BROADBAND LINEAR AMPLIFIER

Model F30PV

HIGH OUTPUT CURRENT

±35 V 2 A

VARIABLE GAIN

0-10x

HIGH SLEW RATE

500 V/µs

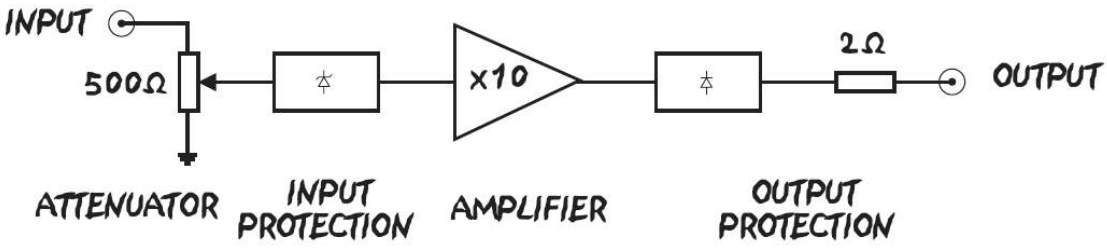
BROADBAND

DC to ca 5 MHz

GENERAL DESCRIPTION

The **F30PV** is a broadband, high output current, general purpose linear amplifier designed for laboratory use. It is based on a fast operational amplifier with a feedback network chosen to give a voltage amplification of 10 times. Any function or arbitrary waveform generator can be used as an input device.

The amplifier combines very high speed with high output current. It is, thus, of the outmost importance for the safe operation that the user understands the possibilities as well as the limitations of the instrument. A functional diagram of the instrument is shown below:



INPUT AMPLITUDE

The amplifier has an attenuator at the input. At the knob position “10” the amplification is equal to 10x. Standard value is 500 ohm, but 50 ohm, 1kohm or other values can be fitted in on request.

The amplitude of the input signal should normally be kept within ±3.5 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. (A spare fuse is provided inside the instrument. If possible, contact service@pendulum-instruments.com for advice before opening the instrument case.)

Keep input signals within ±3.5 V range.

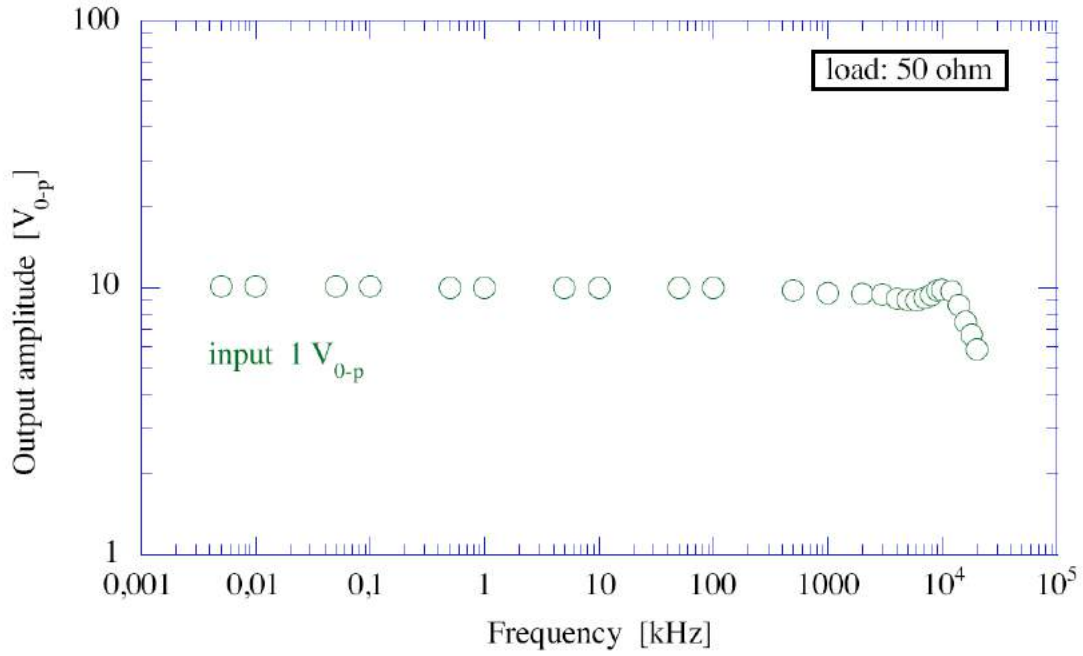
Never connect the output to the input of the amplifier!

