak (8845A), 1000 V rms or 1414 V peak (8846A) or  $8 \times 10^7$  Volts-Hertz product (whichever is less) for any range.

**Measurement Method**.....AC-coupled true-rms. Measures the ac component of input with up to 1000 V dc bias on any range.

**AC Filter Bandwidth:**

- Slow.....3 Hz – 300 kHz
- Medium.....20 Hz – 300 kHz
- Fast.....200 Hz – 300 kHz

**Common Mode Rejection**.....70 dB at 50 Hz or 60 Hz ±0.1 % (1 kΩ unbalance)

**Maximum Crest Factor**.....5:1 at Full Scale

**Additional Crest Factor Errors (<100 Hz)**.....Crest Factor 1-2, 0.05 % of full scale  
 Crest Factor 2-3, 0.2 % of full scale  
 Crest Factor 3-4, 0.4 % of full scale  
 Crest Factor 4-5, 0.5 % of full scale

**Input Characteristics**

Range	Full Scale (6½ Digits)	Resolution			Input Impedance
		4½ Digits	5½ Digits	6½ Digits	
100 mV	100.0000 mV	10 µV	1 µV	100 nV	1 MΩ ±2 % shunted by <100 pf
1 V	1.000000 V	100 µV	10 µV	1 µV	
10 V	10.00000 V	1 mV	100 µV	10 µV	
100 V	100.0000 V	10 mV	1 mV	100 µV	
1000 V	1,000.000 V	100 mV	10 mV	1 mV	

**8846A Accuracy**

Accuracy is given as ± (% measurement + % of range)

Range	Frequency	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 mV	3 – 5 Hz	1.0 + 0.03	1.0 + 0.04	1.0 + 0.04	0.1 + 0.004
	5 – 10 Hz	0.35 + 0.03	0.35 + 0.04	0.35 + 0.04	0.035 + 0.004
	10 Hz – 20 kHz	0.04 + 0.03	0.05 + 0.04	0.06 + 0.04	0.005 + 0.004
	20 – 50 kHz	0.1 + 0.05	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>(1)</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.20 + 0.02
1 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>(1)</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
10 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>(1)</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
100 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 -- 300 kHz <sup>(1)</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02

Range	Frequency	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
1000 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz <sup>[2]</sup>	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1][2]</sup>	4.0 + 0.5	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
[1] Typically 30 % reading error at 1 MHz					
[2] 1000 Volt range is limited to 8 X 10 <sup>7</sup> volt-Hertz					

### 8845A Accuracy

Accuracy is given as ± (% measurement + % of range)

Range	Frequency (Hz)	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 mV	3 – 5 Hz	1.0 + 0.03	1.0 + 0.04	1.0 + 0.04	0.10 + 0.004
	5 – 10 Hz	0.35 + 0.03	0.35 + 0.04	0.35 + 0.04	0.035 + 0.004
	10 Hz – 20 kHz	0.04 + 0.03	0.05 + 0.04	0.06 + 0.04	0.005 + 0.004
	20 – 50 kHz	0.1 + 0.05	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1]</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
1 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1]</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
10 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1]</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
100 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1]</sup>	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02
750 V	3 – 5 Hz	1.0 + 0.02	1.0 + 0.03	1.0 + 0.03	0.1 + 0.003
	5 – 10 Hz	0.35 + 0.02	0.35 + 0.03	0.35 + 0.03	0.035 + 0.003
	10 Hz – 20 kHz	0.04 + 0.02	0.05 + 0.03	0.06 + 0.03	0.005 + 0.003
	20 – 50 kHz	0.1 + 0.04	0.11 + 0.05	0.12 + 0.05	0.011 + 0.005
	50 – 100 kHz <sup>[2]</sup>	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz <sup>[1][2]</sup>	4.0 + 0.5	4.0 + 0.5	4.0 + 0.5	0.2 + 0.02
[1] Typically 30 % reading error at 1 MHz					
[2] 750 Volt range is limited to 8 X 10 <sup>7</sup> volt-Hertz					

### Additional Low Frequency Errors

Error is stated as % of reading.

