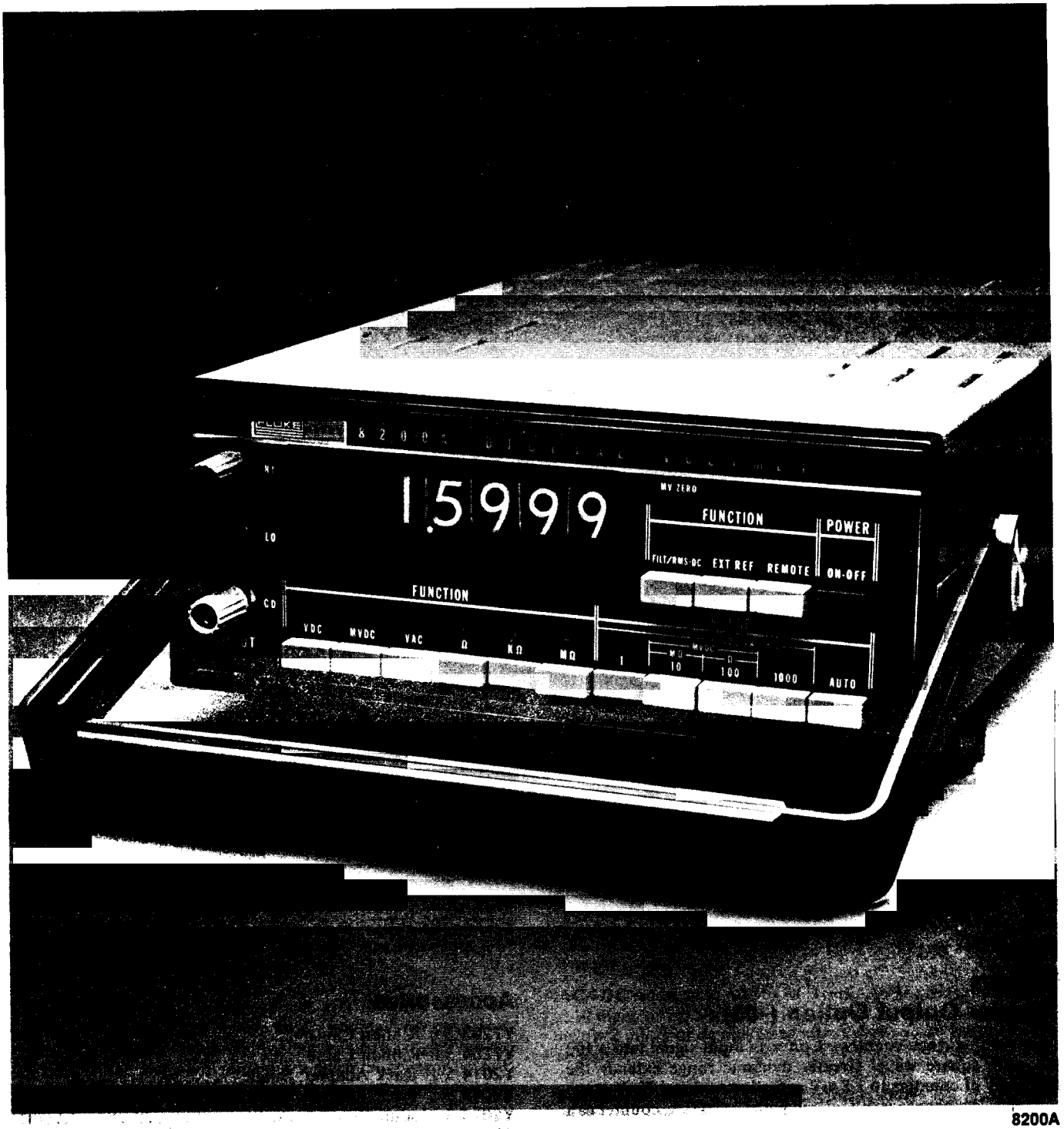
DIGITAL VOLTMETERS & DMM's

4½-Digit Bench/System

8200A



8200A

The 8200A 4½-digit, high speed digital voltmeter is designed for systems applications. In its basic onfiguration it measures dc voltage in four selectable ranges. Optional add-ons are available to expand the unit into a full-blown systems instrument.

Standard features in the basic instrument include 60% overranging, autoranging, push-button range and function selection, full guarding, and a selectable input filter. High speed measurement capability (400 readings per second) is achieved using Fluke's patented Recirculating Remainder (R^2) a-d conversion technique. These features provide the solid base necessary to expand the measurement capability of the 8200A.

Options available for use in expanding the 8200A capabilities are field installable. Each adds a specific capability to upgrade the basic unit in a systems environment. These include True RMS volts ac, average-sensing volts ac, dc millivolts, resistance, ratio, isolated remote control, isolated data output, isolated printer output, and parallel rear input terminals. Details concerning each option are given under specifications.

Specifications

All accuracy specifications are for 18°C to 28°C ambient temperature.

