Pockels Cells Drivers

OEM version of DP-SP series Pockels cell driver

Encased version of DPB2 series Pockels cell driver

CAVITY DUMPING & PULSE PICKING POCKELS CELL DRIVERS – DP / DPB / DP-SP

Features

- HV rise/fall time down to 6 ns
- HV pulse amplitude up to 9.8 kV
- Pulse repetition rate up to 6 MHz
- Output pulse jitter <60 ps if trigger pulse rise time <0.5 ns

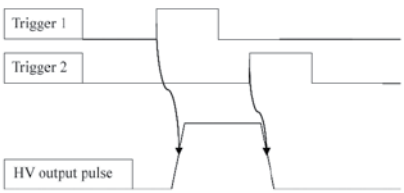

Fig. 1. Control timing charts using two pulses trigger control

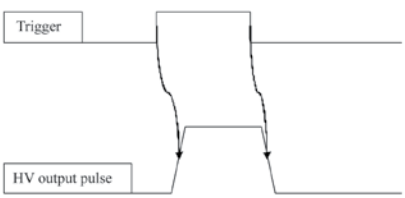

Fig. 2. Control timing charts using single pulse trigger control

Pockels cell drivers are designed for a wide range of applications and operating modes – pulse selection, Q switching, cavity dumping, CW beam chopping, burst modes, etc.

Different versions of the drivers are designed for variations of output voltage, repetition rate and rise/fall time of HV pulses. Those three parameters are mutually dependent: higher voltage means longer rise/fall time, and higher repetition rate is limited by output voltage.

Pockels cell drivers are available in two versions: "open frame" which is ideal for OEM manufacturers incorporating drivers in their own laser systems, or "encased" in aluminum housings. Encasing of Pockels cell driver in aluminum housing helps to solve two problems: shields both humans and electronics from high voltage impact from operating Pockels cell driver, and protects driver itself from accidental potentially harmful external contact – ensuring safe operation of the driver. The encased option is especially handy for researchers and custom product manufacturers who use these drivers during their own systems build-up.

DP/DPBx series Pockels cell drivers operate safely with HV pulse duration from 100 ns to 5 µs. Moreover, HV pulse duration can be extended to infinity using pulse regeneration technique.

Short pulse drivers (DP-SP series) feature safe operation with HV pulse duration from 15 ns to ~1 µs. However, pulse regeneration technique does not work with short pulse drivers.

Operation control of all our drivers can be made by two trigger (sync) pulses (Fig. 1) or by single trigger pulse (Fig. 2), whereas rising edge of trigger pulse turns ON high voltage to Pockels cell and falling edge of the same trigger pulse turns high voltage OFF. Drivers have switchable option to be controlled by one or two trigger pulses.

Pulse regeneration technique

Gives possibility to extend HV pulse duration. Pulse regeneration technique does not work with DP-SP or DPB series drivers. Pulse regeneration technique diagram is shown in *Fig. 3*.

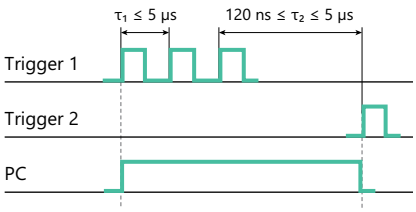

Fig 3. Principle pulse regeneration diagram

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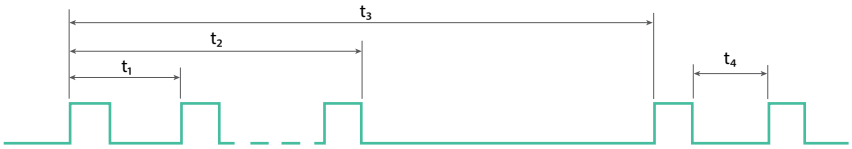
Burst mode operation

Certain laser applications, such as laser material processing, optical metrology and others require for relatively short sequence of high repetition rate of pulses with following pause, i.e. burst mode. All the EKSMA Optics Pockels cell drivers series DP/DPBx, DP-SP and DPB can operate up to 3 MHz bursts by reducing duty cycle and preserving below requirements.

Peak power capacity of HV power supply must be increased for burst operation. Contact EKSMA Optics for details and suggestions.



t_1 – pulse repetition period in burst, should be $1/t_1 \leq 3$ MHz.
t_2 – burst duration.
t_3 – burst packet repetition period.
t_4 – minimal pause between two HV pulses, should be ≥ 150 ns for most of the drivers.
Duty cycle is determined as $D = t_2/t_3$, should be $D \leq F * t_1$.
Here F – maximal repetition rate specified for the driver.

General specifications of Pockels cell drivers

DRIVER SERIES	DP/DPBx	DP-SP	DPB
Minimal HV pulse duration (FWHM)	100 ns	15 ns	30 ns
Maximal HV operation voltage	up to 7.2 kV	up to 3.6 kV	up to 9.8 kV
Maximal HV pulse repetition rate	6 MHz	600 kHz	10 kHz
HV pulse duration extension using pulse regeneration technique	Yes	No	
Triggering pulse duration requirement (For two-pulses triggering mode only)	≥20 ns		
Triggering pulse amplitude requirement	3.5 – 5 V (50 Ω)		
Triggering pulse rise & fall time requirement	≤ 10 ns	≤ 5 ns	≤ 20 ns
Maximal length of leads to Pockels cell	10 cm		
HV pulse delay	25 ns	30 ns	

Specifications are given for Pockels cells with capacity < 6 pF. Not all combinations of parameters are possible at the same time. Specifications are subject to change without advance notice.