Frequency	AC Filter		
	3HZ (slow)	20HZ (medium)	200HZ (fast)
10 – 20 Hz	0	0.25	–
20 – 40 Hz	0	0.02	–
40 – 100 Hz	0	0.01	0.55
100 – 200 Hz	0	0	0.2
200 Hz – 1 kHz	0	0	0.02
> 1 kHz	0	0	0

**Resistance**

Specifications are for 4-wire resistance function, 2 x 4-wire resistance, or 2-wire resistance with zero. If zero is not used, add 0.2 Ω for 2-wire resistance plus lead resistance, and add 20 mΩ for 2 x 4-wire resistance function.

**Measurement Method**.....Current source referenced to LO input.

**Max. Lead Resistance (4-wire ohms)**..... 10 % of range per lead for 100 Ω, 1 kΩ ranges. 1 kΩ per lead on all other ranges.

**Input Protection**..... 1000 V on all ranges.

**Input Characteristics**

Range	Full Scale (6½ Digits)	Resolution			Source Current
		4½ Digits	5½ Digits	6½ Digits	
10 Ω <sup>[1]</sup>	10.00000 Ω	1 mΩ	100 μΩ	10 μΩ	5 mA
100 Ω	100.0000 Ω	10 mΩ	1 mΩ	100 μΩ	1 mA
1 kΩ	1.000000 kΩ	100 mΩ	10 mΩ	1 mΩ	1 mA
10 kΩ	10.00000 kΩ	1 Ω	100 mΩ	10 mΩ	100 μA
100 kΩ	100.0000 kΩ	10 Ω	1 Ω	100 mΩ	10 μA
1 MΩ	1.000000 MΩ	100 Ω	10 Ω	1 Ω	10 μA
10 MΩ	10.00000 MΩ	1 kΩ	100 Ω	10 Ω	1 μA
100 MΩ	100.0000 MΩ	10 kΩ	1 kΩ	100 Ω	1 μA    10 MΩ
1.0 GΩ <sup>[1]</sup>	1.000000 GΩ	100 kΩ	10 kΩ	1 kΩ	1 μA    10 MΩ

[1] 8846A Only

**8846A Accuracy**

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
10 Ω	0.003 + 0.01	0.008 + 0.03	0.01 + 0.03	0.0006 + 0.0005
100 Ω	0.003 + 0.003	0.008 + 0.004	0.01 + 0.004	0.0006 + 0.0005
1 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
10 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
100 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
1 MΩ	0.002 + 0.001	0.008 + 0.001	0.01 + 0.001	0.001 + 0.0002
10 MΩ	0.015 + 0.001	0.02 + 0.001	0.04 + 0.001	0.003 + 0.0004
100 MΩ	0.3 + 0.01	0.8 + 0.01	0.8 + 0.01	0.15 + 0.0002
1 GΩ	1.0 + 0.01	1.5 + 0.01	2.0 + 0.01	0.6 + 0.0002

**8845A Accuracy**

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 Ω	0.003 + 0.003	0.008 + 0.004	0.01 + 0.004	0.0006 + 0.0005
1 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
10 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
100 kΩ	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
1 MΩ	0.002 + 0.001	0.008 + 0.001	0.01 + 0.001	0.0010 + 0.0002
10 MΩ	0.015 + 0.001	0.02 + 0.001	0.04 + 0.001	0.0030 + 0.0004
100 MΩ	0.3 + 0.01	0.8 + 0.01	0.8 + 0.01	0.1500 + 0.0002

**Additional Ohms Errors**

Digits	NPLC	Additional Noise Error
6½	100	0 % of range
6½	10	0 % of range
5½	1	0.001 % of range
5½	0.2	0.001 % of range ± 20 mΩ
4½	0.02	0.01 % of range ± 20 mΩ

