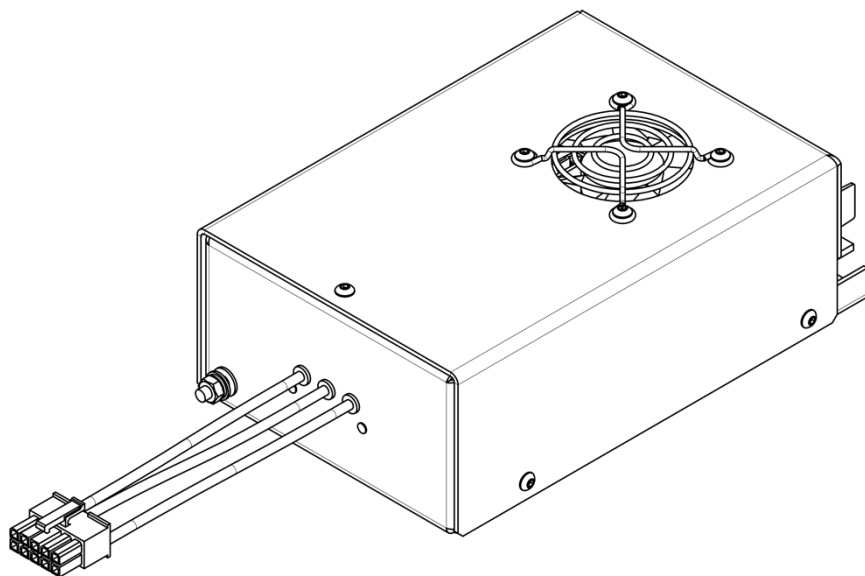


HVPS-300 **high voltage power supply** **with bipolar output**

User manual



Warning! This equipment produces high voltages that can be very dangerous.
Please read user manual carefully before starting operations.

Description / Appearance

HVPS-300 is a specialized HV power supply with bipolar output. This means the output connector has three pins – Ground, HV positive and HV negative. Potentials of HV positive and HV negative are always equidistant from the Ground potential. In other words, 4kV output voltage is produced by generation of +2kV at HV positive pin and -2kV at HV negative pin.

Due to bipolar output and high stability of HV output (see *Specifications* section), the target application of HVPS-300 is feeding high voltage high repetition rate Pockels cell drivers commonly used in laser industry.

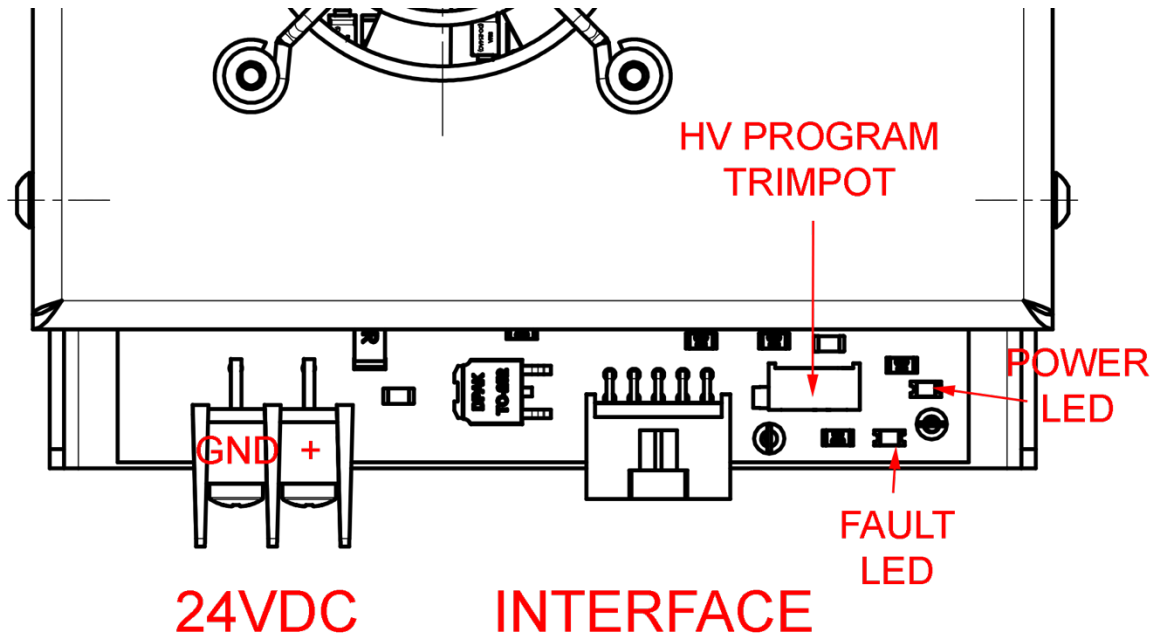
Module's input is 24V DC. Module's output is DC high voltage (modification up to 4kV are available by default, higher voltages are discussable). Maximal output power exceeds 300W.

