

PACIFIC LASER EQUIPMENT

1PA100 User Manual



Name: 1PA100UM

Release: 1.30

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Table of contents:

| | |
|-----------------------------|---|
| 1. Introduction | 3 |
| 1.1 Product description | |
| 1.2 Labels | |
| 1.3 Operation | |
| 1.4 Analog indicator | |
| 2. Block diagram | 5 |
| 2.1 General diagram | |
| 2.2 Power supplies diagram | |
| 3. Technical specs | 6 |
| 4. Test and troubleshooting | 7 |
| 5. Calibration | 7 |
| 6. Addendum | 8 |
| 7. O.E.M versions | 9 |

1.Introduction

1.1 Product description.

The 1A100 is a unique piezo actuator driver with no position sensor processing electronics on board.

It consists of a precision high voltage amplifier, AC power supply, insulation transformers, rectifiers, and voltage regulators. All this is compactly packaged in a 4-part aluminum case that has the surface connected to ground through the AC cord.

The MOSFET amplifier is protected from excessive common mode and differential mode voltages.

On the front panel the device offers manual control as well as an analog input for user control. The level indicator can be used to estimate the voltage applied to the piezo.

All front panel connectors have the outer side connected to ground (GND).

The HV output connector will deliver up to 150V (only positive polarity) on the center pin.

For applications where PC control is necessary we recommend the use of a D/A card to generate the analog input voltage. Suggested manufacturers are Capital Equipment Corporation (CEC), Keithley Instruments and National Instruments (NI).

The same front panel input can be used to drive the 1A100 directly from a function generator. If the driving signal is bipolar the corresponding amplified negative part of the output will be "clipped". See the Operation paragraph for details.

The amplifier is pre-calibrated and has a gain factor of 30 in DC and quasi DC operation.

On the rear panel the user has access to the AC power plug and the ON / OFF switch.

The fuse is located inside the box.

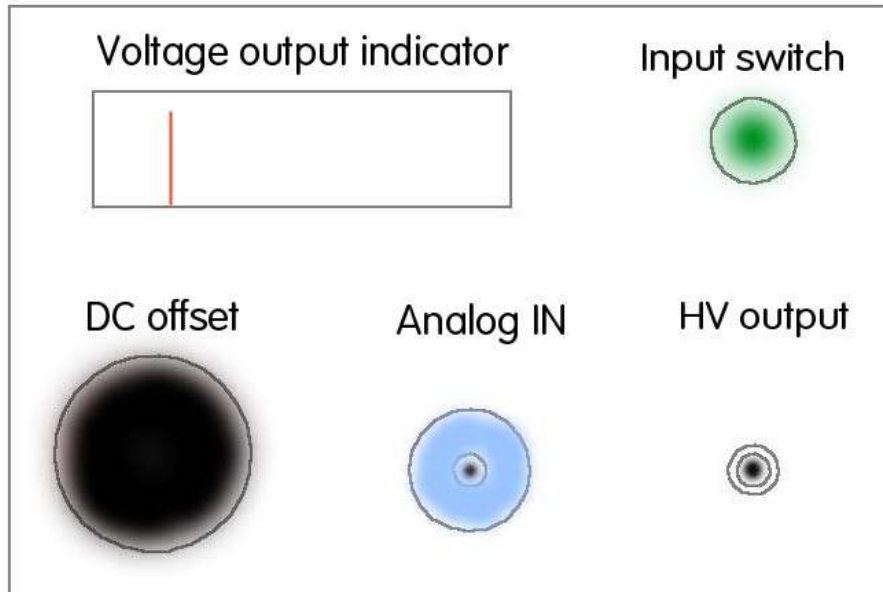
The amplifier is delivered with this manual, power cord and a LEMO to blunt end cable.

Extension cables and adapters can be ordered separately.

1.2 Labels.

Rear panel label displays the power requirements and the unit serial number.

Top cover the label shown below displays a “map” of the front panel controls and connectors.



1.3 Operation.

Two operating modes can be selected from the front panel.

Remote Controlled (RC) and Manually Controlled (MC).

Remote Controlled Operation (RC-Mode)

The nominal input voltage range is 0 to +5 V for 0 to +150 V output voltage range.

For bipolar operation set the output with the external DC-Level potentiometer to an appropriate level (+75 V) and drive the input with 0 to +5 V to get full voltage output swing.

