

# Model 8200

## DC Voltage/Current Calibration Standard

The Model 8200 is an extremely accurate microprocessor-based, remotely programmable, line-powered portable DC voltage/current standard. Transferring NIST reference values to instrumentation and equipment in the laboratory, the QA/QC department and on the production floor is convenient, fast and accurate.

Six decade controls allow adjustment of accurate, ultra-stable DC voltage ranges of  $\pm 100$  mV,  $\pm 10$  V, and  $\pm 100$  V, in steps of  $0.1 \mu\text{V}$ ,  $10 \mu\text{V}$ , and  $100 \mu\text{V}$  respectively, with 10 ppm basic accuracy. If an even wider range is called for, a 1 kV option is available. The Model 8200 also provides outputs from  $\pm 1 \mu\text{A}$  to  $\pm 100$  mA as a DC current source, with 100 ppm basic accuracy.

The 8200 offers microprocessor-assisted Incrematic™ control, allowing unlimited use of any one decade with full borrow/carry to and from all more significant decades for easier, faster, and more convenient manual operation. Measurements such as A/D linearity and monotonicity can be made at any chosen resolution, using only one knob. For additional convenience, the calibrator output automatically returns to zero whenever a new range or polarity is selected.

Well suited for automated test and calibration systems, the Model 8200 offers an optional rack mount kit, a rear terminal output, and IEEE-488 interface. Full automation is achieved by transmitting a simple character string for each new output setting, — an easier way to produce a long series of incremental changes in voltage or current. A fast 1 ms settling time, without troublesome overshoot, increases ATE throughput over other calibrators. The 8200 provides exceptional accuracy without special demands for recalibration or environmental control. It is stable to better than 20 ppm/6 months and 1 ppm/°C over a 0°C– 40°C range.



### FEATURES

- True Secondary-Transfer-Standard Performance
- 10 ppm rdg. + 1 ppm rng. Basic Accuracy
- 10 ppm Stability for 60 Days, 20 ppm for 6 Months
- "Incrematic™" Dial Control
- Over 2-Million Value EMF Reference Source
- 5-Decade Current Source
- NIST-Traceable on All Ranges
- $\mu\text{P}$ -Based Design with Optional IEEE-488 Interface
- 1 ms Settling Time
- Full-Floating Output

### APPLICATIONS

- Instrument and Component Testing
- A/D and D/A Converters
- Operational Amplifiers
- Voltage to Frequency Converters, VCOs
- Sensor Based Instrumentation
- Analog Function Modules
- Calibration of Precision Equipment
- ATE

## SPECIFICATIONS

### VOLTAGE MODE

Range	Full Scale	Resolution	Max. Load
100 mV*	±104.8575 mV	0.1 µV	(EMF source)
10V	±10.48575V	10 µV	100 mA
100V	±104.8575V	100 µV	10 mA

\* Rear panel connector only

#### Accuracy (at 23°C)

±(60 ppm reading + 1 µV) on 100 mV range  
 ±(10 ppm reading + 10 µV) on 10V range  
 ±(10 ppm reading + 100 µV) on 100V range

#### Output Impedance

100Ω on 100 mV range  
 10 mΩ on 10V range  
 20 mΩ on 100V range

#### Long Term Stability

10 ppm for 60 days, 20 ppm for 6 months

#### Temperature Coefficient (0°C to 40°C)

±(1 ppm/°C reading + 0.2 ppm/°C range) on 10V range  
 ±(2 ppm/°C reading + 0.2 ppm/°C range) on 100V and 100 mV ranges

#### Settling Time

1 ms to rated accuracy, without range change  
 15 ms to rated accuracy, with range change

#### Noise (DC–10 kHz)

10 µV RMS on 10V range  
 100 µV RMS on 100V range

#### Output Configuration

Opto-isolated, floating, guarded 4-terminal with remote sensing, on 10V and 100V ranges; Rear panel shielded connector, 2 terminals plus guard, on 100 mV range

### CURRENT MODE

Range	Full Scale	Resolution	Voltage Compliance
±100 mA	±100.000 mA	1 µA	10V

#### Accuracy

±(0.01% reading + 1 µA)

#### Temperature Coefficient

±(10 ppm/°C reading + 2 ppm/°C range)

#### Output Configuration

Opto-isolated, floating, 2-terminals plus guard

### OPTION 1 KV: 1 KV OUTPUT AMPLIFIER

#### Full Scale Range

±1048.575V

#### Resolution

1 mV

#### Maximum Load

1 mA

#### Output Impedance

0.5Ω

#### Basic Accuracy

±(10 ppm reading + 1 mV)

#### Noise

2 mV RMS, DC–100 kHz, including 0.5 mV switching spikes at approximately 50 kHz

#### Settling Time

1.0 second

### GENERAL

#### Maximum Common Mode Voltage

500V guard to case

#### Calibration Interval

60 days for 10 ppm stability  
 6 months for 20 ppm stability

#### Warm-Up Time

1 hour to rated accuracy

#### Power Requirements

115/230V, 50/60 Hz, 25W

#### Controls and Indicators

Six rotary decade selector switches with carry and borrow  
 Rotary range and mode selector switch  
 Rotary polarity selector switch  
 Seven 0.8" LED indicators (+/–/overflow and six decades)  
 Five annunciators (mV, mA, REM, UL "dangerous voltage" symbol, and "Error" display)  
 Push-button power switch

#### Dimensions

17" (432 mm) W x 3.5" (89 mm) H x 13" (330 mm) D  
 all metal shielded case;  
 19" rack mountable

#### Weight

16.5 lb (7.5 kg)