LOAD

The amplifier is intended to drive resistive and capacitive loads. It can also be used to drive an inductance in series with resistance. The maximum load that can be safely connected depends on the slew rate of the amplifier. Unless agreed otherwise, this is normally set at the factory to ca 500 V/μs which yields a capacitive load limit of about **1 nF**. This limit includes the capacitance of the connection cable (ca 100 pF/m for a standard coaxial cable). Increasing the capacitive load causes overshoot and may cause instability of the amplifier. If a larger capacitive load is required then the slew rate should be reduced accordingly (see the Load vs. Frequency plot below). Such an adjustment (within a limited load range) may be performed by qualified personnel and the factory should be contacted for advice, since opening the instrument voids the warranty. Inside the cabinet exist hazardous voltage levels and the amplifier circuit is extremely sensitive to static discharge.

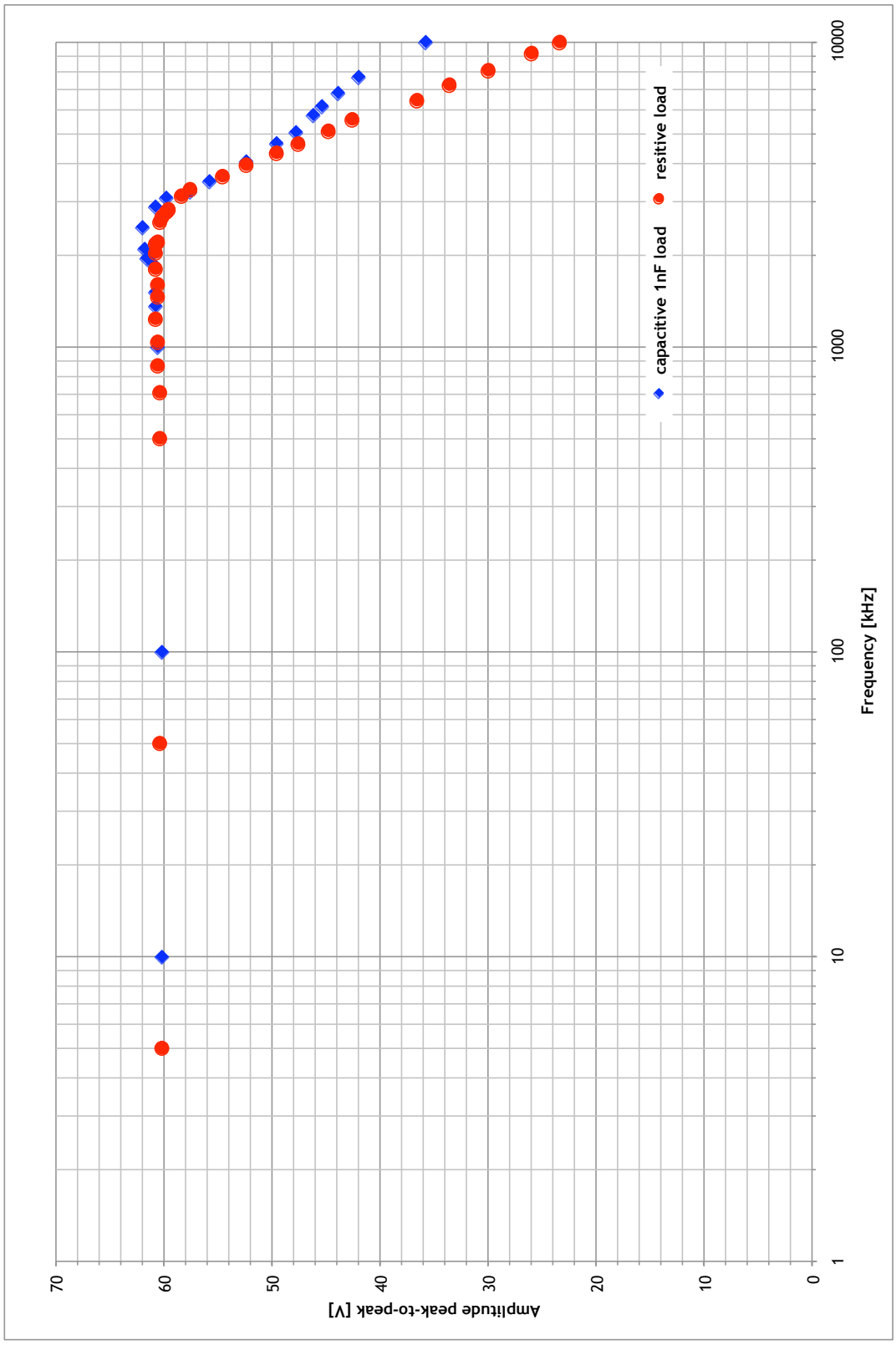
Overloading the output may cause instability.

