



Agilent 970-Series Handheld Multimeters

Data Sheet



Benchtop features and performance with handheld convenience and price

- **3½ and 4½ digits with dcV accuracy to 0.05%**
- **1 kHz to 100 kHz frequency response**
- **Sophisticated math functions**
- **True rms, dB/dBm available**

Bench and field measurements

Agilent Technologies 970-series handheld multimeters give you much more than just the basics. These compact multimeters have the features you'd expect from a bench meter, like sophisticated math functions that allow relative difference or percent readings for checking tolerances and Min/Max with time stamp to monitor all types of measurements including high resolution temperature readings.

These DMMs also include a hold feature to let you save readings manually or automatically and a measurement averaging capability to use when you're working with noisy signals. An auto diode feature automatically reverses polarity for you when you're checking semiconductor junctions.

Measure with confidence

An innovative safety shutter prevents accidental connection to the current terminals. All models feature high-energy fuses and audible overload alarms. A selectable auto power off mode conserves batteries.

Use the rugged 971A in every environment

The 971A is designed to withstand the toughest environments. Like the other handhelds in the 970 series, the 971A provides ac/dc volts, and current, ohms, continuity, diode test, auto diode test, frequency volts and °F and °C high-resolution temperature measurements.

Measure low-level dc/ac volts or capacitance with the 972A

For measuring low-level signals, the 972A gives you 40 mV ranges for dc/ac voltage and the assurance of 20 kHz frequency response. For capacitance testing, the 972A measures from 10 pF to 1000 µF. A convenient dual display shows the range, elapsed time, or reference values, in addition to your reading.

The 973A gives you more ways to test and troubleshoot

The 3½-digit display (with 0.1% basic dc accuracy), 20 kHz frequency range, true rms and ac+dc readings let you measure sinusoidal and nonsinusoidal waveforms with confidence. The 973A also gives you dBm and relative dB with dynamic range of 57 dB (2 mV to 400 mV) or 74 dB (0.2 V to 1000 V), with 0.1 dB resolution. This DMM also features dual displays.

Use the 974A when extra precision is required

For precision measurements, the 974A gives you 4½ digits with a 49,999 count full scale, and basic dc accuracy of 0.05% for all ranges. It also offers true rms, 100 kHz frequency response, dBm /relative dBm readings, and ac+dc readings to accurately measure nonsinusoidal waveforms.

3-year warranty

With 970-series handheld multimeters you get a manual, a high-quality test lead set, a calibration certificate, spare fuse, rubber boot, and two installed AA batteries. Each instrument comes with a 3-year warranty.



Agilent Technologies

Innovating the HP Way

Agilent Technologies 970-series selection guide

Model*	971A	972A	973A	974A
Display Count	4,000	4,000	4,000	50,000
AC Volts Response	1kHz	20kHz	20kHz	100kHz
Basic dc Accuracy	0.3%	0.2%	0.1%	0.05%
Resolution, ACV, DCV	100 μ V	10 μ V	10 μ V	10 μ V
AC, DC Volts/Current	•	•	•	•
Frequency, Ohms	•	•	•	•
Continuity, Diode, Auto Diode	•	•	•	•
Thermistor Temperature	•	•	•	•
Thermocouple Temperature			•	
Relative and Percent	•	•	•	•
Min Max with Time Stamp	•	•	•	•
Data Hold/Auto Hold	•	•	•	•
Average of last 8 readings	•	•	•	•
Current Safety Shutter	•	•	•	•
600V, 15A Fuse, Ovld Alert	•	•	•	•
Auto Power Off	•	•	•	•
40 Segment Bargraph	•	•	•	•
Capacitance to 1000 μ F		•	•	
Dual Digital Display		•	•	
TRUE RMS AC Response			•	•
dB and dBm			•	•

*See our value-priced handheld E2373A on page 6.

