

Keysight Technologies U1210 Series Handheld Clamp Meters

Handle big currents –
more safely

Data Sheet





Introduction

Measurements of electrical distribution cables can be challenging and risky. For cables up to two inches in diameter, the Keysight Technologies, Inc. U1210 Series handheld clamp meters enable high-current measurements without breaking the circuit. Unlike most clamp meters, they also include DMM capabilities—resistance, capacitance, frequency and temperature—to simplify troubleshooting during installation and maintenance. Best of all, they provide an extra layer of protection with CAT IV 600V and CAT III 1000 V safety ratings.

Features

- Large clamp opening of 52 mm or 2"
- High measurement capability of up to 1000 A for AC, DC or AC+DC
- CAT III 1000 V/CAT IV 600 V safety rating
- *Bluetooth*[®] wireless connectivity (optional U1177A Infrared (IR)-to-*Bluetooth* Adapter required)
- Includes full-featured DMM with resistance, capacitance, frequency and temperature functions
- High resolution measurements – measure current as low as 0.01 mA
- Peak hold
- Dual ranging mode – manual and auto
- Large dual display
- Min/max recording capability

Key Measurements

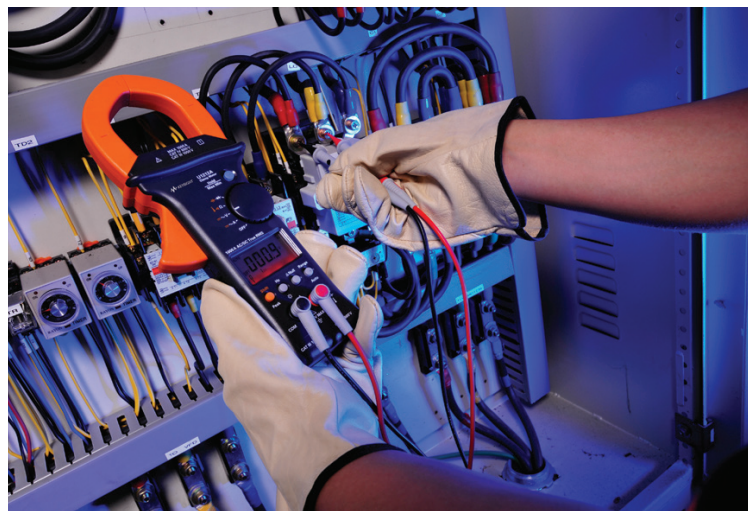
Measure current easily and accurately

Keysight U1210 Series handheld clamp meters come with clamp opening of 52 mm/2 inches and high current measurement capability of up to 1000 A (AC, DC, AC+ DC). With the large jaw size, these handhelds simplify current measurements for thick cables. Clamp on with the U1210 Series and get convenience, versatility and the ability to handle big currents—safely.



Full-featured digital multimeter functions

The U1210 Series handheld clamp meters provide basic functions of a multimeter with wide measurement ranges to cater for a broad range of applications (ACA, DCV, ACV, OHM, audible continuity, diode and frequency tests). These meters also provide auto-ranging capability, built-in peak hold for in-rush current measurement, temperature and capacitance measurement capability, large backlight display and one-hand operation.



Smooth sailing measurements even in a distance

Making current measurements can be strenuously demanding due to its complexity and high current involved. Electrical distribution rooms being typically situated at different areas further complicates maintenance and troubleshooting due to the need to commute back and forth to cross check measurement results.



By adding the new *Bluetooth* capability to your existing U1210 series handheld clamp meters, you are able to make high current measurements in a safer and more

convenient manner. With the U1177A Infrared-to-*Bluetooth* adapter, you can easily monitor measurements and log data up 10-metres range across all Android platform devices—

an added value for maximum efficiency and productivity in all sorts of hard-to-reach environments.

Take a Closer Look



General Specifications

Title	Specification
Dimension	<ul style="list-style-type: none"> – U1211A: 106 mm (W) X 273 mm (L) X 43 mm (H) – U1212A and U1213A: 106 mm (W) X 260 mm (L) X 43 mm (H)
Net Weight	<ul style="list-style-type: none"> – U1211A: 625 grams with batteries included – U1212A and U1213A: 525 grams with batteries included
Display	4 digits with maximum reading 4,100 counts. The 12 Segments analog bar graph and full annunciator. Automatic polarity indication.
Battery	Standard 9 V Battery - Alkaline
Low battery indicator	Battery voltage drops below 6.0 V
Power consumption	<ul style="list-style-type: none"> – U1211A: 186 mVA maximum – U1212A and U1213A: 220 mVA maximum
Battery life	60 hours (typical)
Connectivity	Wireless <i>Bluetooth</i> compatible
Maximum jaw opening	~2 inches
Temperature coefficient	0.12 x (specified accuracy)/°C (from 0 to 18 °C or 28 to 50 °C)
NMRR (Normal Mode Rejection Ratio)	This series has a NMRR specification of > 60 dB at 50 Hz and 60 Hz, which means a good ability to reject the effect of AC noise in DC measurement
CMRR (Common Mode Rejection Ratio)	<ul style="list-style-type: none"> – U1211A and U1212A have CMRR specifications of > 60 dB at DC to 60 Hz in the ACV function; and > 80 dB at DC, 50 Hz and 60 Hz in the DCV function. – U1213A has a CMRR specifications of > 60 dB at DC to 60 Hz in the ACV function; and > 120 dB at DC, 50 Hz and 60 Hz in the DCV function.
Operating temperature	-10 to 50 °C, 0 to 80 % R.H.
Storage temperature	-20 to 60 °C, 0 to 80 % R.H.
Relative Humidity (R.H.)	Maximum 80 % R.H. for temperature up to 31 °C decreasing linearly to 50 % R.H. at 50 °C
Temperature coefficient	0.1 × (specified accuracy) / °C (from 0 °C to 18 °C or 28 °C to 50 °C)
Safety compliance	EN/IEC 61010-1:2001, ANSI/UL 61010-1:2004, and CAN/CSA-C22.2 No.61010-1-04
Measurement category	CAT III 1000 V/ CAT IV 600 V
EMC compliance	<ul style="list-style-type: none"> – Certified to IEC61326-1:2005/ EN61326-1:2006 – CISPR 11:2003/ EN 55011:2007 Group 1 class A – Canada: ICES-001:2004 – Australia/New Zealand: AS/NZS CISPR11:2004

