4

Specifications and Characteristics

This chapter contains the specifications and characteristics for the HP 70110A digital multimeter.

These are the performance standards, or limits against which the instrument may be tested including typical characteristics as additional information for the user. (Only specifications are warranted.)

Table 4-1. Specifications and Characteristics

STANDARD TERMINAL SPECIFICATIONS*			
DC Voltage			
Maximum Non-Destructive Input Terminals	**DC**	**AC RMS**	**AC Peak**
HI to LO	450 V	300 V	450 V
HI to Guard	450 V	300 V	450 V
HI to Chassis	450 V	300 V	450 V
LO to Guard	200 V	140 V	200 V
LO to Chassis	450 V	300 V	450 V
Guard to Chassis	450 V	300 V	450 V
Maximum Reading	**Range**	**Reading**	
	30 mV	30.30000 mV	
	300 mV	303.0000 mV	
	3 V	3.030000 V	
	30 V	30.30000 V	
	300 V	303.0000 V	
Input Resistance†	**Range**	**Resistance Reading**	
	30 mV	>10 GΩ	
	300 mV	>10 GΩ	
	3 V	>10 GΩ	
	30 V	10 MΩ ±1%	
	300 V	10 MΩ ±1%	

* Standard Terminals refer to front or rear panel banana jack inputs.

† With INPut:IMPedance:AUTO ON. If INPut:IMPedance:AUTO is OFF, the input resistance is 10 MΩ on all ranges.

STANDARD TERMINAL SPECIFICATIONS				
DC Voltage (continued)				
Resolution*		**Aperture**		
Range	≥ 16.7 ms	2 ms/1.67 ms	100 μs	10 μs
30 mV	10 nV	100 nV	1 μV	10 μV
300 mV	100 nV	1 μV	10 μV	100 μV
3 V	1 μV	10 μV	100 μV	1 mV
30 V	10 μV	100 μV	1 mV	10 mV
300 V	100 μV	1 mV	10 mV	100 mV
DC Voltage Accuracy Conditions	Autozero on (CALibration:ZERO:AUTO ON). After one-hour warm-up. Tcal is the temperature of calibration from 18 °C to 28 °C.			
24-Hour Accuracy†‡		**Aperture**		
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**	
30 mV	0.0012%+2.2 μV	0.0012%+2.4 μV	0.0012%+3.5 μV	
300 mV	0.0005%+2.4 μV	0.0005%+2.5 μV	0.0005%+3.5 μV	
3V	0.00035%+5.0 μV	0.00035%+6.0 μV	0.00035%+6.0 μV	
30 V	0.00065%+90 μV	0.00065%+100 μV	0.00065%+200 μV	
300 V	0.0025%+500 μV	0.0025%+600 μV	0.0025%+600 μV	
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**	
30 mV	0.0012%+5.5 μV	0.0012%+17 μV	0.0012%+60 μV	
300 mV	0.0005%+7.0 μV	0.0005%+40 μV	0.0005%+400 μV	
3V	0.00035%+40 μV	0.00035%+400 μV	0.00035%+4 mV	
30 V	0.00065%+600 μV	0.00065%+4.0 mV	0.00065%+40 mV	
300 V	0.0025%+4.0 mV	0.0025%+40 mV	0.0025%+400 mV	
90-Day Accuracy†§		**Aperture**		
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**	
30 mV	0.0040%+3.7 μV	0.0040%+3.9 μV	0.0040%+5.0 μV	
300 mV	0.0025%+3.9 μV	0.0025%+4.0 μV	0.0025%+5.0 μV	
3 V	0.0017%+6.0 μV	0.0017%+7.0 μV	0.0017%+7.0 μV	
30 V	0.0035%+190 μV	0.0035%+200 μV	0.0035%+300 μV	
300 V	0.0050%+600 μV	0.0050%+700 μV	0.0050%+700 μV	
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**	
30 mV	0.0040%+7.0 μV	0.0040%+19 μV	0.0040%+60 μV	
300 mV	0.0025%+9.0 μV	0.0025%+40 μV	0.0025%+400 μV	
3 V	0.0017%+40 μV	0.0017%+400 μV	0.0017%+4.0 μV	
30 V	0.0035%+700 μV	0.0035%+4.0 mV	0.0035%+40 mV	
300 V	0.0050%+4.0 mV	0.0050%+40 mV	0.0050%+400 mV	

* Useful Resolution. In some instances, the multimeter may give additional digits.
† ±(% of reading + volts)
‡ Tcal ±1 °C. Accuracy is relative to calibration standard. The module should be calibrated as used.
§ Tcal ±5 °C. Accuracy relative to calibration standard. See the Factory Calibration adders at the end of this appendix. The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used.

STANDARD TERMINAL SPECIFICATIONS

DC Voltage (continued)

1-Year Accuracy*†

Range	Aperture 2 s/1.67 s	200 ms/167 ms	20 ms/16.7 ms
30 mV	0.0045%+3.7 μV	0.0045%+3.9 μV	0.0045%+5.0 μV
300 mV	0.0035%+3.9 μV	0.0035%+4.0 μV	0.0035%+5.0 μV
3 V	0.0025%+6.0 μV	0.0025%+7.0 μV	0.0025%+7.0 μV
30 V	0.0040%+190 μV	0.0040%+200 μV	0.0040%+300 μV
300 V	0.0055%+600 μV	0.0055%+700 μV	0.0055%+700 μV
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**
30 mV	0.0045%+7.0 μV	0.0045%+19 μV	0.0045%+60 μV
300 mV	0.0035%+9.0 μV	0.0035%+40 μV	0.0035%+400 μV
3 V	0.0025%+40 μV	0.0025%+400 μV	0.0025%+4.0 mV
30 V	0.0040%+700 μV	0.0040%+4.0 mV	0.0040%+40 mV
300 V	0.0055%+4.0 mV	0.0055%+40 mV	0.0055%+400 mV

Temperature Coefficient‡§

Range	Coefficient Range
30 mV	0.0005%+0.3 μV
300 mV	0.0005%+0.3 μV
3 V	0.0005%+0.3 μV
30 V	0.0005%+3 μV
300 V	0.0005%+30 μV

Autozero OFF Offset Error**

Range	Additional Offset Error
30 mV	100 nV
300 mV	1 μV
3 V	10 μV
30 V	100 μV
300 V	1 mV

Range-to-Range Response Error

For default settling times, add 0.0005% of input voltage step to the first reading following a range change.

