



HIGH VOLTAGE POWER SUPPLIES

HV-200

HV-400

HV2-200

Technical Description
Rev. 2211

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1.1. Warranty Statement

The HV power supplies are protected by a one-year warranty covering labor and parts. The warranty enters into validity since the shipment date. Any evidence of improper use or unauthorized repair attempts voids the warranty.

1.2. Service Contact Information

For service/warranty requests, please contact:

EKSMA OPTICS, UAB
c/o EKSMA Optics, UAB
Dvarcioniu st. 2B
LT-10233 Vilnius, Lithuania

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Fax.: +370 5 272 92 99
E-mail: info@eksmaoptics.com
Website: www.eksmaoptics.com

2.1. General Information

2.1.1. Models

The table below lists standard options. Custom voltage modifications may be delivered on request.

Table 1. Models

<i>Catalog number</i>	<i>Maximal HV output, kV</i>	<i>Maximal HV current, mA</i>
HV-200-1.8	1.8	110
HV-200-2.6	2.6	76
HV-200-3.6	3.6	55
HV-200-4.0	4.0	45
HV-400-1.8	1.8	220
HV-400-2.6	2.6	152
HV-400-3.6	3.6	110
HV-400-4.0	4.0	90
HV2-200-1.5	±1.5	±133
HV2-200-2.0	±2.0	±100
HV2-200-2.6	±2.6	±76
HV2-200-3.6	±3.6	±55

2.1.2. Main Components

Table 2. Main components

<i>Component</i>	<i>Quantity</i>	<i>Notes</i>
High voltage (HV) power supply	1	-
Connector for DC input	1	-
+24V cable to Pockels cell driver	1	Optionally, if delivered in set with Pockels cell driver.
RS232 cable	1	
CAN cable	1	
719-BNC cable	1	Optionally, if delivered with analog control feature
Technical description	1	-

2.2. Technical Specifications

Table 3. Technical specifications

<i>Parameter</i>	<i>Value(s)</i>		
	<i>HV-200</i>	<i>HV-400</i>	<i>HV2-200</i>
Output voltage polarity	Positive		Bipolar
Maximum HV output power at maximal output voltage, <i>W</i>	200	400	2×200
Supply voltage DC requirements	47.5...55 V, 4.5 A	47.5...55 V, 9 A	
Output voltage ripple, %	< 0.3		
Ways of output voltage control	CAN, RS232, Internal potentiometer – standard Analog voltage 0-10V input - optional		
Maximum +24V output current, <i>A</i>	1.2		
Maximum ambient temperature for operation, °C	45		
Dimensions, <i>mm</i>	See CHAPTER 3 DEVICE LAYOUT. 200×119×76		
Weight, <i>g</i>	1120		