Electrical Specifications for U1211A

Accuracy is given as \pm (% of reading + number of least significant digits) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, with relative humidity less than 80 % R.H.

ACV/ ACA specifications are ac coupled, true R.M.S. and are valid from 5 % of range to 100 % of range. The crest factor may be up to 3.0 at full-scale except the 1000 V and 1000 A ranges where these are 1.5 at full scale. For non-sinusoidal waveforms, add (2 % reading + 2 % full scale) typical, for crest factors up to 3.

DC voltage

Range	Resolution	Accuracy	Overload protection
400 V	0.1 V	0.5 % + 5	1000 V R.M.S
1000 V	1 V	0.5 % + 3	

– Input impedance: 10 M Ω (nominal)

AC voltage

Range	Resolution	Accuracy 45~400 Hz	Overload protection
400 V	0.1 V	1 % + 5	1000 V R.M.S
1000 V	1 V	1 % + 5	

– Input impedance: 10 M Ω (nominal) in parallel with < 100 pF

Voltage (1 ms peak hold)

Range	Resolution	Accuracy	Overload protection
400 V	0.1 V	1 % + 43	1000 V R.M.S
1000 V	1 V	1 % + 43	

– Specified accuracy for changes > 1 ms in duration

Diode check/audible continuity test

Range	Resolution	Accuracy	Test current	Open voltage
Diode	0.001 V	0.5 % + 2	Approximately 0.8 mA	< +3.1 V

– Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current

– Built-in buzzer sounds when reading is below 50 mV approximately and single tone for normal forward-biased diode or semiconductor junction as $0.3\text{ V} \leq \text{Reading} \leq 0.8\text{ V}$

Resistance

Range	Resolution	Accuracy	Test current
400 Ω	0.1 Ω	0.5 % + 3	0.8 mA
4 k Ω	0.001 k Ω	0.5 % + 3	80 μA

Notes:

1. Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current
2. Maximum open voltage: < +3.1 V
3. Instant continuity: Built-in buzzer sounds when resistance is less than 10.0 Ω
4. The accuracy of 400 Ω and 4 k Ω is specified after Relative function, which is used to substrate the test lead resistance and the thermal effect

Electrical Specifications for U1211A (continued)

Capacitance

Range	Resolution	Accuracy	Overload protection
400 μ F	0.1 μ F	2 % + 4	1000 V R.M.S. for circuits
4000 μ F	1 μ F	3 % + 4	< 0.3 A of short circuit current

– The accuracy is based on film capacitor or better and use Relative mode to zero residual value

AC current

Range	Resolution	Accuracy *N1		
		45~65 Hz	65~400 Hz	400 Hz~1 kHz
40 A	0.01 A	1.0 % + 10	1.0 % + 10	3.0 % + 10
400 A	0.1 A	1.0 % + 5	1.0 % + 5	3.0 % + 5
400~700 A	1 A	1.0 % + 5	1.0 % + 5	3.0 % + 5
700~1000 A	1 A	1.0 % + 5	None	None

– Maximum overload: 1000 A R.M.S. The accuracy is specified on the symmetrical waveforms.
 – N1: The maximum verification of current and frequency product is less than 400,000 A x Hz

WARNING:

The measuring duty cycle should not exceed the following limits.

0 ~ 600 A R.M.S.	Continuous
600 ~ 700 A R.M.S.	10 minutes ON, 10 minutes OFF
700 ~ 1000 A R.M.S.	5 minutes ON, 20 minutes OFF

Current (1 ms peak hold)

Range	Resolution	Accuracy	Maximum overload
40 A	0.01 A	2.0 % + 70	1000 A R.M.S.
400 A	0.1 A	2.0 % + 43	
1000 A	1 A	2.0 % + 43	

– Specified accuracy for changes > 1 ms in duration

Electrical Specifications for U1211A (continued)

Frequency (AC coupling)

Range	Resolution	Accuracy	Minimum frequency
99.99 Hz	0.01 Hz	0.2 % + 3	10 Hz
999.9 Hz	0.1 Hz		
9.999 kHz	0.001 kHz		
99.99 kHz	0.01 kHz		
999.9 kHz	0.1 kHz		