Noise Rejection††

NPLC	AC NMR	AC ECMR Guarded	AC ECMR Guard to LO	DC ECMR
<1	0	90	76	140
1	60	150	136	140
10	80	170	156	140
100	90	180	166	140

* ±(% of reading + volts)

† Tcal ±5 °C. Accuracy relative to calibration standard. See the Factory Calibration adders at the end of this appendix. The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used.

‡ ±(% of reading + volts)/ °C

§ To determine the additional error for operation outside the temperature ranges shown in the accuracy specifications, multiply the temperature coefficient by the difference between the operating temperature and Tcal.

** Add additional offset error if autozero is off (CALibration:ZERO:AUTO OFF). Assumes stable environment, ±1 °C over 10 minutes.

†† With 1 kΩ in the LO lead and line frequency ±.08%

STANDARD TERMINAL SPECIFICATIONS

Resistance (Two- and Four-Wire)

Input Protection

Terminals	DC	AC RMS	AC Peak
HI to LO	450 V	300 V	450 V
HI Sense to LO Sense	350 V	350 V	350 V
HI Sense/LO Sense to LO	350 V	250 V	350 V
HI/Hi Sense to Guard	450 V	450 V	450 V
HI/HI Sense to Chassis	450 V	450 V	450 V
LO/LO Sense to Guard	200 V	140 V	200 V
LO/LO Sense to Chassis	450 V	300 V	450 V
Guard to Chassis	450 V	300 V	450 V

Maximum Reading

Range	Reading
30 Ω	30.30000 Ω
300 Ω	303.0000 Ω
3 kΩ	3.030000 kΩ
30 kΩ	30.30000 kΩ
300 kΩ	303.0000 kΩ
3 MΩ	3.030000 MΩ
30 MΩ	30.30000 MΩ
300 MΩ	303.0000 MΩ
3 GΩ	3.030000 GΩ

Measurement Characteristics*

Range	Source Current	Maximum Open Circuit Voltage	Maximum Allowable Current Source Lead Resistance	Maximum Allowable Offset Voltage for Offset Compensated Oh ms	Default Measurement Settling Time
30 Ω	1 mA	12 V	1 Ω	1 mV	560 μs
300 Ω	1 mA	12 V	10 Ω	10 mV	350 μs
3 kΩ	1 mA	12 V	100 Ω	100 mV	350 μs
30 kΩ	100 μA	12 V	1 kΩ	N/A	350 μs
300 kΩ	10 μA	12 V	10 kΩ	N/A	2.4 ms
3 MΩ	1 μA	12 V	100 kΩ	N/A	24 ms
30 MΩ	100 nA	8.5 V	1 MΩ	N/A	240 ms
300 MΩ	100 nA	8.5 V	N/A	N/A	2.4 s
3 GΩ	100 nA	8.5 V	N/A	N/A	2.5 s

* The first reading meets accuracy specification with preprogrammed settling times and < 200 pF circuit capacitance. An additional delay of 0.1 seconds is necessary after a range or function change to meet rated accuracy. On the 300 MΩ and 3 GΩ ranges, the current source is in parallel with 10 MΩ.

STANDARD TERMINAL SPECIFICATIONS				
Resistance (2- and 4-Wire) cont'd				
Noise Rejection	See the DC Voltage Noise Rejection specifications.			
Resolution*		**Aperture**		
	Range	**≥ 16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
	30 Ω	10 μΩ	100 μΩ	1 mΩ	10 mΩ
	300 Ω	100 μΩ	1 mΩ	10 mΩ	100 mΩ
	3 kΩ	1 mΩ	10 mΩ	100 mΩ	1 Ω
	30 kΩ	10 mΩ	100 mΩ	1 Ω	10 Ω
	300 kΩ	100 mΩ	1 Ω	10 Ω	100 Ω
	3 MΩ	1 Ω	10 Ω	100 Ω	1 kΩ
	30 MΩ	10 Ω	100 Ω	1 kΩ	10 kΩ
	300 MΩ	100 Ω	1 kΩ	10 kΩ	100 kΩ
	3 GΩ	1 k Ω	10 kΩ	100 kΩ	1 MΩ
Resistance Accuracy Conditions	Autozero on (CALibration:ZERO:AUTO ON). After one-hour warm-up.			
	Offset compensation on (SENSe:RESistance:OCOMpensated).			
	Tcal is the temperature of calibration from 18 °C to 28 °C.			
24-Hour Four-Wire Accuracy†‡		**Aperture**		
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**	
30 Ω	0.003%+2.2 mΩ	0.003%+2.4 mΩ	0.003%+3.5 mΩ	
300 Ω	0.0015%+2.4 mΩ	0.0015%+2.5 mΩ	0.0015%+3.5 mΩ	
3 kΩ	0.001%+5 mΩ	0.001%+6 mΩ	0.001%+6 mΩ	
30 kΩ	0.001%+50 mΩ	0.001%+60 mΩ	0.001%+60 mΩ	
300 kΩ	0.001%+600 mΩ	0.001%+700 mΩ	0.001%+800 mΩ	
3 MΩ	0.003%+12 Ω	0.003%+14 Ω	0.003%+16 Ω	
30 MΩ	0.02%+800 Ω	0.02%+830 Ω	0.02%+930 Ω	
300 MΩ	Only specified for two-wire Ω.			
3 GΩ	Only specified for two-wire Ω.			
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**	
30 Ω	0.003%+5.5 mΩ	0.003%+17 mΩ	0.003%+60 mΩ	
300 Ω	0.0015%+6 mΩ	0.0015%+40 mΩ	0.0015%+400 mΩ	
3 kΩ	0.001%+40 mΩ	0.001%+400 mΩ	0.001%+4 Ω	
30 kΩ	0.001%+400 mΩ	0.001%+4 Ω	0.001%+40 Ω	
300 kΩ	0.001%+4 Ω	0.001%+40 Ω	0.001%+400 Ω	
3 MΩ	0.003%+70 Ω	0.003%+500 Ω	0.003%+5 kΩ	
30 MΩ	0.02%+1.4 kΩ	0.02%+6 kΩ	0.02%+40 kΩ	
300 MΩ	Only specified for two-wire Ω			
3 GΩ	Only specified for two-wire Ω			

*Userful resolution. In some instances, the multimeter may give additional digits.
† ±(% of reading + oh ms)
‡ Tcal ±1 °C. Accuracy is relative to calibration standard. The module should be calibrated as used.