In RC mode an analog input signal of 0 to +5 V causes the output to swing from 0 to 150V. Most dynamic applications require the power amplifier to deliver a short peak current higher than the average value.

The operating voltage for the piezo actuator may change in the range from 0 to +150 V. Our standard calibration procedure assures that that the output reaches its nominal value when the input control signal is +5 Volt.

Manual Operation:

In MC mode the HV output can be controlled manually from 0 up to +150 VDC from the front panel DC- Offset Potentiometer. In this mode, the HV output is proportional to the number of turns on the DC offset potentiometer.

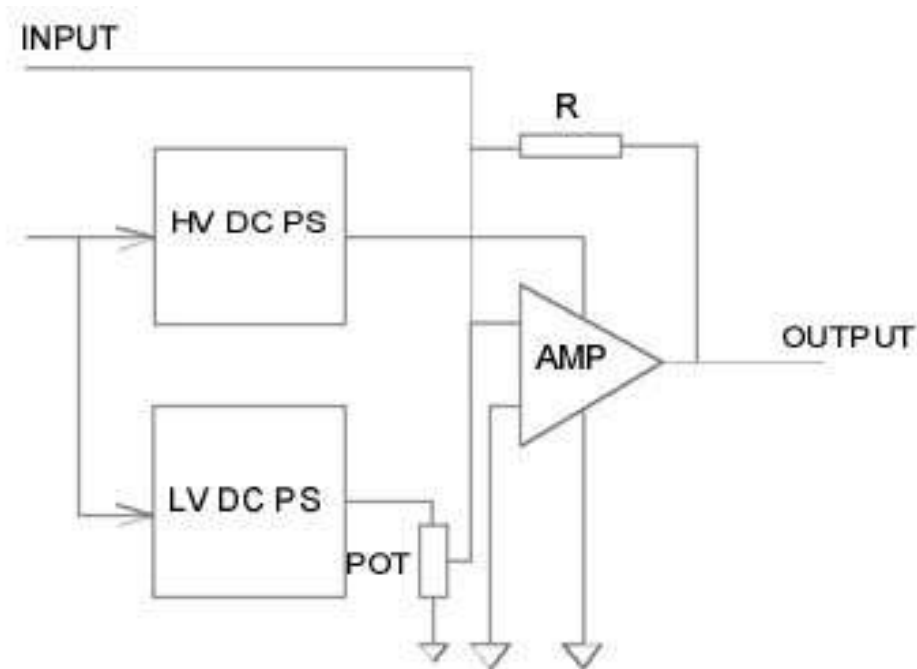
1.4 Analog indicator.

Located on the front panel the voltage indicator can be used to read the approximate voltage applied to the piezo actuator. It is calibrated to swing to the extreme right when the voltage present at the HV connector reaches 150V.

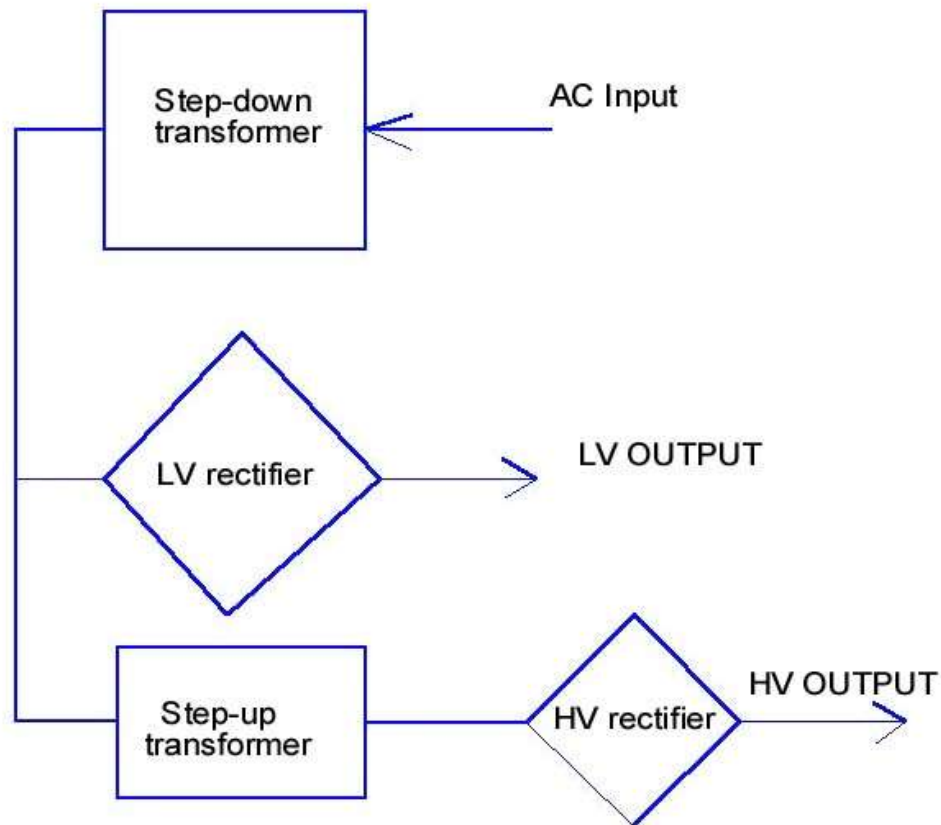
We recommend that the user should test this indicator in relation with the voltage out and use the results during the regular operation. In dynamic mode the indicator will average the voltage output and at high frequency will not be usable.

