

# Agilent U1240 Series Handheld Digital Multimeters

# Helping You Check and Fix More Installation and Maintenance Bugs

#### 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 tests
- Advanced functions Capacitance, temperature, MINMAX recording

#### Ease of use

- Adjustable backlighting two intensity levels
- Manual data logging (U1242B only)
- Built-in switch counter, harmonic ratio (U1242B only), dual/differential temperature capabilities (U1242B only)

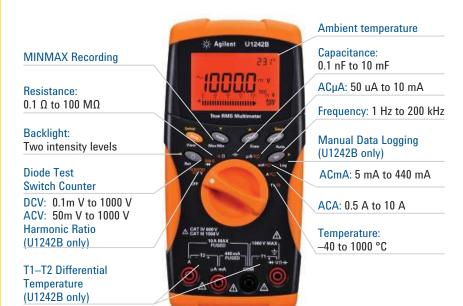
#### **Built to last**

- Overmold body casing
- CAT III 1000 V and CAT IV 600 V safety protection
- Certified to CE and CSA standards
- Operating temperature:
   -10 to 55 °C

The Agilent U1240 Series handheld digital multimeters enable you to check more with wider measurement ranges. They feature true RMS readings on their 10,000-count displays. The adjustable backlighting allows you to complete your jobs even in subdued lighting conditions, or to simply prolong battery life. Your maintenance tasks are greatly simplified due to the built-in switch counter, harmonic ratio, dual and differential temperature capabilities, with just a press of the button. The meters have a high safety rating with CAT III 1000 V and CAT IV 600 V protection and are certified to CE and CSA standards. On top of that, the U1240 Series comes with a certificate of calibration and test report — at no extra cost.

The latest multimeters in this series, the U1241B and U1242B, now come in vivid orange cases, offering the capabilities and functions you need.

#### Functions and ranges at a glance





#### DC specifications

			Test current/	Accuracy ± (9 of least signif	% of reading + counts ficant digit)
Function	Range	Resolution	burden voltage	U1241B	U1242B
	1000.0 mV	0.1 mV	_		0.09% + 5
Valtaral	10.000 V	0.001 V	_	0.000/ 2	
Voltage <sup>1</sup>	100.00 V	0.01 V	_		0.09% + 2
	1000.0 V	0.1 V	_		0.15% + 5
Current	1000.0 μΑ	0.1 μΑ	< 0.06 V (50 Ω)		0.1% + 3
	10000 μΑ	1 μΑ	< 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
	1000.0 Ω5	0.1 Ω	0.5 mA		
	10.000 kΩ <sup>5</sup>	0.001 kΩ	50 μΑ	0.3% + 3	
Resistance <sup>4</sup>	100.00 kΩ	0.01 kΩ	4.91 μΑ		
	1000.0 kΩ	0.1 kΩ	447 nA	<del></del>	
	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

- 1. Input impedance: 10 M $\Omega$  (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 a current of > 440 mA, leave the meter to cool down for twice the measuring time used before applying a low current measurement.
- 3. Current can be measured up to 10 A continuously with a 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 a low current measurement.
- 4. The maximum open voltage is < 2.8 V. For instant continuity, the built-in buzzer sounds when resistance is  $< 10.0 \Omega$ .
- 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 M $\Omega$ , the R.H. is specified for < 60%. The temperature coefficient will be 0.15 times of specified accuracy as > 50 M $\Omega$ .
- 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 V  $\leq$  Reading  $\leq 0.8$  V.

