

8845A/8846A

6.5 Digit Precision Multimeters

FLUKE®



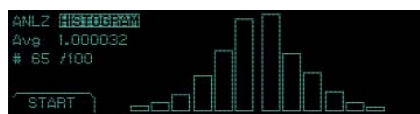
Fluke 8845A



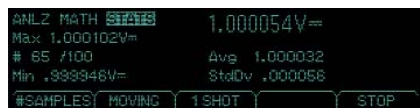
Fluke 8846A



Use the built-in TrendPlot paperless chart recorder to graphically identify the extent of drift and intermittent events in analog circuits



View results in Histogram mode to reveal stability or noise problems in analog circuits



Handle even the most demanding measurements with high accuracy and 6.5 digit resolution

Precision and versatility for bench or systems applications

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.

Dual Display offers versatile graphical capabilities: The 8845A and 8846A features a unique graphical display that can reveal signal quality issues like drift, intermittent and stability by viewing the measurement data as a real time TrendPlot™, Histogram or Statistics using the unique analyze mode.

Wide Measurement Ranges: Resistance or current has been extended to cover the widest range possible.

Perform 4-wire measurements easily with two leads: Patented split terminal jacks for 2x4 Ohms function allow you to perform precise 4-wire measurements with only two leads instead of four. Optional Kelvin leads accessories are available to enable you to establish a 4-wire connection even in tight spaces.

Systems Capabilities: Both instruments include an RS-232, IEEE-488 and Ethernet interface as standard, with popular DMM emulation modes make systems integration a simple task.

Software: Transfer data points from your meter to your PC with the free copy of FlukeView Forms Basic. To customize your forms upgrade with FVF-UG.

Features

	8845A	8846A
Display	Dual VFD Dot Matrix	
Resolution	6.5 Digits	
Measurement Rate (Rdgs/s)	1000	
Continuity / Diode Test	Yes	
Analytical Functions	Statistics, Histogram, TrendPlot™, Limit Compare	
Math Functions	NULL, Min/Max, dB/dBm	
USB Device Port	-	USB Memory Drive port
Real Time Clock	-	Yes
Interfaces	RS232, IEEE-488.2, Ethernet	
Programming Languages/Emulation Modes	SCPI (IEEE-488.2), Agilent 34401A, Fluke 45	
Safety	Designed to comply with IEC 61010-12000-1, ANSI / ISA-S82.01-1994, CAN / CSA-C22.2 No.1010.1-92 1000V CATI / 600V CATII	

Specifications

(Check the Fluke web for detailed specifications)

Function*	8845A			8846A		
	Range	Resolution	Accuracy* (%)	Range	Resolution	Accuracy* (%)
Voltage DC	1000 V	100 nV	0.0035	1000 V	100 nV	0.0024
Voltage AC (Freq 300 Hz)	750 V	100 nV	0.06	1000 V	100 nV	0.06
Resistance (2x4 Wire)	100 MΩ	100 μΩ	0.01	1 GΩ	10 μΩ	0.01
Current DC	10 A	100 pA	0.05	10 A	100 pA	0.05
Current AC (Freq. 3Hz-10kHz)	10 A	1 μA	0.10	10 A	10 nA	0.10
Freq/Period	300 kHz	1 μHz	0.01	1 MHz	1 μHz	0.01
Capacitance	-	-	-	1 nF to 0.1 F	1 pF	1
Temperature RTD	-	-	-	-200 to +600°	0.001°	0.06

* Accuracy = +/- (% of reading)

Size (HxWxD): 88 mm x 215 mm x 293 mm

Weight: 3.6 kg

One Year Warranty



Included Accessories

LCI Line Power Cord, TL71 Test Lead Set, Spare Line Power fuse, Programmers Manual/User Manual on CD-ROM, FVF-BASIC FlukeView Forms Software Basic Version.