DC Voltage

Ranges	Resolution	Resistance	Overload
±1V	100 μV	10^{10} ohms	±1200V dc or
±10V	1 mV	10^{7} ohms	1100V rms
±100V	10 mV	10^{7} ohms	continuous
±1000V	100 mV	10^{7} ohms	

60% overrange except ±1200V on ±1000V range

Accuracy
90 days: ±(0.01% of input +0.01% of range)
1 year: ±(0.02% of input +0.03% of range)

Settling Time
Filter out: 2 ms to within 0.01%
Filter in: 500 ms to within 0.01%

Noise Rejection	Filter in	Filter out
Common Mode:	>140dB,dc to 60 Hz (1 kΩ unbalance)	>110 dB or 1 digit whichever is greater (100Ω unbalance)
Normal Mode:	>60 dB at 50 Hz >65 dB at 60 Hz >100 dB at 200 Hz and above	

DC Millivolts Option (-02)

Ranges	Resolution	Resistance
±10 mV	1 μV	10^{10} ohms
±100 mV	10 μV	10^{10} ohms

60% overranging

Accuracy For 90 days
±10 mV Range: ±(0.01% of input + 0.02% of range)
±100 mV Range: ±(0.01% of input + 0.01% of range)

Overload Protection: Up to ±1200V dc or 1000V rms for 15s; ±300V dc or rms continuously

Setting Time
Filter out: 2 ms max on 100 mV range, 100 ms max on 10 mV range to within 0.01% of final value
Filter in: 2s max, to within 0.01% of final value

Noise Rejection	Filter in	Filter out
Common Mode:	>180 dB dc to 60 Hz (1 kΩ unbalance)	>130 dB dc to 60 Hz (1 kΩ unbalance)
Normal Mode:	>75 dB at 50 Hz >80 dB at 60 Hz (10 mV range) >55 dB at 50 Hz >60 dB at 60 Hz (100 mV range)	

True RMS AC Volts Option (-09)

Ranges	Resolution	Resistance	Overload
1V ac or ac +dc	100 μV	1 MΩ	1100V rms or
10V ac or ac +dc	1 mV	1 MΩ	1500V peak
100V ac or ac+dc	10 mV	1 MΩ	continuous
1000V ac or ac +dc	100 mV	1 MΩ	

60% overrange (1100V rms max on 1000V range)

Accuracy 90 days: ±(% of input +% of range). From 0.001V to 1100V *(1)*

Frequency	AC Only Mode	AC + DC Mode
DC		(0.1 + 0.04)
20 Hz-50 Hz	(0.5 + 0.02)	(0.05 + 0.04)
50 Hz-10 kHz	(0.1 + 0.02)	(0.02 + 0.04)
10 kHz-30 kHz *(2)*	(0.2 +0.04)	(0.2 + 0.06)
30 kHz-50 kHz *(2)*	(0.3 + 0.1)	(0.3 + 0.12)
50 kHz-100 kHz *(2)*	(1.0 + 0.3)	(1.0 + 0.3)
100 kHz-300 kHz *(2)*	(2.0 + 0.5)	(2.0 + 0.5)

(1) With inputs above 500V, multiply accuracy by (2000V + V input) ÷ 2000V
(2) Input volt-Hertz product should not exceed 2 x 10^{7}

Superimposed DC: ±1100V dc (peak ac plus dc not to exceed ±1500V) max

Settling Time: 500 ms max to within 0.1% of final value

Crest Factor: 7:1 at full scale, increasing downrange by 7 x (V range ÷ V input)

Common Mode Noise Rejection: ≥120 dB, dc to 60 Hz, 100Ω unbalance

Resistance Option (-03)

Ranges	Resolution	Source Current	Overload
100Ω	10 mΩ	10 mA	30V rms fused
1 kΩ	100 mΩ	1 mA	
10 kΩ	1Ω	100 μA	130V rms
100 kΩ	10Ω	10 μA	continuous
1000 kΩ	100Ω	1 μA	
10 MΩ	1 kΩ	100 nA	

60% overranging
Accuracy, 90 days: ±(% of input + % of range)

100Ω	1 kΩ-100 kΩ	1000 kΩ	10 MΩ
(0.03+0.02)	(0.01+0.01)	(0.02+0.02)	(0.1+0.02)

Configuration: Two Terminal
Settling Time: To within 0.01% of final value

Ranges:	100Ω-10 kΩ	100 kΩ	1000 kΩ	10 MΩ
Filter out:	2 ms	2 ms	2.5 ms	28 ms
Filter in:	500 ms	550 ms	1.2 ms	7.0s

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Average Sensing AC Volts Option (-01)

Ranges	Resolution	Resistance	Overload
1V ac	100 μV	1 MΩ	1100V rms or 1500V peak continuous
10V ac	1 mV	1 MΩ	
100V ac	10 mV	1 MΩ	
1000V ac	100 mV	1 MΩ	