#### **AC** specifications

			Test current/	Accuracy ± ( least signific	% of reading + co ant digit)	unts of
Function	Range	Resolution	burden voltage	40 to 500 Hz	500 Hz to 1 kHz	1 to 2 kHz
	1000.0 mV	0.1 mV	_		2% + 5	-
AC voltage <sup>8, 12</sup>	10.000 V	0.001 V	_	1% + 5 	1% + 5	2% + 5
True RMS	100.00 V	0.01 V	_			
	1000.0 V	0.1 V	_			_
	1000.0 μΑ	0.1 μΑ	< 0.06 V (50 Ω)	1% + 5	1.5% + 5	
0.10	10000 μΑ	1 μΑ	< 0.55 V (50 Ω)			
AC current <sup>9, 12</sup> True RMS	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)			

<sup>8.</sup> Input impedance: 10 M $\Omega$  (nominal) in parallel with < 100 pF, with overload protection of 1000 V RMS

#### Temperature specifications

Thermocouple type	Range	Resolution	Accuracy ± (% of reading + offset error)
K (for U1241B and U1242B)	-40 to 1000 °C/-48 to 1832 °F	0.1 °C /0.1 °F	1% + 1 °C/1% + 1.8 °F
J (for U1242B 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 ± (% of reading + counts of least significant digit)
1000.0 nF	0.1 nF	
10.000 μF	0.001 μF	1.2% + 4
100.00 μF	0.01 μF	
1000.0 μF	0.1 μF	7% + 4
10.000 mF	0.001 mF	270 + 4

#### Harmonic ratio specifications

Range	Frequency	Voltage
0.0% to 99.9%	40 to 500 Hz	100 mVAC to 1000 VAC

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

<sup>10.</sup> 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 a current of > 440 mA, leave the meter to cool down for twice the measuring time used before application of low current measurement.

<sup>11.</sup> Current can be measured from 0.5 A up to 10 A continuously with a 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 a low current measurement.

<sup>12.</sup> AC voltage and AC current specifications are AC coupled. True RMS measurement is valid from 5 % of range to 100 % of range.

#### Switch counter definition

Switch condition <sup>1, 2</sup>	Circuit switch	Display <sup>3</sup>	Switch threshold
Low level	Normally close	Lo	< 370 ohms
Intermittent <sup>4</sup>	Close to open	Number of switch count	Low to high transition
High level	Normally open	Hi	> 430 ohms
Intermittent <sup>5</sup>	Open to close	Number of switch count	High to low transition

- 1. Detects intermittent Opens or Closes lasting for at least 250 µsec.
- 2. Test current of 0.5 mA with maximum open circuit voltage of 2.8 V is used.
- 3. Maximum count reading: 199.99 M (display "OL" when achieving 2 x 108 and thereafter).
- 4. Count only low to high transition for initial switch condition of Low.
- 5. Count only high to low transition for initial switch condition of High.

#### Frequency specifications

Range	Resolution	Accuracy	Minimum input frequency
100.00 Hz	0.01 Hz		
1000.0 Hz	0.1 Hz		
10.000 kHz	0.001 kHz	0.03%+3	1 Hz
100.00 kHz	0.01 kHz		
1000.0 kHz <sup>1</sup>	0.1 kHz	_	

<sup>1.</sup> Effective frequency measurement of up to 200 kHz; refer to frequency sensitivity table below for details.

#### Frequency sensitivity during voltage measurement

Input range (Maximum input for specified accuracy =	Minimum sensitivity (RMS sine wave)		
10 x Range or 1000 V)	20 Hz to 50 kHz	50 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)	

#### Frequency sensitivity during current measurement

	Minimum sensitivity (RMS sine wave)	
Input range	20 Hz to 20 kHz	
1000.0 μA	100 μΑ	
10000 μΑ	500 μΑ	
100.00 mA	10 mA	
440.00 mA	50 mA	
10.000 A	1 A	

#### Measuring rate

Function	Times/second
ACV	7
DCV (V or mV)	7
Ω	14
Diode	14
Capacitance	4 (< 100 μF)
DCA (µA, mA, A)	7
ACA (µA, mA, A)	7
Temperature	7 (single)
Frequency	1 (> 10 Hz)

