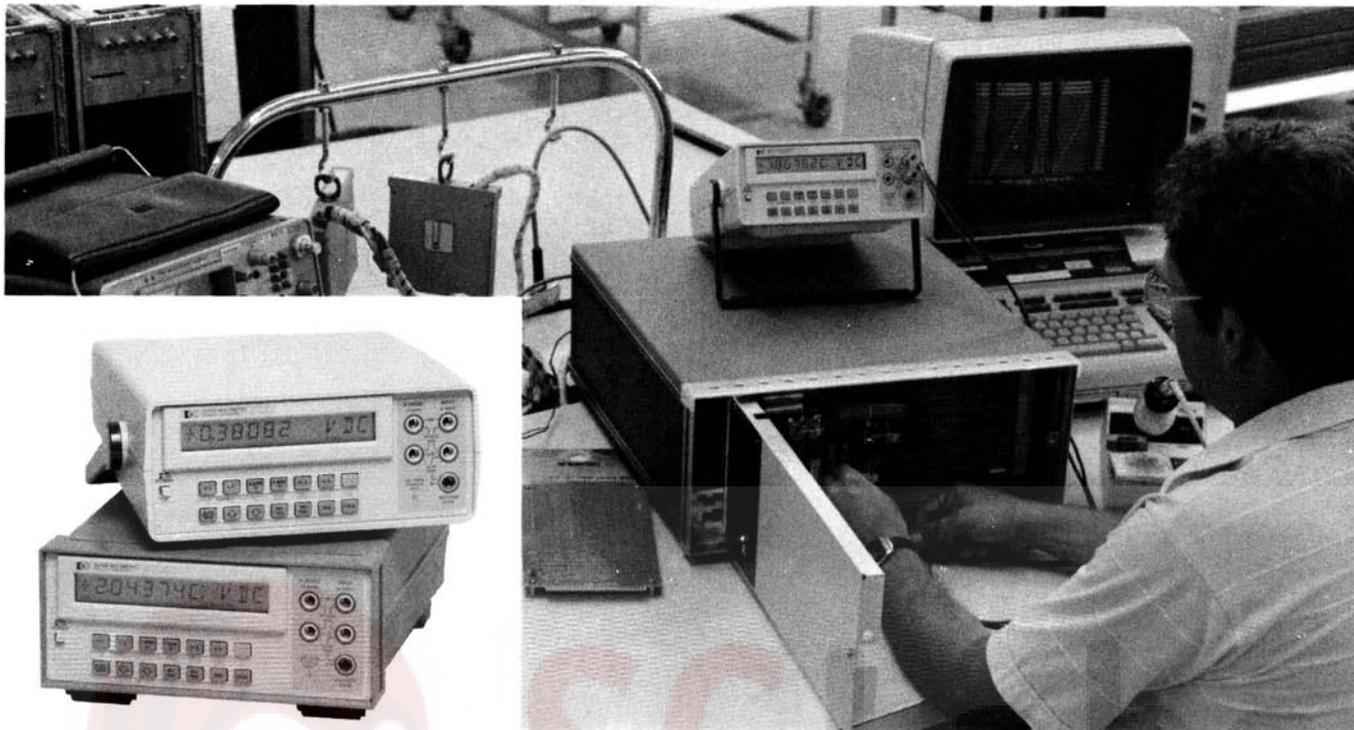


# DIGITAL MULTIMETERS

## High Performance 5½ to 3½ Digit Bench DMM

Models 3468A/B

- Five functions
- Electronic calibration
- 5½ to 3½ digits



HP 3468A/B

### Description

The HP Models 3468A/B are autoranging 5½ to 3½ digit DMMs, with the five functions of dc volts, true RMS ac volts, 2- and 4-wire ohms, dc current and true RMS ac current. They are low-cost, highly reliable DMMs which can be completely calibrated electronically, either manually from the front panel or remotely in an automatic calibration system. Remote calibration is made possible by the built-in HP-IL (Hewlett-Packard Interface Loop) interface which provides complete programmability of functions, ranges and modifiers.

The HP 3468A comes in a streamlined portable package with a handle for convenient carrying, whereas the HP 3468B comes in a plastic system case for easy rack mounting. Both are available with a rechargeable battery and battery charging circuitry for portable measurements.

### High Performance

The HP 3468A/B have 5 functions with selectable 5½, 4½ or 3½ digit resolution. DC and true RMS ac voltage measurements are provided from 0.3 volt full scale range with 1 µV sensitivity up to 300 volts. The bandwidth of the true RMS ac converter is from 20 Hz to 100 kHz on all ranges and up to 300 kHz on the 30 V range. Either 2 or 4-wire ohms measurements can be selected with a maximum range of 30 MΩ. Both dc and true RMS ac current capability is provided up to 3 A. All functions on the HP 3468A/B incorporate fast autoranging. The HP 3468A/B use an integrating analog to digital conversion technique for high noise rejection. The selectable 3½, 4½ or 5½ digits of resolution allows flexibility for choosing speed or noise rejection.