## DC Current

**Input Protection**.....Tool-accessible 11 A/1000 V and 440 mA/1000 V fuses.

### Input Characteristics

Range	Full Scale (6½ Digits)	Resolution			Shunt Resistance (Ohms)	Burden Voltage
		4½ Digits	5½ Digits	6½ Digits		
100 µA	100.0000 µA	10 nA	1 nA	100 pA	100Ω	<0.015
1 mA	1.000000 mA	100 nA	10 nA	1 nA	100Ω	<0.15
10 mA	10.00000 mA	1 µA	100 nA	10 nA	1 Ω	<0.025 V
100 mA	100.0000 mA	10 µA	1 µA	100 nA	1 Ω	<0.25 V
1 A	1.000000 A	100 µA	10 µA	1 µA	0.01 Ω	<0.05 V
3 A <sup>[1]</sup>	3.000000 A	1 mA	100 µA	10 µA	0.01 Ω	<0.15 V
10 A	10.00000 A	1 mA	100 µA	10 µA	0.01 Ω	<0.5 V

[1] Part of 10 A range.

### Accuracy (8846A)

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 µA	0.01 + 0.02	0.04 + 0.025	0.05 + 0.025	0.002 + 0.003
1 mA	0.007 + 0.005	0.030 + 0.005	0.05 + 0.005	0.002 + 0.0005
10 mA	0.007 + 0.02	0.03 + 0.02	0.05 + 0.02	0.002 + 0.002
100 mA	0.01 + 0.004	0.03 + 0.005	0.05 + 0.005	0.002 + 0.0005
1 A <sup>[2]</sup>	0.03 + 0.02	0.04 + 0.02	0.05 + 0.02	0.005 + 0.001
3 A <sup>[1][2]</sup>	0.05 + 0.02	0.08 + 0.02	0.1 + 0.02	0.005 + 0.002
10 A <sup>[2]</sup>	0.1 + 0.008	0.12 + 0.008	0.15 + 0.008	0.005 + 0.0008

[1] Part of 10 A range

[2] Available at front panel connectors only

### Accuracy (8845A)

Accuracy is given as ± (% measurement + % of range)

Range	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 µA	0.01 + 0.02	0.04 + 0.025	0.05 + 0.025	0.002 + 0.003
1 mA	0.007 + 0.005	0.030 + 0.005	0.05 + 0.005	0.002 + 0.0005
10 mA	0.007 + 0.02	0.03 + 0.02	0.05 + 0.02	0.002 + 0.002
100 mA	0.01 + 0.004	0.03 + 0.005	0.05 + 0.005	0.002 + 0.0005
1 A <sup>[2]</sup>	0.03 + 0.04	0.08 + 0.02	0.05 + 0.02	0.005 + 0.001
3 A <sup>[1][2]</sup>	0.05 + 0.08	0.12 + 0.02	0.1 + 0.02	0.005 + 0.002
10 A <sup>[2]</sup>	0.1 + 0.008	0.12 + 0.008	0.15 + 0.02	0.005 + 0.0008

[1] Part of 10 A range

[2] Available at front panel connectors only

### Additional Current Errors

Digits	NPLC	Additional Noise Error
6½	100	0 % of range
6½	10	0 % of range
5½	1	0.001 % of range
5½	0.2	0.001 % of range ± 4 µA
4½	0.02	0.01 % of range ± 4 µA

### AC Current

The following ac current specifications are for sinusoidal signals with amplitudes greater than 5 % of range. For inputs from 1% to 5 % of range, add an additional error of 0.1 % of range.

**Input Protection**.....Tool accessible 11 A/1000 V and 440 mA/1000 V fuses.

**Measurement Method**.....ac-coupled true-rms, dc-coupled to the fuse and shunt (no blocking capacitor)

#### AC Filter Bandwidth

Slow.....3 Hz to 10 kHz  
 Medium.....20 Hz to 10 kHz  
 Fast.....200 Hz to 10 kHz

**Maximum Crest Factor**.....5:1 at full scale

**Additional Crest Factor Errors (<100 Hz)**.....Crest Factor 1-2, 0.05 % of full scale  
 Crest Factor 2-3, 0.2 % of full scale  
 Crest Factor 3-4, 0.4 % of full scale  
 Crest Factor 4-5, 0.5 % of full scale

