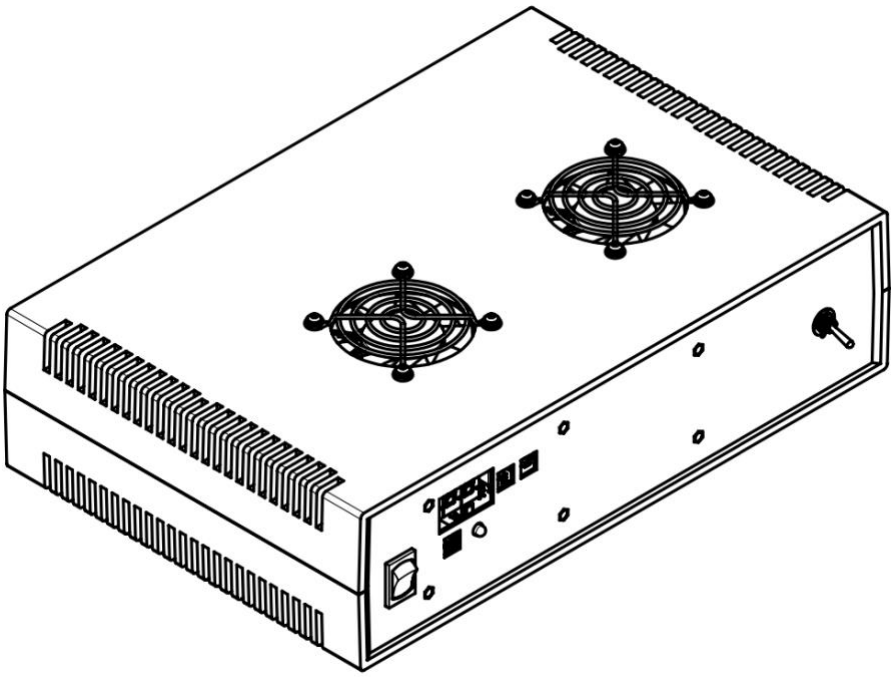
rev 1.10 / 2025 01 27

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

User manual



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

Table of content

Overview / Appearance

The HVPS-BT-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, 2kV output voltage is produced by generation of +1kV at HV positive pin and -1kV at HV negative pin (see picture in *Technical notes* section).

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

The module's input is 100-240VAC. The module's output is DC high voltage (modifications up to 4kV are available by default, higher voltages are discussable). The 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

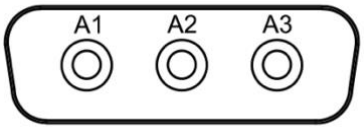
By default, the package contains:

- HVPS-BT-300 power supply – 1pc
- Power cord (European plug) – 1pc
- HV OUTPUT cable to HVSW-04 (0.5m length) – 1pc
- 24V OUTPUT cable to HVSW-04 (0.5m length) – 1pc

USB/RS-232 adapter as well as RS-232 cable are not included in the scope of supply. There is also no any engineering software utilities for the HVPS-BT-300 provided by OEM Tech. However, customizations are possible on request.

Connectors, pins, interface signals

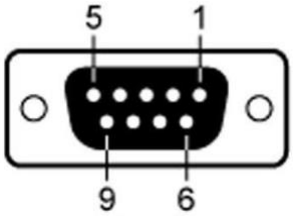
HV OUTPUT (DSUB 3W3 MALE):



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

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

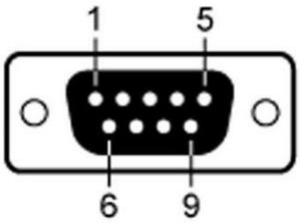
24V OUTPUT (9-PIN DSUB FEMALE):



PIN (color)	DESIGNATION	DESCRIPTION
1 (blue)	**HVSW Enable**	Enable pin of the HVSW-04 should be connected here if the HVSW-04 is powered from the HVPS-BT-300

2, 6	**-**	N/C
3, 4, 5 (red)	**+24V**	Auxiliary 24VDC output. Intended use is the powering up the HVSW-04 Pockels cell driver.
7, 8, 9 (black)	**GND**	Common ground of the HVPS-BT-300

RS-232 (9-PIN DSUB MALE):



PIN (color)	DESIGNATION	DESCRIPTION
1, 6, 7, 9	**-**	N/C
2 (green)	**RS-232 RX**	RS-232 RX
3 (blue)	**RS-232 TX**	RS-232 TX
4, 8	**-**	Interconnected to each other
5 (black)	**GND**	Common ground of the HVPS-BT-300