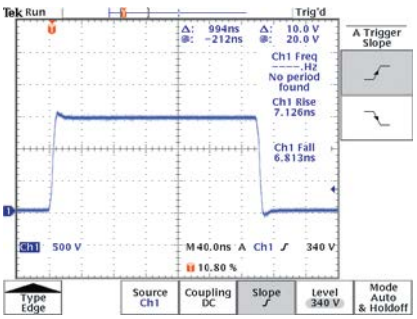


Fig. 5. Typical output pulse shape

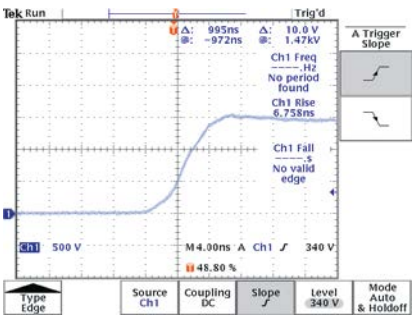


Fig. 6. Typical rising edge of output pulse

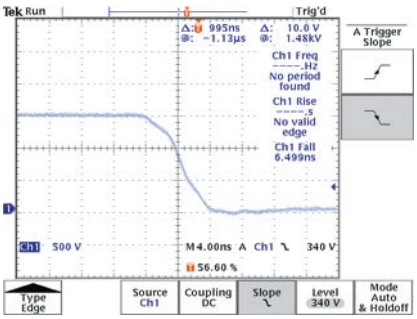


Fig. 7. Typical falling edge of output pulse

Ordering / Part number information

Please provide following information about the driver:

- Operating voltage
- Repetition rate
- HV Pulse duration (range)
- Capacitance of Pockels cell
- OEM or Encased version

DP-50-3.6-AI

- Model name
- Max repetition rate of HV pulse, kHz
- Max operating voltage, kV
- AI – Encased version
  None – OEM version

HIGH VOLTAGE POCKELS CELL DRIVERS – DPB

Features

- HV pulse amplitude up to 9.8 kV
- HV pulse amplitude doubling layout
- Repetition rate up to 10 kHz
- Easy integration with HV power supply
- Easy mounting on optical breadboard

OEM version of DPB series Pockels cell driver mounted with HV power supply

Encased version of DPB series Pockels cell driver with HV power supply mounted inside

Configuration samples of DPB series drivers

CATALOGUE NUMBER OF DRIVER	DPB-10-4.2 DPB-10-4.2-AI	DPB-5-5.5 DPB-5-5.5-AI	DPB-3-8.6 DPB-3-8.6-AI	DPB-2.5-9.8 DPB-2.5-9.8-AI
Maximal HV operation voltage	4.2 kV	5.5 kV	8.5 kV	9.8 kV
Output polarity	bipolar			
HV pulse rise time, typical	6 ns	7 ns	10.5 ns	12 ns
HV pulse fall time, typical	6 ns	7 ns	9.5 ns	10.5 ns
HV pulse duration	30…3000 ns		35…2000 ns	
Maximal HV pulse repetition rate	10 kHz	5 kHz	3 kHz	2.5 kHz
HV pulse delay	30 ns			
Requirement for external triggering pulse amplitude	3.5…5 V (50 Ω load)			
Requirement for external triggering pulse rise time	< 5 ns			
Requirement for external triggering pulse duration	See Fig. 8 for control by 1 pulse, see Fig. 9 for control by 2 pulses			
External powering requirements:				
Low voltage DC supply	15 – 25 V, 150 mA (0.5 A inrush current)		23…25 V, 150 mA	
HV power supply	2.1 kV, 5 W	2.8 kV, 5W	4.4 kV, 5W	5.0 kV, 5W
DC Connectors	Molex Micro-Fit 3.0			
Dimensions (L x W x H):				
Driver board	135 × 65 × 30 mm		135 × 75 × 30 mm	
Driver board mounted with PS-5 power supply	See Fig. 10		See Fig. 11	
Encased driver with PS-5 power supply mounted inside	See Fig. 12		See Fig. 13	

Power consumption for 6 pF load. Voltage or repetition rate derating is necessary if capacitance of your Pockels cell is higher. Contact vendor for details.

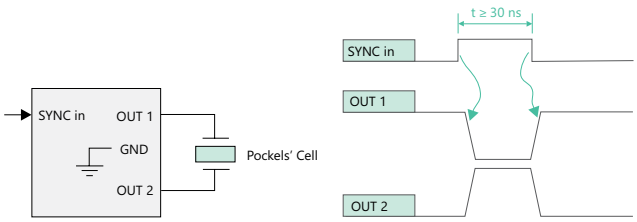


Fig. 8. Diagram of pockels cell connection to driver and timing charts of driver controlled by 1 sync pulse

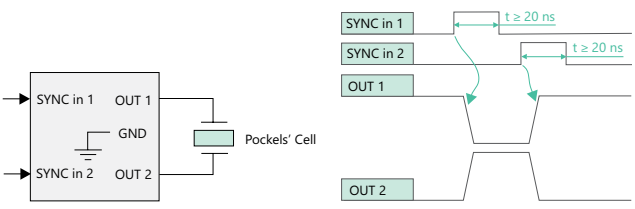


Fig. 9. Diagram of pockels cell connection to driver and timing charts of driver controlled by 2 sync pulses