### Electronic Calibration

Complete calibration of the HP 3468A/B is done electronically, either manually from the front panel or remotely in an automatic calibration system. There are no internal adjustments necessary. Complete calibration of all functions is done without removal of the instrument's covers, thus saving valuable time and reducing cost. The calibration procedure for the HP 3468A/B involves connecting a calibration standard to the input, then pressing three keystrokes to store one calibration constant in CMOS RAM for each range and function. When the HP 3468A/B make a measurement, each reading is corrected according to the calibration constants that have been stored. The internal CMOS RAM used in the HP 3468A/B is powered by a

lithium battery to create a non-volatile memory capable of holding the calibration constants for more than ten years.

### HP-IL

The HP Models 3468A/B are fully programmable with HP-IL, a two-wire serial interface, and the HP-41C/CV handheld calculators or the more powerful HP Series 80 computers. HP-IL provides automatic measurements and adds computational power to these bench DMMs.

### Battery

The optional battery pack includes a rechargeable battery and the battery charger circuitry for up to five hours of continuous measurements.

### DC Voltage

#### Input Characteristics

Range	Maximum Reading (5½ digit)	Resolution		
		5½ digit	4½ digit	3½ digit
0.3 V	±0.301000 V	1 µV	10 µV	100 µV
3 V	± 3.01000 V	10 µV	100 µV	1 mV
30 V	± 30.1000 V	100 µV	1 mV	10 mV
300 V	± 301.000 V	1 mV	10 mV	100 mV

**Input resistance:** 0.3 V, 3 V ranges: > 10<sup>10</sup> Ω  
30 V, 300 V ranges: 10 MΩ ± 1%

#### Maximum Input Voltage (non-destructive)

Hi to Lo: 301 Vrms or 450 V peak

Hi or Lo to Earth Ground: ±500 V peak

**Measurement accuracy:** ±(% of reading + number of counts).

Auto zero ON. 5½ digits.

Range	T <sub>Cal</sub> ± 1°C 24 Hour	T <sub>Cal</sub> ± 5°C	
		90 Day	1 Year
0.3 V	0.005 + 4	0.009 + 5	0.02 + 5
3 V	0.0035 + 2	0.0072 + 2	0.0181 + 2
30 V	0.005 + 3	0.009 + 3	0.02 + 3
300 V	0.0055 + 2	0.009 + 2	0.02 + 2

\*T<sub>Cal</sub> is the temperature of the environment where the 3468A/B was calibrated. Calibration should be performed with the temperature of the environment between 20°C and 30°C.



**HP Model 3468A/B (cont.)**

**Temperature coefficient:** 0°C to 55°C, 5½ digits, auto zero ON.  
± (% of reading + number of counts)/°C.

Range	Temperature Coefficient
0.3 V, 30 V	0.0008 + 0.5
3 V, 300 V	0.0007 + .05

**Noise rejection:** in dB, with 1 kΩ imbalance in Lo lead. AC rejection for 50, 60 Hz ±0.1%. Auto zero ON.

Display	AC NMR	AC ECMR	DC CMR
5½ digits	80	150	140
4½ digits	59	130	140
3½ digits	0	70	140

**Maximum reading rate with HP-85:** 32 readings/second.  
**Maximum reading rate with HP-41CV:** 2 readings/second.

**Resistance** (2-wire Ω, 4-wire Ω)

**Input Characteristics**

Range	Maximum Reading (5½ digit)	Resolution		
		5½ digit	4½ digit	3½ digit
300 Ω	301.000 Ω	1 mΩ	10 mΩ	100 mΩ
3 kΩ	3.01000 kΩ	10 mΩ	100 mΩ	1 Ω
30 kΩ	30.1000 kΩ	100 mΩ	1 Ω	10 Ω
300 kΩ	301.000 kΩ	1 Ω	10 Ω	100 Ω
3 MΩ	3.01000 MΩ	10 Ω	100 Ω	1 kΩ
30 MΩ	30.1000 MΩ	100 Ω	1 kΩ	10 kΩ

**Input protection** (non-destructive): ± 350 V peak.  
**Measurement accuracy:** ±(% of reading + number of counts). Auto zero ON. 5½ digit display. 4-wire ohms.

Range	TCal*±1°C 24 Hour	TCal* ±5°C	
		90 Day	1 Year
300 Ω	.0045 + 4	.012 + 5	.017 + 5
3 kΩ-300 kΩ	.0035 + 2	.011 + 2	.016 + 2
3 MΩ	.0052 + 2	.011 + 2	.016 + 2
30 MΩ	.036 + 2	.066 + 2	.078 + 2

**Current Through Unknown**

Range	300 Ω	3 kΩ	30 kΩ	300 kΩ	3 MΩ	30 MΩ
Current	1 mA	1 mA	100 µA	10 µA	1 µA	100 nA

**Maximum open circuit voltage:** 6.5 V

**AC Voltage** (true RMS responding)

**Input Characteristics**

Range	Maximum Reading (5½ digit)	Resolution		
		5½ digit	4½ digit	3½ digit
0.3 V	0.301000 V	1 µV	10 µV	100 µV
3 V	3.01000 V	10 µV	100 µV	1 mV
30 V	30.1000 V	100 µV	1 mV	10 mV
300 V	301.000 V	1 mV	10 mV	100 mV

**Input impedance:** 1 MΩ ±1% shunted by <60 pF.  
**Maximum input voltage** (non-destructive): 301 Vrms or 450 V peak.  
**Measurement accuracy:** ±(% of reading + number of counts) Auto zero ON. 5½ digit display. Accuracy is specified for sinewave inputs only, >10% of full scale.

