# Transconductance Amplifier
# Model 8200

Galvanically Isolated
Color graphical touch sensitive display
7 Volt Compliance
100 Amperes to 100 kHz
200 µA to 100A in six ranges
100% over range capability
40ppm short term stability
0.04% dc and 0.10% ac accuracy
Accuracy independent of load
Distortion below -60dB
Front Panel Calibration
IEEE-488.2/USB Interface
Stable with inductive loads
High Output Impedance
Low Acoustic Noise


## Low Total Harmonic Distortion

The Model 8200 Transconductance Amplifier is a precision, high stability, high accuracy instrument which produces an output current which is directly proportional to the input voltage over the frequency range from dc to 100kHz. It replaces the well known Model 8100 but is smaller, quieter and features a graphical color touch sensitive display and galvanic isolation. Six overlapping ranges, with full scale values of 2mA, 20mA, 0.2A, 2A, 20A and 100A, provide low distortion output currents from 200uA to 100A. With the exception of the 100A range, for which a 1 V rms input produces the 100 Arms output current, the transconductance of the other ranges is set such that a 2Vrms input produces the full scale output current. With the exception of the 100A range, all of the other ranges may be operated to twice their full scale value without any deterioration in performance. The Model 8200 has both an IEEE and USB digital interfaces.

The total harmonic distortion introduced by the transconductance amplifier is less than -60dB up to 10kHz (typically 20kHz) and less than -40dB to 100kHz for all current ranges.

## Ample Compliance Voltage

The maximum compliance voltage (the maximum permissible voltage which can be developed across a load connected across the output) is at least 7Vrms (7V for dc) for all ranges and all frequencies. This high voltage limit permits a large variety of loads to be driven from the transconductance amplifier. These loads maybe resistive or

resistive with capacitive or inductive components without causing any instability in the output current. An OVERCOMPLIANCE indicator is illuminated when the 7V has been exceeded.

### Frequency and Compliance Voltage Displayed

Both the compliance voltage (0.00V – 7.00V) and the frequency of the input voltage (10Hz to 500kHz) are continuously displayed on the LCD touch sensitive color graphical display.

### Higher Frequency Outputs available in the 20A and lower ranges

Although accuracy is not specified the unit will normally supply full scale currents up to 500kHz into suitable loads. Consult factory for details.

### Easy to Calibrate

The Model 8200 can be calibrated right from the front panel and, in general, doesn't require the removal the top or bottom covers. The DC offset and transconductance value may then be set for each current range.

### Coaxial Output for High Currents

To minimize the output inductance the current output for both the 20A and 100 A range is supplied through a coaxial LC connector. The output current for the lower ranges, where inductance is not as much of a problem is supplied through a set of recessed safety terminals.

### IEEE-488 and USB Control

The Model 8200 is equipped with both and IEEE and USB digital interfaces. Any function that can be entered manually can be sent via a bus controller to the unit.

# SPECIFICATIONS

## Ranges and Transconductance

| Range | Output Current | Transconductance |
|---|---|---|
| 100A | 20A to 100A | 100 Siemens |
| 20A | 2A to 40A | 10 Siemens |
| 2A | 0.2A to 4A | 1 Siemen |
| 0.2A | 20mA to 0.4A | 100 Millisiemens |
| 20mA | 2mA to 40mA | 10 Millisiemens |
| 2mA | 0.2mA to 4mA | 1 Millisiemen |

## 10 Minute Transconductance Stability

| | 0% - 100% of Full Scale | 100% - 200% Full Scale* |
|---|---|---|
| **Frequency** | **(% Reading + % Range)** | **% of Reading** |
| DC | ±(0.002 + 0.002) | ±0.004 |
| 10Hz to 10kHz | ±(0.005 + 0.005) | ±0.010 |
| 10kHz to 20kHz | ±(0.010 + 0.010) | ±0.020 |
| 20kHz to 50kHz | ±(0.015 + 0.015) | ±0.030 |
| 50kHz to 100kHz | ±(0.030 + 0.030) | ±0.060 |

The stability specification is valid after the unit has been in a particular configuration for at least 5 minutes.

## Transconductance Uncertainty (1year)

| | 0% - 100% of Full Scale | 100% - 200% Full Scale* |
|---|---|---|
| **Frequency** | **±(% Reading + % Range)** | **% Reading** |
| DC | ±(0.02 +0.02) | ±0.04 |
| 10Hz to 10kHz | ±(0.05 +0.05) | ±0.10 |
| 10kHz to 20kHz | ±(0.10 + 0.10) | ±0.20 |
| 20kHz to 50kHz | ±(0.15 + 0.15) | ±0.30 |
| 50kHz to 100kHz | ±(0.30 + 0.30) | ±0.60 |

Specifications are based on a resistive load. Appropriate corrections must be made for reactive loads. The DC uncertainty is based on the average of the transconductance obtained with a pos. and neg. input.

## SPECIFICATIONS (continued)

**Compliance Voltage:** 7VRMS for AC and 7V for DC. Display accuracy is ±0.10V

Total Harmonic Distortion: -60db from 10Hz to 10kHz

-50db to 50kHz

-40db to 100kHz

Noise: 0.05% of current range in a band from DC to 100kHz

Inductive loads: Free from oscillations up to 1mH

Input impedance: 500kΩ from each terminal to ground

Frequency measurement accuracy: 0.01% of reading

Display: LCD color, graphical, touch sensitive

Temperature Range: Operating: 10˚C to 35˚

Within specifications: 18˚C to 28˚˚

Storage: -20˚C to 60˚C

Relative Humidity: less then 80%

Warm-up time: Thirty minutes for full specifications

Power Requirements: 207V to 235V, 50Hz to 60Hz, 2500VA power factor corrected

Physical

Weight: 80 lbs. (36.4 Kilograms)

Dimensions: 17” (43.2cm) X 20” (50.8 cm) X 12.25” (31.1 cm)

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