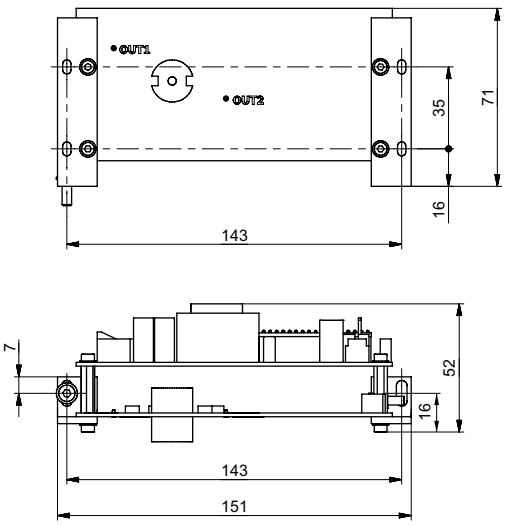


Fig. 10. Outline drawing of OEM version DPB-10 and DPB-5 drivers with PS-5 power supply

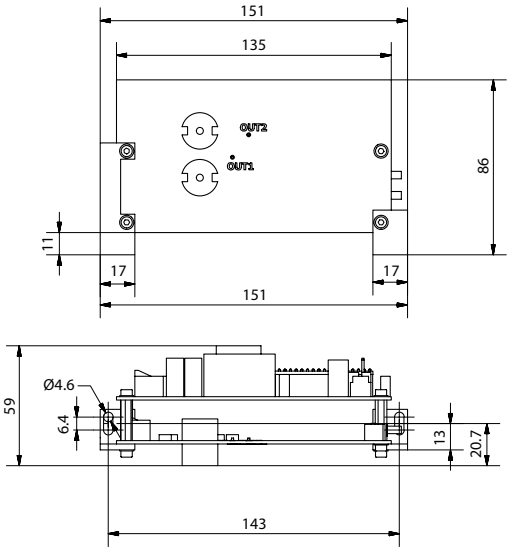


Fig. 11. Outline drawing of OEM version DPB-3 and DPB-2.5 drivers with PS-5 power supply

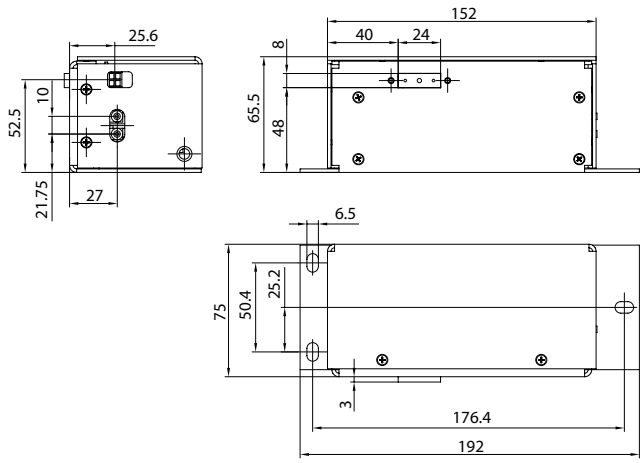


Fig. 12. Outline drawing of encased version DPB-10 and DPB-5 drivers with PS-5 power supply

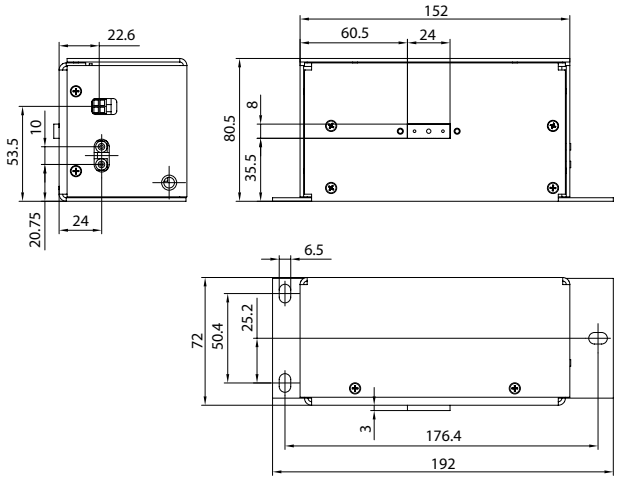


Fig. 13. Outline drawing of encased version DPB-3 and DPB-2.5 drivers with PS-5 power supply

HIGH VOLTAGE POCKELS CELL DRIVERS – DPBx

Features

- HV pulse amplitude up to 7.2 kV
- Repetition rate up to 500 kHz
- HV pulse duration extension using pulse regeneration technique
- OEM version available upon request

Encased version of DPB2 series Pockels cell driver

Configuration samples of DPBx series drivers

CATALOGUE NUMBER OF DRIVER	DPB1-350-4-AI	DPB1-300-4.6-AI	DPB1-250-5.2-AI	DPB2-250-7.0-AI	DPB3-500-7.2-AI
Maximal HV operating voltage	4.0 kV	4.6 kV	5.2 kV	7.0 kV	7.2 kV
Maximal HV repetition rate	350 kHz	300 kHz	250 kHz	250 kHz	500 kHz
Pulse duration	100 – 5000 ns				
HV pulse rise time, typical	< 7.5 ns	< 8 ns	< 8.5 ns	< 9.5 ns	< 10 ns
HV pulse fall time, typical	< 7.5 ns	< 8 ns	< 8.5 ns	< 9.5 ns	< 10 ns
Output polarity	Bipolar				
HV power consumption	< 100 W	< 100 W	< 100 W	< 200 W	< 375 W
24 V power consumption	< 5 W	< 4 W	< 3 W	< 9 W	< 7 W
Recommended HV power supply model	PS2-60 or HVS100-2x60			HV-2x200	
Dimensions	See *Fig. 14*			See *Fig. 15*	See *Fig. 19*
Cooling	Water				

Driver needs to be mounted on heatsink unless it is cooled by water. Driver's base plate temperature needs to be lower than 35 °C in all regimes of operation.
Power consumption for 6 pF load. Voltage or repetition rate derating is necessary if capacitance of your Pockels cell is higher. Contact vendor for details.

