

# Agilent

## U1241A/U1242A Handheld Digital Multimeter

### Data Sheet

#### Key Features

##### Check more, fix more

- 10,000 count display
- 0.09% basic DCV accuracy
- True RMS AC measurement
- Basic functions — ACV, DCV, ACI, DCI, resistance, frequency, diode, continuity test
- Advanced functions — Capacitance, temperature, MINMAX recording

##### Ease of use

- Adjustable backlighting — 2 intensity levels
- Manual data logging (U1242A only)
- Built-in switch counter, harmonic ratio (U1242A only), dual/differential temperatures capabilities (U1242A only)

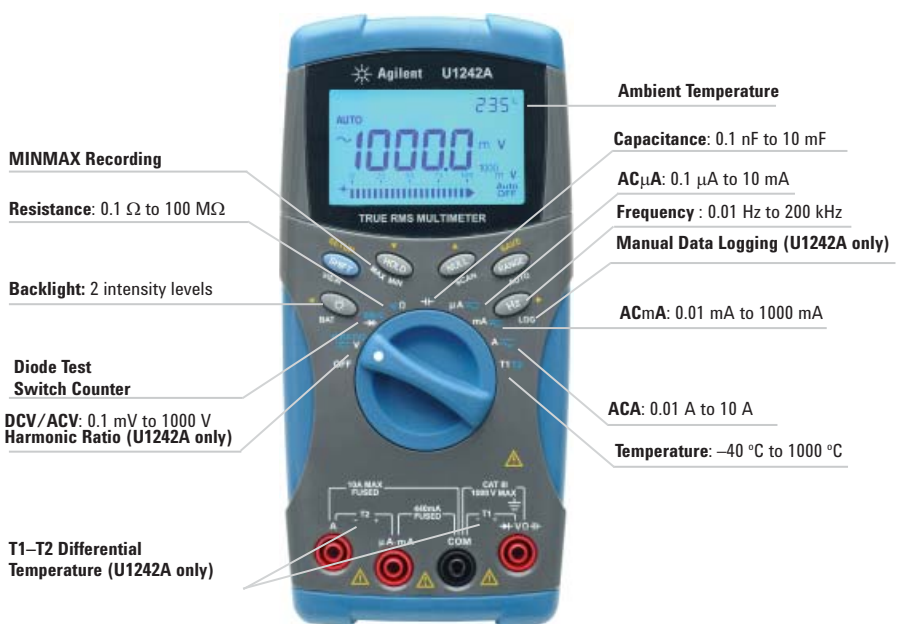
##### Built to last

- Overmold body casing
- CAT III 1000 V safety protection
- Certified to CE, UL, CSA standard
- Operating temperature: -10 °C to 55 °C

#### Introduction

The Agilent U1240A Series handheld digital multimeters enable you to check more with wide measurement ranges. They feature true RMS readings on its 10,000 counts display. The adjustable backlighting allows you to complete your jobs even in subdued lighting conditions, at the same time prolonging the battery life. Your maintenance tasks are greatly simplified with its built-in switch counter, harmonic ratio, dual temperature and differential temperature capabilities, with just a press of the button. The meters have high safety rating with CAT III 1000 V protection and certified to CE, CSA and UL standards. Better yet, the U1240A Series comes with certificate of calibration and test report – at no extra cost.