Specifications 971A, 972A, 973A

23° C \pm 5° C, <80% RH, accuracy \pm (% of reading + number of digits) 974A specifications on page 4

dc Voltage

Range	Resolution	971A	972A	973A	Input Resistance
40 mV	10 μ V	–	0.3% + 5		10 M Ω
400 mV	100 μ V	0.3% + 1	0.2% + 1	0.1% + 1	
4 V	1 mV				11 M Ω
40 V	10 mV				10 M Ω
400 V	100 mV				
1000 V	1V	0.2% + 1			

ac Voltage

		971A		972A				973A				Input Impedance	
		Average		Average				True rms (ac + dc spec in parenthesis)					
Range	Resolution	40 Hz-500 Hz	500 Hz-1 kHz	40 Hz-50 Hz	50 Hz-1 kHz	1 kHz-5 kHz	5 kHz-20 kHz	40 Hz-50 Hz	50 Hz-1 kHz	1 kHz-5 kHz	5 kHz-20 kHz		
40 mV	10 μ V	–	–	1% + 10				1% + 3	1% + 3	–		10 M Ω	
400 mV	100 μ V	1%+2	1.5% + 4	1% + 3				–		(N.A.)		(N.A.)	10 M Ω
4 V	1 mV												11 M Ω
40 V	10 mV			1% + 2	1% + 2	0.5% + 2	1.5% + 3	3% + 6	1%+3 (1% + 4)	0.7%+3 (1% + 4)	1.2%+4 (1.5% + 6)	2%+15 (3% + 18)	10 M Ω
400 V	100 mV			1% + 2	1% + 2	0.5% + 2	1.5% + 3	3% + 6	1%+3 (1% + 4)	0.7%+3 (1% + 4)	1.2%+4 (1.5% + 6)	2%+15 (3% + 18)	<50 pF
1000 V	1V	1% + 2, 40 Hz - 500 Hz						1% + 4, 40 Hz - 500 Hz (1% + 6 dc, 40 Hz to 500 Hz)				<50 pF	

Specifications 971A, 972A, 973A

23° C ± 5° C, <80% RH, accuracy ± (% of reading + number of dig)

Resistance

Range	Resolution	971A	972A	973A	Test Current	Test Voltage
400 Ω	100 mΩ	0.5% + 1	0.2% + 1		.8mA	< 3.2 V
4 kΩ	1 Ω				<80 μA	<1.1V
40 kΩ	10 Ω				<10 μA	
400 kΩ	100 Ω				<1.1 μA	
4 MΩ	1 kΩ		0.5% + 1	<110 nA		
40 MΩ	10 kΩ	1% + 1				

Current, ac, dc

Range	Resolution	971A	972A	973A	971A	972A	973A	Input Resistance
		dc			40 to 500 Hz	40 Hz to 2 kHz		
400 μA	100 nA	0.5%+2	0.5%+2	1.5% + 5	1.5% + 4	<550Ω		
4000 μA	1 μA	1.0% + 2	0.8% + 2					
40 mA	10 μA							
400 mA	100 μA	1.2% + 2	1% + 2					
10 A	10 mA			<0.05Ω				

Frequency, 971A

Range	Resolution	Accuracy	Input voltage	Input Impedance
5 Hz to 9999 Hz	1 Hz	0.02% + 1	0.1 V to 400 V rms	>1.2 MΩ, <50 pF
9.0 kHz to 99.99 kHz	10 Hz		0.8 V to 100 V rms	

Frequency, 972A/973A

Range	Resolution	Accuracy	Input voltage	Input Current
2 Hz to 99.99 Hz	0.01 Hz	0.02% + 1	0.2V to 400V	50 μA to 10A
90 Hz to 999.9 Hz	0.1 Hz		0.4V to 400V	
900 Hz to 9999 Hz	1 Hz			
9.00 kHz to 99.99 kHz	10 Hz		0.8V to 100V	-
90 kHz to 200 kHz	100 Hz		2V to 100V	

dBm 973A, (600Ω, 1 mW reference)

Function	Input dBm	Input Voltage	40Hz to 1kHz	1kHz to 5kHz	5kHz to 20kHz
ac mV	-51.8 dBm to -5.7 dBm	2.0 mV to 400 mV	0.3 dBm	-	
acV	-11.8 dBm to -5.7 dBm	0.2V to 0.4 V	0.2 dBm		
	-5.7 dBm to 53.3 dBm	0.4V to 360 V		0.2 dBm	0.7dBm
	53.3 dBm to 62.2 dBm	360V to 1000V	0.2 dBm, 40 Hz to 500 Hz	-	

