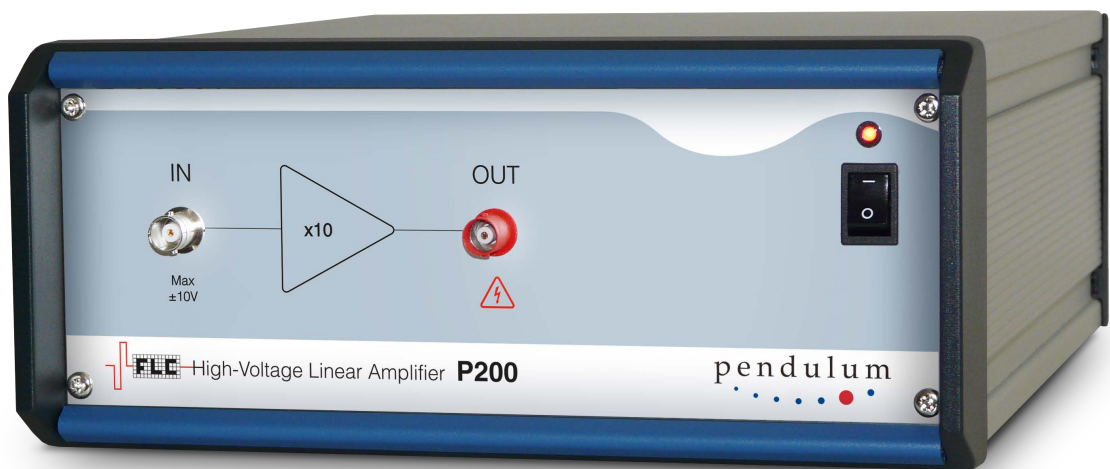


# pendulum



## BROADBAND LINEAR AMPLIFIER

Model P200



HIGH VOLTAGE

$\pm 100\text{V}$

GAIN

10x

HIGH CURRENT

1 A

HIGH  
SLEW RATE

$30\text{ V}/\mu\text{s}$

POWER  
BANDWIDTH

DC to ca 80 kHz

SMALL SIGNAL  
BANDWIDTH

DC to >200 kHz

## GENERAL DESCRIPTION

The **P200** is a general purpose linear amplifier with high voltage and high output current. Intended applications are piezoelectric positioning, electrostatic transducers and other high voltage instrumentation.

## INPUT AMPLITUDE

The **P200** amplifier has a fixed gain of x10 and the input resistance of 1 M $\Omega$ . The input amplitude should be within -10...+10 V giving output voltage in the range -100...+100V. Higher input voltage will be limited to -10...+10 V range by the input protection circuit.

Above ca 300% overvoltage at the input a microfuse may be blown. In such a case there will be no signal at the output (see below). For your convenience one spare fuse is provided on the amplifier's printed-circuit board inside the enclosure. It is advisable to contact [service@pendulum-instruments.com](mailto:service@pendulum-instruments.com) for guidance.

## TROUBLESHOOTING

Problem	Condition	Solution
No output	Power switch is 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. Inside the amplifier case exist dangerous voltage levels!

## IMPORTANT NOTES

This device 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.

Due to the high dissipated power the amplifier requires good ventilation. Air intake (at the bottom of the case) and the fan output (on the back) should never be obstructed.

Please remember that the instrument cannot be powered from a DC-AC converter nor from a solid-state AC generator with non-sinusoidal output. A high level of harmonics in the supply line will overheat the toroidal transformer in the power supply module.

Never connect the output to the input of the amplifier! The input fuse will be blown immediately.