STANDARD TERMINAL SPECIFICATIONS			
Resistance (2- and 4-Wire) cont'd			
90-Day Four-Wire Accuracy*†		**Aperture**	
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**
30 Ω	0.0065%+3.2 mΩ	0.0065%+3.4 mΩ	0.0065%+4.5 mΩ
300 Ω	0.0045%+3.4 mΩ	0.0045%+3.5 mΩ	0.0045%+4.5 mΩ
3 kΩ	0.0035%+6 mΩ	0.0035%+7 mΩ	0.0035%+7 mΩ
30 kΩ	0.0035%+60 mΩ	0.0035%+70 mΩ	0.0035%+70 mΩ
300 kΩ	0.0040%+700 mΩ	0.0040%+800 mΩ	0.0040%+900 mΩ
3 MΩ	0.0055%+12 Ω	0.0055%+14 Ω	0.0055%+16 Ω
30 MΩ	0.0250%+800 Ω	0.0250%+830 Ω	0.0250%+930 Ω
300 MΩ/3 GΩ	Only specified for two-wire Ω.		
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**
30 Ω	0.0065%+6.5 mΩ	0.0065%+18 mΩ	0.0065%+60 mΩ
300 Ω	0.0045%+8 mΩ	0.0045%+40 mΩ	0.0045%+400 mΩ
3 kΩ	0.0035%+40 mΩ	0.0035%+400 mΩ	0.0035%+4Ω
30 kΩ	0.0035%+400 mΩ	0.0035%+4 Ω	0.0035%+40 Ω
300 kΩ	0.0040%+4 Ω	0.0040%+40 Ω	0.0040%+400 Ω
3 MΩ	0.0055%+70 Ω	0.0055%+500 Ω	0.0055%+5 kΩ
30 MΩ	0.0250%+1.4 kΩ	0.0250%+6 kΩ	0.0250+50 kΩ
300 MΩ/3 GΩ	Only specified for two-wire Ω		
1-Year Four-Wire Accuracy*†		**Aperture**	
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**
30 Ω	0.0075%+3.2 mΩ	0.0075%+3.4 mΩ	0.0075%+4.5 mΩ
300 Ω	0.0055%+3.4 mΩ	0.0055%+3.5 mΩ	0.0055%+4.5 mΩ
3 kΩ	0.0050%+6 mΩ	0.0050%+7 mΩ	0.0050%+7 mΩ
30 kΩ	0.0050%+60 mΩ	0.0050%+70 mΩ	0.0050%+70 mΩ
300 kΩ	0.0050%+700 mΩ	0.0050%+800 mΩ	0.0050%+900 mΩ
3 MΩ	0.0065%+12 Ω	0.0065%+14 Ω	0.0065%+16 Ω
30 MΩ	0.0400%+800 Ω	0.0400%+830 Ω	0.0400%+930 Ω
300 MΩ/3 GΩ	Only specified for two-wire Ω.		
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**
30 Ω	0.0075%+6.5 mΩ	0.0075%+18 mΩ	0.0075%+60 mΩ
300 Ω	0.0055%+8 mΩ	0.0055%+40 mΩ	0.0055%+400 mΩ
3 kΩ	0.0050%+40 mΩ	0.0050%+400 mΩ	0.0050%+4 Ω
30 kΩ	0.0050%+400 mΩ	0.0050%+4 Ω	0.0050%+40 Ω
300 kΩ	0.0050%+4 Ω	0.0050%+40 Ω	0.0050%+400 Ω
3 MΩ	0.0065%+70 Ω	0.0065%+500 Ω	0.0065%+5 kΩ
30 MΩ	0.0400%+1.4 kΩ	0.0400%+6 kΩ	0.0400%+50 kΩ
300 MΩ/3 GΩ	Only specified for two-wire Ω		

* ±(% of reading + oh ms)

† Tcal ±5 °C. Accuracy relative to calibration standard. See the Factory Calibration adders at the end of this appendix. The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used.

STANDARD TERMINAL SPECIFICATIONS			
Resistance (2- and 4-Wire) cont'd			
24-Hour Two-Wire Accuracy*†	**Aperture**		
	Add ±200 mΩ to all four-wire specifications except those on the 300 MΩ and 3 GΩ ranges (see below).		
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**
300 MΩ	0.6%+100 kΩ	0.6%+100 kΩ	0.6%+100 kΩ
3 GΩ	6.0%+1 MΩ	6.0%+1 MΩ	6.0%+1 MΩ
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**
300 MΩ/3 GΩ	Not specified for aperture times less than 16.7 ms		
90-Day and 1-Year Two-Wire Accuracy*‡	**Aperture**		
	Add ±200 mΩ to all four-wire specifications except those on the 300 MΩ and 3 GΩ ranges (see below).		
Range	**2 s/1.67 s**	**200 ms/167 ms**	**20 ms/16.7 ms**
300 MΩ	1.6%+100 kΩ	1.6%+100 kΩ	1.6%+100 kΩ
3 GΩ	16%+1 MΩ	16%+1 MΩ	16%+1 MΩ
Range	**2 ms/1.67 ms**	**100 μs**	**10 μs**
300 MΩ/3 GΩ	Not specified for aperture times less than 16.7 ms		
Temperature Coefficient§**	**Range**	**Temperature Coefficient**	
	30 Ω	0.0005%+.5 mΩ	
	300 Ω	0.0005%+.5 mΩ	
	3 kΩ	0.0005%+.5 mΩ	
	30 kΩ	0.0005%+5 mΩ	
	300 kΩ	0.0008%+50 mΩ	
	3 MΩ	0.0010%+500 mΩ	
	30 MΩ	0.0025%+5 Ω	
	300 MΩ	0.3500%+0 Ω	
	3 GΩ	3.5000%+0 Ω	
Autozero OFF Offset Error††	**Range**	**Additional Offset Error**	
	30 Ω	100 μΩ	
	300 Ω	1 mΩ	
	3 kΩ	10 mΩ	
	30 kΩ	100 mΩ	
	300 kΩ	1 Ω	
	3 MΩ	10 Ω	
	30 MΩ	100 Ω	
	300 MΩ	1 kΩ	
	3 GΩ	10 kΩ	