– Overload protection: 1000 V; < 20,000,000 V x Hz

Sensitivity

Frequency sensitivity		
Range	Minimum sensitivity (R.M.S.)	
Maximum input for specified accuracy of AC	40 Hz~2 kHz	10~40 Hz or 2~100 kHz
400 V	6 V	6 V
1000 V	20 V	30 V (< 10 kHz)
40 A	3 A (< 1 kHz)	3 A (< 1 kHz)
400 A	20 A (< 1 kHz)	20 A (< 1 kHz)
1000 A	50 A (1 kHz)	50 A (< 1 kHz)

Electrical Specifications for U1212A

Accuracy is given as \pm (% of reading + number of least significant digits) at 23 °C \pm 5 °C, with relative humidity less than 80 % R.H.

ACV/ ACA specifications are ac coupled, true R.M.S. and are valid from 5 % of range to 100 % of range. The crest factor may be up to 3.0 at full-scale except the 1000 V and 1000 A ranges where these are 1.5 at full scale. For non-sinusoidal waveforms, add (2 % reading + 2 % full scale) typical, for crest factors up to 3.

DC voltage

Range	Resolution	Accuracy	Overload protection
400 V	0.1 V	0.5 % + 3	1000 V R.M.S
1000 V	1 V	0.5 % + 3	

– Input impedance: 10 M Ω (nominal)

AC voltage

Range	Resolution	Accuracy 45~400 Hz	Overload protection
400 V	0.1 V	1 % + 5	1000 V R.M.S
1000 V	1 V	1 % + 5	

– Input impedance: 10 M Ω (nominal) in parallel with < 100 pF

Voltage (1 ms peak hold)

Range	Resolution	Accuracy	Overload protection
400 V	0.1 V	1 % + 43	1000 V R.M.S
1000 V	1 V	1 % + 43	

– Specified accuracy for changes > 1 ms in duration

Diode check/audible continuity test

Range	Resolution	Accuracy	Test current	Open voltage
Diode	0.001 V	0.5 % + 2	Approximately 0.8 mA	< +3.1 V

– Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current

– Built-in buzzer sounds when reading is below 50 mV approximately and single tone for normal forward-biased diode or semiconductor junction as $0.3 \text{ V} \leq \text{Reading} \leq 0.8 \text{ V}$

Resistance

Range	Resolution	Accuracy	Test current
400 Ω	0.1 Ω	0.5 % + 3	0.8 mA
4 k Ω	0.001 k Ω	0.5 % + 3	80 μ A

Notes:

1. Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current
2. Maximum open voltage: < +3.1 V
3. Instant continuity: Built-in buzzer sounds when resistance is less than 10.0 Ω
4. The accuracy of 400 Ω and 4 k Ω is specified after Relative function, which is used to substrate the test lead resistance and the thermal effect

Electrical Specifications for U1212A (continued)

Capacitance

Range	Resolution	Accuracy	Overload protection
400 μ F	0.1 μ F	2 % + 4	1000 V R.M.S. for circuits
4000 μ F	1 μ F	3 % + 4	< 0.3 A of short circuit current

– The accuracy is based on film capacitor or better and use Relative mode to zero residual value

DC current

Range	Resolution	Accuracy	Maximum overload
40 A	0.01 A	1.5 % + 15	1000 A R.M.S.
400 A	0.1 A	1.5 % + 3	
1000 A	1 A	2.0 % + 5	

– Use Relative mode to zero residual offset

AC current

Range	Resolution	Accuracy *N1				Maximum overload
		45~65 Hz	65~200 Hz	200~300 Hz	300~400 Hz	
40 A	0.01 A	2.0 % + 10	3.0 % + 10	3.5 % + 10	6.5 % + 10	1000 A R.M.S.
400 A	0.1 A	2.0 % + 5	3.0 % + 5	3.5 % + 5	6.5 % + 5	
1000 A	1 A	2.5 % + 5	3.0 % + 5	3.5 % + 5	6.5 % + 5	

– N1: The maximum verification of current and frequency product is less than 400,000 A x Hz

Current (1 ms peak hold)

Range	Resolution	Accuracy	Maximum overload
40 A	0.01 A	2.0 % + 70	1000 A R.M.S.
400 A	0.1 A	2.0 % + 43	
1000 A	1 A	2.0 % + 43	

– Specified accuracy for changes > 1 ms in duration

Temperature test

Thermal type	Range	Resolution	Accuracy
K	-200 ~ -40 °C	0.1 °C	1 % + 3 °C
	-40 ~ 1372 °C	0.1 °C	1 % + 1 °C
	-328 ~ -40 °F	0.1 °F	1 % + 6 °F
	-40 ~ 2502 °F	0.1 °F	1 % + 2 °F

Notes:

1. The accuracy does not include the tolerance of the thermocouple probe, and the meter must be operational for at least one hour
2. Do not allow the temperature sensor to contact a surface that is energized above 33 V R.M.S. or 70 V DC. Such voltages will pose a shock hazard.
3. The temperature calculation is according to the standard of EN/IEC-60548-1 and NIST175

Electrical Specifications for U1212A (continued)

Frequency (AC coupling)