Ordering Information

Fluke 8845A 6.5 Digit Precision Multimeter
 Fluke 8845A/SU 6.5 Digit Precision Multimeter (software & cable)
 Fluke 8846A 6.5 Digit Precision Multimeter
 Fluke 8846A/SU 6.5 Digit Precision Multimeter (software & cable)

Recommended Accessories



TL2X4W-PT
2x4 Wire Ohms Test lead 2mm Probe Tip



884X-512M
USB Memory 512M



FVF-UG
FlukeView Forms Software Upgrade

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 μ A to 10 A current range, with up to 100 pA resolution
- Wide ohms ranges from 10 Ω to 1 G Ω 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 Ω to 1 G Ω 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

Input Protection	1000 V all ranges
Overrange	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

Maximum Input	1000 V on any range
Common Mode Rejection	140 dB at 50 or 60 Hz $\pm$ 0.1 % (1 k Ω unbalance)
Normal Mode Rejection	60 dB for NPLC of 1 or greater with dc filter off and power line frequency $\pm$ 0.1 % 100 dB for NPLC of 1 or greater with dc filter on and power line frequency $\pm$ 0.1 %
Measurement Method	Multi-ramp A/D
A/D Linearity	0.0002 % of measurement + 0.0001 % of range
Input Bias Current	<30 pA at 25 °C
Autozero Off Operation	Following instrument warm-up at calibration temperature $\pm$ 1 °C and less than 10 minutes, add error: 0.0002 % range additional error + 5 μ V.
Settling Considerations	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 μ V	1 μ V	100 nV	10 M Ω or >10 G Ω ^[1]
1 V	1.000000 V	100 μ V	10 μ V	1 μ V	10 M Ω or >10 G Ω ^[1]
10 V	10.00000 V	1 mV	100 μ V	10 μ V	10 M Ω or >10 G Ω ^[1]
100 V	100.0000 V	10 mV	1 mV	100 μ V	10 M Ω $\pm$ 1%
1000 V	1,000.000 V	100 mV	10 mV	1 mV	10 M Ω $\pm$ 1%

[1] Inputs beyond $\pm$ 14 V are clamped through 200 k Ω typical. 10 M Ω is default input impedance.

8846A Accuracy

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

Range	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	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 $\pm$ (% measurement + % of range)

Range	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	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 8×10^7 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 $\pm$ (% measurement + % of range)

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	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 ⁽¹⁾	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 ⁽¹⁾	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 ⁽¹⁾	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 ⁽¹⁾	4.0 + 0.50	4.0 + 0.50	4.0 + 0.50	0.2 + 0.02

<i>Range</i>	<i>Frequency</i>	<i>24 Hour (23 ± 1 °C)</i>	<i>90 Days (23 ± 5 °C)</i>	<i>1 Year (23 ± 5 °C)</i>	<i>Temperature Coefficient/ °C Outside 18 to 28 °C</i>
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 ^[2]	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz ^{[1][2]}	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 ⁷ volt-Hertz					

8845A Accuracy

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

<i>Range</i>	<i>Frequency (Hz)</i>	<i>24 Hour (23 ± 1 °C)</i>	<i>90 Days (23 ± 5 °C)</i>	<i>1 Year (23 ± 5 °C)</i>	<i>Temperature Coefficient/ °C Outside 18 to 28 °C</i>
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 ^[1]	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 ^[1]	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 ^[1]	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 ^[1]	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 ^[2]	0.55 + 0.08	0.6 + 0.08	0.6 + 0.08	0.06 + 0.008
	100 – 300 kHz ^{[1][2]}	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 ⁷ volt-Hertz					

Additional Low Frequency Errors

Error is stated as % of reading.

<i>Frequency</i>	<i>AC Filter</i>		
	<i>3HZ (slow)</i>	<i>20HZ (medium)</i>	<i>200HZ (fast)</i>
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 m Ω 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 k Ω ranges. 1 k Ω 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 ^[1]	10.00000 Ω	1 m Ω	100 $\mu\Omega$	10 $\mu\Omega$	5 mA
100 Ω	100.0000 Ω	10 m Ω	1 m Ω	100 $\mu\Omega$	1 mA
1 k Ω	1.000000 k Ω	100 m Ω	10 m Ω	1 m Ω	1 mA
10 k Ω	10.00000 k Ω	1 Ω	100 m Ω	10 m Ω	100 μA
100 k Ω	100.0000 k Ω	10 Ω	1 Ω	100 m Ω	10 μA
1 M Ω	1.000000 M Ω	100 Ω	10 Ω	1 Ω	10 μA
10 M Ω	10.00000 M Ω	1 k Ω	100 Ω	10 Ω	1 μA
100 M Ω	100.0000 M Ω	10 k Ω	1 k Ω	100 Ω	1 μA 10 M Ω
1.0 G Ω ^[1]	1.000000 G Ω	100 k Ω	10 k Ω	1 k Ω	1 μA 10 M Ω