Power supply is forced-air cooled with an embedded fan.

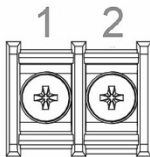
By default, all interfaces are analogue. Digital interfaces are available on request.



Connectors, pins, interface signals



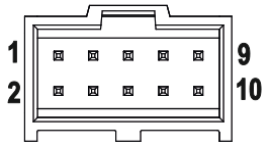
24VDC (M3 screw terminal):



PIN (color)	DESIGNATION	DESCRIPTION
2	+24V	24V voltage from an external low voltage power source to be supplied to these pins to power up the HVPS-300 Current consumption is up to 20A at full output power
1	GND	24VDC return

Warning! Because of safety reasons we highly recommend to use low voltage power supply with DC output galvanically insulated from AC input (insulation strength 4000VAC, 2500VAC or 1500VAC is selected in dependence on your application).

INTERFACE (MOLEX 90130-3110):



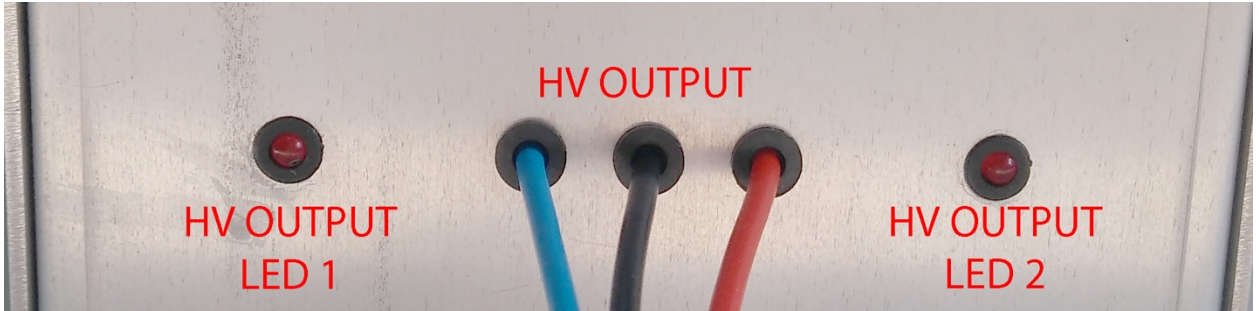
PIN (color)	DESIGNATION	DESCRIPTION
1 (black)	Enable Jumper (GND)	Pins 1 and 2 should be interconnected to use power supply in stand-alone regime In this case, high voltage will appear at the power supply output once HVPS-300 is powered
2, 4 (yellow)	Enable	Pin 2 or 4 should be pulled to the ground to enable the output. Output is disabled while TTL high level is applied to pin 2 (4) or pin 2 (4) is left unconnected To use power supply in stand-alone regime, pin 2 (4) might be short-circuited with one of Interface return pins (e.g. pin 1)
3 (green)	HV Monitor	Output voltage monitor Calibration is linear, 10V on pin 3 corresponds to V_{MAX} at the output
5 (black)	GND (Interface return)	Return of all Interface signals (Enable, HV Monitor, Fault) except HV Program
6 (-)	N/C	-
7 (orange)	HV Program Return	Return of HV Program signal In order to improve high voltage stability isn't connected to the common ground of Interface
8 (violet)	Fault	5V if fault occurred, 0V otherwise. Fault state is set in the next cases: <ul style="list-style-type: none"> Overheating of HVPS-300
9 (blue)	HV Program	DC voltage applied between pins 9 and 7 sets up the high voltage level Calibration is linear, 10V between pins 9 and 7 corresponds to V_{MAX} at the output
10 (white)	HV Program Jumper	Pins 9 and 10 should be interconnected to use power supply in stand-alone regime In this case output voltage is defined with HV Program trimming potentiometer Clockwise rotation decreases HV value Counterclockwise rotation – increases HV value

“ENABLE” JUMPER, “HV PROGRAM” JUMPER AND “HV PROGRAM” TRIMPOT:

Warning! In stand-alone regime high voltage appears at power supply's output once the device is powered. Thus, we do not recommend using power supply in stand-alone regime, do this on your risk only.