Capacitance 972A/973A

Range	10 nF	100 nF	1,000 nF	10 μF	100 μF	1,000 μF
Resolution	10 pF	100 pF	1 nF	10 nF	100 nF	1 μF
Accuracy	2% + 3		1.2% + 2		3% + 2	

Temperature

	971A	972A	973A	
Calibrated element	Thermistor	Thermistor	Thermistor	Thermocouple
Measurement Range	-80 to 150°C -112 to 302°C			-50°C to 700°C -58°F to 1292°F
Resolution	0.1°C, 0.2°F			1°C, 1°F
Accuracy	0.5°C, 1°F	0.3°C, 0.5°F		2%+2°C, 2%+4°F

Note: Accuracy does not include the temperature probe error.

Diode/Auto Diode 971/2/3A

Test current: 0.5 mA nominal @ 0.6 V, <3.2 V
Range: 0-2 V, 1 mV resolution
Accuracy: 1% + 2

Continuity (audible) 971/2/3A

Test Current: 0.8 mA nominal, <3.2 V
Range 0-400 Ω, 0.1 Ω resolution
Threshold: <20 Ω

Relative Measures the difference from a reference value.

Per Cent Displays the per cent change from reference.

Min/Max Records the minimum and maximum value of the input, with audible alert, and elapsed time; the 974A also computes long term average in Min/Max.

Average Displays the average of the last 8 readings.

Data-Hold Holds the display reading. Shows input value on dual display (972A, 973A).

Auto Hold Stores last stable reading and displays it when probe is removed from test circuit.

Range Select auto ranging or manual ranging.

Auto Diode Choose normal diode test, or Auto Diode for automatic reversal of polarity.

Temperature Thermistor temperature for high accuracy and 0.1° C resolution and thermocouple (973A only) for high temperatures.

Dual Display 972/3A, one large main and a secondary display for two digital readouts.

Overload Alert Input overload alert provides audible tone when input is overloaded or in wrong terminal. Fuse check for 971/2/3A.

Safety Shutter Unique terminal shutter that helps prevent inadvertent use of current terminals.

Auto Power Off Turns off power to save batteries after 30 minutes of inactivity or choose to defeat auto power off.

Zero adjust Stores zero between function changes for critical measurements: Ohms zero (971/2/3/4A), dcV and Capacitance zero (972/3A).

ac+dc The 973A, 974A, displays ac+dc true rms.

dBm/dB The 973A, displays dBm and input voltage on dual display; the 974A has 0.01 dB resolution.

Specifications 974A 23° C ± 5° C, <80% RH, accuracy ± (% of reading + number of digits)

dc Voltage

Range	Resolution	Accuracy	Input Resistance
500 mV	10 µV	0.05% + 2	>1000 MΩ
5 V	100 µV		11 MΩ
50 V	1 mV		10 MΩ
500 V	10 mV		
1000 V	100 mV		

True rms ac Voltage Accuracy

Range	Resolution	20 Hz - 50 Hz	50 Hz - 10 kHz	10 kHz - 30 kHz	30 kHz - 50 kHz	50 kHz - 100 kHz	Input Impedance
500 mV	10 µV	1% + 30	0.7%+30	2%+50	-		11 MΩ <50 pF
5V	100 µV		0.5% + 30	1% + 40	2% + 70	3% + 300	10 MΩ <50 pF
50V	1 mV						
500V	10 mV						
750V	100 mV	1% + 30, 20 Hz to 1 kHz					

True rms ac + dc Voltage Accuracy

dc, 20 Hz - 10 KHz	dc, 10 kHz - 30 kHz	dc, 30 kHz - 50 kHz	dc, 50 kHz - 100 kHz
-			
1% + 30	1.2% + 40	2.5% + 70	3.5% + 300
1%+30 dc, 20 Hz - 1 kHz			