Range	Resolution	Accuracy	Minimum frequency
99.99 Hz	0.01 Hz	0.2 % + 3	10 Hz
999.9 Hz	0.1 Hz		
9.999 kHz	0.001 kHz		
99.99 kHz	0.01 kHz		
999.9 kHz	0.1 kHz		

– Overload protection: 1000 V

Sensitivity

Frequency sensitivity		
Range	Minimum sensitivity (R.M.S.)	
Maximum input for specified accuracy of AC	40 Hz~2 kHz	10~40 Hz or 2~100 kHz
400 V	6 V	6 V
1000 V	20 V	30 V (< 10 kHz)
40 A	3 A (< 1 kHz)	3 A (< 1 kHz)
400 A	20 A (< 1 kHz)	20 A (< 1 kHz)
1000 A	50 A (1 kHz)	50 A (< 1 kHz)

Electrical Specifications for U1213A

Accuracy is given as \pm (% of reading + number of least significant digits) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, with relative humidity less than 80 % R.H.

AC voltage, AC current, AC+DC voltage, AC+DC current specifications are ac coupled, true R.M.S. and are valid from 5 % of range to 100 % of range. The crest factor may be up to 3.0 at full-scale except the 1000 V and 1000 A ranges where these are 1.5 at full scale. For non-sinusoidal waveforms, add (2 % reading + 2 % full scale) typical, for crest factors up to 3.

DC voltage

Range	Resolution	Accuracy	Overload protection
4 V	0.001 V		
40 V	0.01 V	0.2 % + 5	
400 V	0.1 V		1000 A R.M.S.
1000 V	1 V	0.5 % + 3	

– Input impedance: 10 M Ω (nominal)

AC voltage

Range	Resolution	Accuracy		Overload protection
		45~400 Hz	400 Hz~2 kHz	
4 V	0.001 V			
40 V	0.01 V			
400 V	0.1 V	1.0 % + 5	2.0 % + 5	1000 V R.M.S.
1000 V	1 V			

– Input impedance: 10 M Ω (nominal) in parallel with < 100 pF

AC+DC voltage

Range	Resolution	Accuracy		Overload protection
		45~400 Hz	400 Hz~2 kHz	
4 V	0.001 V			
40 V	0.01 V			
400 V	0.1 V	1.5 % + 9	2.5 % + 9	1000 V R.M.S.
1000 V	1 V			

– Input impedance: 10 M Ω (nominal) in parallel with < 100 pF

Voltage (1 ms peak hold)

Range	Resolution	Accuracy	Overload protection
4 V	0.001 V		
40 V	0.01 V		
400 V	0.1 V	1.0 % + 3	1000 V R.M.S.
1000 V	1 V		

– Specified accuracy for changes > 1 ms in duration

Electrical Specifications for U1213A (continued)

Diode check/audible continuity test

Range	Resolution	Accuracy	Test current	Open voltage
Diode	0.001 V	0.5 % + 2	Approximately 0.8 mA	< +3.1 V

- Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current
- Built-in buzzer sounds when reading is below 50 mV approximately and single tone for normal forward-biased diode or semiconductor junction as $0.3 \text{ V} \leq \text{Reading} \leq 0.8 \text{ V}$

Resistance

Range	Resolution	Accuracy	Test current
400 Ω	0.1 Ω	0.3 % + 3	0.8 mA
4 k Ω	0.001 k Ω		80 μA
40 k Ω	0.01 k Ω		8 μA
400 k Ω	0.1 k Ω	0.6 % + 3	727 nA
4 M Ω	0.001 M Ω		112 nA
40 M Ω	0.01 M Ω		112 nA

Notes:

1. Overload protection: 1000 V R.M.S. for circuits < 0.3 A of short circuit current
2. Maximum open voltage: < +3.1 V
3. Instant continuity: Built-in buzzer sounds when resistance is less than 10.0 Ω
4. The accuracy of 400 Ω and 4 k Ω is specified after Relative function, which is used to substrate the test lead resistance and the thermal effect

Capacitance

Range	Resolution	Accuracy	Overload protection
4 μF	0.001 μF	1 % + 4	1000 V R.M.S. for circuits < 0.3 A of short circuit current
40 μF	0.01 μF		
400 μF	0.1 μF	2 % + 4	
4000 μF	1 μF	3 % + 4	

- The accuracy is based on film capacitor or better and use Relative mode to zero residual value

DC current

Range	Resolution	Accuracy	Maximum overload
40 A	0.01 A	1.5 % + 15	1000 A R.M.S.
400 A	0.1 A	1.5 % + 3	
1000 A	1 A	2.0 % + 5	

- Use Relative mode to zero residual offset

Electrical Specifications for U1213A (continued)

AC current

Range	Resolution	Accuracy *N1				Maximum overload
		45 ~ 65 Hz	65 ~ 200 Hz	200 ~ 300 Hz	300 ~ 400 Hz	
40 A	0.01 A	2.0 % + 10	3.0 % + 10	3.5 % + 10	6.5 % + 10	1000 A R.M.S.
400 A	0.1 A	2.0 % + 5	3.0 % + 5	3.5 % + 5	6.5 % + 5	
1000 A	1 A	2.0 % + 5	3.0 % + 5	3.5 % + 5	6.5 % + 5	

