

Model 30/20

High-Voltage Power Amplifier



The Model 30/20 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. It is configured as a noninverting amplifier with a fixed gain of 3000 V/V. Industrial and research applications include dielectric studies, electrostatic deflection, and electrooptic modulation.

The Model 30/20 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 30/20 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 On/Off feature provides a connection for a remote device to turn on and off the high voltage of the instrument. This makes the 30/20 suitable for automated or computer controlled systems.

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
350 V/ μ s

Remote high-voltage
ON/OFF capability

Adjustable current limit
or current trip

Precision voltage and
current monitors provide
low-voltage
representations of
output voltage and
load current

Remote high-voltage
on/off feature ideal for
use with automated or
computer controlled
systems

CONTROL WITHOUT COMPROMISE



Model 30/20 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 Voltage Range

0 to ± 10 V DC or peak AC.

Input Impedance

Noninverting Input

50 k Ω , nominal.

Inverting Input

25 k Ω , nominal.

Features

High-Voltage On/Off

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.

Dynamic Adjustment

A graduated one-turn panel potentiometer is used to optimize the AC response of the Model 30/20 under various load conditions.

Current Limit/Trip

Switch selectable for either limit or trip. A graduated one-turn panel potentiometer is used to adjust the limit or 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 30/20 fails to produce the required high-voltage output such as during current 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, or the removal of the top cover.

Fault Status

A BNC will provide a TTL low when the Model 30/20 is out of regulation for greater than 500 ms.

Features (cont.)

Voltage Monitor

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

Scale

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

DC Accuracy

Better than 0.1% of full scale.

AC Accuracy

Calibrated using a Ross Model VD 30-4.1-BD-KC-ALU high-voltage divider.

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

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 5 V rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter). Detailed information concerning the output noise is available upon request.

Slew Rate (10% to 90%, typical)

Greater than 350 V/ μ s.

Large Signal Bandwidth (1% distortion)

DC to greater than 2.5 kHz.

Small Signal Bandwidth (-3dB)

DC to greater than 20 kHz.

Performance (cont.)

Stability

Drift with Time

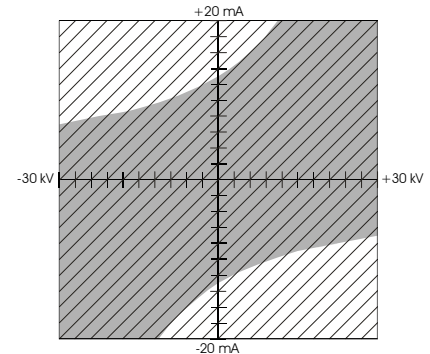
Less than 50 ppm/hr, noncumulative.

Drift with Temperature

Less than 100 ppm/ $^{\circ}$ C.

Automatic Power Limit

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



AC Operating Range (frequencies above 50 Hz, 50% duty cycle, and no DC offset)
 DC Operating Range

General

Dimensions

600 mm H x 482 mm W x 610 mm D
(23.6" H x 19" W x 24" D).

Weight

56 kg (123 lb).

High-Voltage Output Connector

Caton high-voltage connector.

BNC Coaxial Connectors

Amplifier Input
Voltage Monitor
Current Monitor
Remote High-Voltage On/Off
Out of Regulation Status
Fault/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

1000 VA, maximum.

AC Line Receptacle

Standard three-prong AC line connector.

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