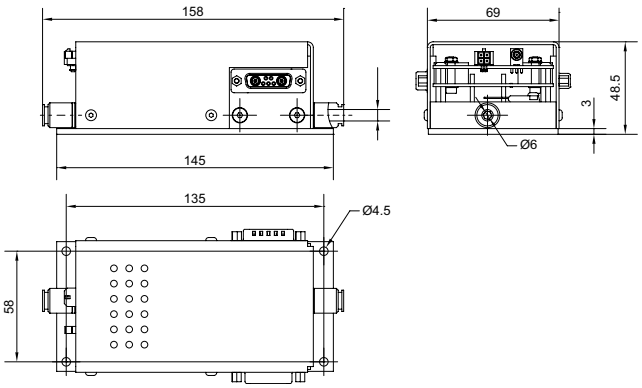


Fig. 14. Outline drawing of encased version DPB1 series Pockels cell drivers

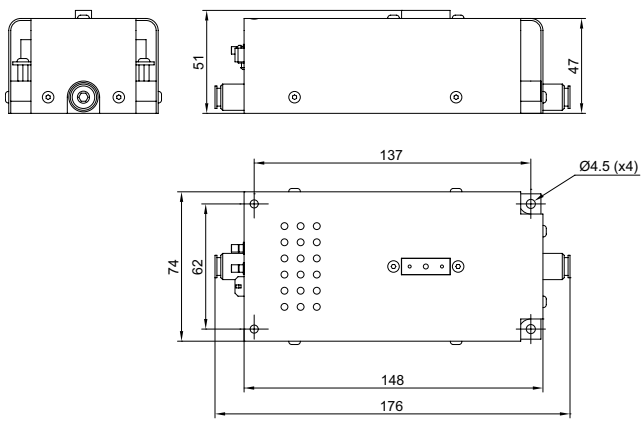


Fig. 15. Outline drawing of encased version DPB2 series Pockels cell drivers

LOW VOLTAGE POCKELS CELL DRIVERS – DP

Features

- HV pulse amplitude up to 3.6 kV
- Repetition rate up to 2 MHz
- HV pulse duration extension using pulse regeneration technique
- Alternative aluminum case option featuring conductive cooling possibility and relocated water and HV output connectors
- OEM version available upon request

Standard of DP/DP-SP series Pockels cell driver

Configuration samples of DP series drivers

CATALOGUE NUMBER OF DRIVER	DP-50-3.6-AI	DP-250-3.6-AI	DP-500-2.6-AI	DP-1000-1.8-AI	DP-2000-1.5-AI
Maximal HV operating voltage	3.6 kV	3.6 kV	2.6 kV	1.8 kV	1.5 kV
Maximal HV repetition rate	50 kHz	250 kHz	500 kHz	1000 kHz	2000 kHz
Pulse duration	100 – 5000 ns				
HV pulse rise time, typical	< 7 ns	< 7 ns	< 6.5 ns	< 6 ns	< 7 ns
HV pulse fall time, typical	< 7 ns	< 7 ns	< 6.5 ns	< 6 ns	< 7 ns
Output polarity	Positive				
HV power consumption	< 20 W	< 75 W	< 90 W	< 80 W	< 120 W
24 V power consumption	< 1 W	< 4 W	< 6 W	< 9 W	< 12 W
Recommended HV power supply model	PS-40 or HVS100-40	PS-80 or HVS100-80	PS-120 or HVS100-120	PS-80 or HVS100-80	PS-120 or HVS-120
Dimensions	Standard - see *Fig. 16*, alternative – see *Fig. 17* [1]				
Cooling	Water [2]				

[1] If alternative aluminum case is required, please add note "option 1" when ordering, for e.g., "Pockels cell driver DP-250-3.6-AI option 1".

[2] Standard aluminum case is suitable for water cooling. Alternative aluminum case (option 1) is suitable for both, conductive and water cooling.

Driver needs to be mounted on heatsink unless it is cooled by water. Driver's base plate temperature needs to be lower than 35 °C in all regimes of operation. Power consumption for 6 pF load. Voltage or repetition rate derating is necessary if capacitance of your Pockels cell is higher. Contact vendor for details.

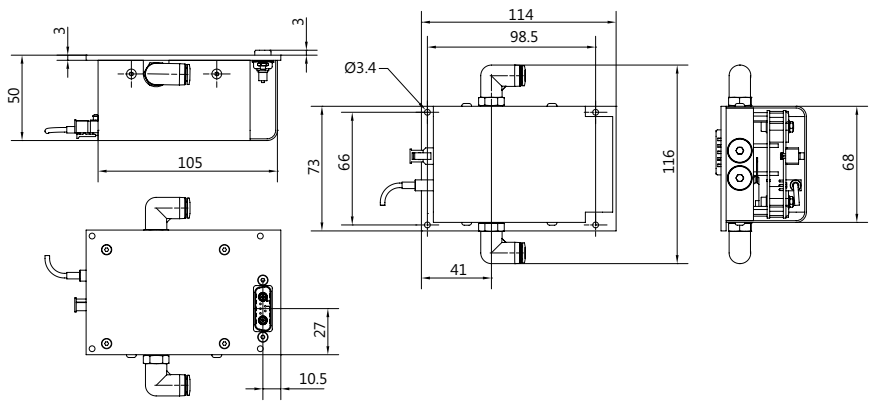


Fig. 16. Outline drawing of standard encased version DP/DP-SP series Pockels cell drivers