The frequency response to 1 V_{pp} input amplitude and with 50 ohm load is shown in the following diagram:



The output current limit is set to ca 2 A. The output is equipped with a current limiting circuit that withstands accidental short-circuits and with a protective 2 Ω resistance. However, prolonged short-circuiting or overload should be avoided.

Full scale frequency response with resistive 50 ohm load (red marks) and with capacitive 1 nF load (blue marks) is shown in the diagram below:



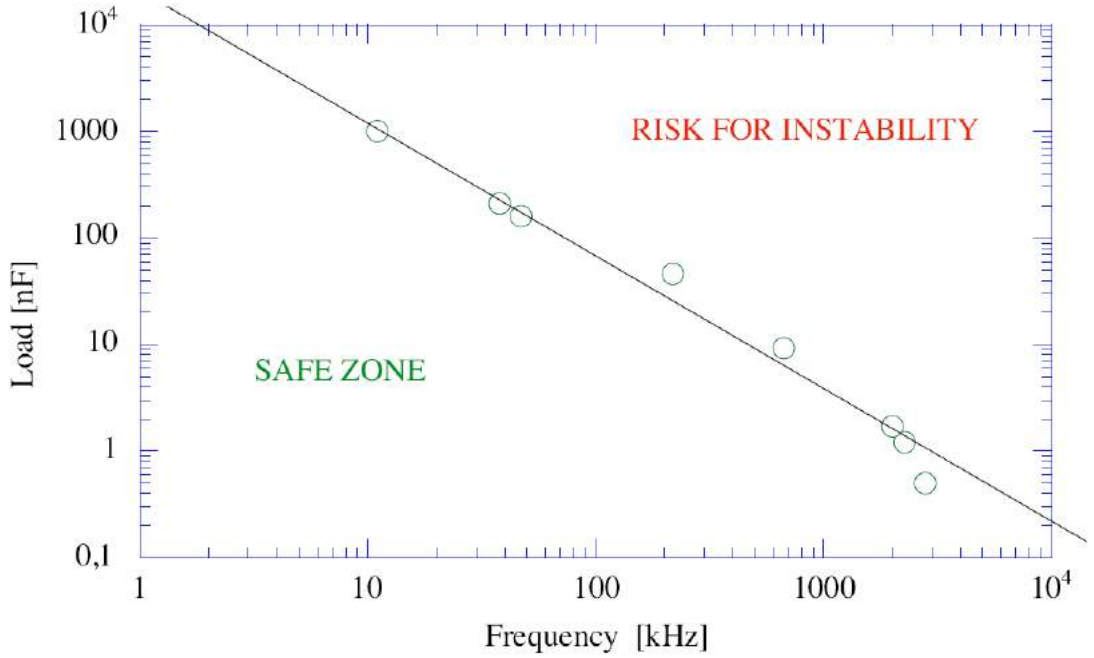
The amplifier may be overheated and enter thermal shutoff if its output is short-circuited for a long time.

The amplifier cannot be used to drive an inductive load.

Maximum frequency depends on the load capacitance. For safe operation with high loads the slew rate has to be reduced by adjusting internal trim capacitor. The slew rate is roughly equal to the max current (2 A) divided by the load capacitance:

$$SR\ [V/\mu s] \approx I_{MAX}\ [A] / C_L\ [\mu F]$$

The diagram below shows the **possible adjustment range**. It **does not mean** that higher loads can be driven just by lowering the frequency. The slew rate adjustment is necessary!



Total noise at the output with short-circuited input is:

frequency [kHz]	0,5	1	10	50
U_{NOISE} [$\mu V/\sqrt{Hz}$]	<1.3	<0.32	<0.06	<0.05

SUMMARY OF TECHNICAL DATA

Bandwidth:		DC to about 5 MHz at 70 V_{pp} and 50 ohm load
Amplification:		10 times fixed; variable with input attenuator
Load:	type	resistive ‖ capacitive, factory adjusted for 1nF max load unless requested otherwise
Impedance:	input	500 Ω ‖ 30 pF, custom values possible
	output	2 Ω in the linear mode
Voltage:	input	nominal ±3.5 V maximum ±10 V
Current:	output	maximum 2 A
Slew Rate:	output	ca 500 V/μs at 50 Ω load
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: 3.15 A (slow), 220/230 V: 2 A (slow)
Dimensions (H/W/L):	112 x 255 x 316 (mm)
Weight:	4.5 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: 13 August 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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