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Find the *Keithley 196* at our website: *Click HERE*

Specifications

System DMM/196

PART NUMBER 196-SPEC

DC VOLTS
(6½ Digits)

RANGE	RESOLUTION	INPUT RESISTANCE	ACCURACY[1] ±(%rdg + counts) 24 Hr.,[2] 23° ±1°C	90 Days, 18°-28°C	1 Year, 18°-28°C	TEMPERATURE COEFFICIENT ±(%rdg + counts)/°C 0°-18° & 28°-50°C
300 mV	100 nV	>1 GΩ	0.0020 + 20[3]	0.005 + 20[3]	0.008 + 20[3]	0.0006 + 10
3 V	1 μV	>1 GΩ	0.0013 + 10	0.003 + 20	0.0036 + 20	0.0004 + 1
30 V	10 μV	11 MΩ	0.0015 + 10	0.006 + 20	0.008 + 30	0.0013 + 3
300 V	100 μV	10.1 MΩ	0.003 + 10	0.009 + 20	0.009 + 30	0.0013 + 1

[1]For 5½-digit accuracy, divide count error by 10. For 4½-digit accuracy, count error is 5 (except 15 on 300mV range). For 3½-digit accuracy, count error is 5.
[2]Relative to calibration standards.
[3]When properly zeroed.

ANALOG SETTLING TIME: <1ms (<2ms on 300mV range), to 0.01% of step change.

CMRR: >120dB at dc, 50Hz or 60Hz (±0.05%) with 1kΩ in either lead.

NMRR: >60dB at 50Hz or 60Hz (±0.05%).

LINEARITY: Linearity is defined as the maximum deviation from a straight line between the readings at zero and full range: 10ppm of range for 3V-300V ranges; 15ppm of range for 300mV range; at 23°C ±1°C.

MAXIMUM ALLOWABLE INPUT: 300V rms, 425V peak, whichever is less.

TRMS AC VOLTS
(5½ Digits)

RANGE	RESOLUTION	ACCURACY[1] ±(%rdg + counts) 1 Year, 18°-28°C 20Hz-50Hz[2]	50Hz-200Hz[2]	200Hz-10kHz[2]	10kHz-20kHz[2]	20kHz-100kHz[3]
300 mV	1 μV	2 + 100	0.3 + 100	0.15 + 100	0.4 + 200	2.0 + 300
3 V	10 μV	2 + 100	0.3 + 100	0.15 + 100	0.3 + 200	1.5 + 300
30 V	100 μV	2 + 100	0.3 + 100	0.15 + 100	0.4 + 200	1.5 + 300
300 V	1 mV	2 + 100	0.3 + 100	0.15 + 100	0.4 + 200	1.5 + 300

[1]For 4½-digit accuracy, divide count error by 10. For 3½-digit accuracy, count error is 5. In 3½- and 4½-digit modes, specifications apply for inputs >200Hz.
[2]For sinewave inputs >2,000 counts.
[3]For sinewave inputs >20,000 counts.

RESPONSE: True root mean square, ac coupled.

CREST FACTOR (ratio of peak to rms): Up to 3:1 allowable.

NONSINUSOIDAL INPUTS: For fundamental frequencies <1kHz, crest factor <3, add 0.25% of reading to specified accuracy for 300mV and 3V ranges; add 0.6% of reading to specified accuracy for 30V and 300V ranges.

INPUT IMPEDANCE: 1MΩ shunted by <120pF.

3dB BANDWIDTH: 300kHz typical.

MAXIMUM ALLOWABLE INPUT: 300V rms, 425V peak, 10^7 V·Hz, whichever is less.

SETTLING TIME: 1 second to within 0.1% of change in reading.

TEMPERATURE COEFFICIENT (0°-18°C & 28°-50°C): <±(0.1 × applicable accuracy specification)/°C below 20kHz, ±(0.2x) for 20kHz to 100kHz.

CMRR: >60dB at 50Hz or 60Hz (±0.05%) with 1kΩ in either lead.

dB (Ref. = 1V): INPUT	ACCURACY ±dB 1 Year, 18°-28°C 20Hz-20kHz	20kHz-100kHz	RESOLUTION
−34 to +49 dB (20mV to 300V)	0.2	0.4	0.01 dB
−54 to −34 dB (2mV to 20mV)	1.1	3[1]	0.01 dB

[1]Typical.

