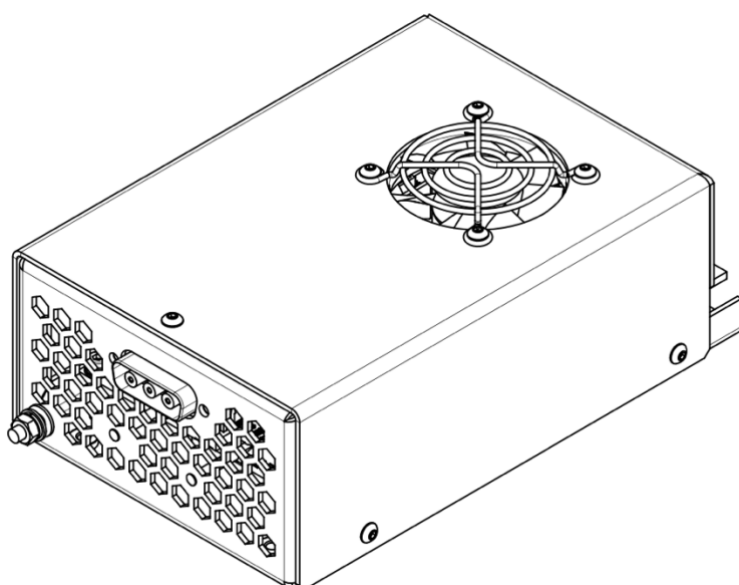


HVPS-300

high voltage power supply with bipolar output

User manual



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

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Overview / Appearance

The HVPS-300 is a specialized high voltage power supply with a bipolar output. This means that 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, e.g. 2kV output voltage is produced by generation of +1kV at HV positive pin and -1kV at HV negative pin (see also *Technical notes* section).

Due to the 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). Maximum output power exceeds 300W.

The power supply is forced air cooled with a built-in fan.

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



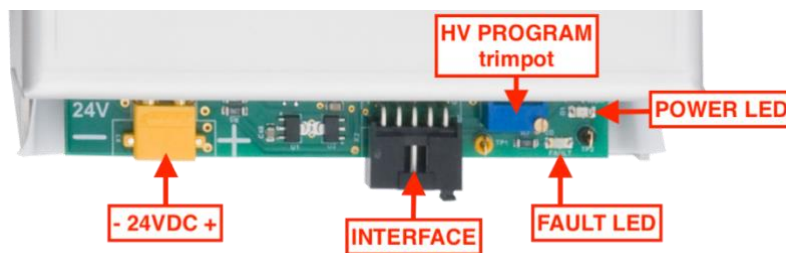
Contents of delivery

By default, the package contains:

- HVPS-300 power supply – 1pc
- Mating INTERFACE cable (0.5m length) – 1pc
- Mating 24VDC input cable (0.5m length) – 1pc
- Mating HV OUTPUT cable for direct connection to HVSW-04 (0.5m length) – 1pc
- Jumpers for stand-alone regime of operations – 2pcs

Customizations are possible on request.

Connectors, pins, interface signals

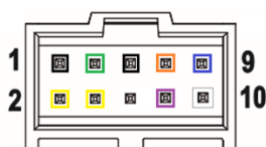


24VDC (AMASS XT30PW-M):

PIN (color)	DESIGNATION	DESCRIPTION
+ (red)	+24V	24V voltage from an external low voltage power source should be supplied to these pins to power up the HVPS-300 Current consumption is up to 20A at full output power
- (black)	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 by HV Program trimming potentiometer Clockwise rotation decreases HV value Counterclockwise rotation – increases HV value

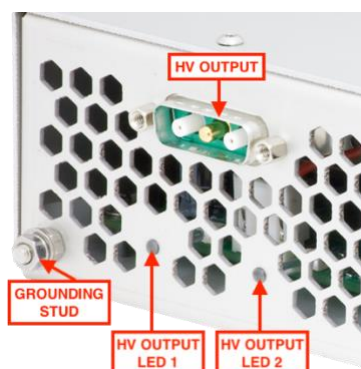
“ENABLE” JUMPER, “HV PROGRAM” JUMPER AND “HV PROGRAM” TRIMPOT:

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.

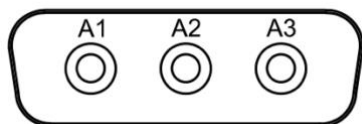
HVPS-300 might be used in stand-alone regime. In this case, Enable jumper should be used instead of Enable signal, HV Program jumper along with HV Program trimming potentiometer should be used instead of HV Program signal.

Enable jumper is set between pins 1 and 2.

HV program jumper is set between pins 9 and 10.



HV OUTPUT (DSUB 3W3 MALE):



A1 and A3 pins are high voltage contacts by Harting (09692812550).

A2 pin is 09692817420 contact by Harting.