## **General Specifications**

Display	Dual display (secondary display is intended for temperature function display only) consists of 4-digit liquid crystal display (LCD) with maximum reading of 11,000 counts. Automatic polarity indication.
Power consumption	0.22 VA maximum
Battery type and life	Four single standard 1.5 V AAA batteries (Alkaline or Zinc Chloride type); 300 hours typical
Operating environment	<ul> <li>Full accuracy at -10 to 55 °C; and to 80% RH for temperatures up to 30 °C, decreasing linearly to 50% RH at 55 °C</li> <li>0 - 2000 meters per IEC 61010-1 2nd Edition CAT III, 1000 V / CAT IV, 600 V IEC 61010-1 2<sup>nd</sup> Edition</li> </ul>
Storage compliance	−20 to 70 °C
Safety compliance	<ul> <li>IEC 61010-1:2001 / EN61010-1:2001</li> <li>Canada: CSA C22.2 No. 61010-1:2004</li> </ul>
Measurement category	CAT III 1000 V / CAT IV 600 V Overvoltage Protection, Pollution Degree 2
EMC compliance	<ul> <li>CISPR 11:1990/EN55011:1990</li> <li>Canada: ICES-001:2004</li> <li>Australia/New Zealand: AS/NZS CISPR11:2004</li> </ul>
Common Mode Rejection Ratio (CMRR)	$>$ 90 dB at DC, 50/60 Hz $\pm$ 0.1% (1 k $\Omega$ unbalanced)
Normal Mode Rejection Ration (NMRR)	> 60 dB at 50/60 Hz ± 0.1%
Crest factor	< 3.0
Temperature coefficient	0.1 × (specified accuracy) / °C (from -10 to 18 °C or 28 to 55 °C)
Shock and vibration	Tested to IEC/EN 60068-2
Dimensions (H x W x D)	193.8 mm x 92.2 mm x 58.0 mm
Weight	<ul><li>450 g with batteries</li><li>400 g without batteries</li></ul>
Warranty	<ul><li>Three years for main unit</li><li>Three months for standard shipped accessories</li></ul>

#### **Ordering Information**





U1241B

U1242B

#### Standard shipped accessories

- Four 1.5 V AAA alkaline batteries
- Certificate of Calibration (CoC)
- · Test probe leads (4-mm tips)
- Quick Start Guide
- · Free test data (Option UK6)

#### Optional accessories

#### Measuring accessories (non-temperature)

U1161A Extended test lead kit



Includes two test leads (red and black), two test probes, mediumsized alligator clips and 4-mm banana plugs.

- · Test leads: CAT III 1000 V, CAT IV 600 V, 15 A
- Test probes: CAT III 1000 V, CAT IV 600 V, 15 A
- · Medium-sized alligator clips: CAT III 1000 V, CAT IV 600 V, 15 A
- · 4-mm banana plugs: CAT II 600 V, 10 A

U1162A Alligator clips



- One pair of insulated alligator clips (red and black).
   Recommended for use with Agilent standard test leads.
- Rated CAT III 1000 V, CAT IV 600 V, 15 A

U1163A SMT grabbers



- One pair of SMT grabbers (red and black). Recommended for use with Agilent standard test leads.
- Rated CAT II 300 V, 3 A

U1164A Fine-tip test probes



- One pair of fine-tip test probes (red and black). Recommended for use with Agilent standard test leads.
- Rated CAT II 300 V, 3 A

U1168A Standard test lead kit



Includes two test leads (red and black), 19-mm and 4-mm test probes, alligator clips, fine-tip test probes, SMT grabbers and mini grabber (black).

- Test leads: CAT III 1000 V, CAT IV 600 V, 15 A
- Test probes (19-mm tip): CAT II 1000 V, 15 A
- Test probes (4-mm tip): CAT III 1000 V, CAT IV 600 V, 15 A (highly recommended for CAT IV environment)
- Alligator clips: CAT III 1000 V, CAT IV 600 V, 15 A
- Fine-tip test probes: CAT II 300 V, 3 A
- SMT grabber: CAT II 300 V, 3 A
- Mini grabber: CAT II 300 V, 3 A

U1169A Test probe leads



Includes two test leads (red and black), and a pair each of 19-mm and 4-mm test probes.