SHORT PULSE POCKELS CELL DRIVERS – DP-SP

Features

- HV pulse amplitude up to 3.6 kV
- Repetition rate up to 1 MHz
- HV pulse duration down to 15 ns
- Short circuit protection at driver output
- Driver pad overheat sensor stops operation when overheated
- Overheat optocoupled output signal
- LED for error indication (overheat and short circuit)
- Alternative aluminum case option featuring conductive cooling possibility and relocated water and HV output connectors
- OEM version available upon request

Configuration samples of DP-SP series drivers

CATALOGUE NUMBER OF DRIVER	DP-SP-50-3.6-AI	DP-SP-250-3.6-AI	DP-SP-500-2.6-AI	DP-SP-1000-1.8-AI
Maximal/minimal HV operating voltage	3.6 kV / 1.8 kV	3.6 kV / 1.8 kV	2.6 kV / 1.3 kV	1.8 kV / 0.9 kV
Maximal HV repetition rate	50 kHz	250 kHz	500 kHz	1000 kHz
Pulse duration	15 – 5000 ns	15 – 1250 ns	15 – 500 ns	15 – 250 ns
HV pulse rise time, typical	< 7 ns	< 7 ns	< 6.5 ns	< 6 ns
HV pulse fall time, typical	< 7 ns	< 7 ns	< 6.5 ns	< 6 ns
Output polarity	Positive			
HV power consumption	< 20 W	< 75 W	< 90 W	< 80 W
12 V / 24 V power consumption	1 W	4 W	< 6 W	9 W
Recommended HV power supply model	PS-40 or HVS100-40	PS-80 or HVS100-80	PS-120 or HVS100-120	PS-80 or HVS100-80
Dimensions	Standard - see *Fig. 16*, alternative – see *Fig. 17* [1]			
Cooling	Water [2]			

[1] If alternative aluminum case is required, please add note "option 1" when ordering, for e.g., "Pockels cell driver DP-SP-250-3.6-AI option 1".
[2] Standard aluminum case is suitable for water cooling. Alternative aluminum case (option 1) is suitable for both, conductive and water cooling.

Driver needs to be mounted on heatsink unless it is cooled by water. Driver's base plate temperature needs to be lower than 35 °C in all regimes of operation. Power consumption for 6 pF load. Voltage or repetition rate derating is necessary if capacitance of your Pockels cell is higher. Contact vendor for details.

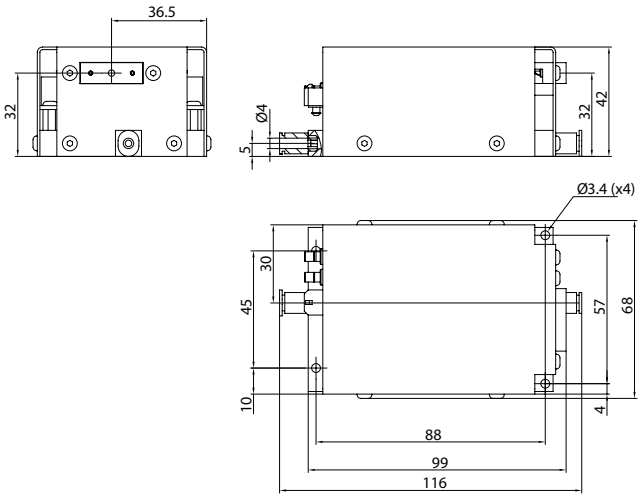


Fig. 17. Outline drawing of alternative encased version DP/DP-SP series Pockels cell drivers with relocated water and HV output connectors (option 1)

HIGH REPETITION RATE POCKELS CELL DRIVERS – 2DP / DPB3

Features

- HV pulse amplitude up to 3.1 kV
- Repetition rate up to 6 MHz
- HV pulse duration down to <1 ns
- HV pulse duration extension using pulse regeneration technique
- OEM version available upon request

Encased version of DPB3 series Pockels cell driver

CATALOGUE NUMBER OF DRIVER	2DP-1000-2.4-Al	2DP-2000-1.6-Al	DPB3-2500-3.1-Al	DPB3-3000-2.6-Al	2DPB3-4000-1.7-Al	2DPB3-6000-1.3-Al
Maximal HV operating voltage	2.4 kV	1.6 kV	3.1 kV	2.6 kV	1.7 kV	1.3 kV
Maximal HV repetition rate	1000 kHz	2000 kHz	2500 kHz	3000 kHz	4000 kHz	6000 kHz
Pulse duration	0 – 5000 ns		100 – 5000 ns		0 – 5000 ns	
HV pulse rise time, typical	< 6.5 ns	< 6 ns	< 9.5 ns	< 8.5 ns	< 10.5 ns	< 8.5 ns
HV fall rise time, typical	< 6.5 ns	< 6 ns	< 9.5 ns	< 8.5 ns	< 10.5 ns	< 8.5 ns
Output polarity	Positive		Bipolar		Positive	
HV power consumption	< 160 W	< 160 W	< 360 W	< 325 W	< 360 W	< 330 W
24 V power consumption	< 14 W	< 18 W	< 10 W	< 10 W	< 6 W	< 10 W
Recommended HV power supply model	HV-200 or HVS100-2x120		HV-2x200		HV-400	
Dimensions	See *Fig. 18*		See *Fig. 19*			
Cooling	Water					

Driver needs to be mounted on heatsink unless it is cooled by water. Driver's base plate temperature needs to be lower than 35 °C in all regimes of operation. Power consumption for 6 pF load. Voltage or repetition rate derating is necessary if capacitance of your Pockels cell is higher. Contact vendor for details.

