



HIGH VOLTAGE DRIVER

DQF-0.1-8B

DQF-0.1-8D

Technical Description
Rev.2205

2022
Lithuania

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1.1. Warranty Statement

The Pockels cell drivers are protected by one-year warranty covering labor and parts. The warranty enters into validity since the shipment date. Any evidence of improper use or unauthorized attempts voids the warranty.

1.2. Service Contact Information

For service/warranty requests, please contact:

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2.1. General Information

2.1.1. Models

DQF-0.1-8B – driver for Q-switching with integrated HV power supply, applicable for BBO Pockels cells

DQF-0.1-8D – driver for Q-switching with integrated HV power supply, applicable for DKDP Pockels cells

2.1.2. Main Components

Table 1. Main components

Component	Quantity
High voltage (HV) driver & HV supply DQF-0.1-8*	1
DC power cable (l=1.5m)	1
BNC-MMCX cables (l=1.5m)	1
Pair of cables for HV output to the Pockels cell (<10 cm)	1
Technical description	1

2.2. Technical Specifications

Table 2. Technical specifications

Parameter	Value(s)	
	DQF-0.1-8B	DQF-0.1-8D
Maximum output pulse amplitude (HV), <i>kV</i>	6.0 (7.6) ¹	7.5
Polarity	Bipolar	
HV pulse fall time, <i>ns</i>	<12ns	
HV pulse duration, <i>μs</i>	650	
Maximum HV repetition rate, <i>Hz</i>	100	
External triggering pulse amplitude @50Ω load, <i>V</i>	3.5...5	
External triggering pulse rise/fall time, <i>ns</i>	< 20	
External triggering pulse duration, <i>μs</i>	120...650	
Maximal HV supply voltage of integrated HV power supply, <i>kV</i>	±3	
Maximum HV power consumption (HV load = 6 pF), <i>W</i>	1	
Low voltage powering DC requirements	11...15V; 80mA	
Connector for low voltage power	KK 2.54mm 2k	
Dimensions, <i>mm</i>	92 x 72 x 33	
Maximal operating temperature, °C	45	
Weight, <i>g</i>	90	

¹ The value in parentheses is achievable using external HV power supply ±3.8 kV

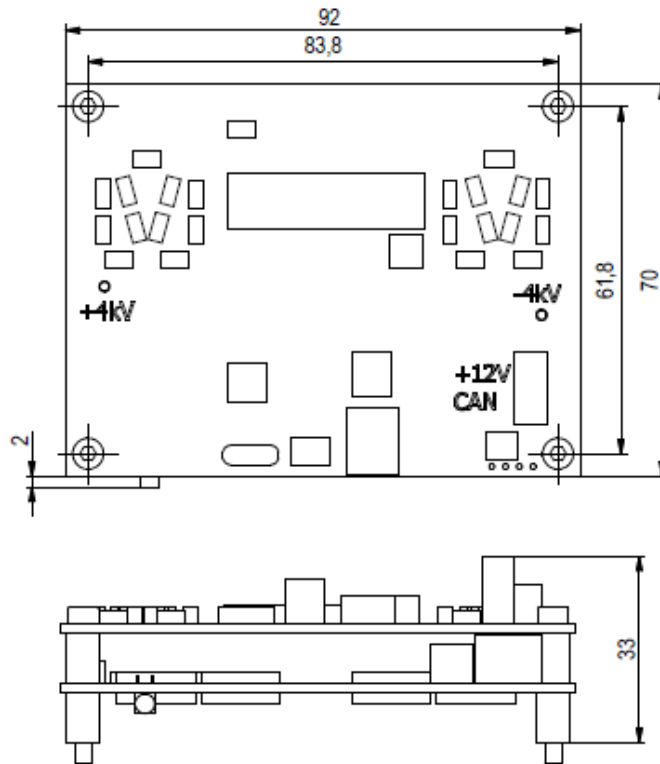


Figure 1. Outline dimensions of the driver

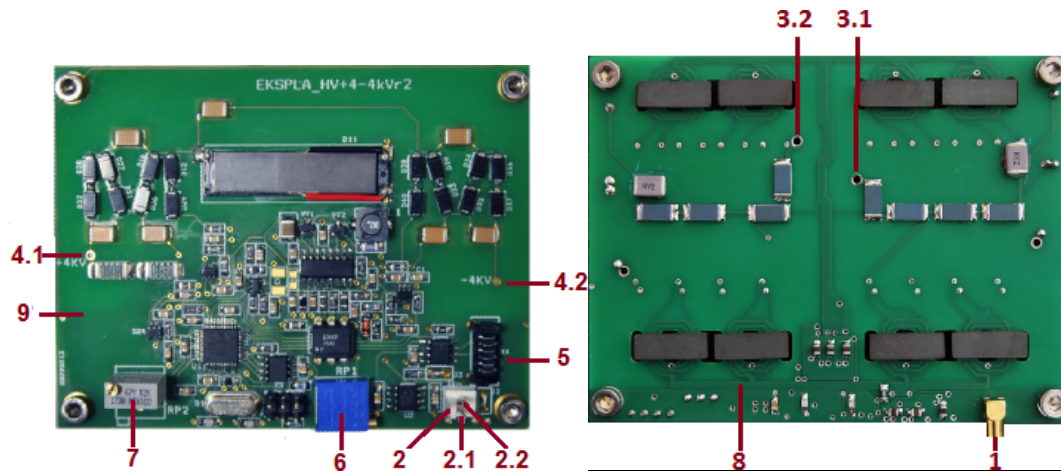


Figure 2. View of the driver

Table 3. Ports seen in view of the driver

#	Port
1	SYNC IN – trigger input
2	Connector Molex p/n 22-27-2021 - interface for +DC (12 VDC) supply
2.1	+12V pin
2.2	GND pin
3.1	HV pulse output pin +OUT
3.2	HV pulse output pin -OUT
4.1	+HV output from HV supply
4.2	-HV output from HV supply
5	CAN interface connector
6	Potentiometer for resonance adjustment*
7	Potentiometer for HV output adjustment
8	HV supply board
9	HV driver board