Safety

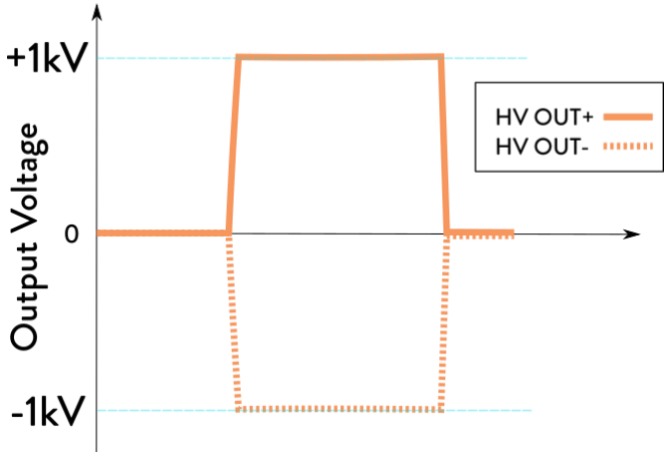
Warning! This equipment produces high voltages that can be very dangerous.
Be careful in a high-voltage appliances area.

Assemble the entire setup before powering up the device.

- 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

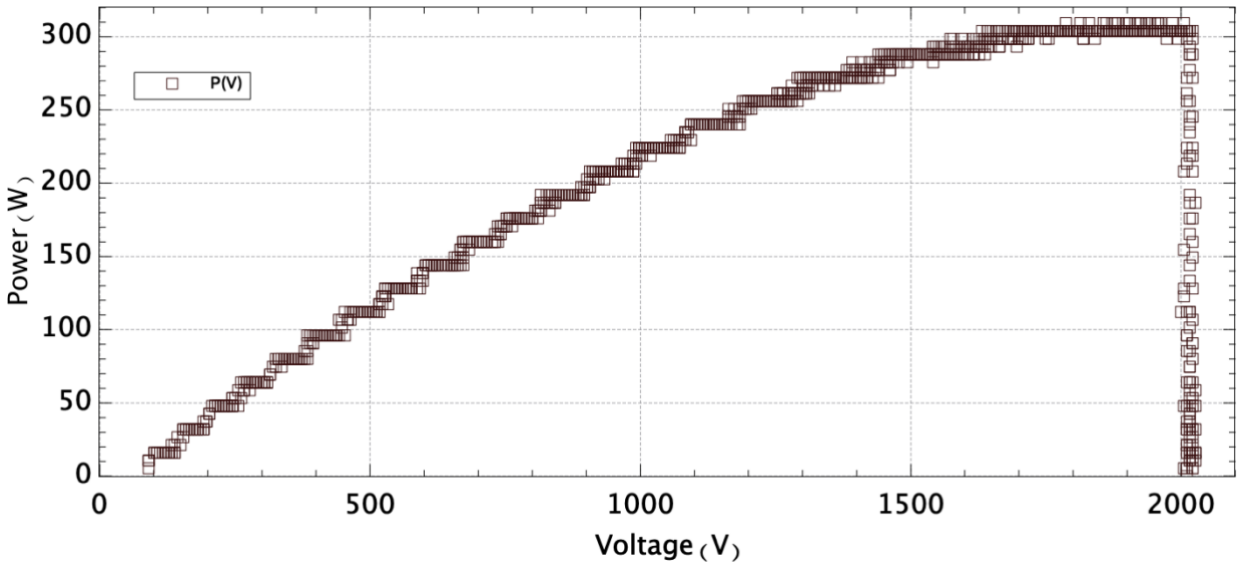
Technical notes

- **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 the HVPS-BT-300-2kV

Specifications

ELECTRICAL SPECIFICATION

Input	100-240VAC, 1ph
HV Output	
Output type	Bipolar (see also *Technical notes* 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 *How to order?* section)
Output power	>300W (in 80-100% of V_{MAX} region)
Output capacitance	Depends on modification (see also *How to order?* 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

