7¹/₂-Digit High Performance Multimeter 8¹/₂-Digit High Performance Multimeter





- True 7½- (Model 2001) or 8½-digit (Model 2002) resolution
- Exceptional measurement integrity with high speed
- High speed function and range changing
- Broad range of built-in measurement functions
- Multiple measurement display
- Built-in 10 channel scanner option
- GPIB interface
- HP3458A emulation mode (Model 2002)

DMM users whose applications demand exceptional resolution, accuracy, and sensitivity combined with high throughput now have two attractive alternatives to high priced, high end DMMs. Keithley's 7½-digit Model 2001 and 8½-digit Model 2002 High Performance Digital Multimeters not only deliver performance specifications usually associated with instruments that cost thousands more, but they also offer a broad range of functions not typically available from DMMs. The 2002 is based on the same superior measurement technology as the 2001, and the front panels of both instruments have the same look, feel, and response.

True 7¹/₂- (or 8¹/₂-) Digit Resolution

While other DMMs may claim 7½- or 8½-digit resolution, they must average multiple readings to extend their resolution. The resolution specifications of the 2001 and 2002 are based on a 28-bit A/D converter that provides the resolution needed to discern smaller changes. This higher resolution also provides greater dynamic range, making it possible to measure from 1 μ V to 20V on a single range, thus avoiding range-shift errors and delays.

Built-In Scanner (Multiplexer) Options

With the addition of a plug-in scanner card, the 2001 or 2002 becomes a complete scan and measure system for applications involving up to ten

measurement points. The additional resolution and measurement ranges provided by the 2002 make it an excellent choice for production test, design verifi-



cation, and metrology applications where high accuracy is critical.

High Accuracy ACV Measurements

A patented circuit design makes the 2001 and 2002's AC measurements several times more accurate than competitive DMMs. In this circuit, the signal bypasses the prime error-contributing section of conventional rms converters. This increases the accuracy at almost any voltage level, and also increases sensitivity down to a guaranteed 1% of the selected range, compared to 5-10% for most other DMMs. The result is highly accurate measurements over a broad range of inputs.

Applications involving vibration, servo, guidance, shock, and control systems often require accurate low frequency ACV measurements. The 2001 and 2002 maintain very good accuracy (better than 0.1%) down to 1Hz. The wide bandwidth of these DMMs allows for accurate measurements of high frequency AC signals without the need for a special AC meter. Both the 2001 and 2002 feature TRMS AC, average AC, peak AC, AC+DC, and crest factor measurement capability for a wide variety of applications.

High Speed for High Throughput

In applications where high throughput is critical, both the 2001 and 2002 provide more than 2000 readings per second at 4½-digit resolution. At 7½ digits, the 2002 maintains full rated accuracy at reading rates up to 44/second on DCV and ohms.

High Speed, High Precision Resistance Measurements

The Model 2002 uses a unique single-phase method for 4-wire ohms measurements. This makes it twice as fast for a given power line cycle rate. This also eliminates errors due to changing lead resistances that can result from fast test handlers. A built-in open-lead detection circuit also eliminates many production test problems.

Fast, Flexible Triggering

Trigger latency—the delay between trigger and measurement—is often a barrier to higher throughput. Also, variability in latency can complicate predicting measurement timing. The 2001 and 2002 trigger is less than $2\mu s \pm 1\mu s$, which is much faster than typical system DMMs.

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Ordering Information

- 2001 High Performance 7½-Digit DMM with 8K Memory
- 2002 High Performance 8½-Digit DMM with 8K Memory
- 2000-SCAN
- 10-channel Scanner Card 2001-SCAN
 - 10-channel Scanner Card with two highspeed channels
- 2001-TCSCAN 9-channel Thermocouple Scanner Card

2001/MEM1

High resolution, high accuracy DMMs

- High Performance 7½-Digit DMM with 32K Memory
- 2001/MEM2
 - High Performance 7½-Digit DMM with 128K Memory
- 2002/MEM1 High Performance 8½-Digit
- DMM with 32K Memory 2002/MEM2 High Performance 8½-Digit

DMM with 128K Memory

Accessories Supplied

Model 8605 High Performance Modular Test Leads, user's manual, option slot cover, and full calibration data.

For more information, request the Model 2001 and 2002 Technical Specifications books.





