# Model 601C

## High-Voltage Power Amplifier




The Model 601C is a DC-stable, high-voltage power amplifier designed to provide precise control of output voltages in the ranges of 0 to ±500 V, 0 to -1 kV, or 0 to +1 kV DC or peak AC, with an output current in the range of 0 to ±10 mA DC or 0 to ±20 mA peak AC. The Model 601C can have up to two (2) independent amplifier channels in one enclosure. Some industrial applications for the Model 601C include driving piezoelectric actuators, modulating electrooptics, and electrostatically controlling ion beams.

The Model 601C 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. The Model 601C has a Dynamic Adjust feature which can be used to optimize the AC response of the output signal. These features are essential for achieving the accurate output response and high slew rates demanded by reactive loads.

The Model 601C 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 representations of the high-voltage output and load current for monitoring purposes or for use as feedback signals in a closed-loop system.

The Digital Enable feature provides a connection for a remote device to turn ON and OFF the high voltage of the instrument. This makes the Model 601C suitable for automated or computer controlled systems.

The Model 601C can be operated as a noninverting or inverting amplifier with a fixed gain. The input gain of the 601C can be factory set for 50 V/V or 100 V/V. If different output voltage ranges, input configurations, or voltage gain ratios are required, please contact Trek, Inc. for more information. The Model 601C is available in single channel or dual channel configurations. These units can be operated on a bench top or, with optional hardware, in a standard 19-inch rack.

**Available Voltage Ranges:**
0 to ±500 V, DC or peak AC
0 to -1 kV, DC or peak AC
0 to +1 KV, DC or peak AC

**Available Gain Ratios:**
100 V / V or 50 V / V

**DC Accuracy:**
Better than 0.1% of full scale

**Slew Rate:**
Greater than 50 V/µs

**Up to two independent amplifier channels in one enclosure**

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

**Remote high-voltage ON/OFF capability**

CE compliant

**CONTROL WITHOUT COMPROMISE**

# Model 601C Specifications

All specifications are with no load unless otherwise noted.

## Output

**Output Voltage Range***
Available in voltage ranges of 0 to ±500 V, 0 to -1 kV, or 0 to +1 kV DC or peak AC.

**Output Current Range (all voltages)**
0 to ±10 mA DC.
0 to ±20 mA peak AC.

## Amplifier Input

**Input Voltage Range**
0 to ±10 V DC or peak AC, noninverting.

**Input Impedance**
25 kΩ, nominal.

## Performance

**DC Voltage Gain***
100 V/V (a gain of 50 V/V is available).

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

**Offset Voltage**
Less than 500 mV.

**Output Noise**
Less than 10 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

**Slew Rate (10% to 90%, typical)**
Greater than 50 V/µs.

**Large Signal Bandwidth (1% distortion)**
DC to 8 kHz.

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

**Settling Time to 1%**
Less than 300 µs for a 1 kV step.

**Stability**
**Drift with Time**
Less than 100 ppm/hr, noncumulative.
**Drift with Temperature**
Less than 50 ppm/°C.

## Features

**Voltage Monitor**
A buffered output provides a low-voltage replica of the high voltage output.
**Scale**
1/100th of the high-voltage output.
**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 10 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).
**Output Impedance**
0.1 Ω.

**Current Monitor**
A buffered output provides a low-voltage representation of the load current.
**Scale**
0.5 V/mA.
**DC Accuracy**
Better than 1 % of full scale.
**Offset Voltage**
Less than ±10 mV.
**Output Noise**
Less than 20 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).
**Output Impedance**
0.1 Ω.

**Output Voltage Configurations**
Factory set for 0 to ±500 V DC or peak AC. Other available output voltage ranges are 0 to -1 kV or 0 to +1 kV DC or peak AC This setting is customer specified.

**Digital Enable**
An input providing a connection for a TTL compatible signal to turn on and off the high-voltage output.

## Features (cont.)

**Input Configuration***
Factory set as a noninverting amplifier, the Model 601C can be configured as an inverting amplifier.

**Dynamic Adjust**
A graduated one-turn potentiometer is used to optimize the AC response of the Model 601C.

## General

**Dimensions**
**Single Channel Instrument**
222.3 mm W x 108 mm H x 335 mm D (8.75″ W x 4.25″ H x 13.2″ D).
**Dual Channel Instrument**
433.8 mm W x 108 mm H x 335 mm D (17″ W x 4.25″ H x 13.2″ D).

**Weight**
**Single Channel Instrument**
4.3 kg (9.4 lb)
**Dual Channel Instrument**
8.6 kg (18.8 lb)

**High-Voltage Output Connector**
SHV high-voltage connector.

**Power Requirements**
**Line Voltage**
Factory set for one of two ranges: 90 to 127 V AC or 180 to 250 V AC, at 48 to 63 Hz (specify when ordering).
**Power Consumption**
150 VA, maximum.

**Power Receptacle**
Standard three-prong power connector with an integral fuse holder.

* Specify when ordering or contact TREK, INC.

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All specifications are subject to change.
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# Model 601C Ordering Information

| Item | Part No. |
|---|---|
| Power Amplifier/Piezo Driver (90 to 127 V AC) | 601C-L |
| Power Amplifier/Piezo Driver (180 to 250 V AC) | 601C-H |

The Model 601C comes from the factory with settings for an output voltage of ±500 V DC or peak AC, a voltage gain ratio of 100 V/V, with a noninverting input. If more than one output voltage range, or voltage gain ratio is required, please contact TREK, INC. for more information.

### Included Accessories

| | |
|---|---|
| Operator's Manual | 23146 |
| High-Voltage Output Cable Assembly (3 meters) | 43874 |
| Line cord (90 to 127 V AC) | N5002 |
| Line Cord (180 to 250 V AC) | Contact Factory |

### Optional Accessories

| Item | Part No. |
|---|---|
| 603RA Full Rack Mount Kit | C4036 |
| 603RA-2 Dual Instrument Full Rack Mount Kit | C4060 |
| 604RA Half-Rack Mount Kit | C4008 |

### Certification

TREK, INC. certifies that each Model 601C is tested and calibrated to specifications using measurement equipment traceable to the National Institute of Standards and Technology or traceable to consensus standards. A Certificate of Calibration accompanies each instrument when it is shipped from the factory.

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