* ±(% of reading + oh ms)

† Inputs > 10% of full scale only, for stable conditions (±1 °C) and within 24 hours of autocalibration (CALibration:INTernal? RES).

‡ Inputs > 10% of full scale only. For stable conditions (±1 °C) and within 24 hours of autocalibration (CALibration:INTernal? RES), use the 24-hour specifications.

§ ±(% of reading + oh ms)/ °C

** To determine the additional error for operation outside the temperature ranges shown in the accuracy specifications above, multiply the temperature coefficient by the difference between the operating temperature and Tcal.

†† Add additional offset error if autozero is off (CALibration:ZERO:AUTO OFF). Assumes stable environment ±1 °C over 10 minutes. With autozero off, changes in the four-wire oh ms LO lead resistance are not corrected.

STANDARD TERMINAL SPECIFICATIONS				
True RMS AC Voltage	(AC- & DC-Coupled)			
Maximum Non-Destructive Input Terminals	**DC**	**AC RMS**	**AC Peak**	
HI to LO	450 V	300 V	450 V	
HI to Guard	450 V	300 V	450 V	
HI to Chassis	450 V	300 V	450 V	
LO to Guard	200 V	140 V	200 V	
LO to Chassis	450 V	300 V	450 V	
Guard to Chassis	450 V	300 V	450 V	
Maximum Reading	**Range**	**Reading**		
	30 mV	32.50000 mV		
	300 mV	325.0000 mV		
	3 V	3.250000 V		
	30 V	32.50000 V		
	300 V	303.00000 V		
Input Impedance*	**Range**	**Impedance**		
	30 mV	1 MΩ ±1%, <90 pF		
	300 mV	1 MΩ ±1%, <90 pF		
	3 V	1 MΩ ±1%, <90 pF		
	30 V	1 MΩ ±1%, <90 pF		
	300 V	1 MΩ ±1%, <90 pF		
Crest Factor	100% Full Scale	3.5		
Noise Rejection†				
Noise Configuration	DC to 60 Hz Common Mode Rejection (CMR)			
Rejection	> 90 dB (Guarded)	> 76 dB (Guard to LO)		
Resolution‡	**Aperture**			
Range	**16.7 ms**	**2/1.67 ms**	**100 μs**	**10 μs**
30 mV	10 nV	100 nV	1 μV	10 μV
300 mV	100 nV	1 μV	10 μV	100 μV
3 V	1 μV	10 μV	100 μV	1 mV
30 V	10 μV	100 μV	1 mV	10 mV
300 V	100 μV	1 mV	10 mV	100 mV
AC-Coupled Accuracy Conditions	AC voltage accuracy specified for sinewave inputs >10% of range. DC component <10% of AC component. AC slow filter on (SENSe:BANDwidth:DETector 20). After one-hour warm-up. Autozero on (CALibration:ZERO:AUTO ON). With preprogrammed settling times, add an additional error of 0.1% of the input voltage step to the first reading. Tcal is the temperature of calibration from 18 °C to 28 °C.			

* Oh ms ±%, shunt capacitance.
† 1 kΩ imbalance in LO lead.
‡ Userful resoltuion. In some instances, the multimeter may give additional digits.

STANDARD TERMINAL SPECIFICATIONS			
ue RMS AC Voltage cont'd	**(AC- & DC-Coupled)**		
24-Hour AC-Coupled Accuracy*†		**Aperture**	
Range	**Frequency**	**≥ 16.7 ms**	**20 ms/1.67 ms**
30 mV to 30 V	20 Hz–45 Hz	0.5%+0.03%	0.5%+0.03%
	45 Hz–100 Hz	0.15%+0.03%	0.15%+0.03%
	100 Hz–20 kHz	0.07%+0.03%	0.07%+0.03%
	400 Hz–20 kHz‡	0.08%+0.03%	0.08%+0.17%
	20 kHz–100 kHz	0.6%+0.06%	0.6%+0.06%
	100 kHz–300 kHz	3.1%+0.3%	3.1%+0.3%
	300 kHz–1 MHz	10.1%+2.2%	10.1%+2.2%
Range	**Frequency**	**100 μs**	**10 μs**
30 mV to 30 V	20 Hz–45 Hz	0.5%+0.04%	0.5%+0.2%
	45 Hz–100 Hz	0.15%+0.04%	0.15%+0.2%
	100 Hz–20 kHz	0.07%+0.04%	0.07%+0.2%
	400 Hz–20 kHz‡	0.08%+0.18%	0.08%+0.33%
	20 kHz–100 kHz	0.6%+0.08%	0.6%+0.23%
	100 kHz–300 kHz	3.1%+0.33%	3.1%+0.47%
	300 kHz–1 MHz	10.1%+2.2%	10.1%+2.4%
Range	**Frequency**	**≥ 16.7 ms**	**20 ms/1.67 ms**
300 V	20 Hz–45 Hz	0.56%+0.03%	0.56%+0.03%
	45 Hz–100 Hz	0.21%+0.03%	0.21%+0.03%
	100 Hz–20 kHz	0.13%+0.03%	0.13%+0.03%
	400 Hz–20 kHz‡	0.14%+0.03%	0.14%+0.17%
	20 kHz–100 kHz	1.0%+0.11%	1.0%+0.11%
	100 kHz–300 kHz	not specified	not specified
Range	**Frequency**	**100 μs**	**10 μs**
300 V	20 Hz–45 Hz	not specified	not specified
	45 Hz–100 Hz	not specified	not specified
	100 Hz–20 kHz	not specified	not specified
	400 Hz–20 kHz‡	not specified	not specified
	20 kHz–100 kHz	not specified	not specified
	100 kHz–300 kHz	not specified	not specified
90-Day AC-Coupled Accuracy§	Add 0.06% reading + 0.013% of range to the 24-hour specifications above.		