Both the 2001 and 2002 provide exceptional measurement range. In addition, the 2002 offers extended DCV and resistance measurement capabilities.

The unique Trigger-Link feature included in the Model 2001 and 2002 and most Keithley test and measurement products can be used to coordinate the operation of two or more instruments. Trigger-Link combines six independent software selectable trigger lines on a single connector for simple, direct control over all instruments in a system.

Spot Trends with the Bar-Graph Display

The ability to track reading trends around a target value easily can be just as important as the absolute readings. A unique bar-graph display function in the 2001 and 2002 indicates data as a percentage of the selected range from $\pm 0.01\%$ to $\pm 100\%$. Whether adjusting about zero or any other desired value, this display can replace a nulling differential voltmeter.

Capture Spikes Down to 1µs

Both the 2001 and 2002 have internal peak detectors that can catch $1\mu s$ spikes such as power supply spikes and transients, AC line power surges, and short-duration dropouts on components. These peak detectors operate up to 1MHz for repetitive signals or down to $1\mu s$ for single spikes, so there is no need for a separate scope. The DMMs can automatically display and store the highest value or display the maximum and minimum values of spikes.

Built-in Features and Capabilities

The 2001 and 2002 offer many built-in measurements that are typically unavailable in instruments of this type, including in-circuit current, temperature with thermocouples or RTDs, and peak spikes. Four separate outputs linked to limits simplify configuring the DMMs for use in binning operations.

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A Greater Measure of Confidence



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The built-in AC crest factor measurement helps ensure the accuracy of AC measurements. Other DMMs typically perform AC measurements for signals without excessive crest factor-the ratio of peak value to rms values. However, when crest factor rises, measurements may not meet specs. With a 2001 or 2002, there is no need for an oscilloscope to determine if the crest factor is acceptable-the DMM measures it directly.

While some DMMs calculate average AC from the rms value, these calculations apply only to sine wave inputs. The 2001 and 2002 measure peak value, average and true rms directly to obtain a complete characterization of the signal. This capability makes these DMMs ideal for AC circuit design or test applications and for verifying test voltages specified only in averages.

When measuring AC or digital signals, frequency is critical. The 2001 and 2002 accurately measure frequency up to 15MHz. Accurate triggering on the signal is critical to measure frequency reliably. The frequency counters in the 2001

and 2002 have a fully adjustable trigger level for good measurements of noisy signals.

Multiple Measurement Display

The 2001 and 2002 can display DC and AC volts and the AC frequency from a single measurement connection simultaneously. Several other multiple-measurement displays are available, including crest factor and bar graph. By measuring sequentially and displaying simultaneously, the 2001/2002 operates as if three different meters are working together.

Option Slot Extends DMM Performance

An option slot in the back of the 2001 and 2002 opens the door to a wide range of measurement capabilities. Choose a 10-channel general-purpose scanner card or a 9-channel thermocouple scanner card to make measurements on multiple test points or devices. This can eliminate the need for a separate scanner and significantly reduce programming and setup time.



ACCESSORIES AVAILABLE

TEST LE/	ADS AND PROBES
5805	Kelvin Probes, 0.9m (3ft)
5805-12	Kelvin Probes, 3.6m (12ft)
5808	Low Cost, Single Pin, Kelvin Probes
5809	Low Cost, Kelvin Clip Lead Set
3502	Micro-DIN to 6 BNCs Adapter Box with 8501-1 Cable
3530	Centronics Adapter
3605	High Performance 2-Wire Modular Test Leads
3606	High Performance Modular Probe Kit
3610	Low Thermal Shorting Plug
3680	RTD Probe Adapter
3681	Low Cost RTD
CABLES/	ADAPTERS
7007-1	Shielded GPIB Cable, 1m (3.3 ft)
7007-2	Shielded GPIB Cable, 2m (6.6 ft)
8501-1	Trigger-Link Cable, 1m (3.3 ft)
8501-2	Trigger Link Cable, 2m (6.6 ft)
3502	Trigger Link Adapter Box
8610	Low Thermal Shorting Plug
3620	4-Wire DMM Shorting Plug
RACK M	OUNT KITS
í 288-1	Single Fixed Rack Mount Kit

Side-by-Side Rack Mount Kit **GPIB INTERFACES** KPCI-488I PA IFFF-488 Interface Controller for the PCI Bus

