Model 30/20A

High-Voltage Power Amplifier

- **Output Voltage Range**
  0 to ±30 kV DC or Peak AC
- **Output Current Range**
  0 to ±20 mA DC or Peak AC
- **DC Accuracy Better Than**
  0.1% of full scale
- **Slew Rate Greater Than**
  750 V/µs
- **DC Offset Adjustment From**
  0 to ±30 kV
- **Adjustable Current Limit or**
  Current Trip
- **Precision Voltage and Current**
  Monitors

The Model 30/20A is a DC-stable, high-voltage power amplifier designed to provide precise control of output voltages in the range of 0 to ±30 kV DC or peak AC with an output current range of 0 to ±20 mA DC or peak AC. The amplifier is configured as noninverting with a fixed gain of 3000 V/V. Inverting and differential input options are available. A potentiometer with a calibrated dial and polarity switch provides a DC offset over a range of 0 to ±30 kV DC.

Industrial and research applications include dielectric studies, electrostatic deflection, and electrooptic modulation.

The Model 30/20A 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 is essential for achieving the accurate output response and high slew rates demanded by reactive loads.

The Model 30/20A is protected against overvoltage and overcurrent conditions that may be generated by active loads or by output short circuits to ground. Precision voltage and current monitors provide low-voltage replicas of the high-voltage output and load current for monitoring purposes or for use as feedback signals in a closed-loop system. The Remote High Voltage Enable feature provides a connection for a remote device to turn on and off the high voltage of the instrument. This makes the 30/20A useful for automated or computer controlled systems. The Model 30/20A is CE compliant.

Model 30/20A Specifications

All specifications are with no load unless otherwise noted.

Output

Output Voltage Range
0 to ±30 kV DC or peak AC.

Output Current Range
0 to ±20 mA DC or peak AC
(see Automatic Power Limit feature for limitations).

Amplifier Input

Input Signal Voltage Range
0 to ±10 V DC or peak AC.
(Inverting and differential input options are available).

Input Impedance
50 kΩ, nominal
(Inverting/differential option 25 kΩ, nominal).

Features

DC Offset Voltage Adjustment
A potentiometer with a calibrated dial adjusts the level of the DC offset voltage from 0 to ±30 kV DC. A three (3) position switch selects positive polarity, negative polarity, or DC bias voltage off.

High-Voltage Enable
Switch selectable for either local or remote control.

Local
Individual push-button switches.

Remote
A TTL compatible input. A TTL high (or open) turns off the high-voltage output. A TTL low turns on the high-voltage output.

Current Limit/Trip
Switch selectable for either limit or trip. A graduated one-turn panel potentiometer is used to adjust the limit/trip level from 0 to ±20 mA.

Out of Regulation Status
An indicator will illuminate and a BNC will provide a TTL low when the Model 30/20A fails to produce the required high-voltage output such as during current limit.

Limit/Trip Status
An indicator will illuminate and a BNC will provide a TTL low 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, the removal of one of the panels, or if the Model 30/20A is out of regulation for greater than 500 ms.

Settling Time (to 1%)
Less than 200 µs for a 0 to 30 kV step.

Features (cont.)

Dynamics Adjust
A graduated one-turn panel potentiometer is used to optimize the AC response of the Model 30/20A for various load parameters.

Voltage Monitor
A buffered output provides a low-voltage replica of the high voltage output.

Scale Factor
1/3000th of the high-voltage output signal.

DC Accuracy
Better than 0.1% of full scale.

Offset Voltage
Less than ±5 mV.

Output Noise
Less than 20 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Output Impedance
47 Ω.

Current Monitor
A buffered output provides a low-voltage representation of the load current.

Scale Factor
0.5 V/mA.

DC Accuracy
Better than 2 % of full scale.

Offset Voltage
Less than ±10 mV.

Output Noise
Less than 30 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Bandwidth (-3db)
DC to greater than 5 kHz.

Output Impedance
47 Ω.

Performance

DC Voltage Gain
3000 V/V.

DC Voltage Gain Accuracy
Better than 0.1% of full scale.

Offset Voltage
Less than ±4 V.

Output Noise
Less than 1.5 V rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Slew Rate (10% to 90%, typical)
Greater than 750 V/µs.

Large Signal Bandwidth (2% distortion)
DC to greater than 5 kHz.

Small Signal Bandwidth (-3dB)
DC to greater than 30 kHz.

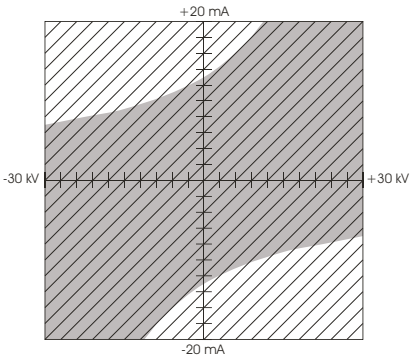
Performance (cont.)

Stability

Drift with Time
Less than 50 ppm/hr, noncumulative.

Drift with Temperature
Less than 100 ppm/°C.

Automatic Power Limit
Automatically limits the internal power dissipation to protect the Model 30/20A from overheating. The following graph illustrates the automatic power limit output capability.



General

Dimensions
91.4 cm H x 43 cm W x 87 cm D
(36" H x 17" W x 34" D).
Depth dimension includes handles and 20 cm (8") of spacing bars to insure proper airflow to the fans on the unit.

Weight
73 kg (160 lb) approximate.

High-Voltage Output Connector
Caton high-voltage connector.

BNC Connectors
Amplifier Input
Voltage Monitor
Current Monitor
Remote High-Voltage Enable
Out of Regulation Status
Limit/Trip Status connector

Power Requirements

Line Voltage
Factory set for one of two ranges:
104 to 127 V AC or 180 to 250 V AC,
at 48 to 63 Hz (specify when ordering).

Power Consumption
1800 VA, maximum.

AC Line Receptacle
Standard three-prong AC line connector.

Optional Accessories
Locking Wheel Kit (Trek c/n 1K042)

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