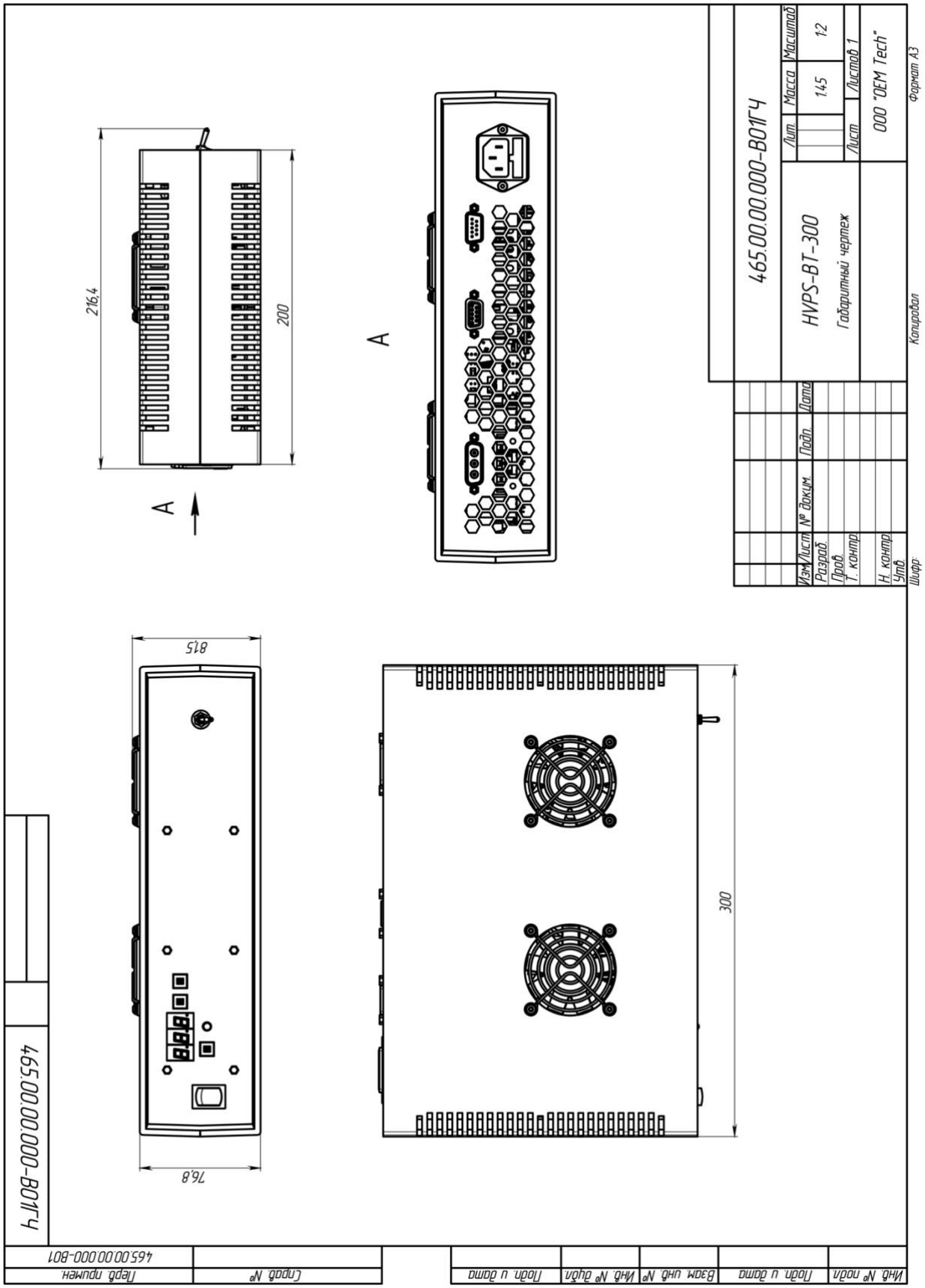
Size (LxWxH)	300x200x77mm (without inputs and outputs, see also the dimensional drawing below)
Weight	<2.0kg

How to order?

