

# Keysight U1251B and U1252B Handheld Digital Multimeter

Quick Start Guide

NOTICE: This document contains references to Agilent Technologies. Agilent's former Test and Measurement business has become Keysight Technologies. For more information, go to **[www.keysight.com](http://www.keysight.com)**.






# Keysight U1251B and U1252B Handheld Digital Multimeter

## Quick Start Guide



The following items are included with your multimeter:

- ✓ Silicone test leads 
- ✓ 4 mm probes 
- ✓ Alligator clips 
- ✓ Printed Quick Start Guide
- ✓ Certificate of Calibration
- ✓ 9 V alkaline battery (for U1251B only)
- ✓ Rechargeable 8.4 V battery (for U1252B only)
- ✓ Power cord and AC adapter (for U1252B only)

If anything is missing or damaged, please contact the nearest Keysight Sales Office.

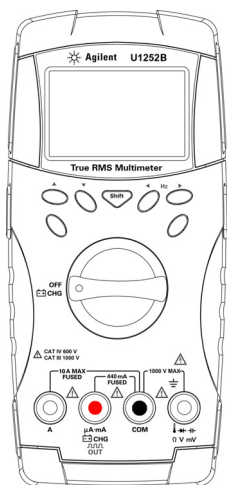
### NOTE

Your multimeter is capable of remote data logging. To use this feature, you will need an IR-USB cable (U1173A, purchased separately) and the Keysight GUI Data Logger Software (downloadable from [www.keysight.com/find/hhTechLib](http://www.keysight.com/find/hhTechLib)).




### WARNING

**Ensure the terminal connections are correct for that particular measurement selection before starting any measurement. To avoid damage to the device, do not exceed the input limit.**

## Charging the Battery



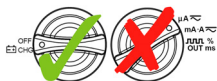
Use the specified accessory, the 24 V DC adaptor to charge the battery.


- 1 Remove and disconnect the test leads from the meter.
- 2 Turn the rotary switch to the  **CHG** position. Connect the power cord to the DC adaptor.
- 3 Plug the Red (+)/ Black (-) banana terminals of the DC adaptor to the  **CHG** and the **COM** terminals respectively. The DC adaptor can be replaced with a DC power supply in order to set the 24 V DC output and the over current limitation to a value more than 0.5 A. Ensure that the polarity of the connection is correct.
- 4 The primary display indicates "bAt" and the 'SbY' flashes on the secondary display and a short tone sounds to remind you whether to charge the battery or not. Press  to start charging the battery, or the meter will automatically start the self-test after the 24 V supply is applied. We recommend not to charge the battery if its capacity is over 90%.

### NOTE

For the battery charger, the mains supply voltage should not fluctuate by plus or minus 10%.

### CAUTION

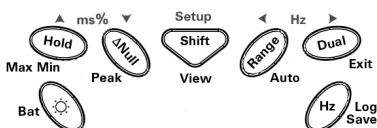















- Do not rotate the rotary switch from  **CHG** position when charging the battery.
- Perform battery charging **only** with 7.2 V or 8.4 V NiMH rechargeable battery, 9 V size.
- Disconnect test leads from all the terminals when charging the battery.
- Ensure proper insertion of battery in the multimeter, and follow the correct polarity.

**CAUTION**


- Upon initial use (or after a prolonged storage period), the rechargeable battery may require three to four charge/discharge cycles before achieving maximum capacity. To discharge, simply run the multimeter under the rechargeable battery's power until it shuts down or the low battery warning appears.
- The multimeter may indicate that charging is complete after ten minutes when charging a new rechargeable battery. This is a normal phenomenon with rechargeable batteries. Remove the rechargeable battery from the device, reinsert it, and repeat the charging procedure.

## Functions and Features

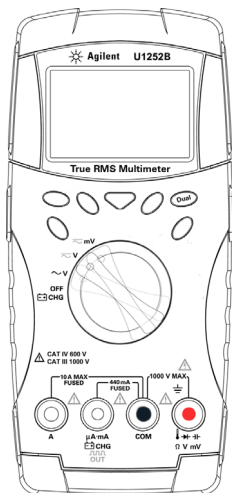


Action	Steps
Turns ON backlight	Press  .
Checks battery capacity	Press and hold  for >1 s.
Freezes the measured value	Press  .
Starts MIN/MAX/AVG recording	Press and hold  for >1 s.
Offsets the measured value	Press  .
Changes the measuring range	Press  .
Turns on auto range	Press and hold  for > 1 s.
Turns on dual display	Press  .
Starts manual data logging	Press and hold  for > 1 s.
Views the logged data	Press  for > 1 s, press  to scroll through the logged data.
Clears the logged data	Press  for > 1 s, press  for >1 s.

