

## ***HV-AMPLIFIER ( $\pm 100$ V, $\pm 70$ mA)***

***PHYSICS BASEL, SP 908***

**DOCUMENTATION VERSION 1.0 / JANUARY 2007**

### **KEY FEATURES:**

- ▲ Fixed gain of +10
- ▲ Bipolar output voltage  $\pm 100$  V
- ▲ Bipolar output current  $\pm 70$  mA with short-cut protection at  $\pm 100$  mA
- ▲ Low output noise
- ▲ Floating input/output prevents from ground-loops
- ▲ Selectable signal LP cut-off (-3dB) at 10 kHz or 100 kHz
- ▲ Selectable output resistance of 10  $\Omega$  or 10 k $\Omega$
- ▲ Input resistance 100 k $\Omega$
- ▲ Drives resistive loads as well as capacitive loads
- ▲ Back-lighted analog indicator of output voltage on the front panel
- ▲ Robust aluminum housing



### **DESCRIPTION:**

The *HV-Amplifier* is a low-noise bipolar amplifier with a fixed voltage-gain of ten. It can be used in precision DC applications as well as for AC tasks up to frequencies of 100 kHz. The device delivers an output voltage of  $\pm 100$  V at an output current of  $\pm 70$  mA. If it is connected to a high-impedance load, the maximum output voltage can reach up to  $\pm 125$  V.

The shielding of the BNC input and output are connected together, but they are isolated from protection-earth (housing) and they can float up to 20 Vrms with respect to earth. This helps to prevent from nasty ground-loops. The BNC-shielding and the protection-earth are internally coupled via a 10 k $\Omega$  resistor and in parallel with 10 nF capacitor. These components are pluggable and can be change if necessary.

The output resistance can be chosen between 10  $\Omega$  (for low impedance loads) and 10 k $\Omega$  (for high impedance loads). The internal short-circuit protection limits the maximum output current to  $\pm 100$  mA. Nevertheless, **do not short-cut the output for a longer time**; it could damage the device. If short-cuts are feasible in your application, switch the output resistance to 10 k $\Omega$ ; this limits the maximum short-cut output current to save  $\pm 10$  mA.

The bandwidth of the device can be selected between DC...10 kHz and DC...100 kHz; this bandwidth is the same for large signals (200 Vpp) or small signals (20 Vpp). The broadband noise is reduced if the lower LP cut-off frequency is chosen.

The instrument can source (with full output swing of 200Vpp) resistive loads of 1.4 k $\Omega$  with frequencies up to 100 kHz, and a capacitive load of 10 nF with frequencies up to 10 kHz.

The device is supplied by the 230 V<sub>AC</sub>/50 Hz line-voltage; the maximum power consumption is 35 W. The line fuse as well as the power ON/OFF switch is located on the back-side of the device near the line input. If the instrument is switched off the output voltage drops to about -7 V for about 0.5 seconds.

## TYPICAL SPECIFICATIONS (25° C):

- **Input:** 0...  $\pm 10$  V (Connector: BNC isolated from ground)
- **DC Input Resistance:** 100 k $\Omega$
- **Gain:** Fixed +10
- **Gain Accuracy:**  $\pm 1\%$
- **Output Voltage:**  $\pm 100$  V @  $R_{load} > 1.4k$  (Connector: BNC isolated from ground)
- **Output Current:**  $\pm 70$  mA; Short-circuit protection at  $\pm 100$  mA
- **Output Offset Voltage:** typ  $\pm 1$  mV; max.  $\pm 5$  mV
- **Supply Voltage/Power:** 230 V<sub>AC</sub> (+5%, -10%); 50 Hz / max. 35 W
- **Line Fuse:** 200 mA T (slow blow)
- **Bandwidth (-3 dB):** Selectable between DC...10 kHz or DC...100 kHz
- **Broadband Noise (10 Hz...1 MHz) input terminated with 50 Ohm:**  
**f<sub>cut LP</sub> = 10 kHz, R<sub>out</sub> = 10 k $\Omega$ :** < 0.8 mVpp (mainly line harmonics)  
**f<sub>cut LP</sub> = 100 kHz, R<sub>out</sub> = 10  $\Omega$ :** < 2 mVpp (mainly line harmonics)
- **Output Voltage Noise Density at 1.08 kHz:** typ. 1  $\mu$ V/sqrt(Hz)
- **Size (Width x Height x Depth):** 105 mm x 70 mm x 180 mm
- **Weight:** 1.450 kg