#### Input Characteristics

Range	Full Scale (6½ Digits)	Resolution			Shunt Resistance (Ohms)	Burden Voltage
		4½ Digits	5½ Digits	6½ Digits		
100 µA <sup>[1]</sup>	100.0000 µA	10 nA	1 nA	100 pA	100Ω	<0.015 V
1 mA <sup>[1]</sup>	1.000000 mA	100 nA	10 nA	1 nA	100Ω	<0.15 V
10 mA	10.00000 mA	1 µA	100 nA	10 nA	1 Ω	<0.025 V
100 mA	100.0000 mA	10 µA	1 µA	100 nA	1 Ω	<0.25 V
1 A	1.000000 A	100 µA	10 µA	1 µA	0.01 Ω	<0.05 V
3 A <sup>[2]</sup>	3.00000 A	1 mA	100 µA	10 µA	0.01 Ω	<0.05 V
10 A	10.00000 A	1 mA	100 µA	10 µA	0.01 Ω	<0.5 V

[1] 8846A Only  
 [2] Part of 10 A range

#### 8846A Accuracy

Accuracy is given as ± (% measurement + % of range)

Range	Frequency (Hz)	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 µA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
1 mA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
10 mA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
100 mA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
1 A <sup>[2]</sup>	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006
3 A <sup>[1][2]</sup>	3 – 5 Hz	1.1 + 0.06	1.1 + 0.06	1.1 + 0.06	0.1 + 0.006
	5 – 10 Hz	0.35 + 0.06	0.35 + 0.06	0.35 + 0.06	0.035 + 0.006
	10 Hz – 5 kHz	0.5 + 0.7	0.15 + 0.06	0.15 + 0.06	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006
10 A <sup>[2]</sup>	3 – 5 Hz	2.0 + 0.06	2.0 + 0.06	2.0 + 0.06	0.2 + 0.006
	5 – 10 Hz	1.1 + 0.06	1.1 + 0.06	1.1 + 0.06	0.1 + 0.006
	10 Hz – 5 kHz	0.15 + 0.06	0.15 + 0.06	0.15 + 0.06	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006

[1] Part of 10 A range  
 [2] Available only on front panel connectors



### 8845A Accuracy

Accuracy is given as  $\pm$  (% measurement + % of range)

Range	Frequency (Hz)	24 Hour (23 $\pm$ 1 °C)	90 Days (23 $\pm$ 5 °C)	1 Year (23 $\pm$ 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
10 mA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
100 mA	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.2 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
1 A <sup>[2]</sup>	3 – 5 Hz	1.0 + 0.04	1.0 + 0.04	1.0 + 0.04	0.1 + 0.006
	5 – 10 Hz	0.3 + 0.04	0.3 + 0.04	0.3 + 0.04	0.035 + 0.006
	10 Hz – 5 kHz	0.1 + 0.04	0.1 + 0.04	0.1 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006
3 A <sup>[1][2]</sup>	3 – 5 Hz	1.1 + 0.06	1.1 + 0.06	1.1 + 0.06	0.1 + 0.006
	5 – 10 Hz	0.35 + 0.06	0.35 + 0.06	0.35 + 0.06	0.035 + 0.006
	10 Hz – 5 kHz	0.15 + 0.06	0.15 + 0.06	0.15 + 0.06	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006
10 A <sup>[2]</sup>	3 – 5 Hz	1.1 + 0.04	1.1 + 0.04	1.1 + 0.04	0.2 + 0.006
	5 – 10 Hz	0.35 + 0.04	0.35 + 0.04	0.35 + 0.04	0.1 + 0.006
	10 Hz – 5 kHz	0.15 + 0.04	0.15 + 0.04	0.15 + 0.04	0.015 + 0.006
	5 – 10 kHz	0.35 + 0.7	0.35 + 0.7	0.35 + 0.7	0.03 + 0.006

[1] Part of the 10 A range  
[2] Available only at front panel connectors

### Additional Low Frequency Errors

Error is stated as % of reading.