4288-4

KI CI-400LI	TELE-100	michael coi	intoner ioi	the rer	Dus
KUSB-488B	IEEE-488	USB-to-GPIB	Interface	Adapter	

SERVICES AVAILABLE

2000-SCAN-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2001/MEM1-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2001/MEM2-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2001-SCAN-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2001-TCSCAN-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2001-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2002/MEM1-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2002/MEM2-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
2002-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
C/2000-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Model 2000-SCAN*
C/2001-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2001, 2001/MEM1, 2001/MEM2, 2001-SCAN, 2001-TCSCAN*
C/2002-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2002, 2002/MEML 2002/MEM28

*Not available in all countries

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2001 Condensed Specifications

DC VOLTS

DCV INPUT CHARACTERISTICS AND ACCURACY

Range	Full Scale		Default	Innut					
-	i un scure	Resolution	Resolution	Resistance	5 Minutes⁴	24 Hours ¹	90 Days ²	1 Year ²	2 Years ²
200 mV ³ ±	210.00000 mV	10 nV	100 nV	>10 GΩ	3 + 3	10 + 6	25 + 6	37 + 6	50 + 6
2 V ±	2.1000000 V	100 nV	$1 \mu V$	>10 GΩ	2 + 1.5	7 + 2	18 + 2	25 + 2	32 + 2
20 V ±	21.000000 V	$1 \mu V$	$10 \ \mu V$	>10 GΩ	2 + 1.5	7 + 4	18 + 4	24 + 4	32 + 4
200 V ±	210.00000 V	$10 \ \mu V$	$100 \ \mu V$	$10 \text{ M}\Omega \pm 1\%$	2 + 1.5	13 + 3	27 + 3	38 + 3	52 + 3
1000 V ±	1100.0000 V	$100 \mu V$	1 mV	$10 \text{ M}\Omega \pm 1\%$	10 + 1.5	17 + 6	31 + 6	41 + 6	55 + 6

DC VOLTS NOTES

- 1. For $T_{CAL} \pm 1^{\circ}$ C, following 55-minute warm-up. T_{CAL} is ambient temperature at calibration, which is 23°C from factory.
- 2. For T_{CAL} =5°C, following 55-minute warm-up. Specifications include factory traceability to US NIST.
- When properly zeroed using REL function.
 DCV Transfer Stability typical applications are standard cell comparisons and relative accuracy measurements. Specs apply for 10 power line cycles. 20-reading digital filter, autozero on with type synchro-
- sons and relative accuracy measurements. Specs apply for 10 power line cycles, 20-reading digital filter, autozero on with type synchronous, fixed range following 2-hour warm-up at full scale to 10% of full scale, at T_{BEE} ±1°C (T_{BEE} is the initial ambient temperature). Specifications on the 1000V range are for measurements within 5% of the initial measurement value and following measurement settling.

Model 2001 and 2002 specifications

Normal Mode RMS ¹
90 Days, ±2°C from last AC self-cal for 1% to 100% of range ²
\pm (% of reading + % of range)

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Range	20–50Hz	50–100Hz	0.1–2kHz	2–10kHz	10–30kHz	30–50kHz	50–100kHz	100–200kHz	0.2–1MHz	1–2MHz
200 mV	0.25 + 0.015	0.07 + 0.015	0.03 + 0.015	0.03 + 0.015	0.035 + 0.015	0.05 + 0.015	0.3 + 0.015	0.75 + 0.025	2 + 0.1	5 + 0.2
2 V	0.25 + 0.015	0.07 + 0.015	0.03 + 0.015	0.03 + 0.015	0.035 + 0.015	0.05 + 0.015	0.3 + 0.015	0.75 + 0.025	2 + 0.1	5 + 0.2
20 V	0.25 + 0.015	0.07 + 0.015	0.04 + 0.015	0.06 + 0.015	0.08 + 0.015	0.1 + 0.015	0.3 + 0.015	0.75 ± 0.025	4 + 0.2	$7 + 0.2^{4}$
200 V ³	0.25 + 0.015	0.07 + 0.015	0.04 + 0.015	0.06 + 0.015	0.08 + 0.015	0.1 + 0.015	0.3 + 0.015	0.75 ± 0.025^{4}	$4 + 0.2^{4}$	
750 V ³	0.25 + 0.015	0.1 + 0.015	0.08 ± 0.015	0.09 + 0.015	0.12 + 0.015	$0.15 + 0.015^{4}$	$0.5 + 0.015^{4}$			

AC VOLTS NOTES

1. Specifications apply for sinewave input, AC + DC coupling, 1 power line cycle, digital filter off, following 55 minute warm-up.