PIN (color)	DESIGNATION	DESCRIPTION
A1 (blue)	HV Negative	High voltage of negative polarity (-V/2) appears on this pin once power supply's output is enabled
A2 (black)	GND	HV output ground potential
A3 (red)	HV Positive	High voltage of positive polarity (+V/2) appears on this pin once power supply's output is enabled

LEDS:

POWER (green):

- LED lights steadily while device is powered.

FAULT (red):

- LED lights steadily once overtemperature (overheating) occurs.

HV OUTPUT, 2PCS (red):

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

MOUNTING AND GROUNDING:

Power supply should be mounted with 4pcs of 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 should be protectively grounded via provided M4 grounding stud.

Cooling

Module contains a fan for active cooling. No additional cooling is required.

Safety

Warning! This equipment produces high voltages that can be very dangerous.
Be careful in a high-voltage appliances area.

Assemble the entire setup before powering up the device.

- The power supply enclosure must be protectively grounded via provided grounding stud.
- Use a 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 the module 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 (automatic control)

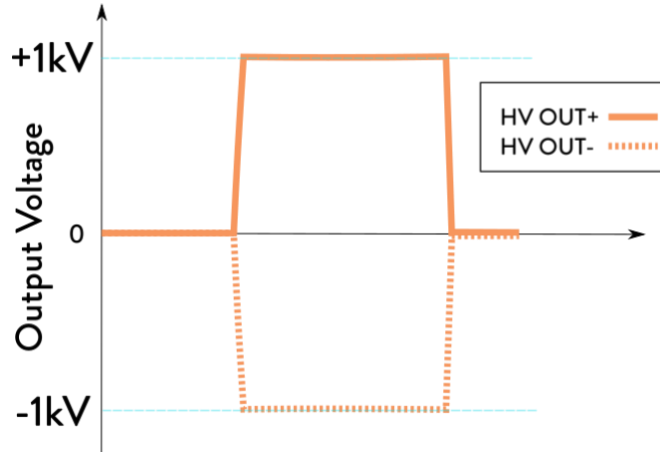
- 1 Ensure 24V DC power supply is off
- 2 Connect HVPS-300 to the load and to 24V DC power supply.
Do not apply 24V DC power until the setup is completely assembled
- 3 *Disable* HVPS-300 (pin 2 of Interface)
- 4 Set HV Program to 0V (pins 7 and 9 of Interface)
- 5 Apply 24V DC power to HVPS-300
- 6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

Operations (manual control)

- 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 Remove all jumpers from Interface connector of HVPS-300
- 4 Place HV Program jumper between pins 9 and 10 of Interface connector
- 5 By rotating HV Program trimming potentiometer clockwise, set HV Program to the low value
- 6 Apply 24V DC power to HVPS-300
- 7 *Enable* HVPS-300 by placing Enable jumper between pins 1 and 2 of Interface connector
- 8 Steadily increase output voltage to the desired value by rotating HV Program trimpot counterclockwise

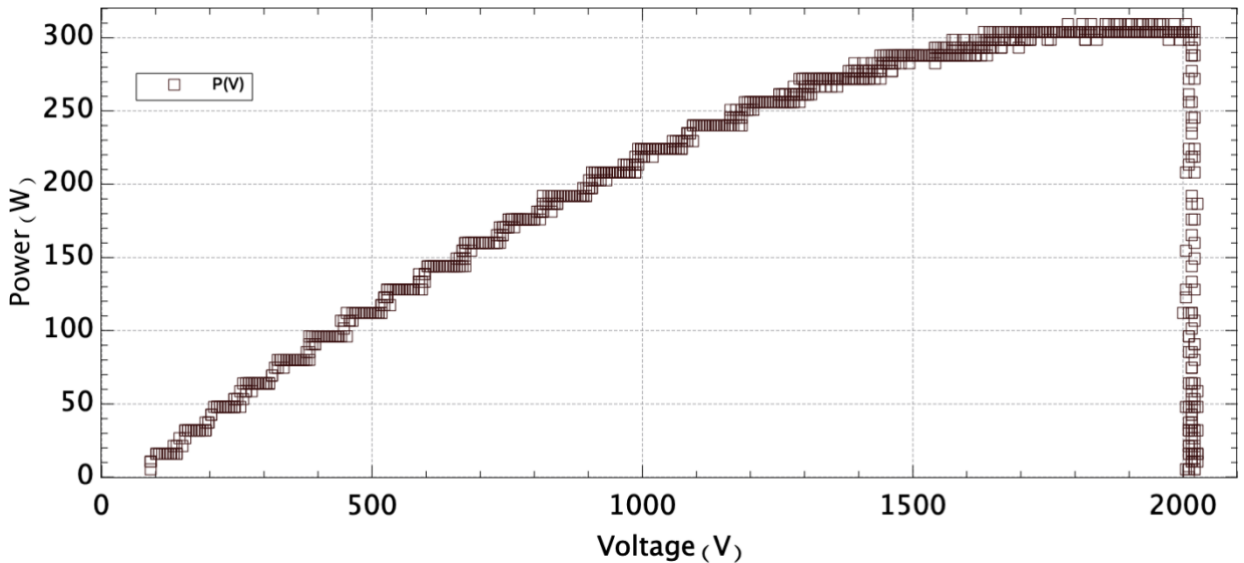
Technical notes

- **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 ~80-100% 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 80-100% 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	>85%
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