Resistance Accuracy

Range	Resolution	Accuracy	Test Current	Test Voltage
500 Ω	10 mΩ	0.06% + 2	<800 µA	<5.5V
5 kΩ	100 mΩ		<80 µA	
50 kΩ	1 Ω			<15 µA
500 kΩ	10 Ω	<1.5 µA		
5 MΩ	100 Ω	0.5% + 2	<150 nA	
50 MΩ	1 kΩ	1% + 2		

Current, ac, dc

Range	Resolution	Accuracy		Input Resistance
		dc	40 Hz to 1 KHz	
500 µA	10 nA	0.3% + 2	1% + 20	<1050Ω
50 mA	1 µA			<12Ω
500 mA	10 µA			<2.5Ω
10 A	1 mA	0.7%+2	-	<0.05Ω

Frequency 974A

Range	Resolution	Accuracy	Input Voltage
10 Hz to 99.99 Hz	0.01 Hz	0.05% + 1	0.45V to 500V
90 Hz to 999.9 Hz	0.1 Hz		
900 Hz to 9999 Hz	1 Hz		
900 kHz to 99.99 kHz	10 Hz		0.7V to 100V
90 kHz to 200 kHz	100 Hz		1.5V to 100V

Temperature

Calibrated Element	Measurement Range	Resolution	Accuracy
Thermistor	-80 to 150° C, -112 to 302° F	0.1° C, 0.1° F	0.2° C, 0.4° F

dBm 974A, (600Ω, 1 mW reference)

acV	Input		Accuracy			
	Input dBm	Input Voltage	20 Hz to 10 kHz	10 kHz to 30 kHz	30 kHz to 50 kHz	50 kHz to 100 kHz
	-29.82 dBm to -23.80 dBm	25 mV to 50 mV	0.2 dBm	0.50 dBm	Not Specified	
	-23.80 dBm to -3.80 dBm	50 mV to 499.99 mV	0.15 dBm	0.30 dBm		
	-3.80 dBm to 55.28 dBm	0.5 V to 450 V	0.1 dBm	0.20 dBm	0.50 dBm	1.00 dBm
	55.28 dBm to 59.72 dBm	450 V to 750 V	0.15 dBm, 20 Hz to 1 kHz	Not Specified		

General Specifications

Display		Humidity	80% RH, 0° C - 40° C
971/2/3A	4 digit LCD display max. reading of "4000" (9999 for Hz, 5656 for ac+dc), 40 segment bargraph with dc zero center.	Battery	1.5V, AA size X 2
974A	5 digit LCD display, max. reading of 49999 (70700 for ac+dc)	Battery life (typical)	
Sampling, dcV		971A	1000 hrs
971/2/3A	2.3 times per second, 23 Bargraph samples/sec	972/3A	600 hrs
974A	2-4 times per second	974A	120 hrs
Operating Temperature		Size (W x H x D)	87 mm x 190 mm x 39 mm (3.4 in x 7.5 in x 1.55 in)
971/2/3A	-10° C to 50° C (14°F to 122°F)	Weight	440 g (1 lb) approx.
974A	0° C to 40° C (32°F to 104°F)		

Ordering Information

971A Handheld Multimeter

972A Handheld Multimeter

973A Handheld Multimeter

974A Handheld Multimeter

970-series handheld multimeters come with alkaline batteries, rubber boot, Certificate of Calibration, spare fuse, operating manual and test leads.

Options

Opt. W50 Additional 2-year warranty (5-year total)

Accessories

34300A	40 kV ac/dc high voltage probe
34301A	700 MHz RF detector probe
34302A	Clamp-on ac/dc current probe (100 A)
34330A	30 A current shunt
E2304A	handheld multimeter padded carrying case
E2306A	deluxe test lead kit
E2305A	2 pairs spare test leads
E2301A	surface type-k thermocouple probe ^{1,2}
E2303A	SMP-to-dual banana plug adapter ²
E2307A	type-k thermocouple bead temperature probe ²
E2308A	thermistor temperature probe

¹Requires E2303A thermocouple probe adapter.

²For use with the 973A multimeter only.