* ±(% of reading + % of range)

† Tcal ±1 °C. Accuracy relative to calibration standard. The module should be calibrated as used.

‡ Using AC fast filter (SENSe:BANDwidth:DETector 400) for frequencies above 400 Hz.

§ Tcal ±5 °C. Within one week of autocal (CALibration:Internal? AC) and within ±5 °C of Tcal (Tcal is the temperature of autocal). The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used. Accuracy relative to calibration standard. See the Factory Calibration adders at end of this appendix. Stable conditions. If autocal is not used, add an additional 0.6% to the % of reading.

STANDARD TERMINAL SPECIFICATIONS	
True RMS AC Voltage cont'd	**(AC- & DC-Coupled)**
1-Year AC-Coupled Accuracy*	Add 0.1% reading + 0.02% of range to the 24-hour specifications above.
AC-Coupled Temperature Coefficient†‡	
Range	**Frequency** — **Temperature Coefficient**
All Ranges	20 Hz–100 kHz — 0.01% + 0.005%
All Ranges	100 kHz–1 MHz — 0.08% + 0.01%
DC-Coupled Accuracy Conditions	AC voltage accuracy specified for sinewave inputs >10% of range. DC component <10% of AC component. AC slow filter on (SENSe:BANDwidth:DETector 20). After one-hour warm-up. Autozero on (CALibration:AUTO:ZERO ON). With preprogrammed settling times, add an additional error of 0.1% of the input voltage step to the first reading. Tcal is the temperature of calibration from 18 °C to 28 °C. Source impedance <10 kΩ

* Tcal ±5 °C. Within one week of autocal (CALibration:Internal? AC) and within ±5 °C of Tcal (Tcal is the temperature of autocal). The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used. Accuracy relative to calibration standard. See the Factory Calibration adders at end of this appendix. Stable conditions. If autocal is not used, add an additional 0.6% to the % of reading.

† ±(% of reading + % of range)/°C

‡ To determine the additional error for operation outside the temperature ranges shown in the accuracy specifications, multiply the temperature coefficient by the difference between the operating temperature and Tcal.

STANDARD TERMINAL SPECIFICATIONS			
True RMS AC Voltage cont'd	**(AC- & DC-Coupled)**		
24-Hour DC-Coupled Accuracy*†		**Aperture**	
Range	**Frequency**	**≥ 16.7 ms**	**20 ms/1.67 ms**
30 mV to 30 V	20 Hz–45 Hz	1.3%+0.05%	1.3%+0.05%
	45 Hz–100 Hz	0.1%+0.05%	0.1%+0.05%
	100 Hz–20 kHz	0.1%+0.05%	0.1%+0.05%
	400 Hz–20 kHz‡	0.38%+0.05%	0.38%+0.87%
	20 kHz–100 kHz	0.6%+0.08%	0.6%+0.09%
	100 kHz–300 kHz	3.1%+0.3%	3.1%+0.3%
	300 kHz–1 MHz	10.1%+2.3%	10.1%+2.3%
Range	**Frequency**	**100 μs**	**10 μs**
30 mV to 30 V	20 Hz–45 Hz	1.3%+0.07%	1.3%+0.2%
	45 Hz–100 Hz	0.1%+0.07%	0.1%+0.2%
	100 Hz–20 kHz	0.1%+0.07%	0.1%+0.2%
	400 Hz–20 kHz‡	0.38%+0.87%	0.38%+1.0%
	20 kHz–100 kHz	0.6%+0.1%	0.6%+0.23%
	100 kHz–300 kHz	3.1%+0.33%	3.1%+0.47%
	300 kHz–1 MHz	10.1%+2.3%	10.1%+2.4%
Range	**Frequency**	**≥ 16.7 ms**	**20 ms/1.67 ms**
300 V	20 Hz–45 Hz	1.3%+0.05%	1.31%+0.066%
	45 Hz–100 Hz	0.17%+0.05%	0.18%+0.066%
	100 Hz–20 kHz	0.17%+0.05%	0.18%+0.066%
	400 Hz–20 kHz‡	0.44%+0.05%	0.45%+0.881%
	20 kHz–100 kHz	1.1%+0.14%	1.11%+0.161%
	> 100 kHz	not specified	not specified
Range	**Frequency**	**100 μs**	**10 μs**
300 V	20 Hz–45 Hz	not specified	not specified
	45 Hz–100 Hz	not specified	not specified
	100 Hz–20 kHz	not specified	not specified
	400 Hz–20 kHz‡	not specified	not specified
	20 kHz–100 kHz	not specified	not specified
	> 100 kHz	not specified	not specified

* ±(% of reading + % of range)

† Tcal ±1 °C. Accuracy relative to calibration standard. The module should be calibrated as used.

‡ Using AC fast filter (SENSe:BANDwidth:DETector 400) for frequencies above 400 Hz.