– N1: The maximum verification of current and frequency product is less than 400,000 A x Hz

AC+DC current

Range	Resolution	Accuracy *N1				Maximum overload
		45 ~ 65 Hz	65 ~ 200 Hz	200 ~ 300 Hz	300 ~ 400 Hz	
40 A	0.01 A	3.5 % + 25	4.5 % + 25	5.0 % + 25	8.0 % + 25	1000 A R.M.S.
400 A	0.1 A	3.5 % + 9	4.5 % + 9	5.0 % + 9	8.0 % + 9	
1000 A	1 A	4.5 % + 9	5.0 % + 9	5.5 % + 9	8.5 % + 9	

Current (1 ms peak hold)

Range	Resolution	Accuracy	Maximum overload
40 A	0.01 A	2.0 % + 70	1000 A R.M.S.
400 A	0.1 A	2.0 % + 43	
1000 A	1 A	2.0 % + 43	

– Specified accuracy for changes > 1 ms in duration

Temperature test

Thermal type	Range	Resolution	Accuracy
K	-200 ~ -40 °C	0.1 °C	1 % + 3 °C
	-40 ~ 1372 °C	0.1 °C	1 % + 1 °C
	-328 ~ -40 °F	0.1 °F	1 % + 6 °F
	-40 ~ 2502 °F	0.1 °F	1 % + 2 °F

Notes:

1. The accuracy does not include the tolerance of the thermocouple probe, and the meter must be operational for at least one hour
2. Do not allow the temperature sensor to contact a surface that is energized above 33 V R.M.S. or 70 V DC. Such voltages will pose a shock hazard.
3. The temperature calculation is according to the standard of EN/IEC-60548-1 and NIST175

Electrical Specifications for U1213A (continued)

Frequency (AC coupling)

Range	Resolution	Accuracy	Minimum frequency
99.99 Hz	0.01 Hz	0.2 % + 3	10 Hz
999.9 Hz	0.1 Hz		
9.999 kHz	0.001 kHz		
99.99 kHz	0.01 kHz		
999.9 kHz	0.1 kHz		

– Overload protection: 1000 V; < 20,000,000 V x Hz

Sensitivity

Frequency sensitivity		
Range	Minimum sensitivity (R.M.S.)	
Maximum input for specified accuracy of AC	45 Hz~2 kHz	10 Hz~200 kHz
4 V	0.3 V	0.6 V
40 V	2 V	3 V
400 V	20 V	30 V (< 100 kHz)
1000 V	50 V	50 V (< 10 kHz)
40 A	3 A (< 1 kHz)	3 A (< 1 kHz)
400 A	20 A (< 1 kHz)	20 A (< 1 kHz)
1000 A	50 A (< 1 kHz)	50 A (< 1 kHz)

Duty cycle

Mode	Range	Accuracy of full scale
AC coupling	0.1 %~99.9 %	0.3 % per kHz + 0.3 %

Notes:

- The accuracy for duty cycle is based on a 4 V square wave input to the DC 4 V range and maximum frequency up to 2 kHz. The duty cycle range can be measured within 5 %~95 % as the signal frequency > 20 Hz.

Ordering Information

Standard shipped accessories

- Test leads
- 4-mm probes
- Soft carrying case
- Quick Start Guide
- Certificate of Calibration (CoC)

Optional accessories

U1168A



Standard test lead kit

U1162A



Alligator clips

U1175A



Soft carrying case

U1186A



K-type thermocouple and adapter

U1177A



Infrared (IR)-to-Bluetooth Adapter



Did you know?

Ensure that the clamp meter measures only one conductor at a time. Measuring multiple conductors may cause inaccuracy in measurement reading due to vector sum of the currents flowing in the conductors.

Keysight U1190 Series Clamp Meters

Data Sheet





Introduction

Keysight Technologies, Inc., U1190 Series clamp meters are packed with a wealth of features to help you work more conveniently and more safely. Designed in a robust case—the unique wire separator makes it easy to measure individual wires in a bundle. The built-in LED flashlight illuminates your test area while Vsense performs non-contact voltage detection. What's more, the U1190 Series clamp meters are CAT III 600 V and CAT IV 300 V certified. Use Keysight U1190 Series clamp meters and retool your expectations in handheld tools.

Features

The U1190 Series clamp meters include:

- Unique wire separator to separate wires from a bundle
- Vsense to perform non-contact voltage detection¹
- Built-in LED flashlight to illuminate test area¹
- Visual (backlight alert) and audible continuity indication in noisy environments
- Current measurement up to 600 A²
- Digital multimeter (DMM) with resistance, capacitance¹, DCV, ACV, DCA3, ACA, DC μ A3 and AC μ A3 measurement capabilities
- Continuity and diode test measurements
- CAT III 600 V / CAT IV 300 V safety rating

1. Exclusive to U1192A, U1193A, and U1194A.
2. Exclusive to U1193A and U1194A.
3. Exclusive to U1194A.

Unique wire separator with a built-in flashlight

The U1190 Series clamp meters are built to perform in the environments you work. The unique wire separator allows you to effortlessly isolate and perform measurements on individual wires in a bundle. For improved visibility when making measurements, these clamp meters also come with an easily activated built-in LED flashlight that illuminates the test area. These features ensure that you are better equipped when making measurements.