HVPS-300 might be used in stand-alone regime. In this case, Enable jumper should be used instead of Enable signal, HV Program jumper along with HV Program trimming potentiometer should be used instead of HV Program signal.

Enable jumper is set between pins 1 and 2.
 HV program jumper is set between pins 9 and 10.



HV OUTPUT (pigtail terminated with MOLEX 3901-2101 connector):

10	9	8	7	6
5	4	3	2	1

PIN (color)	DESIGNATION	DESCRIPTION
1 (red)	HV Positive	High voltage of positive polarity (+V/2) appears on this pin once power supply's output is enabled
8 (black)	GND	HV output ground potential
5 (blue)	HV Negative	High voltage of negative polarity (-V/2) appears on this pin once power supply's output is enabled

LEDS:

POWER (green):

- LED lits steadily while device is powered.

OVERTEMP (red):

- LED is on once Overtemperature occurs.

HV OUTPUT (red):

- LEDs lit steadily while high voltage presents at the power supply output (independently on whether HVPS-300 is powered or not).

MOUNTING AND GROUNDING:

Power supply to be mounted with 4pcs M4 screws (M4x10 or shorter).

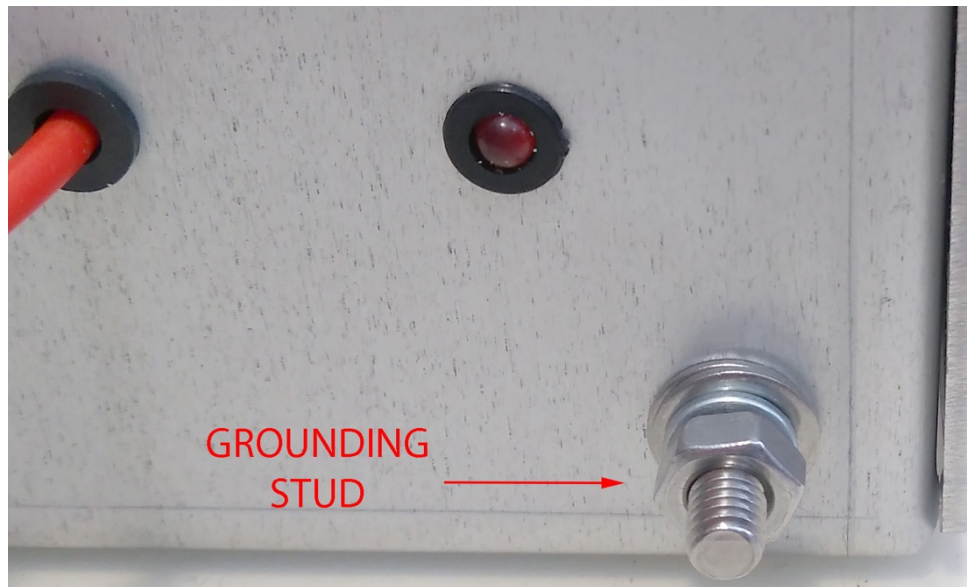
Grounding policy

By default all grounds of HVPS-300 (HV Output Ground, 24VDC RETURN and Interface Returns) are interconnected inside the power supply.

However neither of them is connected to the chassis.

Other grounding policies are possible on request.

Warning! Power supply enclosure to be protectively grounded via provided M4 grounding stud.



COOLING:

Module is forced-air cooled with embedded fan. No additional cooling is required.

Safety

Warning! This equipment produces high voltages that can be very dangerous.
Don't be careless around the equipment.

Assemble the entire setup before powering up the device.

- Power supply enclosure to be protectively grounded via provided grounding stud.
- Use low voltage power supply with DC output galvanically insulated from AC input (insulation strength 4000VAC, 2500VAC or 1500VAC is selected in dependence on your application)
- Do not connect / disconnect output cables while driver is turned on
- Do not operate with disconnected load
- Avoid casual contacts of personnel with output cables and with the load
- Do not turn the power supply on if it was already damaged with water, chemicals, mechanical or electrical shock
- Do not self-repair the power supply, there are no user-serviceable parts inside

Operations

- 1 Ensure 24V DC power supply is off
- 2 Connect HVPS-300 to the load and to 24V DC power supply.
Do not apply 24V DC power until the setup is completely assembled
- 3 *Disable* HVPS-300 (pin 2 of Interface)
- 4 Set HV Program to 0V (pins 7 and 9 of Interface)
- 5 Apply 24V DC power to HVPS-300
- 6 Set HV Program to the desired value (pins 7 and 9 of Interface)
- 7 *Enable* HVPS-300 (pin 2 of Interface)