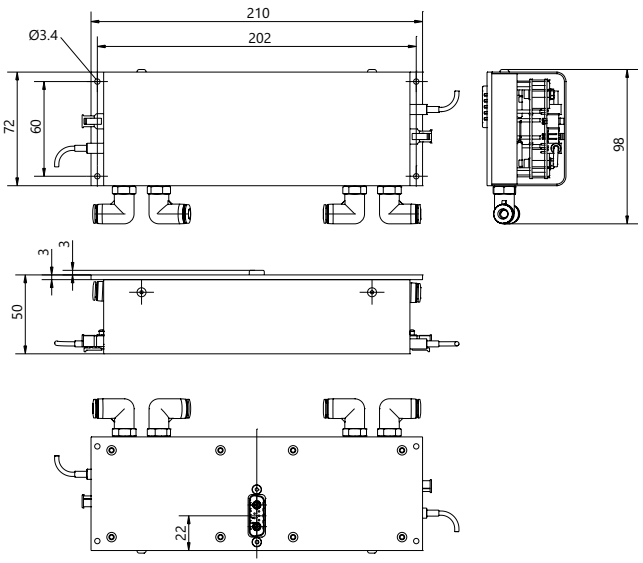


Fig. 18. Outline drawing of encased version 2DP series Pockels cell drivers

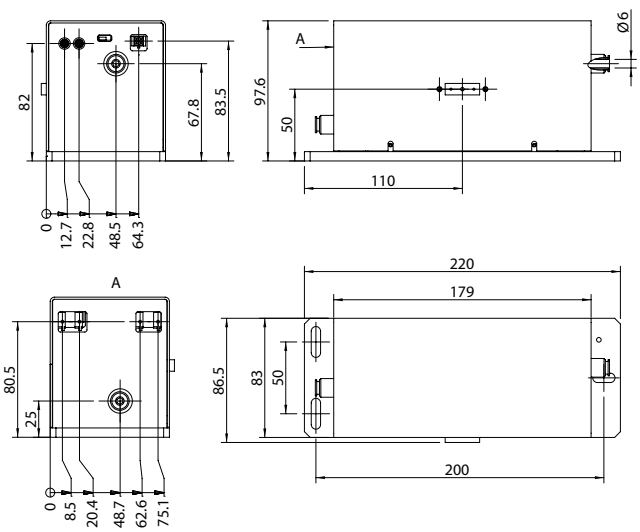


Fig. 19. Outline drawing of encased version 2DPB3/DPB3 series Pockels cell driver

HIGH VOLTAGE DRIVERS WITH FAST AMPLITUDE MODULATION – DP-FAM

Features

- HV pulse repetition rate up to 500 kHz
- Fast amplitude modulation of HV pulses
- Output HV pulse amplitude ranges from 0.1 kV to 2.5 kV

DP-FAM series drivers allow to control the amplitude of each HV output pulse with specific user-defined amplitude levels. The control is realized by one or two trigger-sync pulses and analog signal for amplitude modulation (HV program).

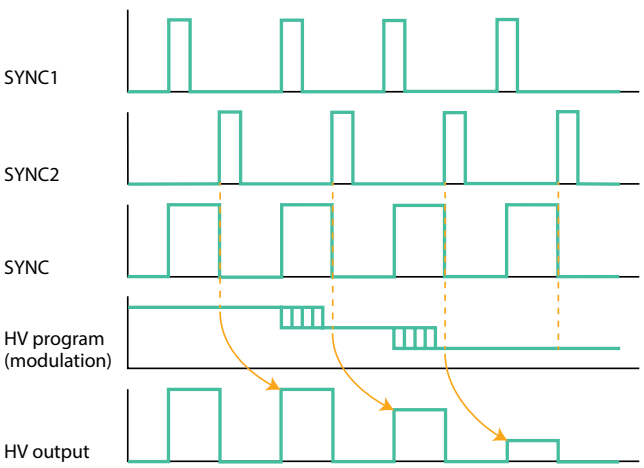
DP-FAM Pockels cell driver

Configuration samples of DP-FAM series encased drivers

CATALOGUE NUMBER OF DRIVER		DP-FAM-250-2.5-AI	DP-FAM-500-2.5-AI
HV operation voltage range		0.1 - 2.5 kV	
HV program input signal range		0.1 - 4.9 V	
Maximal HV repetition rate		250 kHz	500 kHz
HV pulse duration		70 – 3000 ns	70 – 1000 ns
HV pulse rise time, typical [1]		< 26 ns	
HV fall time, typical [1]		< 13 ns	
Output polarity		positive	
External trigger pulse requirements	Amplitude on 50 Ω	3.5 – 5 V	
	Rise/fall time	< 10 ns	
HV power consumption		60 W	120 W
24 VDC power consumption		<12 W	
Recommended HV power supply model		PS-80-2.6 (OEM type) HVS100-80-2.6 (lab type)	PS-120-2.6 (OEM type) HVS100-120-2.6 (lab type)
Dimensions		139 × 69 × 57 mm (*Fig. 20*)	
Cooling [2]		conductive or water	
Control interface [3]		CAN	

[1] All specifications are given for 6 pF Pockels cell load.
[2] Heat sink temperature must not exceed 35 °C (95 °F) in all regimes of operation.
[2] Requires USB-CAN converter for computer control that is sold separately.