Figure 1. The unique wire separator allows you to separate and measure individual wires more easily

Vsense for non-contact voltage detection

The U1190 Series clamp meters have Vsense—a unique method of non-contact voltage detection that safeguards users from exposure to hot or live wires while making measurements in dangerous working environments. Upon the detection of voltage, a unique safety alert of an audible beeper is produced to alert users.

Ergonomically built with current measurement up to 600 A

Ergonomically built, the U1190 Series clamp meters fit comfortably in the palm of your hand and allow you to select measurement functions with just a simple thumb press. Better yet, the U1193A and U1194A come with a current measurement up to 600 A. The wide range of current measurement functions cover an array of applications such as electrical installation, maintenance, and troubleshooting tasks—making it an ideal tool to use across many industrial applications.

Take a Closer Look



Unique wire separator to separate and clamp wires from a bundle

V_{sense} performs non-contact voltage detection¹, DCμA², and ACμA² current measurements

Capacitance/Diode test measurements

Resistance/Continuity measurements

DCV, ACV, DCA², ACA, and frequency measurement capabilities

Data Hold, Min, or Max recording capability

LCD display with maximum reading of 6,000 counts

Backlight display and built-in LED flashlight¹



1. Exclusive to U1192A, U1193A, and U1194A.
2. Exclusive to U1194A.

Figure 2. Built-in LED flashlight to illuminate test area

Model Comparison

	U1191A	U1192A	U1193A	U1194A
Basic features				
Display	6,000 counts	6,000 counts	6,000 counts	6,000 counts
RMS method	Average responding	Average responding	True RMS	True RMS
Measurement range				
DC voltage	600 V	60 to 600 V	60 to 600 V	60 to 600 V
AC voltage	600 V	60 to 600 V	60 to 600 V	60 to 600 V
DC current	–	–	–	60 to 600 A
DC μ A current	–	–	–	60 to 600 μ A
AC current	400 A	60 to 400 A	60 to 600 A	60 to 600 A
AC μ A current	–	–	–	60 to 600 μ A
Resistance	600 Ω to 6 k Ω	600 Ω to 60 k Ω	600 Ω to 60 k Ω	600 Ω to 60 k Ω
Capacitance	–	600 μ F to 6 mF	600 μ F to 6 mF	600 μ F to 6 mF
Diode	1.5 V	1.5 V	1.5 V	1.5 V
Continuity	600 Ω	600 Ω	600 Ω	600 Ω
Temperature	–	–	–	K-type: –40 to 1,200 $^{\circ}$ C
Frequency	–	99.99 Hz to 99.99 kHz	99.99 Hz to 99.99 kHz	99.99 Hz to 99.99 kHz
Data management				
Data hold	Yes	Yes	Yes	Yes
Null	Yes	Yes	Yes	Yes
MAX/MIN/AVG	Yes	Yes	Yes	Yes
Auto/Range	Yes ¹	Yes	Yes	Yes
Other features				
Built-in LED flashlight	No	Yes	Yes	Yes
Auto power OFF	Yes	Yes	Yes	Yes
Clamp opening	31 mm	31 mm	37 mm	37 mm
Clamping diameter	27 mm	27 mm	35 mm	35 mm
Safety and regulatory				
Over-voltage safety protection	CAT III 600 V/ CAT IV 300 V	CAT III 600 V/ CAT IV 300 V	CAT III 600 V/ CAT IV 300 V	CAT III 600 V/ CAT IV 300 V
EN/IEC 61010-1, CE, CSA compliance	Yes	Yes	Yes	Yes

1. Applicable to Resistance range only.

Electrical Specifications

Specification assumptions:

Accuracy is given as \pm (% of reading + counts of least significant digit) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, with relative humidity less than 80% RH. AC voltage and AC current specifications for U1193A and U1194A are AC coupled, true rms and are valid from 5% of range to 100% of range. The crest factor may be up to 3.0 at 4,000 counts. For non-sinusoidal waveforms, add additional accuracy of (2% reading + 2% full scale) typically. In the EMC RF field of 3 V/m, total accuracy is specified as specified accuracy + 30 digits for all functions.

DC specifications

Function	Range	Resolution	Accuracy			
			U1191A	U1192A	U1193A	U1194A
Voltage						
	60 V	0.01 V	–	0.5% + 3	0.5% + 3	0.5% + 3
	600 V	0.1 V	0.5% + 3	0.5% + 3	0.5% + 3	0.5% + 3
Resistance						
	600 Ω	0.1 Ω	0.8% + 5	0.8% + 5	0.8% + 5	0.8% + 5
	6 k Ω	0.001 k Ω	0.8% + 3	0.8% + 3	0.8% + 3	0.8% + 3
	60 k Ω	0.01 k Ω	–	0.8% + 3	0.8% + 3	0.8% + 3
Diode						
	1.5 V	0.001 V	1.0% + 3	1.0% + 3	1.0% + 3	1.0% + 3
Current						
	60 μA	0.01 μA	–	–	–	1.0% + 5
	600 μA	0.1 μA	–	–	–	1.0% + 5
	60 A	0.01 A	–	–	–	2.0% + 5
	600 A	0.1 A	–	–	–	2.0% + 5

Notes for DC voltage specification:

1. Input impedance of 10 M Ω .

Notes for resistance specifications:

1. Overload protection: 600 Vrms for short circuits with < 0.1 mA current.
2. Maximum open voltage is < 1.4 V.
3. The accuracy is specified after the Relative function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).