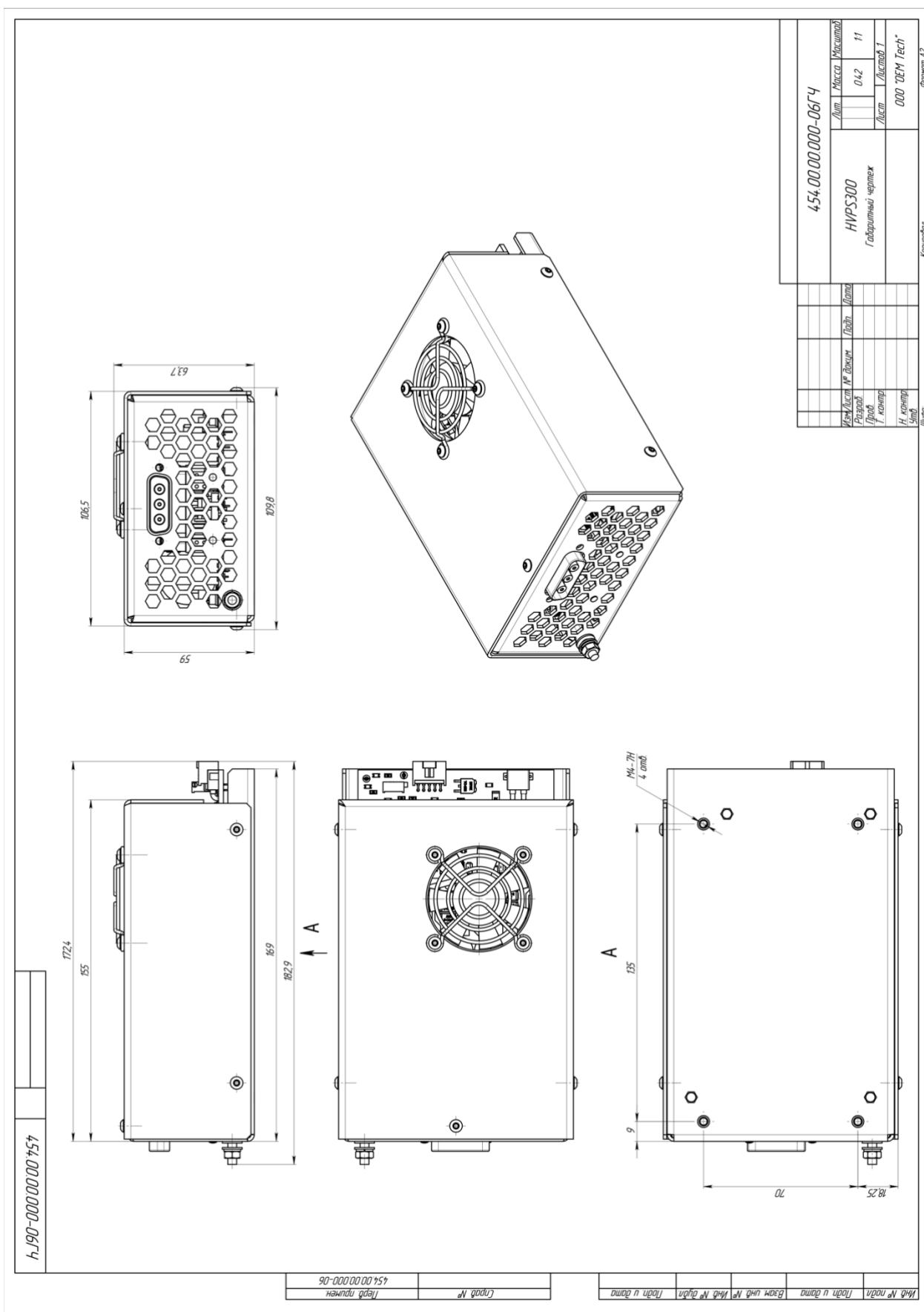
Size (LxWxH)	169x107x59mm (without inputs and outputs, see also the dimensional drawing below)
Weight	<1.0kg

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	Maximum output voltage – 2kV Maximum output power – over 300W @ 2kV and decreases steadily with output voltage Output capacitance – 13.5uF
HVPS-BT-300-2kV	Bench-top version (see photos below)
HVPS-300-4kV	Maximum output voltage – 4kV Maximum output power – over 300W @ 4kV and decreases steadily with output voltage Output capacitance – 3.3uF
HVPS-BT-300-4kV	Bench-top version (see photos below)

Dimensions



Bench-top version

Bench-top version with 100-240VAC input is also available.