- Test leads: CAT III 1000 V, CAT IV 600 V, 15 A
- Test probes (19-mm tip): CAT II 1000 V, 15 A
- Test probes (4-mm tip): CAT III 1000 V, CAT IV 600 V, 15 A (highly recommended for CAT IV environment)

U1583B AC current clamp



- Dual range: 40 A and 400 A
- Rated CAT III 600 V
- · BNC-to-banana-plug adapter provided for use with DMMs

#### **Ordering Information**

#### Optional accessories

Measuring accessories (temperature)

U1180A Thermocouple adapter+lead kit, J and K types



Includes thermocouple adapter, thermocouple bead J-type and thermocouple bead K-type.

- T/C adapter J/K-type
- T/C bead J-type: –20 °C to 200 °C
- T/C bead K-type: -20 °C to 200 °C
- · Type-K T/C for use in oil and other liquids
- Measurement range: –50 °C to 700 °C
- Includes adapter U1184A for connection to DMM

U1181A Immersion temperature probe



U1182A Industrial surface temperature probe



- Type-K T/C for use on still surfaces
- Measurement range: -50 °C to 400 °C
- · Includes adapter U1184A for connection to DMM

U1183A Air temperature probe



- · Type-K T/C for use in air and non-caustic gas
- Measurement range: -50 °C to 800 °C
- · Includes adapter U1184A for connection to DMM

U1184A Temperature probe adapter



· Mini-connector-to-banana-plug adapter for use with DMM

U1185A J-type thermocouple and adapter



- T/C adapter J/K-type
- T/C bead J-type: -20 °C to 200 °C

U1186A

K-type

thermocouple and adapter



T/C adapter J/K-type

T/C bead J-type: –20 °C to 200 °C

Carrying case

U1172A Transit case (aluminium-clad)



The robust casing to transport your DMM and accessories

- · Aluminum-clad, black panel construction
- Dimension: 18 inches (H) x 13 inches (W) x 6 inches (D)
- · Weight: 4 kg

U1174A

Soft carrying case



The convenient way to carry your DMM and essential accessories

Dimension: 9 inches (H) x 5 inches (W) x 3 inches (D)

Hanging kit

U1171A Magnetic hanging kit



For fastening the DMM to a steel surface so both hands are free

U1179A IR Connectivity Bracke



Connect with U1177A IR-to-Bluetooth adapter or U1173A IR-USB cable

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#### **Features**

- Enables Bluetooth connection to Agilent handheld digital multimeters
- Easy to install by attaching to Infrared (IR) port located at the back of Agilent handheld digital multimeters
- Compatible with Agilent U1230 series, U1240 series, U1250 series and U1270 series handheld digital multimeters
- Operated by two 1.5 V AAA batteries

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Agilent U1177A Infrared (IR)-to-*Bluetooth* adapter offers wireless remote connectivity solution via *Bluetooth* connection simply by attaching the adapter to the IR port of an Agilent handheld digital multimeter. The wireless remote connectivity is set up when an Agilent handheld digital multimeter is connected to U1177A and an Android device (tablet or smart phone) with the installed software. Every U1177A also has a unique Media Access Control (MAC) address. User can quickly and easily scan for the right U1177A using their Android device and pair up with the U1177A.







Figure 1. Award winning U1177A Infrared (IR)-to-Bluetooth adapter is being recognized as an innovative solution in Test & Measurement industry

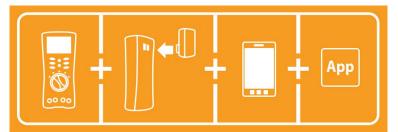


Figure 2. Agilent wireless remote connectivity solution





# Take a closer look



Figure 3. The U1177A as illustrated

# Manual Name Alexandrian (Manual Name Alexandrian Andrews Andre

Figure 4. Data logging with Agilent Mobile Logger software.

