Keysight U1190 Series
Clamp Meters

Data Sheet

KEYSIGHT TECHNOLOGIES

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, DCµA3 and ACµA3 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

Vsense performs non-contact voltage detection[1], DCµA[2], and ACµA[2] current measurements

Capacitance/Diode test measurements

Resistance/Continuity measurements

DCV, ACV, DCA[2], ACA, and frequency measurement capabilites

Data Hold, Min, or Max recording capability

LCD display with maximum reading of 6,000 counts

Backlight display and built-in LED flashlight[1]

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

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

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 µA current	—	—	—	60 to 600 µA
AC current	400 A	60 to 400 A	60 to 600 A	60 to 600 A
AC µA current	—	—	—	60 to 600 µA
Resistance	600 Ω to 6 kΩ	600 Ω to 60 kΩ	600 Ω to 60 kΩ	600 Ω to 60 kΩ
Capacitance	—	600 µF to 6 mF	600 µF to 6 mF	600 µF 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 °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 ± (% of reading + counts of least significant digit) at 23 °C ± 5 °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

			Accuracy			
Function	**Range**	**Resolution**	**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 kΩ	0.001 kΩ	0.8% + 3	0.8% + 3	0.8% + 3	0.8% + 3
	60 kΩ	0.01 kΩ	—	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 MΩ.*

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 V ≤ reading ≤ 0.8 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

		Voltage accuracy (45 to 500 Hz)	
Range	**Resolution**	**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 MΩ (nominal) in parallel with < 100 pF.*
2. *Frequency response: 45 to 500 Hz (sine wave).*

AC current specification

		U1191A[3]		U1192A[3]		U1193A[4]		U1194A[4]	
Range	**Resolution**	**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 µA	0.01 µA	—	—	—	—	—	—	1.0% + 5	1.0% + 5
600 µA	0.1 µA	—	—	—	—	—	—	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

		Accuracy	
Range	**Resolution**	**U1191A**	**U1192/3/4A**
600 µF	0.1 µF	—	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

			Accuracy
Thermal type	**Range**	**Resolution**	**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

		Accuracy
Range	**Resolution**	**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

		Accuracy				
Range	Resolution	U1191A	U1192A	U1193A	U1194A	Test current
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)

	Times/second			
Function	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 µF 1 time/9 seconds for 6 mF	2 times/second for 600 µF 1 time/9 seconds for 6 mF	2 times/second for 600 µF 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	– Approximately 40 hours with backlight on – Approximately 200 hours with backlight off and continuous DC voltage measurement
Power consumption	– 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	– 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	– 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)	– 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)	> 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
Warranty[1]	– Three years for product – Three months for product's standard accessories (unless otherwise specified)
Weight (with batteries)	U1191/2A: 320 g U1193A: 334 g U1194A: 348 g
Calibration cycle	One year

Notes:

1. *Please refer to* http://www.keysight.com/go/warranty_terms.
   Please note that for the product, the warranty does not cover:
   - *Damage from contamination*
   - *Normal wear and tear of mechanical components*
   - *Manuals and batteries*

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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