Example of driver operation.
Green trace – modulated analog input signal, purple trace – trigger signal SYNC (single pulse control mode), yellow trace – HV pulse.



Operation timing charts.
SYNC1 and SYNC2 are used for 2-pulses control operation mode. HV program input amplitude is readout at SYNC2 rising edge and is used to set HV output amplitude for next HV output pulse which is started with SYNC1 rising edge. SYNC is used for single pulse control mode. HV program input amplitude is readout at SYNC falling edge and is used to set HV output amplitude for next HV output pulse which is started with SYNC rising edge.

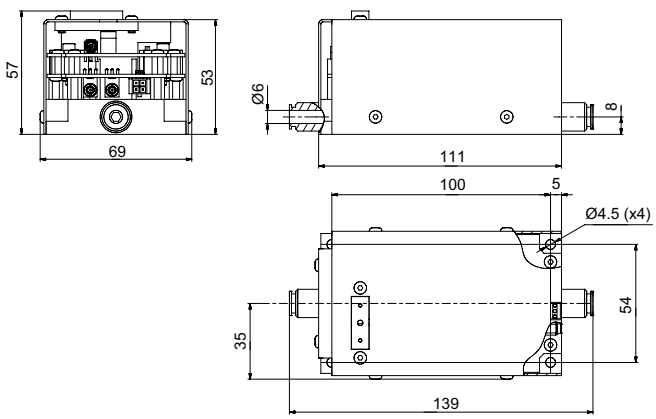


Fig. 20. Outline drawing of DP-FAM series drivers.

HIGH REPETITION RATE POCKELS CELL DRIVER FOR Q-SWITCHING OF DIODE PUMPED LASERS – DQ

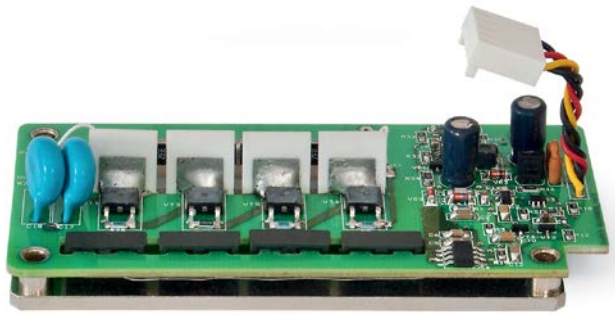
Features

- Pulse repetition rate up to 100 kHz
- Fast HV rise time <7 ns for 4 kV pulse
- HV pulse amplitude up to 4 kV

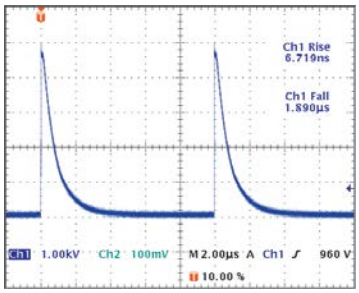
DQ series high repetition rate Pockels cell driver has been designed for use in mode-locked lasers for cavity dumping or for cavity Q-switching of solid-state nanosecond lasers. Fast HV edge ensures excellent pre- and post-pulse contrast.

Ability to operate at high pulse repetition rates makes this driver perfect fit for most of diode-pumped nanosecond lasers. For pulse repetition rates up to 10 kHz heatsink is not required. For high repetition rates the driver should be attached to the heatsink with thermal resistance of at least 0.4 °C/W for room temperature (25 °C) operation.

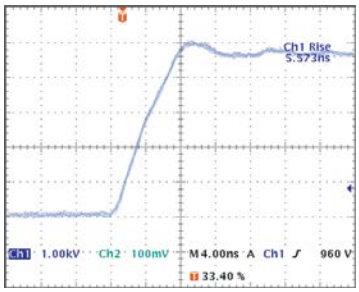
The driver should be mounted into dielectric box (not provided) providing electrical insulation. Low voltage power supply is required to internal triggering circuit, while tuning of HV power supply voltage.



DQ series Pockels cell driver



Oscillogram of DQ-100-4 driver operation



Fast edge of HV pulse in detail

Specifications

CATALOGUE NUMBER	DQ-100-4
Maximum high voltage (HV) pulse amplitude	4.0 kV
Polarity	Positive
HV pulse rise time	< 7 ns
HV pulse fall time	~2 µs [1]
HV pulse duration	180 ns [1]
Maximum HV pulse repetition rate	100 kHz
HV pulse jitter	< 0.5 ns
External triggering pulse duration requirement	100 – 1000 ns
External triggering pulse amplitude requirement	3 – 5 V (50 Ω)
External triggering pulse rise & fall time	< 10 ns
HV pulse delay	35 – 40 ns
External powering requirements:	
high voltage supply	0 – 4.0 kV, 9 mA max [2]
low voltage DC supply	9 – 24 V, 500 mA max [2]
Operating temperature	0 – 35 °C [3]
Size	104 × 52 × 25 mm

[1] Typical value.

[2] Test conditions: PRR = 100 kHz, C = 6 pF, U = 4 kV.

[3] Heat sink temperature must not exceed 35 °C (95 °F) in all regimes of operation.

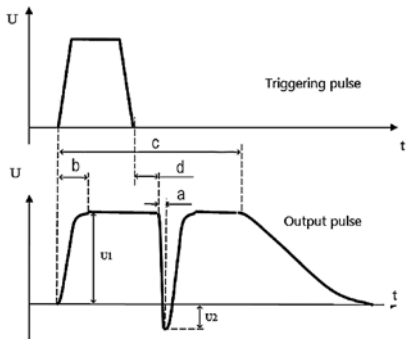
POCKELS CELLS DRIVER FOR Q-SWITCHING OF FLASHLAMP PUMPED LASERS – DQF

DQF drivers are designed for Q-switching of nanosecond lasers without use of phase retardation plate. High voltage is applied to Pockels cell in order to inhibit oscillation. Pockels cell is opened by negative polarity pulse allowing laser to radiate.