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

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

Dimensions

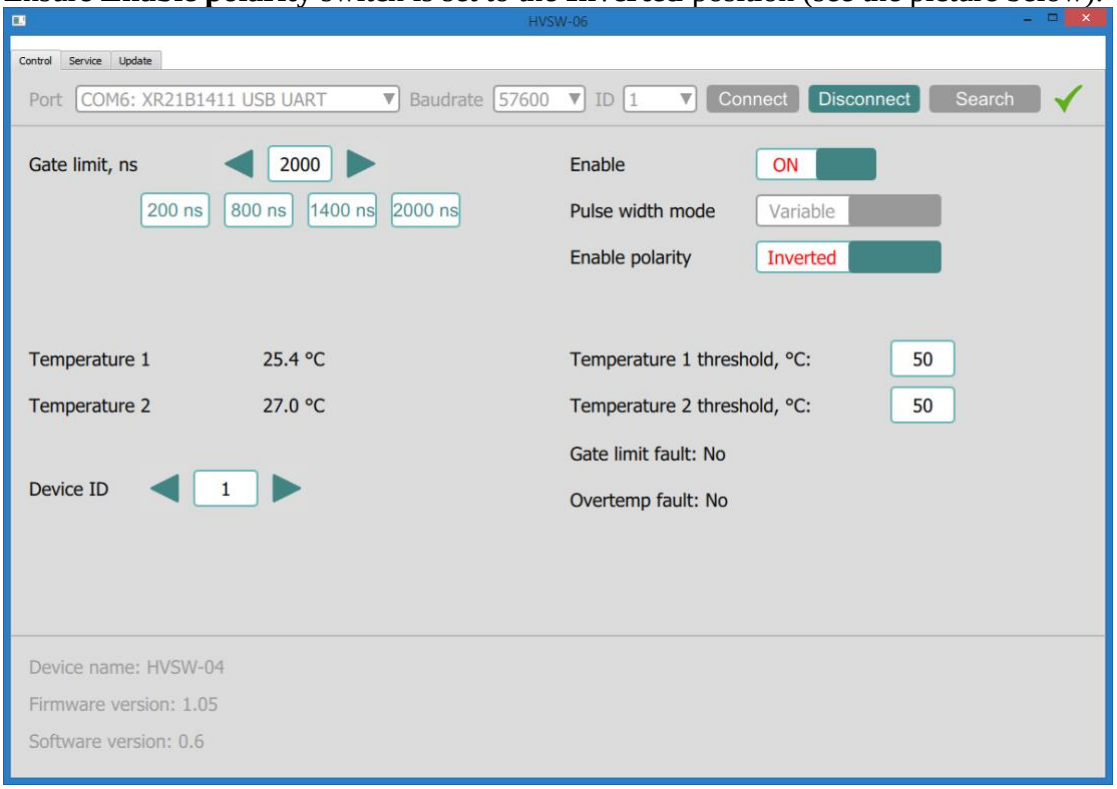

465.00.00.000-B01Ч
HVPS-BT-300
Габаритный чертеж
ООО "OEM Tech"
Масштаб 1:2
Масса 145
Лит
Лист
Листов 1
Формат А3
Копировал
216.4
200
A
A
815
76.8
300

HVSW-04 connection and stand-alone operations (i.e. without PC)

STEP 1: HVSW-04 PREPARATION

1. Read the HVSW-04 user manual carefully.
2. Connect the HVSW-04 to the PC (accordingly to the HVSW-04 user manual) and to the HVPS-BT-300 (using Low voltage cable supplied together with the HVPS-BT-300), see the picture below:

3. Connect the HVPS-BT-300 to the mains, turn on POWER switch of the HVPS-BT-300, after that 24VDC power will be applied to the HVSW-04.
4. Run HVSW-04 engineering software (see the HVSW-04 user manual for details).
5. Ensure **Enable polarity** switch is set to the **Inverted** position (see the picture below).



6. After that, the HVSW-04 is enabled when the HVSW ENABLE switch on the front panel of the HVPS-BT-300 is in the ON position, and disabled when the switch is in the OFF position.
7. Set the **Pulse width mode** and, if necessary, the **Gate limit** accordingly to your application.

STEP 2: HVPS-BT-300 AND HVSW-04 CONNECTION

1. Turn off POWER switch of the HVPS-BT-300, disconnect the HVPS-BT-300 from the mains, wait 60s for the complete discharge of all internal capacitor banks.
2. Connect the HVPS-BT-300 and the HVSW-04 with High voltage cable and Low voltage cable (both supplied with the HVPS-BT-300) following the schema below:

The HVSW-04 can be disconnected from the PC or, optionally, left connected as well, this allows to monitor module's internal temperatures and the state of all Fault signals.

3. Connect the HVSW-04 to your pulse generator with SMA-SMA or SMA-BNC cable.
4. Ensure HVSW ENABLE switch of the HVPS-BT-300 is set to the OFF position:

5. Apply AC power to the HVPS-BT-300.
6. Turn on POWER switch of the HVPS-BT-300
7. Set the desired operating voltage with VOLTAGE buttons of the HVPS-BT-300.
8. Press START button to apply this voltage to the HVSW-04.
9. Enable the HVSW-04 (HVSW ENABLE switch of the HVPS-BT-300 to the ON position).
10. Apply trigger pulses from your pulse generator to the HVSW-04

RS-232 interface description

RS-232 connection parameters: 38400 bps, 8 data bits, 1 stop bit, no parity.

Command format is: {command} {data (optionally)} {end-of-line}

- command is 1 or 2 character long (see list below)
- data is ASCII-string of adjusting value
- end-of-line symbols are \r\n or \n

List of available commands:

- v – sets output voltage (in volts)
- V – returns output voltage set point (in volts)
- mV – returns voltage measured at module's output (in volts)
- r – enables/disables high voltage output ('r 1' enables, 'r 0' disables)
- R – returns module's state (enabled or disabled)
- e – turns on/off echoing of symbols in RS-232 ('e 1' echo is on, 'e 0' echo is off)
- E – returns echoing status

Example: 'v 1500' sets output voltage to 1500 volts.