60% overranging (1100V rms max on 1000V range)
Accuracy, 90 days: ±(% of input + % of range)

Frequency	0.001V to 500V	500V to 1100V
30 Hz - 50 Hz	(0.5 + 0.02)	(0.5 + 0.0)
50 Hz - 20 kHz	(0.1 + 0.02)	(0.15 + 0.0)
20 kHz - 50 kHz	(0.2 + 0.02)	(0.2 + 0.0)
50 kHz - 100 kHz	(0.5 + 0.02)	

Input volt-Hertz product not to exceed 2×10^7
Superimposed DC: ±1100V dc (peak ac plus dc not to exceed ±1500V max)
Settling Time: 500 ms max to within 0.1% of final value
Common Mode Noise Rejection: ≥120 dB, dc to 60 Hz, 100Ω unbalance

DC External Reference Option (-04)

Reference Voltage: +1V dc to + 11V ac
Reading: 10 x ratio

Ratio Range	Range	Resolution	Overload
±0.0:1	±1V	0.01%	±1200V dc or 1100V rms continuous
±1.0:1	±10V		
±10:1	±100V		
±100:1	±1000V		

60% overrange except 1200V max dc voltage of range on ±1000V range
Input Resistance: 1 MΩ
Input Type: Isolated 4 wire
Isolation: Input Lo and Reference Lo not to exceed +8V
Overload: Absolute value of V reference plus difference in potential of Reference Lo and Input Lo must not exceed 25V
Normal Mode Noise Rejection: ≥25 dB at 60 Hz
Common Mode Noise Rejection: ≥80 dB with +10V reference and up to 1 kΩ unbalance
Settling Time: 1s max to 0.01% of reference range for step change of reference voltage.
Accuracy, 90 days: ±(0.01% or reading + 0.1% of dc voltage range ÷ reference voltage)

Isolated Data Output Option (-07)

For Systems Applications
Data Available: Digits, polarity, range, functions
Coding: 8-4-2-1 BCD, digits and range
Logic Levels: 1 = +5V, 0 = 0V (Series 930 DTL with 6k pull up)
Maximum Trigger Rate: 400 per second
Flags: Ready, Overload
Acquisition: Full parallel or serial by character in multiples of 4 bits
Automatic Adaptive Timeouts: Automatic delays allow for settling time of all analog inputs
Data Lines: Blanked during digitizing time
Serial Output: 4 bits or multiples of 4 bits. Requires external sequencer

Remote Control Option (-08)

For Systems Applications
Control Levels: 0 = function called, 1 = function inactive
Logic Levels: 0 = contact closure or 0V, 1 = open or +5V (Series 930 DTL)
No Call: Volts, dc, and autorange called
Flag: +5V through 6 kΩ when the remote button is depressed

Isolated Printer Output Option (-06)

Data Available: Digits, polarity, range
Coding: 8-4-2-1 BCD digits and range
Logic Levels: 1 = +5V, 0 = 0V (Series 930 DTL with 6k pull up)
Maximum Trigger Rate: 400 per second

Rear Input Option (-05)

Connector: 5 pin, located on rear panel
Connections: In parallel with front panel input terminals

General

Digitizing Time: 2.5 ms (500 ms aperature at A/D input)
Sample Rate: Up to 400 readings per second via external trigger, or up to 4 readings per second with internal trigger
Autorange Time: 250 ms per range with internal trigger, 25 ms per range with external trigger for mV, VDC, Ω, kΩ, and MΩ with filter "out", or 250 ms for all other combinations
Filters: 4 pole active, for dc volts and resistance measurements; 3 pole active filter for millivolt measurements
Range Selection: Manual, Automatic, Remote (optional)
Warm-up Time: 20 minutes to "1 year" accuracy, 1 hour to full accuracy
Temperature: -10°C to +50°C operating; -40°C to +75°C storage
Relative Humidity: ≤90% to +15°C, ≤80% to +50°C
Shock, Vibration, Altitude: MIL-T-28800B, Class 4
Power: 115 or 230V ac ±10%, 50 to 440 Hz, ≤25W including options
Size: 8.9 cm H x 21.6 cm W x 38.1 cm D (3.5 in H x 8.5 in W x 15 in D)
Weight: ≤7.8 kg (15 lbs)

Model

8200A Digital Voltmeter $1895

Options*

8200A-01 Average Sensing AC Volts 445
8200A-02 Milliwatts DC 350
8200A-03 Resistance 300
8200A-04 External Reference 150
8200A-05 Parallel Rear Input 100
8200A-06 Printer Output 225
8200A-07 Data Output 445
8200A-08 Remote Control 250
8200A-09 True RMS AC Volts 645

**Order options as separate line items. Most may be combined. Option -05 must be ordered with -04. Option -01 and -09 can not be combined nor can option -06 and -07. Add suffix letter "K" for kit for field installation.*

Accessories

M00-200-607 3½" Rack Adapter 50
M00-203-700 Panel Protector 20
See page 152 for more accessory information.