#### Functions and ranges at a glance



## DC SPECIFICATIONS

FUNCTION	RANGE	RESOLUTION	TEST CURRENT/ BURDEN VOLTAGE	ACCURACY ± (% of reading + No. of Least Significant Digit)	
				U1241A	U1242A
VOLTAGE <sup>[1]</sup>	1000.0 mV	0.1 mV	–	0.09% + 5	
	10.000 V	0.001 V	–	0.09% + 2	
	100.00 V	0.01 V	–	0.15% + 5	
	1000.0 V	0.1 V	–	0.15% + 5	
CURRENT	1000.0 µA	0.1 µA	< 0.06 V (50 Ω)	0.1% + 3	
	10000 µA	1 µA	< 0.55 V (50 Ω)	0.1% + 3	
	100.00 mA	0.01 mA	< 0.18 V (0.5 Ω)	0.2% + 3	
	440.0 mA <sup>[2]</sup>	0.1 mA	< 0.8 V (0.5 Ω)	0.5% + 3	
	10.000 A <sup>[3]</sup>	0.001 A	< 0.4 V (0.01 Ω)	0.6% + 5	
RESISTANCE <sup>[4]</sup>	1000.0 Ω <sup>[5]</sup>	0.1 Ω	0.5 mA	0.3% + 3	
	10.000 kΩ <sup>[5]</sup>	0.001 kΩ	50 µA		
	100.00 kΩ	0.01 kΩ	4.91 µA		
	1000.0 kΩ	0.1 kΩ	447 nA		
	10.000 MΩ	0.001 MΩ	112 nA	0.8% + 3	
	100.00 MΩ <sup>[6]</sup>	0.01 MΩ	112 nA	1.5% + 3	
DIODE TEST <sup>[7]</sup>	1 V	0.001 V	approximately 0.5 mA	0.3% + 2	

## AC SPECIFICATIONS

FUNCTION	RANGE	RESOLUTION	TEST CURRENT/ BURDEN VOLTAGE	ACCURACY ± (% of reading + No. of Least Significant Digit)		
				40 Hz to 500 Hz	500 Hz to 1 kHz	1 kHz to 2 kHz
AC VOLTAGE <sup>[8]</sup> TRUE RMS	1000.0 mV	0.1 mV	–	1% + 5	2% + 5	–
	10.000 V	0.001 V	–		1% + 5	2% + 5
	100.00 V	0.01 V	–			
	1000.0 V	0.1 V	–		–	
AC Current <sup>[9]</sup> TRUE RMS	1000.0 µA	0.1 µA	< 0.06 V (50 Ω)	1% + 5	1.5% + 5	–
	10000 µA	1 µA	< 0.55 V (50 Ω)			
	100.00 mA	0.01 mA	< 0.18 V (0.5 Ω)			
	440.0 mA <sup>[10]</sup>	0.1 mA	< 0.8 V (0.5 Ω)			
	10.000 A <sup>[11]</sup>	0.001 A	< 0.4 V (0.01 Ω)			

[1] Input impedance: 10 MΩ (nominal).

[2] Current can be measured up to 440 mA continuously. An additional 0.2% needs to be added to the specified accuracy if the signal measured is in the range of 440 mA to 1100 mA for 30 seconds maximum. After measuring current of > 440 mA, leave the meter to cool down for twice the measuring time used before application of low current measurement.

[3] Current can be measured up to 10 A continuously with the maximum operating temperature of 50 °C. An additional 0.3% needs to be added to the specified accuracy if the signal measured is in the range of 10 A to 19.999 A for 15 seconds maximum. After measuring a current of > 10 A, leave the meter to cool down for 60 seconds before applying low current measurement.

[4] The maximum open voltage is < 2.8 V. For instant continuity, the built-in buzzer sounds when resistance is < 10.0 Ω.

[5] The accuracy of 1 kΩ and 10 kΩ is specified after Null function, which is used to substrate the test lead resistance and the thermal effect.

[6] For the range of 100 MΩ, the R.H. is specified for < 60%. The temperature coefficient will be 0.15 times of specified accuracy as > 50 MΩ.

[7] Overload protection: 1000 V RMS for circuits < 0.3 A short circuit current. The built-in buzzer sounds when reading is approximately below 50 mV and audible single tone for normal forward biased diode or semiconductor junction as  $0.3 \text{ V} \leq \text{Reading} \leq 0.8 \text{ V}$ .