. For 1% to 5% of range below 750V range, and for 1% to 7% of 750V range, add 0.01% to range uncertainty. For inputs from 200kHz to 2MHz, specifications apply above 10% of range.

3. Add 0.001% of reading \times (V_{IN}/100V)² additional uncertainty above 100V rms.

4. Typical values.

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TWO-WIRE AND FOUR-WIRE OHMS (2W and 4W Ohms Functions)⁶

			Default	Current	Resistance Accura ±(ppm of reading + ppm			/ ³ of range)	
Range	Full Scale	Resolution	Resolution	Source 1	24 Hours 4	90 Days ⁵	1 Year 5	2 Years 5	
20 Ω	21.000000 Ω	$1 \ \mu\Omega$	$10 \ \mu\Omega$	9.2 mA	29 + 7	52 + 7	72 + 7	110 + 7	
200 Ω	210.00000 Ω	$10 \ \mu\Omega$	$100 \ \mu\Omega$	0.98 mA	24 + 7	36 + 7	56 + 7	90 + 7	
2 kΩ	$2100.0000 \ k\Omega$	$100 \ \mu\Omega$	$1 \text{ m}\Omega$	0.98 mA	22 + 4	33 + 4	50 + 4	80 + 4.5	
20 kΩ	$21.000000 \ k\Omega$	$1 \text{ m}\Omega$	10 mΩ	89 μA	19 + 4	32 + 4	50 + 4	80 + 4.5	
200 k Ω	$210.00000 \ k\Omega$	10 mΩ	100 mΩ	7 μA	20 + 4.5	72 + 4.5	90 + 4.5	130 + 5	
$2 M\Omega^2$	$2.1000000 \text{ M}\Omega$	$100 \text{ m}\Omega$	1 Ω	770 nA	50 + 4.5	110 + 4.5	160 + 4.5	230 + 5	
$20 \text{ M}\Omega^2$	$21.000000 \text{ M}\Omega$	1 Ω	10 Ω	70 nA	160 + 4.5	560 + 4.5	900 + 4.5	1100 + 5	
$200M\Omega^{2}$	210.00000 M\Omega	10 Ω	100 Ω	4.4 nA	3000 + 100	10000 + 100	20000 + 100	30000 + 100	
$1 \ G\Omega^2$	1.0500000 G Ω	100 Ω	1 kΩ	4.4 nA	9000 + 100	20000 + 100	40000 + 100	60000 + 100	

OHMS NOTES

- 1. Current source is typically ±9% absolute accuracy.
- 2. For 2-wire mode.
- 3. Specifications are for 1 power line cycle, 10 reading digital filter, Auto Zero on, 4-wire mode, offset compensation on (for 20Ω to $20k\Omega$ ranges).
- 4. For $T_{CAL} \pm 1^{\circ}C$, following 55 minute warm-up. T_{CAL} is ambient temperature at calibration ($23^{\circ}C$ at the factory).
- 5. For $T_{\rm CAL}\pm5^{\rm o}{\rm C},$ following 55-minute warm-up. Specifications include traceability to US NIST.
- 6. When measuring resistance of inductive loads, the inductance of that load must be 10mH or less.

DCI INPUT CHARACTERISTICS AND ACCURACY⁴

			Default	Maximum Burden	Accuracy ¹ ±(ppm of reading + ppm of range)			range)
Range	Full Scale	Resolution	Resolution	Voltage ⁶	24 Hours ²	90 Days ³	1 Year ³	2 Years ³
200 µA	210.00000 µA	10 pA	100 pA	0.25 V	63 + 25	300 + 25	500 + 25	1350 + 25
2 mA	2.1000000 mA	100 pA	1 nA	0.31 V	64 + 20	300 + 20	400 + 20	750 + 20
20 mA	21.000000 mA	1 nA	10 nA	0.4 V	65 + 20	300 + 20	400 + 20	750 + 20
200 mA	210.00000 mA	10 nA	100 nA	0.5 V	96 + 20	300 + 20	500 + 20	750 + 20
2 A	2.1000000 A	100 nA	1 µA	1.5 V	500 + 20	600 + 20	900 + 20	1350 + 20

DC AMPS NOTES

- 1. Specifications are for 1 power line cycle, Auto Zero on, 10 reading digital filter.
- 2. For $T_{CAL} \pm 1^{\circ}C$, following 55 minute warm-up.
- For T_{CAL} ±5°C, following 55 minute warm-up. Specifications include traceability to US NIST.
- 4. Add 50 ppm of range for current above 0.5A for self heating.
 6. Actual maximum voltage burden = (maximum voltage burden) ×
 - (I_{MEASURED}/I_{FULL SCALE}).