Notes for diode specifications:

1. Overload protection: 600 Vrms for short circuits with < 0.4 mA current.
2. Maximum open voltage is 1.8 V.
3. Built-in buzzer beeps continuously when the voltage measured is less than 100 mV and beeps once for forward-biased diode or semiconductor junctions measured between 0.3 and 0.8 V ($0.3\text{ V} \leq \text{reading} \leq 0.8\text{ V}$).

Notes for DC current specifications:

1. DC current measurement is only available for U1194A model.
2. 60 to 600 A ranges are from clamp current measurement. 60 to 600 μA ranges are from digital multimeter measurement.
3. Overload protection for 60 to 600 A range: 600 Arms.
4. Position error: 1% from reading.
5. Use Relative mode to zero residual offset.

Electrical Specifications

AC voltage specification

Range	Resolution	Voltage accuracy (45 to 500 Hz)	
		U1191A	U1192/3/4A
60 V	0.01 V	–	1.2% + 5
600 V	0.1 V	1.2% + 5	1.2% + 5

Notes for AC voltage:

1. Input impedance 10 M Ω (nominal) in parallel with < 100 pF.
2. Frequency response: 45 to 500 Hz (sine wave).

AC current specification

Range	Resolution	U1191A ³		U1192A ³		U1193A ⁴		U1194A ⁴	
		Current accuracy (45 to 65 Hz)	Current accuracy (65 to 500 Hz)	Current accuracy (45 to 65 Hz)	Current accuracy (65 to 500 Hz)	Current accuracy (45 to 65 Hz)	Current accuracy (65 to 500 Hz)	Current accuracy (45 to 65 Hz)	Current accuracy (65 to 500 Hz)
60 μ A	0.01 μ A	–	–	–	–	–	–	1.0% + 5	1.0% + 5
600 μ A	0.1 μ A	–	–	–	–	–	–	1.0% + 5	1.0% + 5
60 A	0.01 A	–	–	2.0% + 5	3.0% + 5	2.0% + 5	3.0% + 5	2.0% + 5	3.0% + 5
400 A	0.1 A	2.0% + 5	3.0% + 5	2.0% + 5	3.0% + 5	–	–	–	–
600 A	0.1 A	–	–	–	–	2.0% + 5	3.0% + 5	2.0% + 5	3.0% + 5

Notes for AC current:

1. Frequency response: 45 to 500 Hz (sine wave).
2. Position error: 1% of reading.
3. AC conversion type for U1191A and U1192A: Average sensing, RMS indication.
4. AC conversion type for U1193A and U1194A: RMS sensing, RMS indication.
5. Maximum overload: 400 A RMS.
6. For non-sinusoidal waveform, add additional accuracy of (2% reading + 2% full scale) typically for crest factor ≥ 3.0 .

Capacitance specifications

Range	Resolution	Accuracy	
		U1191A	U1192/3/4A
600 μ F	0.1 μ F	–	2.0% + 4
6 mF	0.001 mF	–	2.0% + 4

Notes for capacitance specifications:

1. Capacitance measurement is not available with U1191A model.
2. Overload protection: 600 Vrms for short circuits with < 0.1 mA current.
3. The accuracy for all ranges is specified based on a film capacitor or better, and use Relative mode.

Electrical Specifications

Temperature specifications

Thermal type	Range	Resolution	Accuracy
			U1194A
K	-40 to 400 °C	0.1 °C	1.0% + 2.0 °C
	400 to 1,200 °C	1.0 °C	1.0% + 2.0 °C
	-40 to 752 °F	0.1 °F	1.0% + 3.6 °F
	752 to 2,192 °F	1.0 °F	1.0% + 3.6 °F

Notes for temperature specifications:

1. Temperature measurement is only available with the U1194A model.
2. The accuracy does not include the tolerance of the thermocouple probe, and the meter should be put on a place that has been operating for a minimum of one hour.
3. Do not allow the temperature sensor to contact a surface that is energized above 30 Vrms or 60 V DC. Such voltage poses a shock hazard.
4. The temperature calculation is specified according to the safety standards of EN/IEC-60548-1 and NIST175.
5. Accuracy specification assumes the surrounding temperature is stable with ± 1 °C. For the surrounding temperature changes of ± 3 °C, rated accuracy applies after two hours.