STANDARD TERMINAL SPECIFICATIONS		
True RMS AC Voltage cont'd	**(AC- & DC-Coupled)**	
90-Day DC-Coupled Accuracy*	Add ±(0.06% reading + 0.07% of range) to the 24-hour specs.	
1-Year DC-Coupled Accuracy*	Add ±(0.1% reading + 0.07% of range) to the 24-hour specs.	
DC-Coupled Temperature Coefficient†‡		
Range	**Frequency**	**Temperature Coefficient**
30 mV, 3V	20 Hz–100 kHz	0.01% + 0.19%
30 mV, 3V	100 kHz–1 MHz	0.08% + 0.20%
300 mV, 30V, 300V	20 Hz–100 kHz	0.01% + 0.034%
300 mV, 30V, 300V	100 kHz–1 MHz	0.08% + 0.044%
DC-Coupled DC Componenet Error§	Add ±(0.14% of reading + 0.77% of range)	
Frequency and Period**		
Input Impedance††	1 MΩ ±1%, < 90 pF	
Maximum Input	Refer to AC Voltage specifications	
Frequency Range	10 Hz to 1.5 MHz	
Period Range	0.1 s to 667 ns	
Trigger Level	Triggers and counts on zero crossings	
Sensitivity	10 mV RMS (sinewave)	
Accuracy	±(% of reading)	
Frequency	**Period**	**Accuracy**
10 Hz–400 Hz	0.1 – 0.025 s	0.05%
400 Hz–1.5 MHz	0.025 s – 667 ns	0.01%
Memory		
Reading Storage into internal RAM	16,384 readings (all aperture times)	
Multimeter State Memory	10 states (*SAV 0 to *SAV 9)	

*Within one week of autocal (CALibration:Internal? AC) and within ±5 °C of Tcal (Tcal is the temperature of autocal from 18 °C to 28 °C). The Tcal specification is based on the ambient temperature when the calibration was performed. Factory calibration was performed in an HP 70001A mainframe with various other low-power modules. Variations due to different mainframes, modules, or module locations may cause variations in the module temperature. For highest accuracy, the module should be calibrated as used. Accuracy relative to calibration standard. See the Factory Calibration adders at end of this appendix. Stable conditions. If autocal is not used, add the following: ±(0.6% of reading + 0.2% of range).

† ±(% of reading + % of range)/°C

‡ To determine the additional error for operation outside the temperature ranges shown in the accuracy specification, multiply the temperature coefficient by the difference between the operating temperature and Tcal.

§ DC component > 10% of AC component

**Frequency and period of the AC componenet of the AC- or DC-coupled voltage input is measured. The counter uses a reciprocal counting technique to give constant resolution independent of the input frequency.

†† resistance ±%, capacitance

STANDARD TERMINAL SPECIFICATIONS			
Timer/Pacer*†	**(SAMPle:SOUREce TIMer;:SAMPle:TIMer)**		
Timer Range	680 μs to 2100 s in 1 μs increments		
Accuracy	0.02% of setting		
Jitter	< 2 ns RMS		
Programmable Delay	**(TRIGger:DELay)**		
Input Range‡	0 to 2100 s in increments of 1 μs		
DC Current			
Resolution	**Maximum Reading**	**Aperture**	
Range	**6.5 Digits**	**2 s/1.67 s to 20 ms/16.7 ms**	**2 ms/1.67 ms**
300 μA	303.0000 μA	100 pA	1 nA
3 mA	3.030000 mA	1 nA	10 nA
30 mA	30.30000 mA	10 nA	100 nA
300 mA	303.0000 mA	100 nA	1 μA
2A	2.00000 A	1 μA	10 μA
Range	**Aperture**		**Shunt**
	100 μs	**10 μs**	**Resistance**
300 μA	10 nA	100 nA	1000 Ω
3 mA	100 nA	1 μA	100 Ω
30 mA	1 μA	10 μA	10 Ω
300 mA	10 μA	100 μA	1 Ω
2 A	100 μA	1 mA	.1 Ω
Maximum Burden Voltage	**Range**	**Voltage**	
	300 μA, 3 mA, 30 mA	0.35 V	
	300 mA	0.6 V	
	2 A	2 V	
Temperature Coefficient	**±(% of Reading + Amps)/ °C**		
	Range	**Auto-Zero ON**	**Auto-Zero OFF**
	300 μA	.002 + 2 nA	.002 + 3 nA
	3 mA	.002 + 20 nA	.002 + 30 nA
	30 mA	.002 + 200 nA	.002 + 300 nA
	300 mA	.007 + 2 μA	.007 + 3 μA
	2A	.007 + 20 μA	.007 + 30 μA
Noise Rejection	See the DC Voltage Noise Rejection Specifications		

*Allows the selection of the time between measurements cycles after the time set for TRIGger:DELay has past. Its primary purpose is to generate a precise internal timing pulse to pace the measurement cycles.

†Autozero off (CALibration:ZERO:AUTO OFF) and autorange off in DCV or Oh ms for aperture times of 10 μs or 100 μs.

‡Allows selection of the time between measurement cycles. It is provided to allow the selection of settling time and precise triggering of the measurement.

STANDARD TERMINAL SPECIFICATIONS				
DC Current (cont'd)				
24 Hour Accuracy*†			**Aperture**	
Range	**% Reading**	**2s/1.67 ms**	**200 ms/167 ms**	**20 ms/16.7 ms**
300 μA	0.0020	5.4 nA	5.4 nA	6.5 nA
3 mA	0.002	54 nA	54 nA	65 nA
30 mA	0.0020	540 nA	540 nA	650 nA
300 mA	0.03	15 μA	15 μA	17 μA
2A	0.03	500 μA	500 μA	500 μA
Range		**2 ms/1.67 ms**	**100 μs**	**10 μs**
300 μA		9 nA	50 nA	400 nA
3 mA		90 nA	500 nA	4 μA
30 mA		900 nA	5 μA	40 μA
300 mA		19 μA	60 μA	400 μA
2A		540 μA	900 μA	5 mA
90 Day Accuracy*‡			**Aperture**	
Range	**% Reading**	**2s/1.67 ms**	**200 ms/167 ms**	**20 ms/16.7 ms**
300 μA	0.020	10 nA	10 nA	12 nA
3 mA	0.020	100 nA	100 nA	120 nA
30 mA	0.020	1 μA	1 μA	1.2 μA
300 mA	0.070	20 μA	20 μA	22 μA
2A	0.070	600 μA	600 μA	620 μA
Range		**2 ms/1.67 ms**	**100 μs**	**10 μs**
300 μA		14 nA	50 nA	400 nA
3 mA		140 nA	500 nA	4 μA
30 mA		1.4 μA	5 μA	40 μA
300 mA		24 μA	60 μA	400 μA
2A		640 μA	1 mA	5 mA
1 Year Accuracy*‡			**Aperture**	
Range	**% Reading**	**2s/1.67 ms**	**200 ms/167 ms**	**20 ms/16.7 ms**
300 μA	0.04	10 nA	10 nA	12 nA
3 mA	0.04	100 nA	100 nA	120 nA
30 mA	0.04	1 μA	1 μA	1.2 μA
300 mA	0.08	20 μA	20 μA	22 μA
2A	0.08	600 μA	600 μA	620 μA
Range		**2 ms/1.67 ms**	**100 μs**	**10 μs**
300 μA		14 nA	50 nA	400 nA
3 mA		140 nA	500 nA	4 μA
30 mA		1.4 μA	5 μA	40 μA
300 mA		24 μA	60 μA	400 μA
2A		640 μA	1 mA	5 mA