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2001 Condensed Specifications (continued)

AC AMP	S							AC AMPS NOTES
	90 Days, 1 '	Year or 2 Years	A 5, T _{CAL} ±5°C, fo	CI ACCURACY ¹ or 5% to 100%	, ² of range, ±(%	of reading + ^c	% of range)	 Specifications apply for sinewave input, AC+DC coupling, 1 power line cycle, digital filter off, following 55 minute warm-up. Add 0.005% of range uncertainty for current above 0.5A rms for self-
RANGE	20Hz- 50Hz	50Hz– 200Hz	200Hz– 1kHz	1kHz– 10kHz	10kHz– 30kHz³	30kHz– 50kHz³	50kHz– 100kHz³	heating. 3. Typical values.
200 µA	0.35 + 0.015	0.2 + 0.015	0.4 + 0.015	0.5 + 0.015				
2 mA	0.3 + 0.015	0.15 + 0.015	0.12 + 0.015	0.12 + 0.015	0.25 + 0.015	0.3 + 0.015	0.5 + 0.015	
20 mA	0.3 + 0.015	0.15 + 0.015	0.12 + 0.015	0.12 + 0.015	0.25 + 0.015	0.3 + 0.015	0.5 + 0.015	
200 mA	0.3 + 0.015	0.15 + 0.015	0.12 + 0.015	0.15 + 0.015	0.5 + 0.015	1 + 0.015	3 + 0.015	
2 A	0.35 + 0.015	0.2 + 0.015	0.3 + 0.015	0.45 + 0.015	1.5 + 0.015	4 + 0.015		

FREQUENCY COUNTER

AC VOLTAGE INPUT: 1Hz-15MHz.

ACCURACY: ±(0.03% of reading)

DC IN-CIRCUIT CURRENT

TYPICAL RANGES: Current: 100μ A to 12A. Trace Resistance: $1m\Omega$ to 10Ω typical. ACCURACY: ±(5% + 2 counts). For 1 power line cycle, Auto Zero on, 10 reading digital filter,

T_{CAL} ±5°C, after being properly zeroed. 90 days, 1 year or 2 years.

TEMPERATURE

Built-in linearization for J, K, N, T, E, R, S, B thermocouple types to ITS-90 and 100 platinum RTDs DIN 43 760 or IPTS-68.

GENERAL

- POWER: Voltage: 90-134V and 180-250V, universal self-selecting. Frequency: 50Hz, 60Hz, or 400Hz self-identifying. Consumption: <55VA.
- ENVIRONMENTAL: Operating Temperature: 0° to 50°C. Storage Temperature: -40° to 70°C. Humidity: 80% R.H., 0° to 35°C, per MIL-T-28800E1 Para 4.5.5.1.2.
- PHYSICAL: Case Dimensions: 90mm high × 214mm wide × 369mm deep (3½ in. × 8½ in. × 141/2 in.). Net Weight: <4.2kg (<9.2 lbs.). Shipping Weight: <9.1kg (<20 lbs.).

STANDARDS

EMI/RFI: Conforms to VDE 0871B (per Vfg 1046/1984), IEC 801-2. Meets FCC part 15 Class B. CISPR-22 (EN55022)

Safety: Conforms to IEC348, CAN/CSA-C22.2. No. 231, MIL-T-28800E1. Designed to UL1244.

Note 1: For MIL-T-28800E, applies to Type III, Class 5, Style E.

