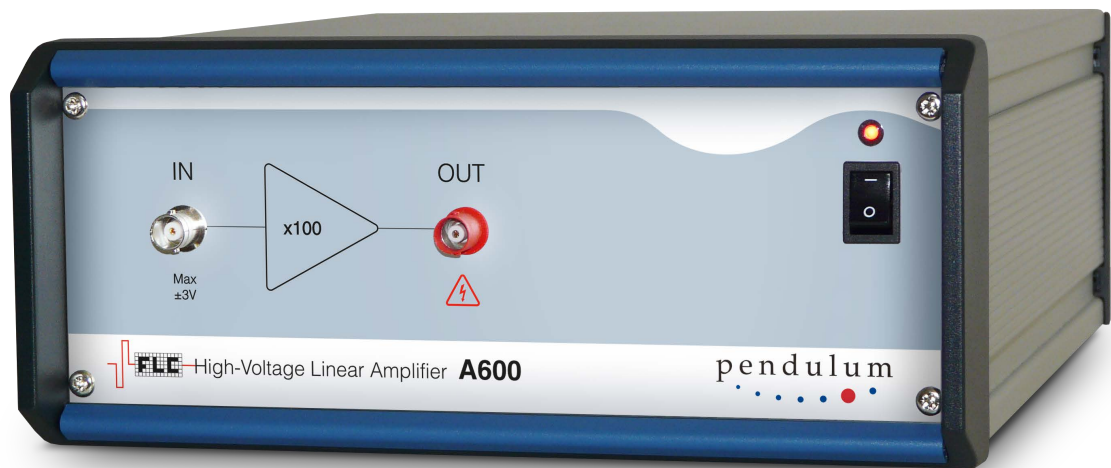


# pendulum

## BROADBAND LINEAR AMPLIFIER

### Model A600



#### HIGH VOLTAGE

600 Vpp  
75 mA

#### FIXED GAIN

100x

#### BROADBAND

DC to ca 350 kHz  
FULL SCALE

#### LOW OUTPUT IMPEDANCE

<0.1  $\Omega$

#### HIGH SLEW RATE

500 V/ $\mu$ s

## GENERAL DESCRIPTION

The **A600** is a general purpose linear amplifier designed for laboratory use. It is based on a fast high-voltage operational amplifier with a feedback network chosen to give a voltage amplification of 100 times. Any function or arbitrary waveform generator with low output impedance and output voltage up to  $\pm 10$  V can be used as an input device.

The amplifier outputs high voltage signals at high frequency. It is, thus, imperative for the safe operation that the user understands the possibilities and limitations of the instrument. Isolated BNC output connector is used to comply with safety requirements.

## INPUT AMPLITUDE

The amplitude of the input signal should normally be kept within  $\pm 3$  V. The input protection network limits the signal amplitude delivered to the power amplifier to a safe value. It also effectively cuts accidental spikes and overshoots. However, large and prolonged overvoltage at the input may blow the microfuse in the input protection circuit.

Keep input signals within  $\pm 3$  V range.

Never connect any high voltage output to any input or output of the instrument!

## TROUBLESHOOTING

Problem	Condition	Solution
No output	Power switch does not lit	Check the mains fuse located on the back
No output or very small, distorted signal	Power switch OK	Check the input microfuse located <u>inside</u> the device.
Constant high voltage output	Without any input signal	Amplifier failure. Contact <a href="mailto:service@pendulum.se">service@pendulum.se</a>

You should suspect a blown input microfuse if the output is about zero or the amplifier is producing a very low voltage, distorted copy of the input signal (due to the capacitive coupling through the blown fuse).

Spare microfuses are provided inside the instrument. They look like small metal cans and are placed in white holders. The resistance of a good fuse is in the order of 46 ohm. It is imperative to disconnect the power cable and wait at least a minute before opening the case. If possible, contact [service@pendulum-instruments.com](mailto:service@pendulum-instruments.com) for advice.

