



TREK 20/20C

High voltage power amplifier with an all-solid-state design for high slew rate, wide bandwidth, and low-noise operation for in industrial and research applications.



The Trek® 20/20C is a DC-stable, high voltage power amplifier used in industrial and research applications. It features an all-solid-state design for high slew rate, wide bandwidth and low-noise operation. The four-quadrant, active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range. This type of output is essential to achieve an accurate output response and high slew rate demanded by a variety of loads such as highly capacitive or reactive loads. It is configured as a non-inverting amplifier.

PRODUCT HIGHLIGHTS

- Four-quadrant output for driving capacitive loads
- Closed loop system for high accuracy
- Short-circuit protected for equipment protection
- All solid-state design for maintenance free operation
- DC-stable for programmable supply applications
- Low output noise for ultra-accurate outputs

TYPICAL APPLICATIONS

- Electrostatic deflection
- Electrophoresis
- Electrorheological fluids
- Electro-optic modulation
- Material poling
- AC or DC biasing
- Ion beam steering
- Particle accelerators
- Mass spectrometers
- Material characterization
- Ferroelectrics
- Atmospheric plasma
- Dielectric barrier discharge

AT A GLANCE

Output Voltage Range

0 to ± 20 kVDC or peak AC

Output Current Range

0 to ± 20 mA DC or peak AC

Slew Rate

Greater than 450 V/ μ s

Large Signal Bandwidth (-3 dB)

DC to greater than 7.5 kHz

DC Voltage Gain

Fixed at 2000 V/V

TREK 20/20C HIGH VOLTAGE POWER AMPLIFIER

TECHNICAL DATA

| Performance Specifications | | |
|----------------------------|---|--|
| Output Voltage Range | 0 to ± 20 k VDC or peak AC | |
| Output Current Range | 0 to ± 20 mA DC or peak AC | |
| Input Voltage Range | 0 to ± 10 VDC or peak AC | |
| Input Impedance | 25 k Ω , nominal | |
| DC Voltage Gain | 2000 V/V | |
| DC Voltage Gain Accuracy | Better than 0.1% of full scale | |
| DC Offset Voltage | Less than ± 2 V | |
| Output Noise | Less than 1.5 V rms ¹ | |
| Slew Rate | Greater than 450 V/ μ s (10% to 90%, typical) | |
| Small Signal Bandwidth | DC to greater 20 kHz (-3dB) | |
| Large Signal Bandwidth | DC to greater than 7.5 kHz, typical (-3dB) | DC to greater than 3.75 kHz (1% distortion) |
| Stability | Drift with Time: Less than 50 ppm/hr, noncumulative | Drift with Temp: Less than 100 ppm/ $^{\circ}$ C |

| Voltage Monitor Specifications | |
|--------------------------------|-------------------------------------|
| Ratio | 1/2000th of the high-voltage output |
| DC Accuracy | Better than 0.1% of full scale |
| DC Offset Voltage | Less than ± 2 mV |
| Output Noise | Less than 10 mV rms ¹ |
| Output Impedance | 47 Ω |

| Current Monitor Specifications | |
|--------------------------------|----------------------------------|
| Ratio | 0.5 V/mA |
| DC Accuracy | Better than 0.1% of full scale |
| Offset Voltage | Less than ± 2 mV |
| Output Noise | Less than 10 mV rms ¹ |
| Output Impedance | 47 Ω |

| Mechanical Specifications | |
|---------------------------|--|
| Dimensions (H x W x D) | 279 x 482 x 654 mm (11 x 19 x 25.75 in) |
| Weight | 24.9 kg (55 lb) |
| HV Connector | Caton High Voltage Connector |
| BNC Connectors | Amplifier Input, Voltage Monitor, Current Monitor, Remote High Voltage ON/OFF, Out of Regulation Status, Fault/Trip Status |

| Electrical Specifications | |
|---------------------------|--|
| Line Voltage | Factory set for one of two ranges: 104 to 127 VAC or 180 to 250 VAC, either at 48 to 63 Hz |
| AC Line Receptacle | Standard IEC 320 three-prong AC line connector |
| Power Consumption | 1000 VA, maximum |

| Environmental Specifications | |
|------------------------------|---|
| Temperature | 0 to 40 $^{\circ}$ C (32 to 104 $^{\circ}$ F) |
| Relative Humidity | To 85%, noncondensing |
| Altitude | To 2000 meters (6561.68 ft) |

¹ Measured using the true rms feature of the HP Model 34401A digital multimeter

TECHNICAL DATA

| Features | | |
|--------------------------|---|---|
| High Voltage On/Off | Local: Individual push-button switches | Remote: TTL compatible input. TTL high (or open) turns off high voltage output. TTL low turns on high voltage output. |
| Dynamic Adjustment | Graduated one-turn panel potentiometer is used to optimize the AC response for various load parameters | |
| Current Limit/Trip | Switch selectable for either limit or trip. Graduated one-turn panel potentiometer is used to adjust limit or trip level from 0 to ± 20 mA | |
| Out of Regulation Status | Illuminates and a TTL low is provided when unit fails to produce required HV output such as during current limit or short circuit load conditions | |
| Trip Status | Illuminates and a TTL low is provided when the high-voltage output is disabled due to the output current exceeding the current trip level, the detection of a high-voltage supply fault or the removal of the top cover | |
| Fault Status | A BNC provides a TTL low when the Trek 20/20C is out of regulation for greater than 500 ms | |

REFERENCE NUMBERS

| Included Accessories | |
|----------------------|--|
| PN | Description |
| 23177 | Operator's Manual |
| 43466 | HV Output Cable |
| N5011 | Line Cord, Spare Fuses (selected per geographic destination) |

| Optional Accessories | |
|----------------------|--|
| PN | Description |
| 608RA | 19" Rack Mount Kit (with EIA hole spacing) |
| 608RAJ | 19" Rack Mount Kit (with JIS hole spacing) |



ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE

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