For complete specifications, refer to the 2001 Technical Data book

2002 Condensed Specifications

DC VOLTS

DCV INPUT CHARACTERISTICS AND ACCURACY

Enhance	d Accuracy 1 – 10	OPLC, DFILT	10	Relative Accuracy ±(ppm of reading + ppm of range)					
Range	Full Scale	Resolution	Input Resistance	Transfer ⁵	24 Hours ²	90 Days ³	1 Year ³	2 Years ³	
200 mV 4	±210.000000 mV	1 nV	>100 GΩ	0.4 + 1.5	3.5 + 3	15 + 8	19 + 9	23 + 10	
2 V ⁴	±2.10000000 V	10 nV	$>100 \ G\Omega$	0.2 + 0.15	1.2 + 0.3	6 + 0.8	10 + 0.9	14 + 1	
20 V	±21.0000000 V	100 nV	>100 GΩ	0.1 + 0.05	1.2 + 0.1	6 + 0.15	10 + 0.15	14 + 0.15	
200 V	±210.000000 V	$1 \mu V$	$10 \text{ M}\Omega \pm 1\%$	0.5 + 0.08	5 + 0.4	14 + 2	22 + 2	30 + 2	
1000 V ⁶	±1100.00000 V	$10 \ \mu V$	10 M Ω ±1%	1 + 0.05	5 + 0.08	14 + 0.4	22 + 0.4	30 + 0.4	

Normal Accuracy⁷ – 1PLC, DFILT off

Re	lative Accuracy	
:(ppm of r	reading + ppm of range)	

			Input				
Range	Full Scale	Resolution	Resistance	24 Hours ²	90 Days ³	1 Year ³	2 Years ³
200mV^{4}	±210.00000 mV	10 nV	>100 GΩ	3.5 + 6	15 + 11	19 + 12	23 + 13
2 V ⁴	±2.1000000 V	100 nV	$>100 \text{ G}\Omega$	1.2 + 0.6	6 + 1.1	10 + 1.2	14 + 1.3
20 V	±21.000000 V	$1 \mu V$	$>100 G\Omega$	3.2 + 0.35	8 + 0.4	12 + 0.4	16 + 0.4
200 V	±210.00000 V	$10 \ \mu V$	10 MΩ ±1%	5 + 1.2	14 + 2.8	22 + 2.8	30 + 2.8
1000 V ⁶	±1100.0000 V	$100 \ \mu V$	$10 \text{ M}\Omega \pm 1\%$	5 + 0.4	14 + 0.7	22 + 0.7	30 + 0.7

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AC VOLTS Normal Mode RMS¹

		\pm (% of reading + % of range)								
Range	20-50Hz	50-100Hz	0.1–2kHz	2–10kHz	10-30kHz	30–50kHz	50–100kHz	100-200kHz	0.2–1MHz	1–2MHz
200 mV	0.25 + 0.015	0.07 + 0.015	0.02 + 0.02	0.02 + 0.02	0.025 + 0.02	0.05 + 0.01	0.3 + 0.015	0.75 + 0.025	2 + 0.1	5 + 0.2
2 V	0.25 + 0.015	0.07 + 0.015	0.02 + 0.02	0.02 + 0.02	0.025 + 0.02	0.05 + 0.01	0.3 + 0.015	0.75 + 0.025	2 + 0.1	5 + 0.2
20 V	0.25 ± 0.015	0.07 + 0.015	0.03 + 0.015	0.04 ± 0.015	0.05 + 0.015	0.07 + 0.015	0.3 + 0.015	0.75 ± 0.025	4 + 0.2	$7 + 0.2^{4}$
200 V ³	0.25 + 0.015	0.07 + 0.015	0.03 + 0.015	0.04 + 0.015	0.05 + 0.015	0.07 + 0.015	0.3 + 0.015	$0.75 + 0.025^{4}$	$4 + 0.2^{4}$	
750 V ³	0.25 + 0.015	0.1 + 0.015	0.05 + 0.015	0.06 + 0.015	0.08 + 0.015	$0.1 + 0.015^{4}$	$0.5 + 0.015^{4}$			

DC VOLTS NOTES

- 1. Specifications are for 10 power line cycles, synchronous autozero, 10-reading repeat digital filter, autorange off, except as noted.
- For T_{CAL} ±1°C, following 4-hour warm-up. T_{CAL} is ambient temperature at calibration (23°C at the factory). Add 0.5ppm of reading uncertainty if the unit is power cycled during this interval.