**1 Year, TCal ±5°C**

Frequency	Ranges		
	0.3V	3 V, 30 V	300 V
20-50 Hz	1.14 + 163	1.14 + 102	1.18 + 102
50-100 Hz	0.46 + 163	0.46 + 103	0.5 + 102
100 Hz-20 kHz	0.29 + 163	0.26 + 102	0.33 + 102
20-50 kHz	0.56 + 247	0.41 + 180	0.55 + 180
50-100 kHz	1.74 + 882	1.05 + 825	1.26 + 825
100 k-300 kHz	10.1 + 3720 (30 V range only)		

**Crest factor:** >4:1 at full scale.

**DC Current**  
**Input Characteristics**

Range	Maximum Reading (5½ digit)	Resolution		
		5½ digit	4½ digit	3½ digit
3 A	± 3.01000 A	10 µA	100 µA	1 mA

**Maximum input** (non-destructive): 3 A from <250 V source; fuse protected.

**Measurement accuracy:** ±(% of reading + number of counts). Auto zero ON. 5½ digit display.

Range	TCal ±5°C	
	90 Days	1 Year
3 A, <1 A input	0.14 + 6	0.17 + 6
3 A, >1 A input	1.0 + 30	1.0 + 30

**AC Current** (true RMS responding)

**Input Characteristics**

Range	Maximum Reading (5½ digit)	Resolution		
		5½ digit	4½ digit	3½ digit
.3 A	0.301000 A	1 µA	10 µA	100 µA
3 A	3.01000 A	10 µA	100 µA	1 mA

**Maximum input** (non-destructive): 3 A from <250 V source; fuse protected.

**Measurement accuracy:** ±(% of reading + number of counts). Auto zero ON. 5½ digit display. Accuracy specified for sinewave inputs only, >10% of full scale.

**1 Year, TCal ±5°C**

Frequency	Ranges	
	0.3 A	3 A
20-50 Hz	1.77 + 163	2.5 + 163
50-1 kHz	1.1 + 163	1.8 + 163
1 k-10 kHz	1.0 + 163	1.7 + 163
10 k-20 kHz	1.14 + 163	1.84 + 163

**General Information**

**Operating temperature:** 0 to 55°C  
**Humidity range:** 95% R.H., 0 to 40°C  
**Power:** AC line 48 to 440 Hz, 86 to 250 V, (see configuration)  
**Battery:** (Opt 001) Rechargeable lead-acid; minimum continuous operation for 5 hours at 25°C; recharge time is 16 hours with HP 3468A/B off and 36 hours with HP 3468A/B on.  
**Size:** HP 3468A: 98.4 mm H x 238.1 mm W x 276.2 mm D (3.88 in. H x 9.38 in. W x 10.88 in. D). 3468B: 89 mm H x 213 mm W x 275 mm D (without feet), 3.5 in. H x 8.38 in. W x 10.83 in. D.  
**Weight:** HP 3468A/B—2.1 kg (4.63 lb); HP 3468A/B with Opt 001—3.1 kg (6.83 lb).

**Configuration:** order one power and frequency option at no charge from below.

- Opt 315:** 100 V, 50 Hz; **Opt 335:** 220 V, 50 Hz
- Opt 316:** 100 V, 60 Hz; **Opt 336:** 220 V, 60 Hz
- Opt 325:** 120 V, 50 Hz; **Opt 345:** 240 V, 50 Hz
- Opt 326:** 120 V, 60 Hz; **Opt 346:** 240 V, 60 Hz

**Ordering Information**

**HP 3468A DMM** in Streamlined Portable Case with HP-IL and test probes. **Price** \$750 ☎

**HP 3468B DMM** in Rack and Stack Case with HP-IL and test probes. **Price** \$750 ☎

**Options and Accessories.**

- HP 3468A/B Option W30**, add 3 year Extended Hardware Support **Price** \$25
  - HP 3468A/B Option 001**, add Rechargeable Battery Pack **Price** \$150
  - HP 3468B Option 401**, add Side Handle Kit **Price** \$20
  - HP 3468B Option 907**, add Front Handle Kit (HP P/N 5061-1171) **Price** \$50
  - HP 3468B Option 908**, add Rack Mount Kit for a Single Instrument (HP P/N 5060-0173) **Price** \$52.50
  - HP P/N 5060-0174 Rack Mount Kit** for rack mounting two instruments side-by-side **Price** \$70.00
- ☎ Fast-Ship product - See page 766