OHMS
(6½ Digits)

RANGE	RESOLUTION	NOMINAL I-SHORT	ACCURACY[1] ±(%rdg + counts) 24 Hr.,[5] 23° ±1°C	90 Days, 18°-28°C	1 Year, 18°-28°C	TEMPERATURE COEFFICIENT ±(%rdg + counts)/°C 0°-18° & 28°-50°C
300 Ω[2]	100 μΩ	1.7 mA	0.0025 + 20[3]	0.008 + 20[3]	0.010 + 20[3]	0.001 + 7
3 kΩ[2]	1 mΩ	1.7 mA	0.0025 + 20	0.005 + 20	0.007 + 20	0.001 + 1
30 kΩ[2]	10 mΩ	160 μA	0.0025 + 20	0.005 + 20	0.007 + 20	0.001 + 1
300 kΩ	100 mΩ	50 μA	0.006 + 20	0.020 + 20	0.021 + 20	0.004 + 1
3 MΩ	1 Ω	5 μA	0.007 + 20	0.020 + 20	0.021 + 20	0.004 + 1
30 MΩ	10 Ω	0.5 μA	0.06 + 50	0.1 + 50	0.1 + 50	0.030 + 1
300 MΩ[4]	1 kΩ	0.5 μA	2.0 + 5	2.0 + 5	2.0 + 5	0.30 + 1

[1]For 5½-digit accuracy, divide count error by 10. For 4½-digit accuracy, count error is 5 (except 15 on 300Ω range). For 3½-digit accuracy, count error is 5.
[2]4-wire accuracy, 300Ω-30kΩ ranges.
[3]When properly zeroed.
[4]Resolution on 300MΩ range is limited to 5½ digits.
[5]Relative to calibration standards.

CONFIGURATION: Automatic 2- or 4-wire. Offset compensation available on 300Ω-30kΩ ranges, requires proper zeroing. Allowable compensation of ±10mV on 300Ω range and ±100mV on 3kΩ and 30kΩ ranges.

MAX. ALLOWABLE INPUT: 300V rms, 425V peak, whichever is less.

OPEN CIRCUIT VOLTAGE: 5.5V maximum.

LINEARITY: Linearity is defined as the maximum deviation from a straight line between the readings at zero and full range: 20ppm of range for 300Ω-30kΩ ranges, at 23°C ±1°C.

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APP. MAH DATE 7-18-86

KEITHLEY Keithley Instruments Inc. Cleveland, Ohio 44139

SPECIFICATIONS

PART NUMBER 196-SPEC

BRUNING 40-21 62198

FORM 29777A

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PURCHASED ITEM

Specifications

System DMM/196

PART NUMBER 196-SPEC

DC AMPS

(5½ Digits)

RANGE	RESOLUTION	ACCURACY[1] ±(%rdg + counts) 1 Year, 18°-28°C	MAXIMUM VOLTAGE BURDEN
300 µA	1 nA	0.09 + 20	0.4 V
3 mA	10 nA	0.05 + 10	0.4 V
30 mA	100 nA	0.05 + 10	0.4 V
300 mA	1 µA	0.05 + 10	0.5 V
3 A	10 µA	0.09 + 10	2 V

[1]4½-digit count error is 20. 3½-digit count error is 5.

MAXIMUM ALLOWABLE INPUT: 3A, 250V.

OVERLOAD PROTECTION: 3A fuse (250V), accessible from rear panel.

TEMPERATURE COEFFICIENT (0°-18°C & 28°-50°C):
< ±(0.1 × applicable accuracy specification)/°C.

TRMS AC AMPS

(5½ Digits)

RANGE	RESOLUTION	ACCURACY[1] 1 Year, 18°-28°C 20Hz-45Hz	45Hz-10kHz	MAXIMUM VOLTAGE BURDEN
300 µA	1 nA	2 + 100	0.9 + 100	0.4V
3 mA	10 nA	2 + 100	0.6 + 100	0.4V
30 mA	100 nA	2 + 100	0.6 + 100	0.4V
300 mA	1 µA	2 + 100	0.6 + 100	0.5V
3 A	10 µA	2 + 100	0.6 + 100	2 V

[1] For sinewave inputs >2000 counts. For 4½-digit accuracy, divide count error by 10. For 3½-digit accuracy, count error is 5. In 3½- and 4½-digit modes, specifications apply for sinewave inputs >200Hz.

RESPONSE: True root mean square, ac coupled.

CREST FACTOR (ratio of peak to rms): Up to 3:1 allowable at ⅔ full scale.

NONSINUSOIDAL INPUTS: Specified accuracy for fundamental frequencies <1kHz, crest factor <3.

SETTLING TIME: 1 second to within 0.1% of change in reading.

MAXIMUM ALLOWABLE INPUT: 3A, 250V.

OVERLOAD PROTECTION: 3A fuse (250V) accessible from rear panel.

