

±2kV, ±150mA, 30kHz

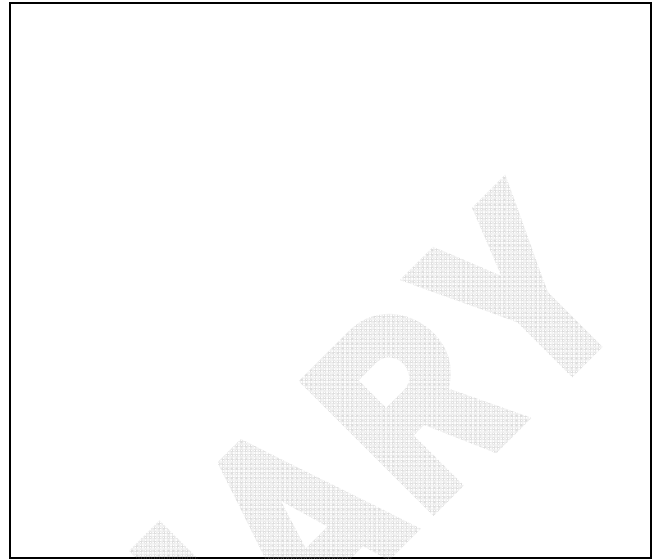
**PRECISION PROGRAMMABLE HIGH VOLTAGE AMPLIFIER
WITH INTEGRATED SIGNAL GENERATOR AND USER INTERFACE**

■ FEATURES

- ±2000V / ±150mA
- Programmable Current Limit
- Integrated DDS/ARB Signal Generator
- Local User Interface w/ Display
- High Precision, High Stability
- Low Noise, High Speed
- Inhibit Input
- V/I Monitor Outputs
- Interlock Input and HV OFF Button

■ APPLICATIONS

- General High Voltage Testing
- EAP
- ER Fluids
- Emulsion separation
- Electrophoresis
- Ion Beam Deflection
- Electro Optics



The **HA77GM-2B150** is a fast precision high voltage amplifier with integrated signal generator in a 19" rack mountable case.

This single channel amplifier provides output voltages of -2000V to +2000V at ±150mA. The power bandwidth is 30kHz. For local operation a user interface with LC display is provided.

The amplifier features high precision, high stability and very low noise. It is suitable to drive capacitive and resistive-capacitive loads. The output is stable with any capacitive load and also stable at no load conditions. It can easily drive loads like EAP actuators, electrorheological fluid elements, electrostatic deflection electrodes and many other loads.

Power bandwidth and slew rate depend on the actual load capacitance.

A differential ±10V amplifier input prevents any ground loops and provides excellent noise suppression.

The voltage gain is fixed to 200, voltage and current monitor outputs and a TTL compatible INHIBIT input are provided.

The maximum output current can be limited to programmable values and programmable behavior. When the output current reaches the threshold the output will either shut down or the output current will be limited to the set value.

Internal high voltage sources feed the output stage. The output stage is protected against overload, short circuit, over temperature and high voltage arcing. The amplifier output is made available via an SHV connector on the rear.

Operational and overload conditions are being displayed on the front panel.

A safety interlock circuit is provided to integrate the unit into an emergency shutdown circuit. When the interlock loop is open, the internal high voltage sources are being shut down. In addition to the interlock input a red HV OFF palm button is available on the front panel. The red indicator lamp HV ON signals that the internal high voltage sources are switched on.

A command interface is available via USB and Ethernet interfaces to control the amplifier. Monitor values of output voltage, output current as well as internal operational parameters can be read.

An implemented DDS/ARB signal generator is provided to generate standard waveforms like sinewave, trapezoid, squarewave, pulse, sawtooth and noise as well as fully arbitrary waveshapes. Parameters like waveform, amplitude, frequency, duty cycle, rise/fall time, offset, DC value, current limit and further functional parameters are controllable via the command interface or via the local control elements.

The internal waveform generator can be synchronized to other generators or signal sources.

An LC display equipped with soft keys and a jog wheel allows for local operation of the signal generator and control of the amplifier.

Customized and full custom models are available on request.

■ TECHNICAL DATA

Output Voltage:	-2000V ... +2000V
Output Current:	±150mA
Full Power Bandwidth:	> DC ... 30kHz @ $C_L=300\text{pF}$ *
Small Signal Bandwidth:	> DC ... 100kHz @ $C_L=300\text{pF}$ *
Slew-Rate:	> $650\text{V}/\mu\text{s}$ @ $C_L=0$ * > $400\text{V}/\mu\text{s}$ @ $C_L=300\text{pF}$ *
Noise:	< 10mV_{RMS} @ $C_L=300\text{pF}$ *
Control Input:	±10V ($10\text{V} \cong 2000\text{V}$), BNC, $R_i = 50\text{k}\Omega$
DC-Gain:	$200 \pm 0.3\%$
Offset Voltage (RTO):	< ±50mV
Monitor Output (V):	±10V ($10\text{V} \cong 2000\text{V} \pm 0.3\%$), BNC
Monitor Output (I):	±10V ($10\text{V} \cong 200\text{mA} \pm 0.5\%$), BNC
Interlock:	24V, internally fed, Combicon
INHIBIT Input:	TTL compatible, BNC
SYNC I/O:	BNC
Output Connector:	SHV An output cable of 2m length is included.

Output GND is connected the chassis and protective earth

Cooling: temperature controlled fans

Line Voltage: 100 - 240V_{AC} ±10% 50/60Hz
Power Consumption: ca. 500VA (4000V_{PP}, 30kHz, $C_L=300\text{pF}$)
Ambient Temperature: Operation: 0 - +40°C
Storage: -25 - +70°C
Dimensions (d x w x h): ca. 450 x 449/480 x 266mm³ (19" / 6U)
Weight: ca. 25kg

Safety: according to EN 61010-1
EMC: according to EN 61326-1

- * Bandwidth, slew rate and output noise are depending on the size of the capacitive load. The coaxial output cable is part of the capacitive load and will reduce slew rates and large signal bandwidth. A typical coaxial cable has a capacitance of approx. 100pF/m.
Increasing the load capacitance reduces output noise.

Disclaimer

The information given in this data sheet is technical data, not assured product characteristics. It has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. The user has to ensure by adequate tests that the product is suitable for his application regarding safety and technical aspects.
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Safety Advice

Design, installation and inspection of machinery and devices carrying high voltage require accordingly trained and qualified personnel. Appropriate safety rules and directives must be complied with.
Improper handling of high voltage can mean severe injuries or death and may cause serious collateral damage!