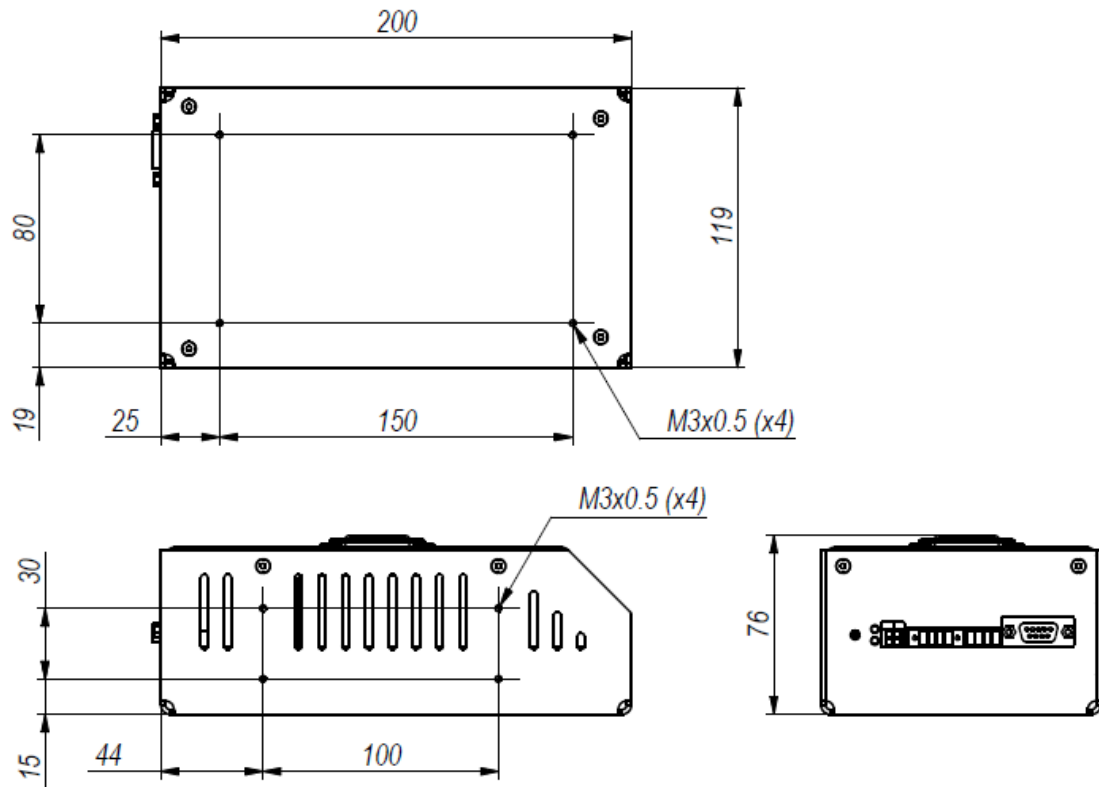


Figure 1. Outline drawing and dimensions of the HV power supply

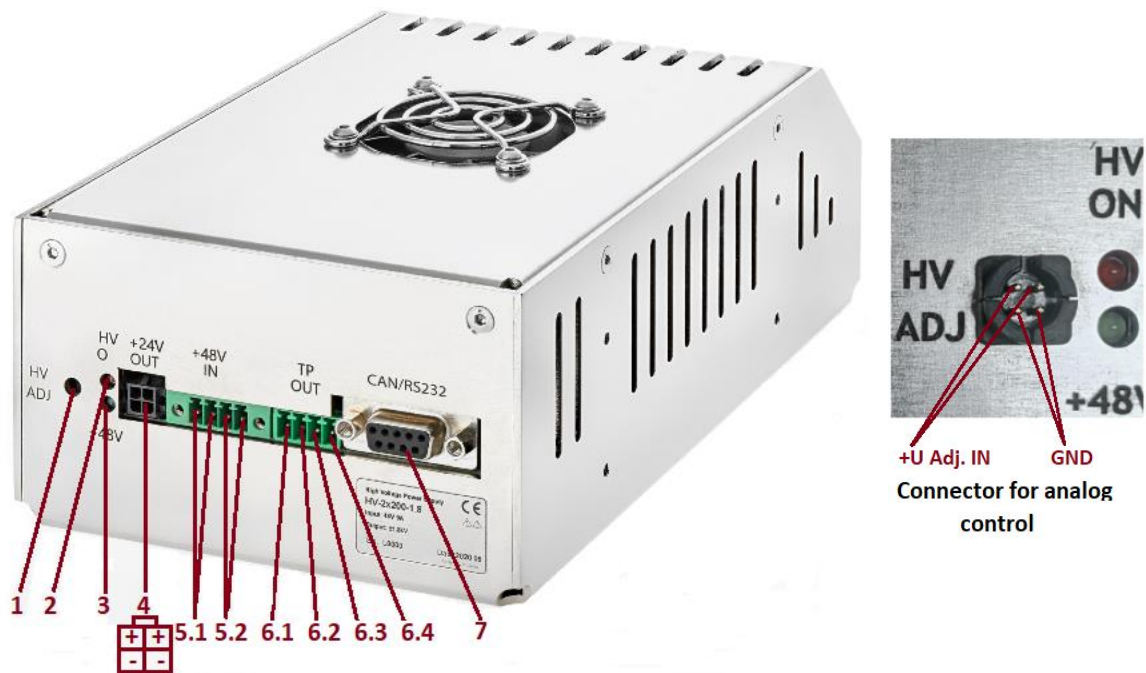


Figure 2. Front controls of the HV power supply. Left – front panel, right – detailed view of optional connector for input of analog control voltage 0-10V

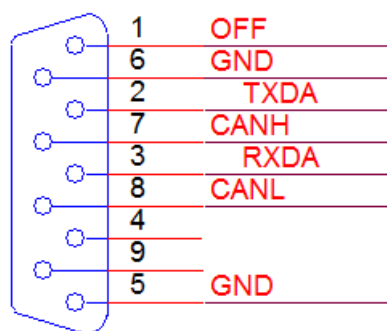


Figure 3. Rear controls of the HV power supply

Table 4. Controls and connections of the HV power supply

#	Port
1	Potentiometer for HV tuning in potentiometer mode or optional type 719 connector for analog control voltage 0-10V input
2	LED HV output on
3	LED +48V
4	+24V auxiliary output connector
5.1	2 pins for +48V input
5.2	2 pins for GND input (-48V)
6.1	Test point for -HV current monitoring (1V = 100mA)
6.2	Test point for +HV current monitoring (1V = 100mA)
6.3	Test point for +HV output monitoring (1V = 1kV)
6.4	Test point GND
7	CAN/RS232 connector
8	Grounding screw
9	+HV output
10	GND output
11	-HV output if equipped.

CAN/RS232



DB9f

Figure 4. RS232/CAN connector pinout

Equipment is designed to be safe under normal environmental conditions according to 1.4.1. 61010-1@IEC:2010 (Safety requirements for electrical equipment, control and laboratory use):

1. indoor use;
2. altitude up to 2000 m;
3. temperature 5°C to 35°C;
4. maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 35°C;
5. POLLUTION degree 1: no POLLUTION or only dry, non-conductive POLLUTION occurs.

Warning:

The safety of the system incorporating driver and HV power supply is the responsibility of the assembler of the system.

Operating the power supply is allowed to persons acquainted with the operation manual and having permission to deal with voltages over 1000 V.

Do not remove unit covers while power cable is connected to the mains (if applicable).

WARNING

Direct contact with the exposed inner parts of the system when it is powered may cause human injuries or death.

Do not operate the unit until it is **grounded** and the load is connected.

Do not use the unit if any defects have been detected.

5.1. Ground the HV Power Supply

Provide the proper ground connection to ground screw (#8) of HV power supply.

5.2. Supply +48V Power

Connect the +48 VDC power supply to the HV power supply. See **Table 3** for requirements.

5.3. Set Required Output HV

HV level may be tuned by:

1. Using CAN or RS232, see CHAPTER 6 CONTROL VIA CAN/RS232 for details.
2. Using internal (#1) trimmer potentiometer. CAN register 'Analog control' need to be ON. Output voltage and current monitoring is accessible on test point TP OUT connector pins (#6).
3. Using analog control input 0-10V (if ordered option). CAN register 'Analog control' need to be ON. Can register 'Uset' need to be specific value shown on a sticker located on the body of power supply.
4. HV output can be switched off by shorting **pin 1** of connector CAN/RS232 (#7) to GND (**pins 5 or 6**).