2. Block diagrams

2.1 General diagram.



2.2 Power supplies diagram



3. Technical specs

| | |
|----------------------------|---|
| Output voltage: | 0V to +150V DC (positive polarity). |
| Display: | Analog voltage indicator. |
| Analog input: | 0 to 5V for 0 to nominal actuator expansion (pre-calibrated). |
| Power out: | 2.5W continuous, 5W peak. |
| Dimensions: | 5 x 3.21 x 1.85" |
| Power requirements: | 120V AC, 100mA. |
| Enclosure material: | Aluminum (Silver or black anodized 3008H-5N) |

Test and troubleshooting

High voltage output

Attention:

The HV output can reach +150V. This is a dangerous voltage.

Test in RC mode. At 5V analog input the indicator should read MAX.

Fuse

Check the main fuse inside the unit. When replacing it, use slow-blow 100mA.

The fuse is located inside the box and access to it is fairly difficult.

AC Power

Make sure that the AC power used is always 120V.

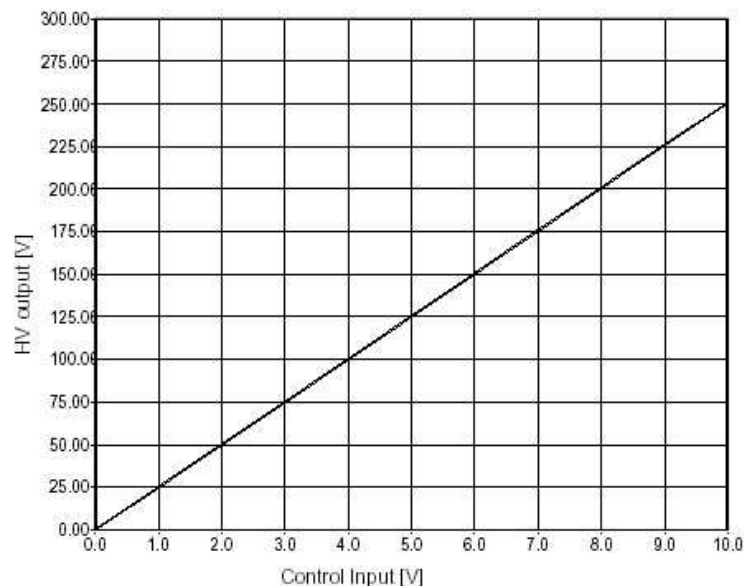
Calibration

Adjusted during manufacturing RC mode with the front panel potentiometer fully turned counterclockwise and 0V analog input, the HV output is 0V.

At 5V analog input the HV output is 150V DC.