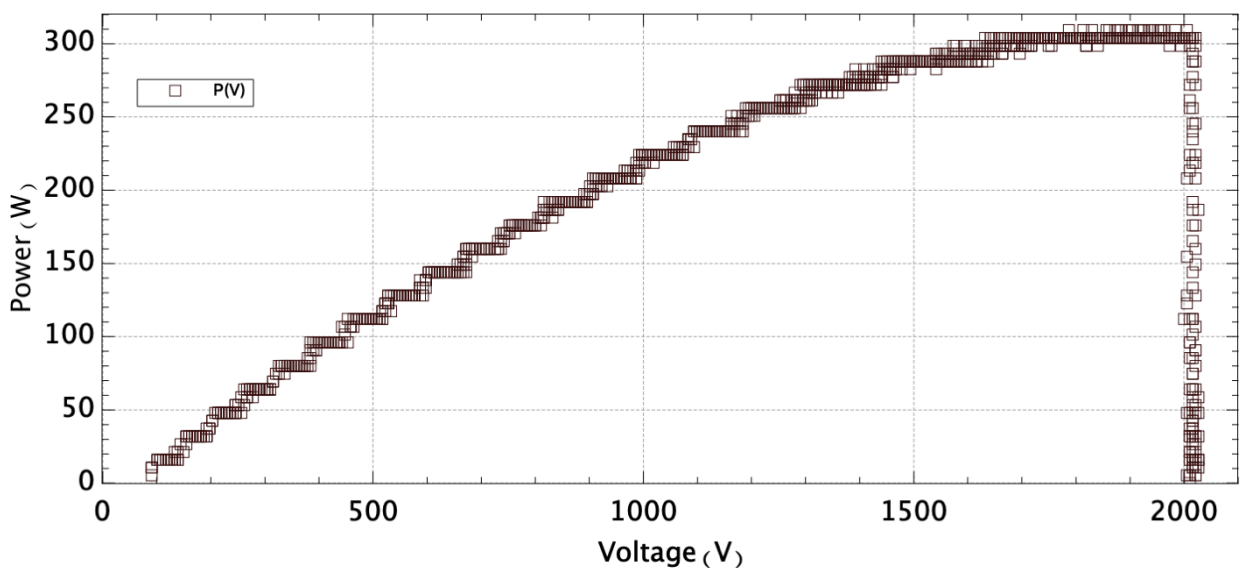
Technical notes

- **Module's output is bipolar.** This means that e.g. 2kV output voltage is physically formed by delivering +1kV to one output wire (HV Positive) and -1kV to the other (HV negative, see also figure below)



By default, all descriptions of HV outputs are given in terms of voltage differences. Please keep this in mind!

- **Output power depends on the operating voltage.** Rated output power is achieved in $\sim 75\text{-}100\%$ of V_{MAX} region only. At lower output voltages output power decreases linearly with the voltage.



Typical power curve of HVPS-300-2kV

Specifications

ELECTRICAL SPECIFICATION

Input	+24V DC; up to 20A at full output power
HV Output	
Output type	Bipolar (see also <i>Technical notes</i> section) I.e. +V/2 applied to one output wire; -V/2 to another
Output voltage	A few modifications with output voltage up to 4kV DC ¹ are available (see also <i>How to order?</i> section)
Output power	>300W (in 70-100% of V _{MAX} region)
Output capacitance	Depends on modification (see also <i>How to order?</i> section)
Voltage accuracy (incl. temperature drifts)	<0.5% (typically)
Ripple	<0.2% pk-pk
Efficiency	>90%
Protections	From overheating
Environment	
Operation temperature	+10...+40 °C
Storage temperature	-20...+60 °C
Humidity	90%, non-condensing

¹ In terms of bipolar output (see also *Technical notes* section)

MECHANICAL SPECIFICATION

Size (LxWxH)	180x107x57mm (without inputs and outputs)
Weight	<1,0kg

How to order?

Since power curve depends on output voltage (see also *Technical notes* section), there are a few modifications different with output voltage.

Modification	Description
HVPS-300-2kV	Maximal output voltage – 2kV Maximal output power – over 300W @ 2kV and decreases steadily with output voltage Output capacitance – 13.5uF
HVPS-300-4kV	Maximal output voltage – 4kV Maximal output power – over 300W @ 4kV and decreases steadily with output voltage Output capacitance – 3.3uF