## Input Terminals and Overload Protection

Measurement Functions	Input Terminal		Overload Protection
Voltage	 $\Omega$ V mV	COM	1000 V R.M.S
Diode			1000 V R.M.S
Resistance			< 0.3 A short circuit current
Capacitance			
Temperature			
Current ( $\mu$ A and mA)	$\mu$ A.mA	COM	440 mA/1000 V 30 kA/fast-acting fuse
Current (A)	A	COM	11 A/1000 V 30 kA/fast-acting fuse

# Performing Voltage Measurements



## Measuring AC voltage

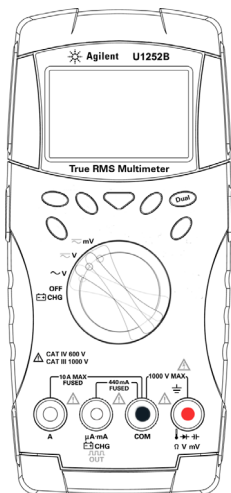
- 1 Set the rotary switch to  $\sim$  V . For  $\sim$  V and  $\sim$  mV mode, press **Shift** to ensure  $\sim$  is shown on the display.
- 2 Connect the red and black test leads to input terminals **V. mV (red)** and **COM (black)** respectively.
- 3 Probe the test points and read the display.
- 4 Press **Dual** to display dual measurements. Parameter can be switched consecutively.

## Measuring DC voltage









### NOTE

For measuring DC voltage from a mixed signal in DC measurement mode, ensure that the Filter is enabled

- 1 Set the rotary switch to  $\sim$  V or  $\sim$  mV . Ensure that  $\text{---}$  is shown on the display.
- 2 Connect the red and black test leads to input terminals **V. mV (red)** and **COM (black)** respectively.
- 3 Probe the test points and read the display.
- 4 Press **Dual** to display dual measurements. Parameters can be switched consecutively.



## Using the Filter

- 1 To enter the Setup mode, switch off the meter, then turn the rotary knob to any non-OFF position while holding  until you hear a beep. You may release  once you hear the beep.
- 2 Press  or  to scroll through the menu items until **FiLte** is shown in the secondary display.
- 3 Press  or  to enable the Filter.
- 4 Press  to save your changes.
- 5 Press and hold  until the meter restarts and returns to its normal operating mode.

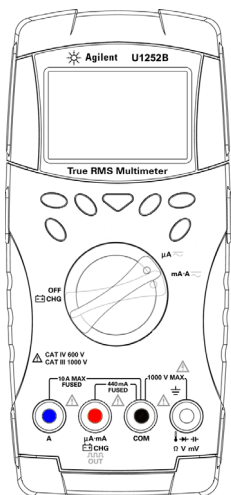
### CAUTION

To avoid possible electric shock or personal injury, enable the Filter to verify the presence of hazardous DC voltages. Displayed DC voltages can be influenced by high frequency AC components and must be filtered to assure an accurate reading.







# Performing Current Measurements




To perform current measurements, set up your multimeter as shown in the figure below. For measuring DC current from a mixed signal in DC measurement mode, ensure that the Filter is enabled.



## Measuring AC current

- 1 Set the rotary switch to  $\mu A$   or mA·A . Press  to ensure  is shown on the display.
- 2 Connect the red and black test leads to input terminals  $\mu A$ ·mA (red) and COM (black) or A (blue) and COM (black) respectively.
- 3 Probe the test points in series with the circuit and read the display.

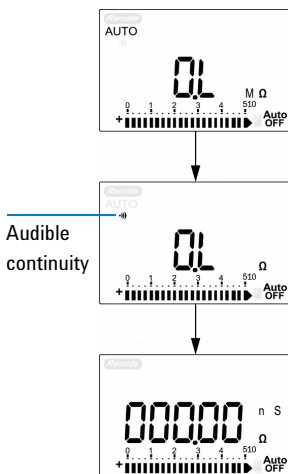
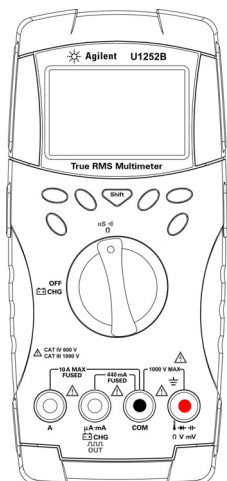
## Measuring DC current


- 1 Set the rotary switch to  $\mu A$   or mA·A . Ensure that  is shown on the display.
- 2 Connect the red and black test leads to input terminals  $\mu A$ ·mA (red) and COM (black) or A (blue) and COM (black) respectively.
- 3 Probe the test points in series with the circuit and read the display.