# 

Figure 5. Up to three multimeters measurements with the Agilent Mobile Meter

# Perform data logging with up to three multimeters – wirelessly and simultaneously!

Data logging is an important function for industrial users to capture data streams or plotting trending graphs. These data and graphs are used for analysis to identify intermittent behavior or detect drifts. Agilent Mobile Logger is the free Android application software that logs data and provides trending graphs from Agilent handheld digital multimeters. Agilent Mobile Logger offers an array of extended functions such as sending e-mail or Short Message Service (SMS) automatically, and pan and zoom function via the Android device's touch screen. Alternatively, data logging and monitoring activities can also be performed at the comfort of one's Personal Computer (PC) via a downloadable Agilent GUI data logger software.

#### Notes:

- Agilent Mobile Meter and Agilent Mobile Logger can be downloaded from www.agilent.com/ find/hh-Android or from Android Market (https://market.android.com/)
- 2. Agilent GUI Data Logger Software can be www.agilent.com/find/hh-logger

# Monitor up to three multimeter measurements at the same time with Agilent Mobile Meter

Agilent Mobile Meter is a free Android application software that allows an Android device to connect, control and perform up to 3 multimeter measurements. Without the need to be physically present at various points, users can now extend their reach to two or three places. This solution allows you to make measurements from a safe distance, eliminates the need to walk back-and-forth between measure target and control points, and monitors multiple measurements simultaneously. Achieve higher work productivity when you use the U1177A with your Agilent handheld digital multimeters.



Figure 6. Make measurements with the Agilent Mobile Meter via an Android smart phone

# Specifications

Product characteristics	Description
Radio specification	<ul> <li>Frequency: 2402 MHz ~ 2480 MHz</li> <li>Antenna Power: 1 mW or less</li> <li>Number of Channels: 79</li> </ul>
	Number of Channels: 79     Modulation: GFSK / PSK
Operating environment	Operating temperature from –20 to 55 °C
Storage environment	Storage temperature from –40 to 70 °C
Relative humidity (R.H.)	Relative humidity up to 95% at 40 °C (non-condensing)
Power consumption	Maximum 130 mVA for two 1.5 V AAA batteries
Battery life	30 hours typical (based on continuous data transfer)
Battery type	Alkaline 24 A (ANSI/NEDA) and LR03 (IEC), or Zinc Chloride 24 D (ANSI/NEDA) and R03 (IEC)
Dimension (W x H x L)	39.0 × 71.0 × 37.0 mm
Weight	60 g with batteries
Warranty	Three months
Bluetooth	" <i>Bluetooth</i> " Version 2.1 + EDR compliant, SPP profile, Class 2 device (with 10 metres connection range)
Safety	The U1177A complies with the requirements of the following safety and regulation standards:  • FCC Part15C (Certification) (15.209, 15.247) FCC ID: ZKMAGILENT-U1177A  • FCC Part15B (DoC) (15.109)  • RSS-210 Issue 8:2010 IC: 6310A-U1177A  • ICES-003 Issue 4:2004  • EN 300 328 V1.7.1:2008  • EN 301 489-IV1.8.1:2008/-17 V2.11:2009  • EN 55022:2006+A1:2007/EN55024:1998+A1:2001+A2:2003  • EN 50371:2002  • EN 60950-1:2006/A11:2009/A1:2010  • Complies with IDA Standards (DB 102425)  • India Equipment Type Approval (ETA) Certificate No: 1424/2011/WRLO  • COFETEL Certificate No: RCPAGU111-1066, registered under Agilent Technologies Mexico S de RL de CV



#### Standard shipped items:

- Two 1.5 V AAA batteries
- Operating instructions

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