## LOAD

The amplifier is intended to drive resistive and/or small capacitive loads. The maximum capacitive load depends on the slew rate of the amplifier. The slew rate is normally set at the factory to 500 V/ $\mu$ s which is appropriate for a small load (for example 5 k $\Omega$  in series with 100 pF). Due to the output current limit (75 mA) the slew rate at higher load of 300 pF drops to ca 200 V/ $\mu$ s rising edge and ca 130 V/ $\mu$ s falling edge. This load includes the capacitance of the connection cable (ca 100 pF/m for a standard coaxial cable). Increasing the capacitive load causes overshoot to appear. If a larger capacitive load is required, and the overshoot is not acceptable, then the slew should be reduced accordingly. Such an adjustment may be performed by qualified personnel and the factory should be contacted for advice (preferably by email [service@pendulum-instruments.com](mailto:service@pendulum-instruments.com)). Inside the cabinet exist hazardous voltage levels and the amplifier circuit is sensitive to static discharge.

Pendulum Instruments recommends to monitor the output signal of the amplifier with an oscilloscope. It is then important to use a low capacitive probe with a division factor of at least 1/100 (please note also the maximum voltage that can be connected to the oscilloscope input and that can be handled by the probe).

**The amplifier cannot be used to drive an inductive load.**

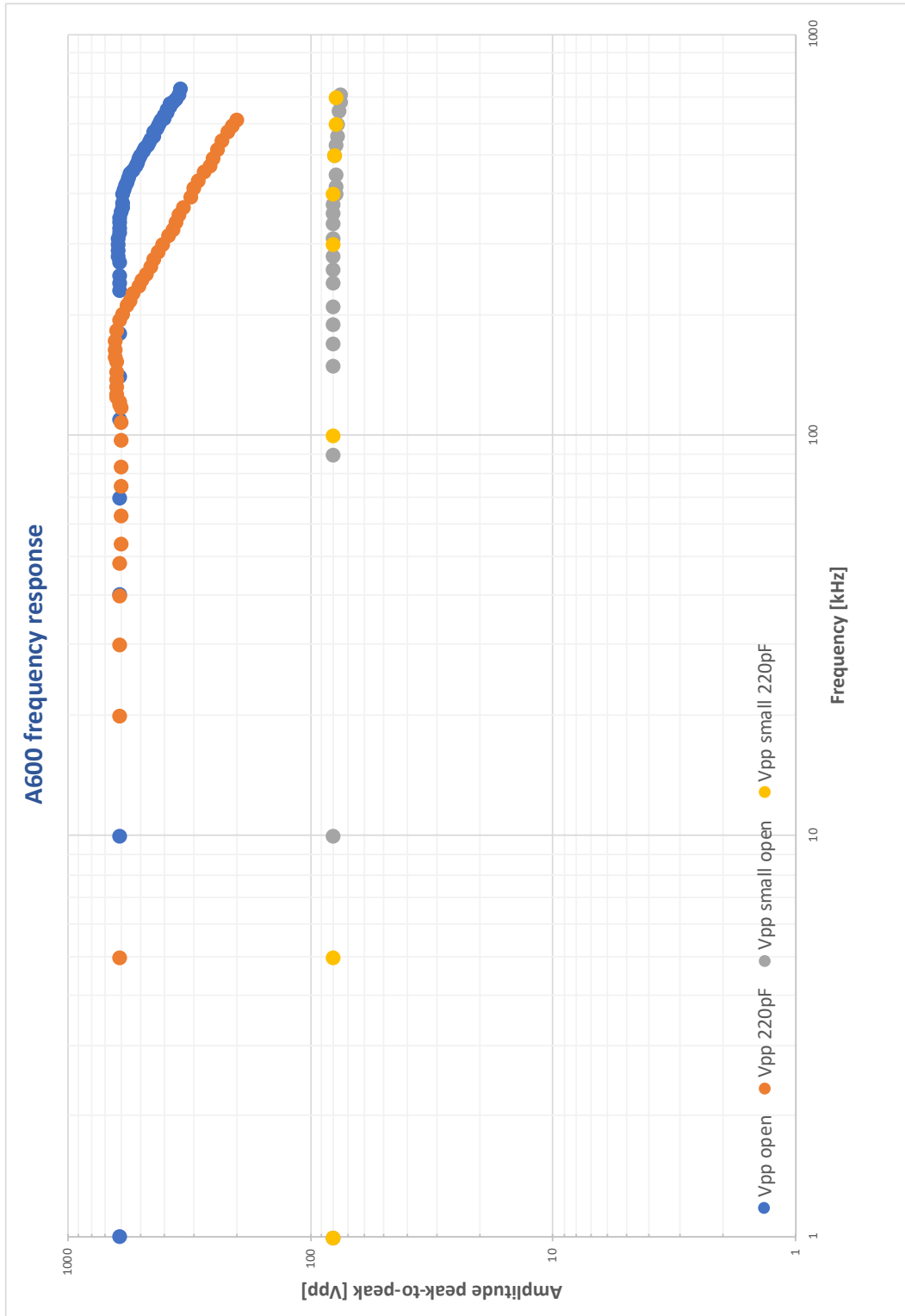
The continuous output current limit is 75 mA and the output power limit is 30 W. The output is equipped with a current limiting circuit that withstands accidental short-circuits. Prolonged short-circuiting may result in overheating the amplifier.

