



# Autocal Digital Multimeter

- 6½ Digit Resolution
- 90 Day DCV Specifications to  $\pm 28$ ppm
- High Accuracy ACV Option
- IEEE-488 Programmable
- 200 Readings/sec

The 1061A is an accurate 6½ digit DMM which is optimized for systems applications, and also satisfies a wide range of bench and professional requirements.

## Optional Configuration

Maximum flexibility is assured by offering the 1061A as a DC voltmeter to which options may be added, giving it multifunctional capability specific to the user's requirements. Optional measurement functions include True RMS ACV, High accuracy True RMS ACV, Resistance, DC and True RMS AC Current, and Ratio.

In the ratio mode the DMM takes sequential readings of each channel before displaying the ratio in percent. Each channel can handle 4-wire inputs on resistance and up to 350 Volts peak on voltage measurements. Used with Auto ranging, ratios of any function can be read automatically using the highest to lowest range on either channel. This facility is particularly useful for measurements such as circuit gain, and the 1061A's math capability means that the result can also be displayed directly in dB's.

## Systems Capability

The 1061A can be configured with an IEEE-488 interface, turning it into a DMM capable of meeting the most demanding systems applications. With complete control from the bus, and a wide selection of SRQ and trigger modes, the 1061A can readily adapt to a wide variety of systems configurations. For more exacting ATE applications, the 1061A provides an impressive selection of specialist features including Ohms Guard for in-circuit resistance measurements, and excellent common mode and series mode rejection. These ensure that the 1061A maintains a high degree of measurement integrity under the most adverse conditions.

For users wishing to interface the 1061A into parallel BCD systems, a BCD Digital Interface can be fitted to a 5½ digit version of the instrument known as the 1061. Full range and function programming is provided together with control of the DMM's triggering, while readings are output as BCD data together with full instrument status. With this interface fitted, the 1061 can achieve 30 readings per second with 5½ digits resolution or up to 100 readings

per second in 4½ digit Superfast mode. In applications requiring more than one instrument on a common data bus, the BCD interface can be tri-stated to disconnect it from the system.

## High Reliability

In systems use the 1061A's high reliability and fast AUTOCAL features eliminate expensive downtime for repair and recalibration. In addition, an extensive diagnostic self-check routine can be run on command to sequentially test all displays, measurement circuits, and the non-volatile calibration memory.

## Computation

The 1061A is supplied with math functions which include offset and scaling for simple linear calculations, Max, Min, and Max-Min stores for capturing the largest excursions of a signal over a period of time, and Hi and Lo limits for checking signals against pre-determined tolerances. A dB feature is also provided covering a dynamic range of  $\pm 200$  dB to a resolution of 0.0001 dB.

**DC Voltage**

**Ranges:** 100 mV to 1000V in decades.  
**FS:** 2 x Full Range. 100% Overrange. (Except 1 kV range).  
**Resolution:** 100 nV, 6½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, ±(ppmR+ppmFS)).  
 100 mV Range: 30+8.  
 1V & 10V Ranges: 20+4.  
 100V Range: 30+4.  
 1000V Range: 30+4.  
**CMRR:** (1kΩ unbalance) >140 dB at DC, >80 dB+NMRR) at 1 Hz-60 Hz.  
**NMRR:** 66 dB at 50/60 Hz (Filter out), 100 dB at 50/60 Hz (Filter in).  
**Input Impedance:** >10,000MΩ from 100 mV to 10V ranges, 10MΩ ±0.1% on 100V and 1000V ranges.  
**Input Protection:** Withstands 1kV RMS on any range.  
**Input Current:** <50pA.

**Settling Time:** (To 10ppm step size) <5 ms (Filter out), <350 ms (Filter in).  
**Read Rate:** 1.5/s at 6½ digits, 200/s in Super-fast mode, 4 digits.

**True RMS AC Voltage.**

**Ranges:** 100 mV to 1000V in decades.  
**FS:** 2 x Full Range. 100% Overrange. (Except 1kV range).  
**Resolution:** 1μV, 5½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, Signal >0.25% FS, ±(%R+%FS)).

**100 mV and 1000V Ranges**

DC+45 Hz-5 kHz: 0.08+0.02.  
 DC+5 kHz-100 kHz: 0.2+0.05.

**1V to 100V Ranges**

DC+45 Hz-5 kHz: 0.04+0.01.  
 DC+5 kHz-100 kHz: 0.1+0.025.

**Hf Accuracy:** (1V and 10V ranges, typical).  
 DC+100 kHz-1 MHz: ±(2%R+1%FS).

**CMRR:** (1kΩ unbalance) >90 dB at DC -60 Hz.  
**Input Impedance:** >1MΩ shunted by 150pF.  
**Input Protection:** Withstands 1kV RMS on any range.