TEMPERATURE COEFFICIENT (0°-18°C & 28°-50°C):
< ±(0.1 × applicable accuracy specification)/°C.

dB (Ref. = 1mA): INPUT	ACCURACY ±dB 1 Year, 18°-28°C 20Hz-10kHz	RESOLUTION
−34 to +69 dB (20µA to 3A)	0.2	0.01 dB
−54 to −34 dB (2µA to 20µA)	0.9	0.01 dB

MAXIMUM READING RATES[1]

DCV, DCA, ACV, ACA READINGS/SECOND

RESOLUTION	Continuous into Internal Buffer MUX: Off	On	External Trigger into Internal Buffer MUX: Off	On	Triggered via IEEE-488 Bus MUX: Off	On
3½-Digit	1000	1000	237	80	112	58
4½-Digit	333	333	145	63	91	49
5½-Digit	35 (29)	9 (7.5)	40 (33)	9 (7.5)	35 (29)	9 (7.5)
6½-Digit[2]		9 (7.5)		0.3 (0.25)		0.3 (0.25)

OHMS READINGS/SECOND

RESOLUTION	Continuous into Internal Buffer MUX: Off	On	External Trigger into Internal Buffer MUX: Off	On	Triggered via IEEE-488 Bus MUX: Off	On
3½-Digit	53	25	57	25	37	23
4½-Digit	43	20	47	21	30	19
5½-Digit	16 (13)	9.5 (7.5)	18 (15)	9.5 (7.5)	15 (12.5)	9.5 (7.5)
6½-Digit[2]		9 (7.5)		0.3 (0.25)		0.3 (0.25)

Offset Compensated Ohms: Rates are 0.5× normal mux on ohms rates.

[1]Reading rates are for on-range on-scale readings with internal filter off, for 3V, 3kΩ, and 3mA ranges. 6½- and 5½-digit rates are for 60Hz operation. Values in parentheses are for 50Hz operation.
[2]Internal filter on.

IEEE-488 BUS IMPLEMENTATION

MULTILINE COMMANDS: DCL, LLO, SDC, GET, GTL, UNT, UNL, SPE, SPD.

UNILINE COMMANDS: IFC, REN, EOI, SRQ, ATN.

INTERFACE FUNCTIONS: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1.

PROGRAMMABLE PARAMETERS: Range, Function, Zero, Integration Period, Filter, EOI, Trigger, Terminator, Delay, 500-Reading Storage, Calibration, Display, Multiplex, Status, Service Request, Self Test, Output Format, TRANSLATOR.

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A	ECO 1510	MS	7-17-86

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KEITHLEY Keithley Instruments Inc. Cleveland, Ohio 44139

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PURCHASED ITEM

PART NUMBER 196-SPEC

GENERAL

RANGING: Manual or autoranging.

MAXIMUM READING: 3029999 counts in 6½-digit mode.

ZERO: Control subtracts on-scale value from subsequent readings or allows value to be programmed.

CONNECTORS: Analog: Switch selectable front or rear, safety jacks. **Digital:** TRIGGER input and VOLTMETER COMPLETE output on rear panel, BNCs.

WARMUP: 2 hours to rated accuracy.

DISPLAY: 10, 0.5-in. alphanumeric LED digits with decimal point and polarity. Function and IEEE-488 bus status also indicated.

ISOLATION: Input Lo to IEEE Lo or power line ground: 500V peak. 5×10^8 max. V·Hz product. $>10^{10}\Omega$ paralleled by 400pF.

DATA MEMORY: 1 to 500 locations, programmable. Measurement intervals selectable from 1ms to 999999ms or triggered.

BENCH READING RATE: 5 readings/second (2/second on 30MΩ and 300MΩ ranges).

FILTER: Weighted average (exponential). Programmable weighting, 1 to 1/99.

OPERATING ENVIRONMENT: 0°-50°C, 0%-80% relative humidity up to 35°C; linearly derate 3% RH/°C, 35°C-50°C (0%-60% RH up to 28°C on 300MΩ range).

STORAGE ENVIRONMENT: −25° to +65°C.

POWER: 105-125V or 210-250V, rear panel switch selected, 50Hz or 60Hz, 30VA max. 90-110V and 180-220V versions available upon request.

DIMENSIONS, WEIGHT: 127mm high × 216mm wide × 359mm deep (5 in. × 8½ in. × 14¼ in.). Net weight 3.7kg (8 lbs.).

ACCESSORIES AVAILABLE:

Model 1019A-1: 5¼-in. Single Fixed Rack Mounting Kit
Model 1019A-2: 5¼-in. Dual Fixed Rack Mounting Kit
Model 1019S-1: 5¼-in. Single Slide Rack Mounting Kit
Model 1019S-2: 5¼-in. Dual Slide Rack Mounting Kit
Model 1651: 50-Ampere Shunt
Model 1681: Clip-On Test Lead Set
Model 1682A: RF Probe
Model 1685: Clamp-On Current Probe
Model 1751: General Purpose Test Leads
Model 1754: Universal Test Lead Kit
Model 5806: Kelvin Clip Leads
Model 7007-1: Shielded IEEE-488 Cable, 1m
Model 7007-2: Shielded IEEE-488 Cable, 2m
Model 7008-3: IEEE-488 Cable, 3 ft. (0.9m)
Model 7008-6: IEEE-488 Cable, 6 ft. (1.8m)

Prices and specifications subject to change without notice.

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