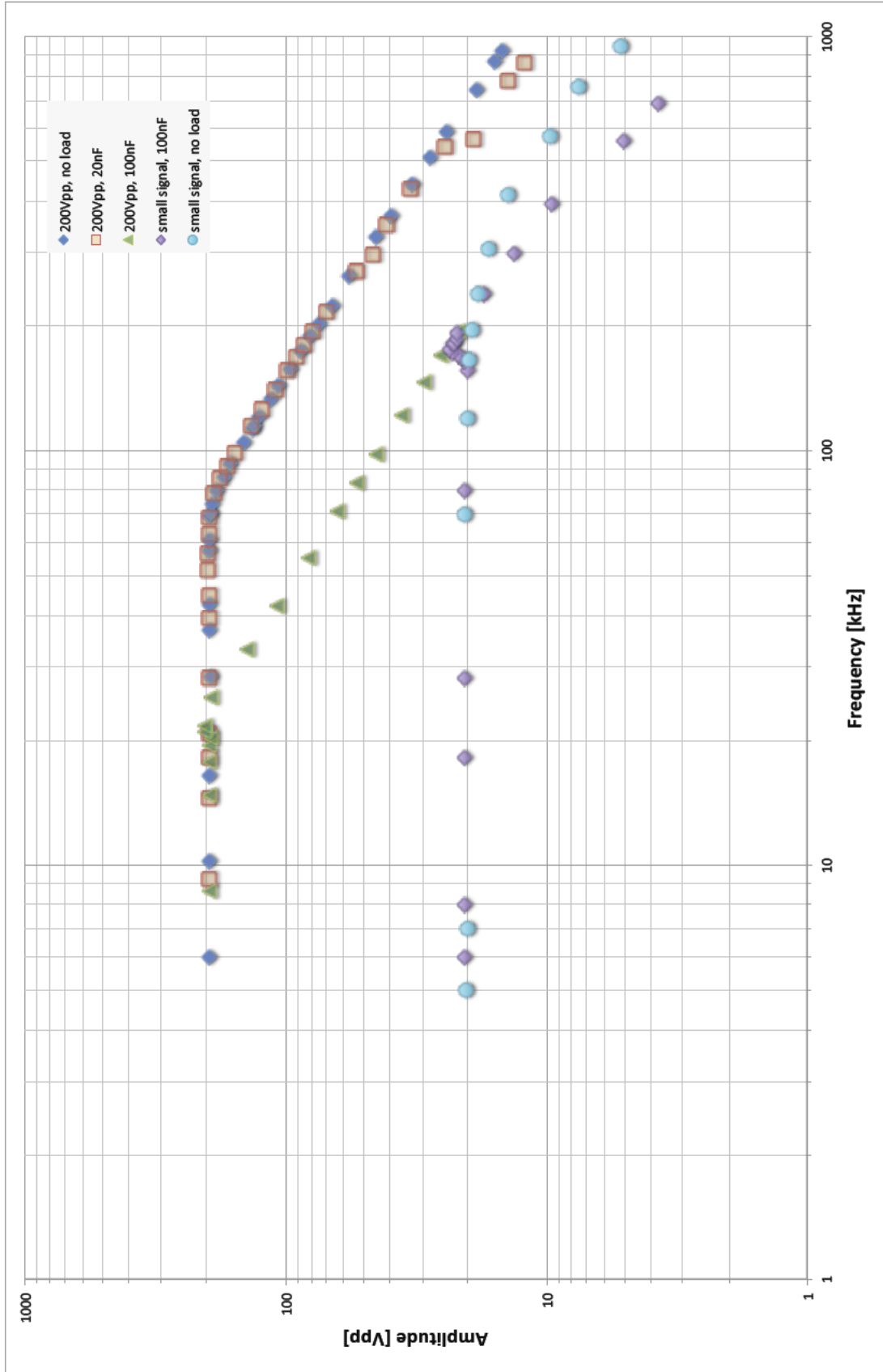
## LOAD

**P200** is designed for resistive and capacitive load. Do not use with inductive load!

The maximum capacitive load depends on the slew rate of the amplifier. This is normally set at the factory to 30 V/ $\mu$ s. When the load is large the effective slew rate becomes governed by the output current limit. This may cause an overshoot to appear. If an overshoot is not acceptable then the slew setting 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 very sensitive to static discharge.

The maximum power dissipation of the amplifier is 125W and the maximum output current is ca 1A. The output is equipped with a current limiting circuit that withstands accidental short-circuits. Prolonged short-circuiting may result in overheating of the amplifier.

# FREQUENCY RESPONSE



## SUMMARY OF TECHNICAL DATA

Bandwidth:		DC to about 80 kHz at 200 V <sub>pp</sub>
Small signal bandwidth:		DC to >200 kHz
Amplification:		10 times fixed
Load:	type	resistive    capacitive
Impedance:	input	1 M $\Omega$    <30 pF
	output	1 $\Omega$ in the linear mode
Voltage:	input	maximum $\pm 10$ V
Current:	output	maximum 1 A
Slew Rate:	output	ca 30 V/ $\mu$ s
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:		100/110 V or 220/230 V, 50/60 Hz
Fuse:		100/110 V: 4 A (slow), 220/230 V: 2 A (slow)
Dimensions (H/W/L):		112 x 255 x 316 (mm)
Weight:		6 kg
Country of Origin:		Poland

**Note:** Specifications apply to instruments operating at 23°C $\pm$ 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: 15 February 2019*

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



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



**Do not use the amplifier to drive inductive load!**



**Any load 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.**



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



**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.

<https://mod-e.ru/>

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Specifications subject to change  
or improvements without notice.