Model 192 Programmable DMM Specifications

DC VOLTS

RANGE	RESOLUTION 6½*	5½	4½**	INPUT RESISTANCE	5½-DIGIT ACCURACY ±(% of rdg + digits) 24 HR. 23°C ±1°C	90 DAYS 18° to 28°C	1 YEAR 18° to 28°C	TEMPERATURE COEFFICIENT ±(% rdg + digits)/°C 0°-18°C & 28°-50°C
0.2 V		1 μV	10 μV	> 1000MΩ	0.004+2***	0.005+2***	0.009+2***	0.0003+1
2 V	1 μV	10 μV	100 μV	> 1000MΩ	0.003+1.5	0.005+1.5	0.007+1.5	0.0003+0.1
20 V	10 μV	100 μV	1mV	> 1000MΩ	0.003+1	0.005+1	0.009+1	0.0004+0.1
200 V	100 μV	1mV	10mV	10MΩ	0.004+2	0.007+2	0.010+2	0.0007+0.1
1200 V	1mV	10mV	100mV	10MΩ	0.004+1	0.007+1	0.011+1	0.0007+0.1

*Multiply digit error by 10.
**Using Model 1923 Interface.
***After pushbutton zeroing.

MAXIMUM ALLOWABLE INPUT: 1200V peak.
CMRR: Greater than 120dB at DC and 50 or 60Hz (with 1kΩ in either lead).

NMRR: Greater than 60dB at 50 or 60Hz.
BENCH READING RATE: 8/s.
SETTLING TIME: 250ms to within 6 digits at 5½-digit resolution.

OHMS

RANGE	RESOLUTION 6½*	5½	4½**	MAXIMUM OUTPUT I SHORT	V OPEN	5½-DIGIT ACCURACY ±(% of rdg + digits) 24 HR. 23°C ±1°C	90 DAYS 18°-28°C	1 YR. 18°-28°C	TEMP. COEFFICIENT ±(% rdg+digits)/°C 0°-18°C & 28°-50°C
0.2 kΩ		1mΩ	10mΩ	−5 mA	−0.5V	0.0035+2***	0.007+2***	0.010+2***	0.001 +0.7
2 kΩ	1mΩ	10mΩ	100mΩ	−5 mA	−5 V	0.0035+2	0.007+2	0.010+2	0.001 +0.1
20 kΩ	10mΩ	100mΩ	1 Ω	−500 μA	−5 V	0.0035+1	0.007+2	0.010+2	0.001 +0.1
200 kΩ	100mΩ	1 Ω	10 Ω	−50 μA	−5 V	0.0035+1	0.007+2	0.010+2	0.001 +0.1
2000 kΩ	1 Ω	10 Ω	100 Ω	−5 μA	−5 V	0.005 +1	0.010+2	0.010+2	0.0012+0.1
20 MΩ	10 Ω	100 Ω	1 kΩ	−0.5 μA	−5 V	[redacted]			

*Multiply digit error by 10.
**Using Model 1923 Interface.
***After pushbutton zeroing.

CONFIGURATION: Automatic 2- or 4-terminal.
MAXIMUM ALLOWABLE INPUT: 360V peak or 250V rms.

BENCH READING RATE: 8/s on 0.2kΩ—2000kΩ ranges; 4/s on 20MΩ range.
SETTLING TIME: 250ms to within 6 digits at 5½-digit resolution on 0.2kΩ—2000kΩ ranges; 500ms on 20MΩ range.

AC VOLTS (Option 1910)

RANGE	RESOLUTION 6½*	5½	4½**	5½-DIGIT ACCURACY ±(% of rdg + digits) 1 YEAR, 18°-28°C (above 1000 counts) 50Hz-20kHz	20Hz-50Hz and 20kHz-100kHz	TEMPERATURE COEFFICIENT ±(% rdg + digits)/°C 0°-18°C & 28°-50°C 50Hz-20kHz	20-50Hz & 20kHz-100kHz
2 V	1 μV	10 μV	100 μV	0.1 +10	1+20	0.015+.5	0.05+0.5
20 V	10 μV	100 μV	1mV	0.1 +10	1+20	0.015+.5	0.05+0.5
200 V	100 μV	1mV	10mV	0.1 +10	1+20	0.015+.5	0.05+0.5
1000 V	1mV	10mV	100mV	0.15+10†	1+20‡	0.020+.5†	0.05+0.5‡

*Multiply digit error by 10.
**Using Model 1923 Interface.
†50Hz-10kHz.
‡20Hz-50Hz & 10kHz-20kHz.

RESPONSE: Average, calibrated in rms of a sine wave.
MAXIMUM ALLOWABLE INPUT: 1000V rms sine or DC, 2×10^7 V•Hz.