- 3. For T_{CAL} ±5°C, following 4-hour warm-up.
- 4. Care must be taken to minimize thermal offsets due to operator cables Specifications apply for 20-reading repeat digital filter, $\rm T_{REF}\pm0.5^{\circ}C$ $(T_{REF}$ is the initial ambient temperature), and for measurements within 10% of the initial measurement value and within 10 minutes of the
- initial measurement time Add 20ppm \times $(V_{IN}\!/1000V)^2$ additional uncertainty for inputs above 200V, except in transfer accuracy specifications
- Specifications are for 1 power line cycle, normal autozero, digital filter off, autorange off.

AC VOLTS NOTES

range

Typical values.

1. Specifications apply for sinewave input, AC + DC coupling, 1 power line cycle, autozero on, digital filter off, following 55-minute warm-up. For 1% to 5% of range below 750V range, and for 1% to 7% of 750V range, add 0.01% of range uncertainty. For inputs from 200kHz to 2MHz, specifications apply above 10% of

Add 0.001% of reading $\times (V_{IN}/100V)^2$ additional uncertainty for inputs above 100V rms Model 2001 and 2002 specifications



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7¹/₂-Digit High Performance Multimeter 8¹/₂-Digit High Performance Multimeter

2002 Condensed Specifications (continued)

OHMS

TWO-WIRE AND FOUR-WIRE OHMS

			Current	Relative Accuracy ³ ±(ppm of reading + ppm of range)					
Range	Full Scale	Resolution	Source 1	Transfer ⁷	24 Hours 4	90 Days ⁵	1 Year 5	2 Years 5	
20 Ω	21.000000 Ω	100 nΩ	7.2 mA	2.5 + 3	5 + 4.5	15 + 6	17 + 6	20 + 6	
200 Ω	210.00000 Ω	$1 \ \mu \Omega$	960 μA	2.5 + 2	5 + 3	15 + 4	17 + 4	20 + 4	
2 kΩ	$2100.0000 \ k\Omega$	$10 \ \mu\Omega$	960 μA	1.3 + 0.2	2.5 + 0.3	7 + 0.4	9 + 0.4	11 + 0.4	
20 kΩ	$21.000000 \ k\Omega$	$100 \ \mu\Omega$	96 µA	1.3 + 0.2	2.5 + 0.3	7 + 0.4	9 + 0.4	11 + 0.4	
$200 \ k\Omega$	$210.00000 \ k\Omega$	$1 \text{ m}\Omega$	9.6 µA	2.5 + 0.4	5.5 + 0.5	29 + 0.8	35 + 0.9	40 + 1	
2 MΩ	$2.1000000 \text{ M}\Omega$	$10 \text{ m}\Omega$	1.9 μA	5 + 0.2	12 + 0.3	53 + 0.5	65 + 0.5	75 + 0.5	
$20 M\Omega^2$	$21.000000 \text{ M}\Omega$	$100 \text{ m}\Omega$	$1.4 \ \mu A^{6}$	15 + 0.1	50 + 0.2	175 + 0.6	250 + 0.6	300 + 0.6	
$200~M\Omega^{2}$	$210.00000 \text{ M}\Omega$	1 Ω	$1.4 \ \mu A^{6}$	50 + 0.5	150 + 1	500 + 3	550 + 3	600 + 3	
$1 G\Omega^2$	$1.0500000 ~G\Omega$	10 Ω	$1.4 \mu A^{6}$	250 + 2.5	750 + 5	2000 + 15	2050 + 15	2100 + 15	

DC AMPS

AC AMPS

200 mA

2 A

DCI INPUT CHARACTERISTICS AND ACCURACY

			Maximum	Relative Accuracy ±(ppm of reading + ppm of range)				
Range	Full Scale	Resolution	Burden Voltage ³	24 Hours 1	90 Days ²	1 Year ²	2 Years 2	
200 µA	210.00000 µA	10 pA	0.25 V	50 + 6	275 + 25	350 + 25	500 + 25	
2 mA	2.1000000 mA	100 pA	0.3 V	50 + 5	275 + 20	350 + 20	500 + 20	
20 mA	21.000000 mA	1 nA	0.35 V	50 + 5	275 + 20	350 + 20	500 + 20	
200 mA	210.00000 mA	10 nA	0.35 V	75 + 5	300 + 20	375 + 20	525 + 20	
2 A	2.1000000 A	100 nA	1.1 V	350 + 5	600 + 20	750 + 20	1000 + 20	