[8] Input impedance: 10 MΩ (nominal) in parallel with <100 pF, with overload protection of 1000 V RMS

[9] Crest factor ≤ 3. For non-sinusoidal waveforms with crest factor up to 3, add 2% reading + 2% full scale typical.

[10] Current can be measured from 50 mA to 440 mA continuously. An additional 0.2% needs to be added to the specified accuracy if the signal measured is in the range of 440 mA to 1100 mA for 30 seconds maximum. After measuring current of > 440 mA, leave the meter to cool down for twice the measuring time used before application of low current measurement.

[11] Current can be measured from 0.5 A up to 10 A continuously with the maximum operating temperature of 50 °C. An additional 0.3% needs to be added to the specified accuracy if the signal measured is in the range of 10 A to 19.999 A for 15 seconds maximum. After measuring a current of >10 A, leave the meter to cool down for 60 seconds before applying low current measurement.

## TEMPERATURE SPECIFICATIONS

THERMOCOUPLE TYPE	RANGE	RESOLUTION	ACCURACY $\pm$ (% of reading + offset error)
K (for U1241A and U1242A)	-40 to 1000 °C/ -48 to 1832 °F	0.1 °C/ 0.1 °F	1% + 1 °C/ 1% + 1.8 °F
J (for U1242A only)	-40 to 1000 °C/ -48 to 1832 °F	0.1 °C/ 0.1 °F	1% + 1 °C/ 1% + 1.8 °F

## CAPACITANCE SPECIFICATIONS

RANGE	RESOLUTION	ACCURACY $\pm$ (% of reading + No. of Least Significant Digit)
1000.0 nF	0.1 nF	1.2% + 4
10.000 $\mu$ F	0.001 $\mu$ F	
100.00 $\mu$ F	0.01 $\mu$ F	
1000.0 $\mu$ F	0.1 $\mu$ F	2% + 4
10.000 mF	0.001 mF	

## HARMONIC RATIO SPECIFICATIONS

RANGE	FREQUENCY	VOLTAGE
0.0% to 99.9%	40 Hz to 500 Hz	100 mVAC to 1000 VAC

## FREQUENCY SPECIFICATIONS

RANGE	RESOLUTION	ACCURACY	MINIMUM INPUT FREQUENCY
100.00 Hz	0.01 Hz	0.03%+3	1 Hz
1000.0 Hz	0.1 Hz		
10.000 kHz	0.001 kHz		
100.00 kHz	0.01 kHz		
1000.0 kHz <sup>[1]</sup>	0.1 kHz		

[1] Effective frequency measurement up to 200 kHz, refer to frequency sensitivity table below for details.

## FREQUENCY SENSITIVITY DURING VOLTAGE MEASUREMENT

INPUT RANGE (Maximum input for specified accuracy = 10 x Range or 1000 V)	MINIMUM SENSITIVITY (RMS Sine-Wave)	
	20 Hz - 50 kHz	50 kHz to 200 kHz
1000.0 mV	0.3 V	0.6 V
10.000 V	0.5 V	1.8 V
100.00 V	5 V	10 V (<100 kHz)
1000.0 V	50 V	100 V (<100 kHz)

## OPERATING MEASURING RATE

Function	Times/second
ACV	7
DCV (V or mV)	7
$\Omega$	14
Diode	14
Capacitance	4 (< 100 $\mu$ F)
DCA ( $\mu$ A, mA, A)	7
ACA ( $\mu$ A, mA, A)	7
Temperature	7 (single)
Frequency	1 (> 10 Hz)

## FREQUENCY SENSITIVITY DURING CURRENT MEASUREMENT

INPUT RANGE	MINIMUM SENSITIVITY (RMS Sine wave) 20 Hz to 20 kHz
1000.0 $\mu$ A	100 $\mu$ A
10000 $\mu$ A	500 $\mu$ A
100.00 mA	10 mA
440.00 mA	50 mA
10.000 A	1 A