CMRR: Greater then 60dB at DC, 50 & 60Hz (1kΩ in either lead).
INPUT IMPEDANCE: 2MΩ shunted by less than 50pF.
BENCH READING RATE: 2/s.
SETTLING TIME: Less than 1.3s to within 0.05% of final reading.

GENERAL

RANGING: Manual or Fast Autoranging (less than 150ms per range change on DCV).
ZERO: Pushbutton zeroing of offsets.
DISPLAY: Seven 0.5-inch LED digits with appropriate decimal point.
OVERRANGE INDICATION: Display indicates polarity and OFLO.
ISOLATION: Input LO to IEEE LO or power line ground: 1400V peak, 5×10^9 V•Hz; greater than $10^{9}\Omega$ parallel by 1200pF.
WARMUP: 2 hours to rated accuracy.
ENVIRONMENTAL LIMITS: Operating: 0°-50°C, 0% to 80% relative humidity up to 35°C. **Storage:** −25°C to 65°C.
POWER: 105-125 or 210-250 volts (internal switch selected), 50Hz-400Hz, 30V•A maximum.
INPUT CONNECTORS: 5-way binding posts.
DIMENSIONS, WEIGHT: 127mm high × 216mm wide × 359mm deep (5" × 8½" × 14⅛"). Net weight 3.4kg (7.5 lbs.).

ACCESSORIES AVAILABLE:
Model 1019 Universal Rack Mounting Kit
Model 1600 High Voltage Probe
Model 1641 Kelvin Test Lead Set
Model 1651 50-Ampere Shunt
Model 1681 Clip-On Test Lead Set
Model 1682 RF Probe
Model 1683 Universal Test Lead Set
Model 1685 Clamp-On Current Probe
Model 1901 Current Adapter
Model 1910 ACV Option
Model 1923 IEEE-488 Interface
Model 1924 Rear Input Adapter

Model 7008 IEEE Cable (1.8m, 6 ft.)

Model 192 (DCV & Ohms)

Prices and specifications subject to change without notice.
For more information on specifications, refer to the Model 192 Operator's Manual, P/N 30839.

MODEL 1923 IEEE-488 INTERFACE SPECIFICATIONS

I. IEEE-488-1978 BUS IMPLEMENTATION:

Multiline Commands: DCL, SDC, GET, LLO, GTL, UNT, UNL, SPE, SPD.

Uniline Commands: IFC, REN, EOI, SRQ, ATN.

INTERFACE FUNCTIONS: SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1

Programmable Parameters: Function, Range, Zero, Trigger Modes, Delay, EOI State, SRQ Bus Response, Data Terminators, Data Store to 100 Readings.

Conversion Rates: Nine different conversion rates may be selected; fastest modes for DC volts are:

USEABLE RESOLUTION	INTEGRATION PERIOD	TRIGGER TO FIRST BYTE OUT
4½-digits	4.4ms	27ms
5½-digits	16.67ms*	39ms

*20ms at 50Hz.

Data String: 16 bytes (excluding terminators).

4½-digit accuracy: ±(.015% + 1d) for 1 year on DCV and Ohms (below 2000kΩ).

Address Modes: TALK ONLY and ADDRESSABLE.

II. STATUS PORT:

Separate port providing function and HI/LO/PASS outputs (open collector, 100mA sink).

FRONT PANEL PROGRAMS

PROGRAM	NAME	DESCRIPTION
0	CLEAR	Cancels Programs 3 through 7.
1	RESOLUTION	Selects 5½- or 6½-digit resolution.
2	FILTER	Selects extra digital filtering.
3	OFFSET/SCALE	Displays the result of Y=sX+b. s and b are entered from the front panel.
4	% DEVIATION	Displays the percent deviation from an entered value.
5	MIN/MAX	Remembers the minimum and maximum reading for front panel recall.
6	HI/LO/PASS	Displays HI, LO or PASS defined by entered limits. Status output available with 1923 option.
7	DATA LOGGER	Saves up to 100 readings for front panel recall. Interval programmable up to 1 hour.

TJD/cet
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192 Spec Addenda

The following information is supplied as clarification of 192 specifications.

1. NMRR. To prevent AD saturation, peak AC + DC value must be less than full scale on any range.

2. IEEE low to power line ground isolation is 1MΩ.

3. Four terminal lead resistance: Maximum per lead for additional 1 digit error at 5-1/2 digits.

Range	Resistance
.2k	7 Ω
2k	22 Ω
20k	70 Ω
200k	220 Ω
2000k	700 Ω
20M	2200 Ω

4. Input current. With 1MΩ shunt on 2V range, display should be less than 5 digits (<50pA) at $T_A = 23^{\circ}C$ (use filter program 2).