### CAUTION

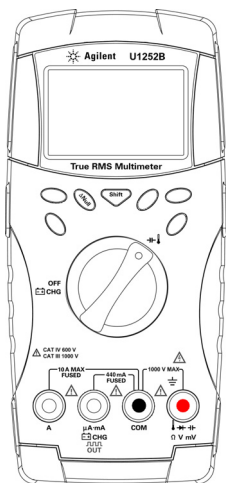
- If the current is  $\leq 440$  mA, connect the red and black test leads to input terminals  $\mu A$ ·mA (red) and COM (black).
- If the current is  $> 440$  mA, connect the red and black test leads to input terminals A (red) and COM (black).

# Performing Resistance, Conductance, and Continuity Measurements



- 1 Set the rotary switch to  $nS \rightarrow \Omega$ .
- 2 Connect the red and black test leads to input terminals  $\Omega$  (red) and COM (black) respectively.
- 3 Probe the test points (by shunting the resistor) and read the display.
- 4 Press  to scroll through audible continuity, conductance, and resistance tests as shown.

# Performing Capacitance and Temperature Measurements



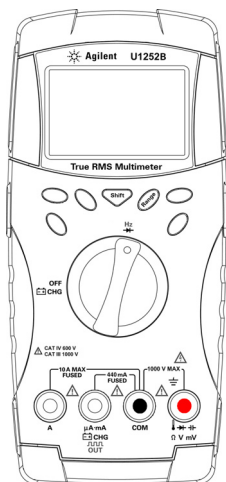
## Capacitance

- 1 Set the rotary switch to **→C→**.
- 2 Connect the red and black test leads to input terminals **→C→ (red)** and **COM (black)** respectively.
- 3 Connect the red test lead to the positive terminal of the capacitor, and the black test lead to the negative terminal.
- 4 Read the display.

## Temperature

- 1 Set the rotary switch to **→C→**. Press **5mV** to select temperature measurement.
- 2 Plug the thermocouple adapter (with the thermocouple probe connected to it) into input terminals **↓ (red)** and **COM (black)**.
- 3 Touch the measurement surface with the thermocouple probe.
- 4 Read the display.

# Frequency and Frequency Counter Measurements



## Frequency Measurement

During AC/DC voltage or AC/DC current measurements, you can measure the signal frequency by pressing **Hz** at any time.

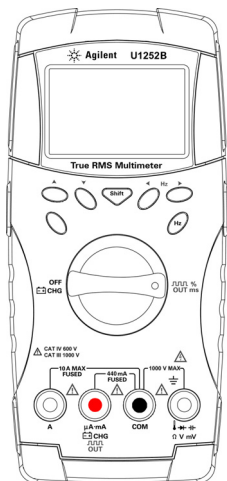
## Frequency Counter Measurement



- 1 Set the rotary switch to **Hz**.
- 2 Press **Shift** to select the frequency counter (Hz) function. "—1—" on the secondary display means the input signal frequency is divided by 1. This accommodates for higher frequency range of up to 985 kHz.
- 3 Connect the red and black test leads to input terminals **V (red)** and **COM (black)** respectively.
- 4 Probe the test points and read the display.
- 5 If the reading is unstable or zero, press **Range** to select division of input signal frequency by 100. This accommodates a higher frequency range of up to 20 MHz.
- 6 The signal is out of range if the reading is still unstable after **step 5**.

### WARNING


- Use the frequency counter for low voltage applications. Never use the frequency counter on AC power line systems.
- For input more than 30 Vpp, you are required to use frequency measurement mode available under the current or voltage measurement instead of frequency counter.

## Square Wave Output (for U1252B only)



- 1 Turn the rotary switch to  **OUT ms**. Default display setting is 600 Hz on secondary display and 50% duty cycle on primary display.
- 2 Press ◀ or ▶ to scroll through the available frequencies (there are 28 frequencies to choose from).
- 3 Press  to select duty cycle (ms) on the primary display.
- 4 Press ▲ or ▼ to adjust the duty cycle. Duty cycle can be set for 256 steps and each step is 0.390625%. The display only indicates the best resolution with 0.001%.

### NOTE

Pressing  is the same as pressing ▶.

## Safety Notices

### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.





### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

## Safety Information

This meter is safety-certified in compliance with EN/IEC 61010-1:2001, UL 61010-1 Second Edition and CAN/CSA 22.2 61010-1 Second Edition, CAT III 1000 V/CAT IV 600 V Overvoltage Protection, Pollution Degree II. Use with standard or compatible test probes.

## Safety Symbols

	Earth (ground) terminal
	Equipment protected throughout by double insulation or reinforced insulation
	Caution, risk of electric shock
	Caution, risk of danger (refer to the instrument manual for specific Warning or Caution information)
<b>CAT III 1000 V</b>	Category III 1000 V overvoltage protection
<b>CAT IV 600 V</b>	Category IV 600 V overvoltage protection

**For further safety information details, refer to the**  
*Keysight U1251B and U1252B Handheld Digital Multimeter User's Guide.*

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