**Overloading the output may cause an overshoot which might be dangerous for connected devices.**

**The amplifier may be overheated when the output is short-circuited for a long time.**

## FREQUENCY RESPONSE

The graph below shows frequency response of **A600** without load and with 220pF capacitive load :



Bandwidth:		DC to about 350 kHz at 600 Vpp
Amplification:		100 times
Load:	type	resistive    capacitive
Impedance:	input	1 MΩ    30 pF, custom values possible
	output	<0.1 Ω in the linear mode
Voltage:	input	nominal ±3 V
Current:	output	maximum 75 mA
Slew Rate:	output	ca 500 V/μs without load (different adjustments available on request)
Input protection fuse		15 mA (Littelfuse, part number 272.015) one spare fuse provided inside the instrument, additional fuses available from Littelfuse resellers or from Pendulum Instruments.
Operating Ambient Temperature:		0°C to 30°C
Storage Temperature:		0°C to 60°C
Relative Humidity:		up to 90% (operation) 30% to 50% (storage)
Power Requirements:		100, 120 or 230 V, 50/60 Hz factory set or 110/220V line voltage selector
Fuse:		2 A (slow)
Dimensions (H/W/L):		112 x 255 x 316 (mm)
Weight:		4 kg
Country of Origin:		Poland

**Note:** Specifications apply to instruments operating at 23°C±5°C ambient temperature after 15 min. warm-up time. Due to ongoing product development, specifications are subject to change without notice.

**WARNING** It is not allowed to connect the 100...230V AC line power input of the amplifier to DC-AC converters or solid state AC generators with non-sinusoidal output.

*Data sheet revision date: 6 November 2019*

## **I M P O R T A N T**



**Inside the amplifier case exist dangerous voltage levels.**



**The amplifier cannot be used to drive an inductive load.**



**The instrument cannot be powered from a DC-AC converter nor from a solid-state AC generator with non-sinusoidal output.**



**Loads sensitive to voltage transients should be disconnected from the amplifier during power-up and power-down.**



**Never connect the output to the input of the amplifier!**



**The amplifier may be overheated if the output is short-circuited for a long time.**



**It is recommended to monitor the output signal of the amplifier on the oscilloscope.**

## **WARRANTY**

The Warranty Statement is part of the folder *Important Information* that is included with the shipment.

## **DECLARATION OF CONFORMITY**

The complete text with formal statements concerning product identification, manufacturer and standards used for type testing is available on request.

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