*±(% of Reading + Amps)
†Tcal ±1 °C after two hour warm-up. Auto-zero ON. Accuracy relative to calibration standard.
‡Tcal ±5 °C after one hour warm-up. Auto-zero ON. Accuracy relative to calibration standard.

STANDARD TERMINAL SPECIFICATIONS					
True RMS AC Current	**AC and DC Coupled**				
Resolution	**Maximum**		**Aperture**		
Range	**Reading**	**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
30 mA	32.50000 mA	10 nA	100 nA	1 μA	10 μA
300 mA	325.0000 mA	100 nA	1 μA	10 μA	100 μA
2 A	2.000000 A	1 μA	10 μA	100 μA	1 mA
Maximum Input*	3 Amps from 250 volt source. Input is fuse protected.				
Maximum Burden Voltage	2 V r ms at 2A r ms input for frequencies < 20 kHz.				
Crest Factor	> 3.5 to 1 at full-scale.				
AC-Coupled Accuracy Conditions	After two hour warm-up. Since-wave inputs >10% of range. AC slow filter ON (SENSe:BANDwidth:DETector 20). Auto-zero ON. For preprogrammed settling times, error is <10% of input current step. Specifications apply within one week of AC auto-cal (CALibration:INTernal? AC) for stable temperature conditions. If AC auto-cal is not used, add 0.6 to the percent of reading figures.				
24-Hour AC-Coupled Accuracy†‡					
30 mA and 300 mA Range			**Aperture**		
Frequency		**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
20Hz–45Hz		0.8% + 0.095%	0.8% + 0.095%	0.8% + 0.11%	0.8% + 0.23%
46Hz–100Hz		0.25% + 0.095%	0.25% + 0.095%	0.25% + 0.11%	0.25% + 0.23%
101Hz–20kHz		0.2% + 0.095%	0.2% + 0.095%	0.2% + 0.11%	0.2% + 0.23%
400Hz–20kHz§		0.2% + 0.095%	0.2% + 0.25%	0.2% + 0.27%	0.2% + 0.4%
21kHz–100kHz		0.9% + 0.13%	0.9% + 0.13%	0.9% + 0.14%	0.9% + 0.27%
2 A Range			**Aperture**		
Frequency		**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
20Hz–45Hz		0.9% + 0.095%	0.9% + 0.095%	0.9% + 0.11%	0.9% + 0.23%
46Hz–100Hz		0.35% + 0.095%	0.35% + 0.095%	0.35% + 0.11%	0.35% + 0.23%
101Hz–20kHz		0.30% + 0.095%	0.30% + 0.095%	0.30% + 0.11%	0.30% + 0.23%
400Hz–20kHz§		0.30% + 0.095%	0.30% + 0.25%	0.30% + 0.27%	0.30% + 0.4%
90 Day AC Coupled Accuracy**	Add 0.05 to the % of reading numbers in the above 24-Hour Specs.				
1 Year AC Coupled Accuracy**	Add 0.08 to the % of reading numbers in the above 24-Hour Specs.				

*non-destructive
†±(% of Reading + % of Range)
‡Tcal ±1 °C. After 2 hour warm-up. Accuracy relative to calibration standard.
§Using AC fast filter (SENSe:BANDwidth:DETector 400) for frequencies above 400 Hz.
**All ranges.

STANDARD TERMINAL SPECIFICATIONS				
True RMS AC Current (cont'd)				
Temperature Coefficient-AC Coupled*	**Aperture**			
Frequency	**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
20Hz–100 kHz	0.017% + 0.005%	0.017% + 0.005%	0.017% + 0.005%	0.017% + 0.005%
DC-Coupled Accuracy Conditions	After two hour warm-up. Since-wave inputs >10% of range. AC slow filter ON (SENSe:BANDwidth:DETector 20). Auto-zero ON. For preprogrammed settling times, error is 0.1% of input current step.			
24-Hour DC-Coupled Accuracy†‡				
30 mA and 300 mA Range	**Aperture**			
Frequency	**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
20Hz–45Hz	1.5% + 0.53%	1.5% + 0.53%	1.5% + 0.55%	1.5% + 0.67%
46Hz–100Hz	0.35% + 0.53%	0.35% + 0.53%	0.35% + 0.55%	0.35% + 0.67%
101Hz–20kHz	0.25% + 0.53%	0.25% + 0.53%	0.25% + 0.55%	0.25% + 0.67%
400Hz–20kHz§	0.6% + 0.53%	0.6% + 1.25%	0.6% + 1.25%	0.6% + 1.4%
21kHz–100kHz	0.9% + 0.58%	0.9% + 0.58%	0.9% + 0.6%	0.9% + 0.73%
2 A Range**	Add 0.1 to the % of reading numbers in the above 24-Hour Specs.			
90 Day DC Coupled Accuracy*	Add 0.05 to the % of reading numbers in the above 24-Hour Specs.			
Temperature Coefficient-DC Coupled*	**Aperture**			
Frequency	**≥20 ms/16.7 ms**	**2 ms/1.67 ms**	**100 μs**	**10 μs**
20Hz–100 kHz	0.017% + 0.005%	0.017% + 0.005%	0.017% + 0.005%	0.017% + 0.005%
Maximum Reading Rates††‡‡	**AC Slow Response§§**		**AC Fast Response§§**	
Aperture	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**
10 μs	1.0	1.0	9.5	9.5
100 μs	1.0	1.0	9.5	9.5
2 ms/1.67 ms	1.0	1.0	9.25	9.2
20 ms/16.7 ms	1.0	1.0	7.25	6.9
200 ms/167 ms	0.7	0.65	2.0	1.7
2 s/1.67 s	0.2	0.17	0.25	0.2