## GENERAL SPECIFICATIONS

<b>Power Supply</b>	4 single standard 1.5 V AAA batteries (Alkaline or Zinc Chloride type)
<b>DISPLAY</b>	Dual display (secondary display is cater for temperature function display only) are 4-digit liquid crystal display (LCD) with maximum reading of 11,000 counts. Automatic polarity indication.
<b>POWER CONSUMPTION</b>	0.22 VA maximum
<b>OPERATING ENVIRONMENT</b>	Full accuracy at $-10\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$ Full accuracy to 80% RH for temperature up to $30\text{ }^{\circ}\text{C}$ , decreasing linearly to 50% RH at $55\text{ }^{\circ}\text{C}$
<b>STORAGE COMPLIANCE</b>	$-20\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$
<b>ALTITUDE</b>	0 – 2000 meters per IEC 61010-1 2 <sup>nd</sup> Edition CAT III, 1000 V
<b>SAFETY COMPLIANCE</b>	<ul style="list-style-type: none"> <li>• IEC 61010-1:2001 / EN61010-1:2001</li> <li>• USA: UL 61010-1:2004</li> <li>• Canada: CSA C22.2 No. 61010-1:2004</li> </ul>
<b>MEASUREMENT CATEGORY</b>	CAT III 1000 V Overvoltage Protection, Pollution Degree 2
<b>EMC COMPLIANCE</b>	<ul style="list-style-type: none"> <li>• Certified to IEC 61326:2002/EN 61326: 2003</li> <li>• CISPR 11:1990/EN55011:1990</li> <li>• Canada: ICES-001:2004</li> <li>• Australia/New Zealand: AS/NZS CISPR11:2004</li> </ul>
<b>COMMON MODE REJECTION RATIO (CMRR)</b>	> 90 dB at DC, 50/60 Hz $\pm 0.1\%$ (1k $\Omega$ unbalanced)
<b>NORMAL MODE REJECTION RATIO (NMRR)</b>	> 60 dB at 50/60 Hz $\pm 0.1\%$
<b>CREST FACTOR</b>	< 3.0
<b>TEMPERATURE COEFFICIENT</b>	0.1 $\times$ (specified accuracy) / $^{\circ}\text{C}$ (from $-10\text{ }^{\circ}\text{C}$ to $18\text{ }^{\circ}\text{C}$ or $28\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$ )
<b>SHOCK and VIBRATION</b>	Tested to IEC/EN 60068-2
<b>DIMENSION (HxWxD)</b>	193.8 mm x 92.2 mm x 58.0 mm
<b>WEIGHT</b>	450 g with batteries 400 g without batteries
<b>WARRANTY</b>	3 years

Änderungen vorbehalten

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Product specifications and descriptions in this document subject to change without notice.

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## Accessories included:

- Four 1.5 V AAA alkaline batteries
- Certificate of Calibration (CoC)
- Test leads
- Quick Start Guide
- Product Reference CD

## Optional Accessories (sold separately):

- U1162A Alligator clips
- U1163A SMT grabbers
- U1164A Fine tip test probe
- U1181A Immersion probe (measures food, oil, and other liquids temperature within the range of  $-50\text{ }^{\circ}\text{C}$  to  $700\text{ }^{\circ}\text{C}$ )
- U1182A Industrial surface probe (measures still surface temperature within the range of  $-50\text{ }^{\circ}\text{C}$  and  $400\text{ }^{\circ}\text{C}$ )
- U1183A Air probe (measures dryer, transport pipe and surrounding air temperature within the range of  $-50\text{ }^{\circ}\text{C}$  to  $800\text{ }^{\circ}\text{C}$ )
- U1184A Temperature probe adapter
- U1185A Thermocouple (J-type) probe and adapter
- U1186A Thermocouple (K-type) probe and adapter
- U1583A AC current clamp (extend current measurement range up to 400 A)

## DIMENSION