ACI Accuracy 1, 2 90 Days, 1 Year or 2 Years, T_{CAL} ±5°C, for 5% to 100% of range, ±(% of reading + % of range) 200Hz-10kHz-30kHz-50kHz-20Hz-50Hz-1kHz-50kHz³ 100kHz³ Range 50Hz 200Hz 1kHz 10kHz 30kHz³ 200 µA 0.35 + 0.0150.2 + 0.015 0.4 + 0.015 0.5 + 0.015 0.3 + 0.015 0.15 + 0.0150.12 + 0.0150.12 + 0.0150.3 + 0.0150.5 + 0.0150.25 + 0.0152 mA 05 ± 0.015 20 mA 0.3 + 0.015 0.15 ± 0.015 0.12 ± 0.015 0.12 + 0.015 0.25 ± 0.015 0.3 ± 0.015

0.15 + 0.015

0.45 + 0.015

0.5 + 0.015

1.5 + 0.015

0.12 + 0.015

0.3 + 0.015

FREQUENCY COUNTER

0.3 + 0.015

0.35 + 0.015

AC VOLTAGE INPUT: 1Hz–15 MHz. ACCURACY: ±(0.03% of reading).

DC IN-CIRCUIT CURRENT

TYPICAL RANGES: Current: $100\mu A$ to 12A. Trace Resistance: $1m\Omega$ to 10Ω .

0.15 + 0.015

0.2 + 0.015

ACCURACY: $\pm(5\% + 500\mu$ A). For 1 power line cycle, autozero on, 10-reading digital filter, T_{CAL} $\pm 5^{\circ}$ C, 90 days, 1 year or 2 years.

TEMPERATURE

Built-in linearization for J, K, N, T, E, R, S, B thermocouple types to ITS-90 and 100 Ω platinum RTDs DIN 43760, IPTS-68, and ITS-90.

OHMS NOTES

- 1. Current source has an absolute accuracy of ±5%.
- 2. For 2-wire mode.
- 3. Specifications are for 10 power line cycles, 10-reading repeat digital filter, synchronous autozero, autorange off, 4-wire mode, offset compensation on (for 20Ω to $20k\Omega$ ranges), except as noted.
- 4. For $T_{CAL} \pm 1^{\circ}C$, following 4-hour warm-up. T_{CAL} is ambient temperature at calibration (23°C at the factory).
- 5. For $T_{CAL} \pm 5^{\circ}C$, following 4-hour warm-up.
- 6. Current source is paralleled with a $10M\Omega$ resistance.
- 7. Specifications apply for 20-reading repeat digital filter, $T_{\rm RFF}\pm0.5^\circ\rm C$ ($T_{\rm RFF}$ is the initial ambient temperature), and for measurements within 10% of the initial measurement value and within 10 minutes of the initial measurement time.

DC AMPS NOTES

- 1. For T_{CAL} $\pm1^{\circ}C$, following 55-minute warm-up. T_{CAL} is ambient temperature at calibration (23°C at the factory).
- For T_{CAL} ±5°C, following 55-minute warm-up.
 Actual maximum burden voltage = (maximum burden voltage) ×
- (I MEASURED/I FULL SCALE).

AC AMPS NOTES

- Specifications apply for sinewave input, AC+DC coupling, 1 power line cycle, autozero on, digital filter off, following 55-minute warm-up.
- 2 Add 0.005% of range uncertainty for current above 0.5A rms for self-heating.
- 3. Typical values

GENERAL

- POWER: Voltage: 90–134V and 180–250V, universal self-selecting. Frequency: 50Hz, 60Hz, or 400Hz self-identifying at power-up. Consumption: <55VA.</p>
- **ENVIRONMENTAL: Operating Temperature:** 0° to 50°C. **Storage Temperature:** -40° to 70°C. **Humidity:** 80% R.H., 0° to 35°C.
- **PHYSICAL: Case Dimensions:** 90mm high × 214mm wide × 369mm deep (3½ in. × 8½ in. × 14½ in.). **Net Weight:** <4.2kg (<9.2 lbs.). **Shipping Weight:** <9.1kg (<20 lbs.).

STANDARDS

1 + 0.015

4 + 0.015

3 + 0.015

- EMI/RFI: Conforms to European Union EMC directive.
- Safety: Conforms to European Union Low Voltage directive.
- Note 1: For MIL-T-28800E, applies to Type III, Class 5, Style E.

1.888.KEITHLEY (U.S. only)

www.keithley.com



Model 2001 and 2002 specifications



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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