Frequency	AC Filter		
	3HZ (slow)	20HZ (medium)	200HZ (fast)
10 – 20 Hz	0	0.25	–
20 – 40 Hz	0	0.02	–
40 – 100 Hz	0	0.01	0.55
100 – 200 Hz	0	0	0.2
200 Hz – 1 kHz	0	0	0.02
> 1 kHz	0	0	0

### Frequency

**Gate Times**.....Programmable to 1 s, 100 ms, and 10 ms.

**Measurement Method**.....Flexible counting technique. AC-coupled input using the ac voltage measurement function.

**Settling Considerations**.....When measuring frequency or period after a dc offset voltage change, errors may occur. For the most accurate measurement, wait up to 1 second for the input blocking capacitor to settle.

**Measurement Considerations**.....To minimize measurement errors, shield inputs from external noise when measuring low-voltage, low-frequency signals.

### 8846A Accuracy

Accuracy is given as  $\pm$  % measurement

Range	Frequency	24 Hour (23 $\pm$ 1 °C)	90 Days (23 $\pm$ 5 °C)	1 Year (23 $\pm$ 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
100 mV to 1000 V <sup>[1][2]</sup>	3 – 5 Hz	0.1	0.1	0.1	0.005
	5 – 10 Hz	0.05	0.05	0.05	0.005
	10 – 40 Hz	0.03	0.03	0.03	0.001
	40 Hz – 300 kHz	0.006	0.01	0.01	0.001
	300 kHz – 1 MHz	0.006	0.01	0.01	0.001

[1] Input >100 mV. For 10 – 100 mV, multiply percent measurement error by 10.  
[2] Limited to 8 X 10<sup>7</sup> volt-Hertz

**8845A Accuracy**

Accuracy is given as ± % measurement

Range	Frequency	24 Hour (23 ± 1 °C)	90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	Temperature Compensation/°C Outside 18 to 28 °C
100 mV to 750 V <sup>[1][2]</sup>	3 – 5 Hz	0.1	0.1	0.1	0.005
	5 – 10 Hz	0.05	0.05	0.05	0.005
	10 – 40 Hz	0.03	0.03	0.03	0.001
	40 Hz – 300 kHz	0.006	0.01	0.01	0.001
[1] Input >100 mV. For 10 – 100 mV, multiply percent measurement error by 10. [2] Limited to 8 X 10 <sup>7</sup> volt-Hertz					

**Gate Time vs. Resolution**

Gate Time	Resolution
0.01	5½
0.1	6½
1.0	6½

**Additional Low Frequency Errors**

Error stated as percent of measurement for inputs >100 mV. For 10 – 100 mV, multiply percent by 10.

Frequency	Resolution		
	6½	5½	4½
3 – 5 Hz	0	0.12	0.12
5 – 10 Hz	0	0.17	0.17
10 – 40 Hz	0	0.2	0.2
40 – 100 Hz	0	0.06	0.21
100 – 300 Hz	0	0.03	0.21
300 Hz – 1 kHz	0	0.01	0.07
> 1 kHz	0	0	0.02

**Capacitance (8846A Only)**

Accuracy is stated as ±(% of measurement + % of range)

Range	Resolution	1 Year Accuracy <sup>[1]</sup> (23 ± 5 °C)	Temperature Coefficient/°C Outside 18 to 28 °C
1 nF	1 pF	2% ± 2.5 %	0.05 + 0.05
10 nF	10 pF	1% ± 0.5 %	0.05 + 0.01
100 nF	100 pF	1% ± 0.5 %	0.01 + 0.01
1 µF	1 nF	1% ± 0.5 %	0.01 + 0.01
10 µF	10 nF	1% ± 0.5 %	0.01 + 0.01
100 µF	100 nF	1% ± 0.5 %	0.01 + 0.01
1 mF	1 µF	1% ± 0.5 %	0.01 + 0.01
10 mF	10 µF	1% ± 0.5 %	0.01 + 0.01
100 mF	100 µF	4% ± 0.2 %	0.05 + 0.05
[1] Stated accuracy is attained when Zero function is used.			