Frequency specifications

Range	Resolution	Accuracy
		U1192/3/4A
99.99 Hz	0.01 Hz	0.5% + 3
999.9 Hz	0.1 Hz	0.5% + 3
9.999 kHz	0.001 kHz	0.5% + 3
99.99 kHz	0.01 kHz	0.5% + 3

Notes for frequency specifications:

1. Exclusive to U1192A, U1193A, and U1194A.
2. Overload protection: 600 V.
3. Minimum frequency is 10 Hz.

Frequency Sensitivity Specifications

For voltage measurements

Input range	Minimum sensitivity (rms sine wave)	
	10 Hz to 10 kHz	10 to 60 kHz
Maximum input for specified accuracy	U1192/3/4A	U1192/3/4A
60 V	6.0 V	30 V
600 V	60 V	-

For current measurements

Input range	Minimum sensitivity (rms sine wave)
	45 Hz to 1 kHz
Maximum input for specified accuracy	U1192/3/4A
60 A	6.0 A
600 A	60 A

Continuity specifications

Range	Resolution	Accuracy				Test current
		U1191A	U1192A	U1193A	U1194A	
600 Ω	0.1 Ω	0.8% + 5	0.8% + 5	0.8% + 5	0.8% + 3	0.1 mA

Notes for continuity specifications:

1. Overload protection: 600 Vrms for short circuits with < 0.1 mA current.
2. Maximum open voltage is 1.4 V.
3. Built-in buzzer beeps continuously when the reading measured is less than 30 Ω and does not beep when the measured resistance is more than 200 Ω . Buzzer may either sound or not between 30 Ω and 200 Ω .
4. Continuity indicator: 2.7 kHz tone buzzer.

Measuring rate (approximate)

Function	Times/second			
	U1191A	U1192A	U1193A	U1194A
AC V	3	3	3	3
DC V	3	3	3	3
Ω	2	2	2	2
Diode	3	3	3	3
Capacitance	-	2 times/second for 600 μ F 1 time/9 seconds for 6 mF	2 times/second for 600 μ F 1 time/9 seconds for 6 mF	2 times/second for 600 μ F 1 time/9 seconds for 6 mF
Temperature	-	-	-	2
DC A	-	-	-	3
AC A	3	3	3	3
Frequency	-	3 (> 10 Hz)	3 (> 10 Hz)	3 (> 10 Hz)

Product Characteristics

Power supply	
Battery type	2 x 1.5 V AAA Alkaline battery
Battery life	<ul style="list-style-type: none"> - Approximately 40 hours with backlight on - Approximately 200 hours with backlight off and continuous DC voltage measurement
Power consumption	<ul style="list-style-type: none"> - Approximately 9 mVA with backlight off and DC voltage measurement - Approximately 42 mVA with backlight on and DC voltage measurement
Display	Liquid crystal display (LCD) (with maximum reading of 6,000 counts)
Operating environment	<ul style="list-style-type: none"> - Operating temperature from -10 to 50°C, 0 to 80% RH - Altitude up to 2,000 meters - Pollution degree II
Relative humidity (RH)	Relative humidity up to 80% RH for temperature up to 30 °C decreasing linearly to 50% RH at 50 °C
Storage compliance	-40 to 60 °C, 40% to 80% RH without batteries
Safety compliance	<ul style="list-style-type: none"> - Low Voltage Directive (2006/95/EC) - IEC 61010-1:2001/EN 61010-1:2001 - IEC 61010-2-032:2002/EN 61010-2-032:2002 - CAN/CSA-C22.2 No. 61010-1-04 - CAN/CSA-C22.2 No. 61010-2-032-04 - ANSI/UL Std No. 61010-1:2004
Measurement category	CAT III 600 V / CAT IV 300 V
Electromagnetic compatibility (EMC)	<ul style="list-style-type: none"> - EMC Directive (2004/108/EC) - IEC 61326-1:2005/EN61326-1:2006 - Canada: ICES/NMB-001: Issue 4, June 2006 - Australia/New Zealand: AS/NZS CISPR 11:2004
Temperature coefficient	0.1 x (specified accuracy)/°C (from 0 to 18 °C, or 28 to 50 °C)
Common mode rejection ratio (CMRR)	<ul style="list-style-type: none"> > 60 dB at 50/60 Hz in the AC V function > 120 dB at DC, 50/60 Hz in the DC V function
Dimensions (W x H x D)	U1191/2A: 77.1 x 225.0 x 38.6 mm U1193/4A: 77.1 x 238.0 x 38.6 mm
Weight (with batteries)	U1191/2A: 320 g U1193A: 334 g U1194A: 348 g
Calibration cycle	One year

Ordering Information



Standard shipped items

Certificate of calibration

Quick Start Guide

K-type thermocouple (only for U1194A)

1.5 V AAA Alkaline battery

Soft carrying case

Test leads with 4-mm tips

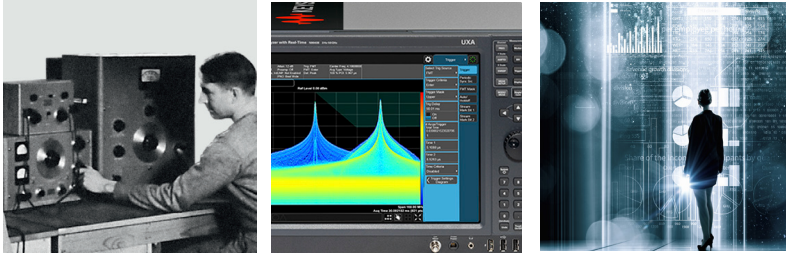
Recommended accessories

U1168A	Standard test lead kit
U1169A	Test Probe Leads
U1176A	LED Probe Clip Light
U1178A	Soft carrying case
U1181A	Immersion temperature probe
U1182A	Industrial surface temperature probe
U1183A	Air temperature probe
U1184A	Temperature probe adaptor
U1186A	K-type thermocouple extension grade
U1188A	K-type thermocouple grade

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