**Crest factor:** 7:1 at Full Range.

**Max Volt-Hertz:** 2 x 10<sup>7</sup>.

**Settling Time:** (To 0.1% step size) <500 ms (Filter in), <150 ms (Filter out).

**Read Rate:** 3/s.

**High Performance True RMS ACV**

**Resolution:** 100 nV, 6½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, Signal >1% FS, ±(%R+%FS)).

**100 mV and 1000V Ranges**

45 Hz-2 kHz: 0.04+0.007.  
 2 kHz-30 kHz: 0.08+0.015.  
 30 kHz-100 kHz: 0.2+0.022.  
 Add 0.01% per 100V above 500V.

**1V to 100V Ranges**

45 Hz-2 kHz: 0.025+0.005.  
 2 kHz-30 kHz: 0.05+0.01.  
 30 kHz-100 kHz: 0.1+0.02.

**DC Coupled:** For DC add ±(0.1%R+15ppm FS +10μV) to main specs.

**Hf Accuracy:** (1V and 10V ranges) 100 kHz-1 MHz ±(2%R+1%FS).

**Ranges, FS, CMRR, Input Impedance, Input Protection, Max Volt-Hertz:** All as Option 10.

**Crest Factor:** 5:1 at Full Range.

**Settling Time:** (To 0.1% step size) <200 ms (Filter out), <1.25 ms (Filter in).

**Resistance**

**Ranges:** 10Ω to 10MΩ in decades.  
**FS:** 2 x Full Range, 100% Overrange.  
**Resolution:** 10μΩ, 6½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, ±(ppmR+ppmFS)).  
 10Ω Range: 40+8.  
 100Ω to 10kΩ Range: 30+4.  
 100kΩ Range: 40+4.  
 1MΩ Range: 100+4.  
 10MΩ Range: 300+4.

**Open Circuit Voltage:** <10V.

**Lead Resistance:** Up to 100Ω.

**Current Through Unknown:**

10Ω	10mA
100Ω	10mA
1kΩ	1mA
10kΩ	100μA
100kΩ	10μA
1MΩ	1μA
10MΩ	100nA

**Input Protection:** Withstands 250V RMS on any range.

**Settling Time:** Up to 10kΩ generally the same as DCV.

**Read Rate:** 1.5/s at 6½ digits, 200/s in Super-fast mode, 4 digits.

**DC Current**

**Ranges:** 100μA to 1A in decades.  
**FS:** 2 x Full Range. 100% Overrange.  
**Resolution:** 1nA, 5½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, ±(ppmR+ppmFS)).

**100μA to 100mA Ranges:** 100+20.

**1A Range:** 200+20.

**Shunt Resistance:**

100μA	1kΩ
1 mA	100Ω
10 mA	10Ω
100 mA	1Ω
1A	100mΩ

**Settling Time:** (To 10ppm of step size) <5 ms (Filter out), <350 ms (Filter in).

**Read Rate:** 35/s.

**AC Current**

**Ranges:** 100μA to 1A in decades.  
**FS:** 2 x Full Range. 100% Overrange.  
**Resolution:** 1nA, 5½ digits.  
**Total Uncertainty:** (90 Day, 23° ±5°C, ±(%R+%FS)).

**100μA to 1A Ranges:**

DC+45 Hz-5 kHz 0.2+0.05

**Shunt Resistance:**

100μA	1kΩ
1 mA	100Ω
10 mA	10Ω
100 mA	1Ω
1A	100mΩ

**Settling Time:** (To 0.1% of step size) <150 ms (Filter out), <500 ms (Filter in).

**Read Rate:** 3/s.

**Ratio Accuracy**

±(net signal accuracy+net reference accuracy).

**GENERAL**

**Calibration:** Autocal from front panel or via the IEEE-488 interface.

**Remote Programming:**

IEEE-488  
 BCD (1061 Only)

**Environmental:**

Operating Temp: 0° to +50°C.  
 Storage Temp: -40° to +70°C.

**Dimensions:** 88 mm (3.5 in.) high, 455 mm (17.9 in.) wide, 420 mm (16.5 in.) deep.

**Weight:** 10 kg (22 lb.).

**Power:** 105-127V or 205-255V, 50 Hz, 60 Hz, or 400 Hz. 20 Watts approx.

**CONFIGURATIONS**

**Model 1061A:** 6½ Digit AUTOCAL Digital Multi-meter (includes DCV, 5 Year Warranty).  
**Model 1061:** 5½ Digit AUTOCAL Digital Multi-meter (includes DCV, 5 Year Warranty).

**OPTIONS**

- 10: True RMS AC Converter**
- 12: High Performance True RMS AC Converter**
- 20: 2-wire and 4-wire Resistance Converter**
- 30: Current Converter (Not available with Option 12)**
- 40: Comprehensive Ratio and Rear Input**
- 41: Selectable Rear Input (Included with Option 40)**
- 50: IEEE-488 (1978) Standard Digital Interface**
- 51: BCD Digital Interface (1061 only. Not available with Option 50)**
- 52: Remote Trigger (Included in Option 50)**
- 70: Analog Output**
- 80: 115V 60 Hz Line Operation**
- 81: 115V 50 Hz Line Operation**
- 82: 115V 400 Hz Line Operation**
- 90: Rack Mounting Kit**

**ACCESSORIES**

**1501: DMM Lead Kit**

**FACTORY/FOB**

**Indianapolis, IN  
 Norwich, England**