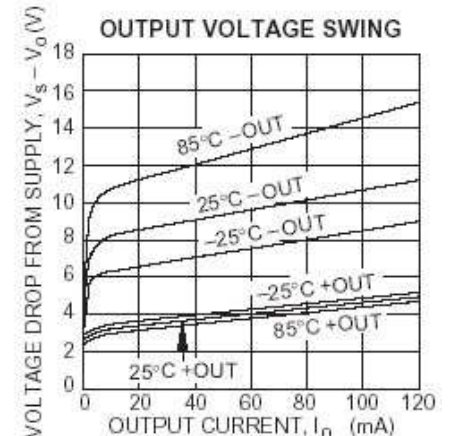
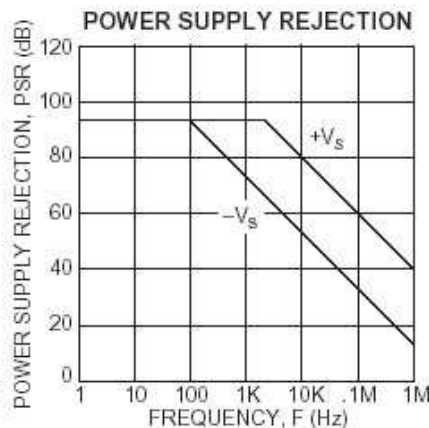
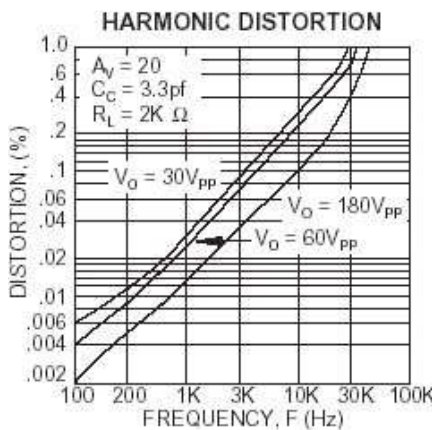
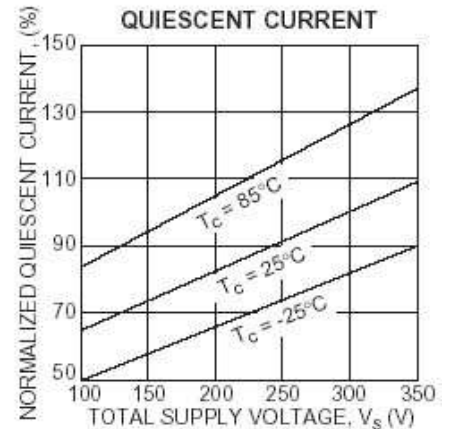
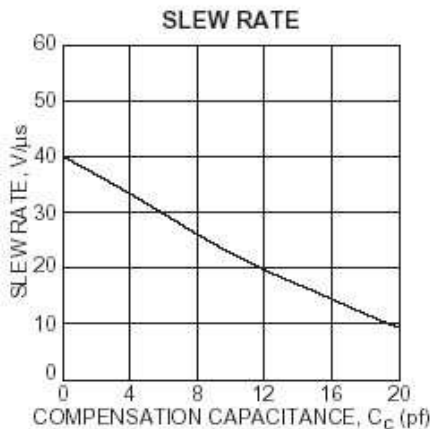
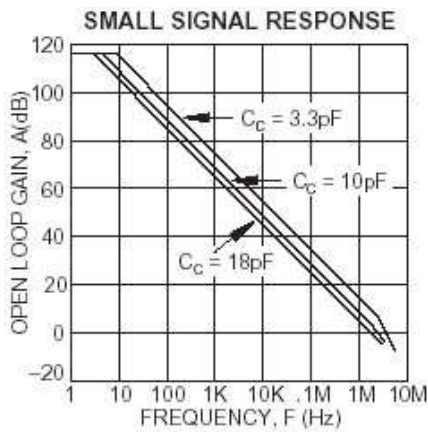
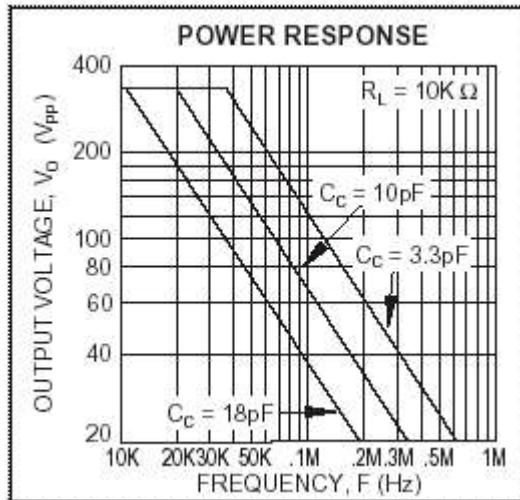
4. Calibration

HV output calibration graph



Addendum

Calibration graphs shown below for 0-5V control input.