****Caution!***

Please DO NOT adjust the potentiometer (No. 5 in the table and image above). Unauthorized adjusting may lead to operation malfunctions.

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):

- a) indoor use;
- b) altitude up to 2000 m;
- c) temperature 5°C to 45°C;
- d) maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 45°C;
- e) 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 driver 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).

Do not touch any parts of the system when high voltage is applied, as it 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.

1. Connect wires to the Pockels cell

The wires leading from HV outputs to the Pockels cell must be about $0.24 \text{ mm}^2 \text{ CSA}$. Both the wires must be as short as possible and equal length. The length of each wire must be not exceeding 100 mm. They should be located at least 5 mm away from any conductive material (including the operator's fingers and instruments) – this is done to avoid any additional capacitive load. Otherwise, driver characteristics may degrade and/or the driver may get damaged.

2. Ground the Pockels cell driver and HV supply together with the generator

The driver output of several kilovolts (kV) with very fast edges is a powerful source of electromagnetic interference (EMI). Please ensure proper wiring and grounding to avoid problems caused by interference.

The best solution to minimize EMI is to mount the driver and the HV power supply on the metal body of the laser. The driver base plate must have very good electrical contact with the ground wire of the HV power supply, such as the four mounting holes on the edges of the board. Ensure that these connections are firmly tighten and has god electrical connection. This is enough in most of cases.

If the EMI level is still very high, attempt mounting ferrites on all power and control wires leading to the driver and power supply (except wires to the Pockels cell).

3. Provide synchronization pulses from the generator

It is necessary to measure the generator output voltage with a 50Ω load before applying synchronization signals to the DQF-0.1-8B driver. The signal voltage must be in the range of 3.5...5 V.

After the generator output voltage is measured, remove the 50Ω load and provide synchronization pulses to the driver.

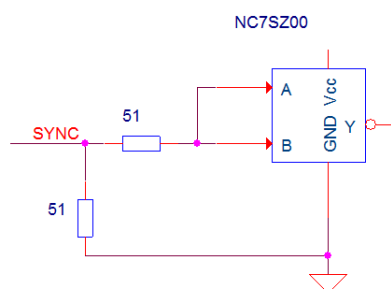


Figure 3. Input circuit of the driver

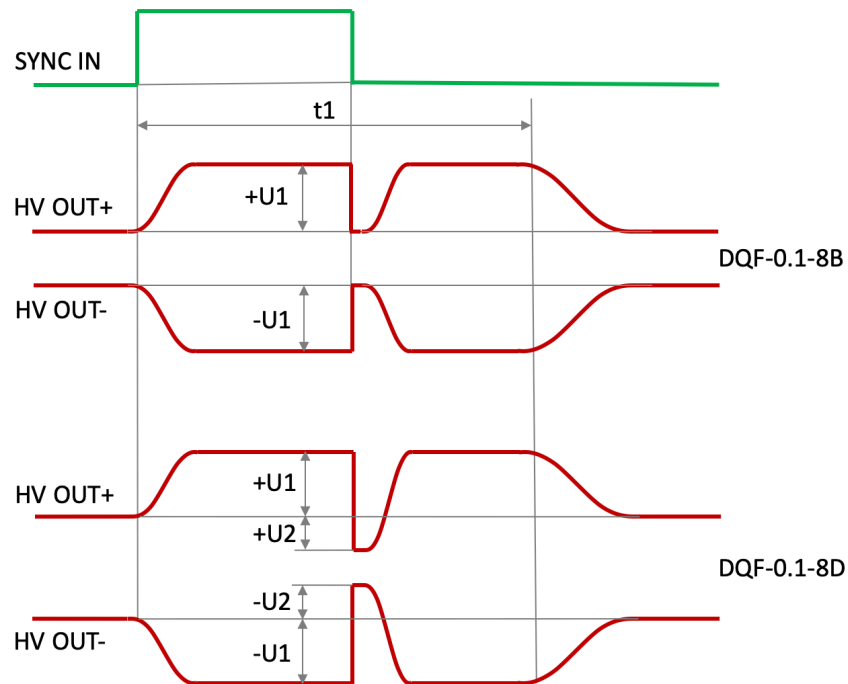


Figure 4. Control timing charts

4. Supply voltage to the driver from the DC power supply

Use connector #2 (Figure2) to supply +12V.

5. Set HV Voltage

Turn on +12 VDC power supply. Depending on CAN setting HV can be adjusted either by CAN interface or using onboard trimmer 7 (Figure2). CAN register “**Set HV knob control enable**” is to switch in between trimmer and CAN control options.