[1] 8846A Only

8846A Accuracy

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

Range	24 Hour (23 $\pm$ 1 $^{\circ}\text{C}$)	90 Days (23 $\pm$ 5 $^{\circ}\text{C}$)	1 Year (23 $\pm$ 5 $^{\circ}\text{C}$)	Temperature Coefficient/ $^{\circ}\text{C}$ Outside 18 to 28 $^{\circ}\text{C}$
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 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
10 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
100 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
1 M Ω	0.002 + 0.001	0.008 + 0.001	0.01 + 0.001	0.001 + 0.0002
10 M Ω	0.015 + 0.001	0.02 + 0.001	0.04 + 0.001	0.003 + 0.0004
100 M Ω	0.3 + 0.01	0.8 + 0.01	0.8 + 0.01	0.15 + 0.0002
1 G Ω	1.0 + 0.01	1.5 + 0.01	2.0 + 0.01	0.6 + 0.0002

8845A Accuracy

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

Range	24 Hour (23 $\pm$ 1 $^{\circ}\text{C}$)	90 Days (23 $\pm$ 5 $^{\circ}\text{C}$)	1 Year (23 $\pm$ 5 $^{\circ}\text{C}$)	Temperature Coefficient/ $^{\circ}\text{C}$ Outside 18 to 28 $^{\circ}\text{C}$
100 Ω	0.003 + 0.003	0.008 + 0.004	0.01 + 0.004	0.0006 + 0.0005
1 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
10 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
100 k Ω	0.002 + 0.0005	0.008 + 0.001	0.01 + 0.001	0.0006 + 0.0001
1 M Ω	0.002 + 0.001	0.008 + 0.001	0.01 + 0.001	0.0010 + 0.0002
10 M Ω	0.015 + 0.001	0.02 + 0.001	0.04 + 0.001	0.0030 + 0.0004
100 M Ω	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 $\pm$ 20 m Ω
4½	0.02	0.01 % of range $\pm$ 20 m Ω

DC Current

Input ProtectionTool-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 ^[1]	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 ^[2]	0.03 + 0.02	0.04 + 0.02	0.05 + 0.02	0.005 + 0.001
3 A ^{[1][2]}	0.05 + 0.02	0.08 + 0.02	0.1 + 0.02	0.005 + 0.002
10 A ^[2]	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 ^[2]	0.03 + 0.04	0.08 + 0.02	0.05 + 0.02	0.005 + 0.001
3 A ^{[1][2]}	0.05 + 0.08	0.12 + 0.02	0.1 + 0.02	0.005 + 0.002
10 A ^[2]	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 ^[1]	100.0000 µA	10 nA	1 nA	100 pA	100Ω	<0.015 V
1 mA ^[1]	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 ^[2]	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 ^[2]	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 ^{[1][2]}	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 ^[2]	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 ^[2]	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 ^{[1][2]}	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 ^[2]	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 ^{[1][2]}	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 ⁷ volt-Hertz					

8845A 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 Compensation/ °C Outside 18 to 28 °C
100 mV to 750 V ^{[1][2]}	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 ⁷ 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 $\pm$ (% of measurement + % of range)

Range	Resolution	1 Year Accuracy ^[1] (23 $\pm$ 5 °C)	Temperature Coefficient/ °C Outside 18 to 28 °C
1 nF	1 pF	2% $\pm$ 2.5 %	0.05 + 0.05
10 nF	10 pF	1% $\pm$ 0.5 %	0.05 + 0.01
100 nF	100 pF	1% $\pm$ 0.5 %	0.01 + 0.01
1 μ F	1 nF	1% $\pm$ 0.5 %	0.01 + 0.01
10 μ F	10 nF	1% $\pm$ 0.5 %	0.01 + 0.01
100 μ F	100 nF	1% $\pm$ 0.5 %	0.01 + 0.01
1 mF	1 μ F	1% $\pm$ 0.5 %	0.01 + 0.01
10 mF	10 μ F	1% $\pm$ 0.5 %	0.01 + 0.01
100 mF	100 μ F	4% $\pm$ 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 $\pm$ °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 $\pm$ 5 °C)	1 Year (23 $\pm$ 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 ThresholdSelectable between 1 Ω and 1000 Ω

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 Ω	0.002 + 0.01	0.008 + 0.02	0.01 + 0.02	0.001 + 0.002

Diode Test

Test Current 100 μ 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 ^[1]	
				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 ^[2]	6½	3 Hz		0.14	0.14
	6½	20 Hz		1	1
	6½	200 Hz ^[3]		1.6	1.6
	6½	200 Hz ^[4]		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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