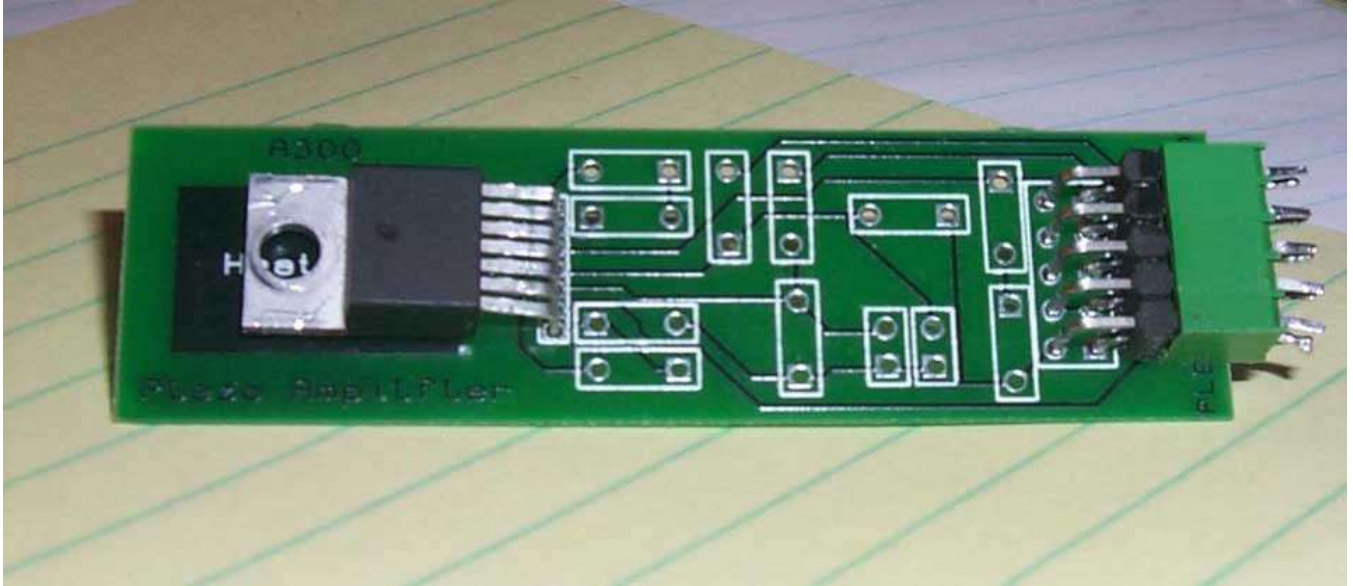


THIS DATA SHEET HAS BEEN CAREFULLY CHECKED AND IS BELIEVED TO BE RELIABLE, HOWEVER, NO RESPONSIBILITY IS ASSUMED FOR POSSIBLE INACCURACIES OR OMISSIONS. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

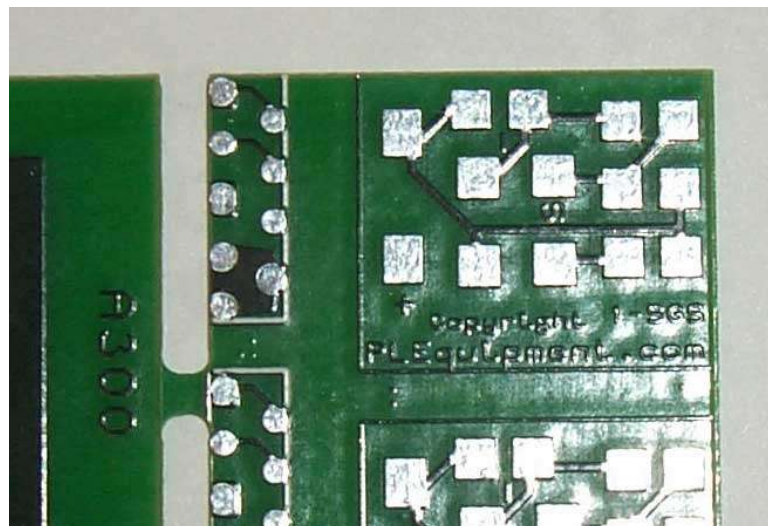
5. OEM version

We are offering the OEM version as a stripped down version of the desktop model. These OEM version requires constant DC voltage up to 250V and the customer can specify the input voltage range.

For volume orders custom designs are possible if they make economic sense.



Special design amplifier with easy replacement connector.



Special design, small layout amplifier. Surface mount for minimal physical dimensions.