*All ranges.
†±(% of Reading + % of Range)
‡Tcal ±1 °C. (ACDCI Function) After 2 hour warm-up. Accuracy relative to calibration standard.
§Using AC fast filter (SENSe:BANDwidth:DETector 400) for frequencies above 400 Hz.
**The 2A range is only specified up to 20 kHz and a maximum input of 2A r ms.
††Readings/Second
‡‡Reading Rates apply with Auto-zerto ON, fixed range, and preprogrammed settling times.
§§SENSe:BANDwidth:DETector set to <400 for AC slow response and set to >400 for AC fast response.

MULTIPLEXER INPUTS		
Armature Relay Multiplexer		
Input Characteristics	Eight two-wire with guard, armature relay channels and two current/actuator channels, with guard.	
Maximum Voltage	250 VDC or 250 VAC r ms HI-to-Lo or channel-to-channel. 200 V peak Guard-to-Lo. 350 V peak terminals to chassis.	
Maximum Current*	2 A DC or AC r ms	
Thermal Offset	< 3 μV	
Relay Life	10^6 operations at maximum load (2 amps @ 250 VAC r ms).	
Closed Channel Resistance†	< 2 Ω	
Max Switching and Meas. Speed	33 channels/second	
Adjacent Channel Crosstalk‡	−70 dB @ 100 kHz	
DC Isolation§	Channels 0–7 (40 °C, 95% Relative Humidity)	10^{10} Ω
	Channels 0–7 (40 °C, 60% Relative Humidity)	10^{11} Ω
	Channels 8 & 9 (40 °C, 95% Relative Humidity)	10^9 Ω
	Channels 8 & 9 (40 °C, 60% Relative Humidity)	10^{10} Ω
AC Isolation	Channels 0–7 Closed	150 pF
	Channels 0–7 Open	10 pF
Noise Rejection**	Refer to Noise Rejection specifications for each function.	
Reed Relay Multiplexer		
Input Characteristics	Ten two-wire with guard, reed relay channels or five four-wire channels with guard.	
Maximum Voltage	Terminal-to-Terminal or Terminal-to-chassis. 120 Vr ms, 120 Vdc, 170 Vpeak.	
Thermal Offset	< 3 μV	
Relay Life	10^7 operations at maximum load (125 VAC peak-to-peak).	
Closed Channel Resistance†	< 4 Ω	
Max Switching and Meas. Speed	300 channels/second	
Adjacent Channel Crosstalk‡	−70 dB @ 100 kHz	
DC Isolation§	Channels 0–9 (40 °C, 95% Relative Humidity)	10^9 Ω
	Channels 0–9 (40 °C, 60% Relative Humidity)	10^{10} Ω
AC Isolation	Channels 0–9 Closed	200 pF
	Channels 0–9 Open	15 pF
Noise Rejection**	Refer to Noise Rejection specifications for each function.	

*Per current/actuator channel.
†End of Relay Life.
‡Channels terminated into 50 Ω
§Channel-to-channel and Hi-to-Lo resistance.
**The Noise Rejection specifications can be degraded by a maximum of 10 dB if all channels are unguarded and connected to chassis ground.

GENERAL SPECIFICATIONS					
Reading Rates*†			**Aperture**		
Function	**2s**	**1.67s**	**200 ms**	**167 ms**	**20 ms**
DC Voltage, 2- and 4- Wire Ω, DCI	0.4	0.49	4	4.9	47
AC Voltage (fast response)	0.2	0.25	1.7	2.0	6.9
AC Voltage (slow response)	0.17	0.2	0.65	0.7	1.0
Function	**16.7 ms**	**2 ms**	**1.67 ms**	**100 μs**	**10 μs**
DC Voltage, 2- and 4- Wire Ω, DCI	56	312	360	1250	1450
AC Voltage (fast response)	7.2	9.2	9.2	9.5	9.5
AC Voltage (slow response)	1.0	1.0	1.0	1.0	1.0
A/D Resolution‡§			**Aperture**		
Units	**≥16.7 ms**	**2ml/1.67 ms**		**100 μs**	**10 μs**
Binary Bits	±21.5	±18.2		±14.9	±11.5
Decimal Digits	6.5	5.5		4.5	3.5
Factor Calibration Adders					
DCV					
Range	30 mV	300 mV	3V	30 V	300 V
Adder Value	33.3 PPM	7.1 PPM	5.5 PPM	9.7 PPM	10.5 PPM
ACV					
Range	30 mV	300 mV	3V	30 V	300 V
Adder Value	250 PPM	155 PPM	155 PPM	285 PPM	485 PPM
OHMS					
Range	30 Ω	300 Ω	3 kΩ	30 kΩ	300 kΩ
Adder Value	33.3 PPM	16.5 PPM	16.5 PPM	16.5 PPM	21.0 PPM
OHMS					
Range	3 MΩ	30 MΩ			
Adder Value	25.0 PPM	120.0 PPM			

Power Line Cycles	**Aperture**		
	50 Hz**	**60 Hz****	**PLCs**
	2 s	1.67 s	100
	200 ms	167 ms	10
	20 ms	16.7 ms	1
	2 ms	1.67 ms	0.1
	100 μs	100 μs	0.005
	10 μs	10 μs	0.0005

*Readings/Second

†For DC voltage, 2- and 4-wire resistance: autozero, autrange, and offset compensation are OFF; fixed range (30 Ω to 3 kΩ range for resistance); delay set to 0 seconds; sample source time and sample count >1; For AC voltage: autozero OFF in fixed range with preprogrammed setting times; reading to internal memory. No backplane activity such as serial polls or query operations occurring.

‡bits/digits

§Useful resolution. In some instances, the multimeter may return additional digits.

**Power Line Frequency