**Temperature (8846A only)**

Test Current..... 1 mA

Accuracy is stated as ± °C and is based on a Platinum RT100 (DIN IEC 751, 385 type) RTD with less than 10 ohms lead resistance. Specifications do not include probe accuracy, which must be added.

Range	Resolution	Accuracy		Temperature Coefficient/°C Outside 18 to 28 °C
		90 Days (23 ± 5 °C)	1 Year (23 ± 5 °C)	
-200 °C	0.001 °C	0.06	0.09	0.0025
-100 °C	0.001 °C	0.05	0.08	0.002
0 °C	0.001 °C	0.04	0.06	0.002
100 °C	0.001 °C	0.05	0.08	0.002
300 °C	0.001 °C	0.1	0.12	0.002
600 °C	0.001 °C	0.12	0.14	0.002

## Continuity

**Continuity Threshold**..... Selectable between 1  $\Omega$  and 1000  $\Omega$

**Test Current**..... 1 mA

**Response Time**..... 300 samples/sec with audible tone

Accuracy is given as  $\pm$  (% measurements + % of range)

Range	24 Hour (23 $\pm$ 1 $^{\circ}$ C)	90 Days (23 $\pm$ 5 $^{\circ}$ C)	1 Year (23 $\pm$ 5 $^{\circ}$ C)	Temperature Coefficient/ $^{\circ}$ C Outside 18 to 28 $^{\circ}$ C
1000.0 $\Omega$	0.002 + 0.01	0.008 + 0.02	0.01 + 0.02	0.001 + 0.002

## Diode Test

**Test Current**..... 100  $\mu$ A or 1 mA

**Response Time**..... 300 samples/sec with audible tone.

Accuracy is given as  $\pm$  (% measurements + % of range)

Range	24 Hour (23 $\pm$ 1 $^{\circ}$ C)	90 Days (23 $\pm$ 5 $^{\circ}$ C)	1 Year (23 $\pm$ 5 $^{\circ}$ C)	Temperature Coefficient/ $^{\circ}$ C Outside 18 to 28 $^{\circ}$ C
5.0000 V	0.002 + 0.002	0.008 + 0.002	0.01 + 0.002	0.001 + 0.002
10.0000 V	0.002 + 0.001	0.008 + 0.002	0.01 + 0.002	0.001 + 0.002

## Measurement Rates

Function	Digits	Setting	Integration Time 60 Hz (50 Hz)	Measurements/Second <sup>[1]</sup>	
				8845A	8846A
DC Volts, DC Current, and Resistance	6½	100 NPLC	1.67 (2) s	0.6 (0.5)	0.6 (0.5)
	6½	10 NPLC	167 (200) ms	6 (5)	6 (5)
	5½	10 NPLC	16.7 (20) ms	60 (50)	60 (50)
	5½	0.2 NPLC	3 ms	300	300
AC Voltage and AC Current <sup>[2]</sup>	6½	3 Hz		0.14	0.14
	6½	20 Hz		1	1
	6½	200 Hz <sup>[3]</sup>		1.6	1.6
	6½	200 Hz <sup>[4]</sup>		6	6
Frequency and Period	6½	1 s		1	1
	5½	100 ms		9.8	9.8
	4½	10 ms		80	80

[1] Typical measurement rates with autozero off.

[2] Maximum measurement rates for 0.01 % of ac step. When dc input varies, additional settling delay is required.

[3] For remote operation or external trigger using default settling delay

[4] Settling delay = 0

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**Fluke Corporation**  
PO Box 9090, Everett, WA USA 98206

**Fluke Europe B.V.**  
PO Box 1186, 5602 BD  
Eindhoven, The Netherlands

**For more information call:**  
In the U.S.A. (800) 443-5853 or  
Fax (425) 446-5116  
In Europe/M-East/Africa +31 (0) 40 2675 200 or  
Fax +31 (0) 40 2675 222  
In Canada (800)-36-FLUKE or  
Fax (905) 890-6866  
From other countries +1 (425) 446-5500 or  
Fax +1 (425) 446-5116  
Web access: <http://www.fluke.com>