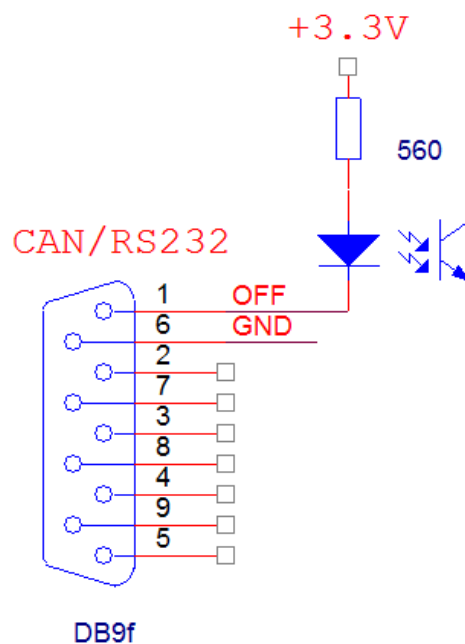


Figure 5. ON/OFF control input

5.4. Connect the Load

Connect the load while DC power supply is switched off. Check that the connection cables are firmly attached.

Bipolar versions of HV power supply need to be loaded symmetrically. Positive and negative output current difference more than 30% (factory setting) stops operating and HV power supply need to be restarted.

5.5. Check the DC Power Supply

Switch the +48 VDC power on. Measure the voltage on +48 VDC input of HV power supply while HV power supply is loaded at maximum.

If the voltage measured is below +47V, use thicker wires, or increase the DC supply voltage to compensate voltage drop.

6.1. CAN

CAN-USB converter is recommended for operation. It can be ordered from Eksma Optics. It comes together with "CAN Browser" software and a set of required cables.



Figure 6. CAN-USB converter

1. Connect CAN-USB converter to PC and HV power supply by cables supplied.
2. Turn on +48V power supply.
3. Install and open CAN Browser.
4. Set required settings (see CHAPTER 7 CAN BROWSER CONTROLS).

6.2. RS232

1. Connect **HV** power supply to PC by the RS232 cable supplied. Note: do not attempt using ordinary RS232 cables. Some of them are not compatible with this series of HV power supplies.
2. Turn on +48V power supply.
3. Install and open CAN Browser.
4. Set required settings (see CHAPTER 7 CAN BROWSER CONTROLS).
5. Refer document "ASCII serial protocol description" for details.

Chapter 7 CAN BROWSER CONTROLS

The tables below present lists of registers that can be accessed and/or read-out using CAN Browser.

Table 5. Basic controls

Setting	Description
Command	Toggle the HV supply output ON/OFF
Uset	Set HV output value.
Controller setup/Analog control	Off – control HV supply via CAN/RS232.
	On – control HV supply by potentiometer or external voltage 0-10V (specifically ordered option)

Table 6. Advanced control registers

Setting	Description
External off status	Inactive – pin 1 of connector CAN/RS232 (#7) is not connected to ground.
	Active – pin 1 of connector CAN/RS232 (#7) is connected to ground. HV power supply output is turned off.
Udisp	Display HV output voltage.
IsensP	Display positive output current of HV supply.
IsensM	Display negative output current of HV supply.
Tpcb	Display PCB temperature of HV supply.
Vpwr	Display input +48 voltage.
Vprog	Display maximal HV value of output for potentiometer mode.
Interlock/Vpwr max	Display actual value of +48V maximal input. If DC input is over the maximal value (see Table 3), HV power supply turns off.
Interlock/Uout max	Display setting of maximal HV output value. If this value is exceeded, HV power supply is off.
Interlock/IsenseP max	Display setting of positive output maximal current value. If this value is exceeded, HV power supply is off.
Interlock/IsenseM max	Display setting of negative output maximal current value. If this value is exceeded, HV power supply is off.
Interlock/Tpcb max	Display setting of PCB maximal temperature. If this value is exceeded, HV power supply is off.
Interlock/Tunildm max	Display setting of processor maximal temperature. If this value is exceeded, HV power supply is off.
Controller setup/Uset limit	Display setting of HV output limit.