Driver DQF-0.1-8D is integrated with ±4 kV HV power supply. High voltage can be controlled either by onboard trimmer potentiometer or by using CAN interface. Control by CAN requires USB-CAN converter for computer control that is sold separately.

DQF-0.2-5 Pockels cell driver

DQF-0.1-8 Pockels cell driver with integrated HV Power supply



Timing diagram of DQF driver

Specifications

CATALOGUE NUMBER	DQF-0.2-5D	DQF-0.1-8D
Maximum high voltage to cell (HV) pulse amplitude (U1 + U2)	5 kV	8 kV
U1 value	equal to HV powering voltage	
U2 value	equal to 0.25×U1	
HV pulse fall time (a)	< 15 ns	< 12 ns
HV pulse rise time, typical (b)	60 µs	120 µs
HV pulse duration, typical (c)	300 µs (1200 µs optionally)	650 µs
HV pulse repetition rate	≤ 250 Hz	≤ 100 Hz
HV pulse delay (d)	40 ns	25 ns
External triggering pulse duration	100 – 1200 µs	120 – 650 µs
External triggering pulse amplitude	3 – 5 V (50 Ω)	3.5 – 5 V (50 Ω)
External triggering pulse rise & fall time	< 20 ns	
Board dimensions [1]	92 × 70 × 22 mm	92 × 70 × 27 mm
Mounting holes location for M3 studs	84 × 62 mm	
External powering requirements:		
DC supply	12 – 24 V, max 200 mA	12 V, max 15 mA
HV supply	4 kV, 1 mA	integrated in the driver

[1] Keep safety distance at least 5 mm from any side of board or any component to surrounding conductive parts.

POCKELS CELL AND POCKELS CELL DRIVER SELECTION GUIDE

Suggested Configuration samples. Please contact our sales engineers for a complete solution tailored to your application.

For operation at **515 – 532 nm** wavelength

Material	Max repetition rate, kHz	Ø CA, mm	Phase retardation	HV pulse duration	Pockels cell	Driver	HV Power supply
BBO	1000	2.5	λ/4	100 – 5000 ns	PCB3S	DP-1000-1.8-AI	PS-80-1.8 or HVS100-80-1.8
BBO	500	3.5			PCB4S	DP-500-2.6-AI	PS-120-2.6 or HVS100-120-2.6
DKDP	10	11		30 – 3000 ns	PC12SR or D-compact/12	DPB-10-4.2	PS-5-2.1
KTP / RTP	2000	5.5	λ/2	0 – 5000 ns	PCK6 / PCR6	2DP-2000-1.6-AI	HV-200-1.6 or HVS100-2x120-1.6
BBO	500	3.5	0 – λ/2	70 – 1000 ns	PCB4D	DP-FAM-500-2.5-AI	PS-120-2.6 or HVS100-120-2.6
DKDP	5	11	λ/2	30 – 3000 ns	PC12SR or D-compact/12	DPB-5-5.6	PS-5-2.8

For operation at **780 – 800 nm** wavelength

Material	Max repetition rate, kHz	Ø CA, mm	Phase retardation	HV pulse duration	Pockels cell	Driver	HV Power supply
BBO	6000	2.5	λ/4	0 – 5000 ns	PCB3D/25	2DPB3-6000-1.3-AI	HV-400-1.5
BBO	1000	5.8		100 – 5000 ns	PCB6.3D	DPB1-1000-2.9-AI	PS2-60-1.6 or HVS100-2x60-1.6
DKDP	10	11		30 – 3000 ns	PC12SR or D-compact/12	DPB-10-4.2	PS-5-2.1
KTP / RTP	1000	5.5	λ/2	0 – 5000 ns	PCK6 / PCR6	2DP-1000-2.4-AI	HV-200-2.4
KTP / RTP	500	5.5	0 – λ/2	70 – 1000 ns	PCK6 / PCR6	DP-FAM-500-2.5-AI	PS-120-2.6 or HVS100-120-2.6
DKDP	3	11	λ/2	35 – 2000 ns	PC12SR or D-compact/12	DPB-3-8.6	PS-5-4.4

For operation at **1030 – 1064 nm** wavelength

Material	Max repetition rate, kHz	Ø CA, mm	Phase retardation	HV pulse duration	Pockels cell	Driver	HV Power supply
KTP / RTP	4000	5.5	λ/4	0 – 5000 ns	PCK6 / PCR6	2DPB3-4000-1.7-AI	HV-400-2.0
BBO	600	3.5		15 – 400 ns	PCB4D	DP-SP-600-2.5-AI	PS-120-2.6 or HVS100-120-2.6
DKDP	5	11		30 – 3000 ns	PC12SR-1/1, D-compact/12	DPB-5-5.6	PS-5-2.8
KTP / RTP	1000	5.5	λ/2	100 – 5000 ns	PCK6 / PCR6	DPB1-1000-2.9-AI	PS2-60-1.4 or HVS100-2x60-1.4
BBO	300	3.5			PCB4D	DPB1-300-4.6-AI	PS2-60-2.6 or HVS100-2x60-2.6
DKDP	2.5	11		35 – 2000 ns	PC12SR-1/1, D-compact/12	DPB-2.5-9.8	PS-5-5.0

For operation at **1550 – 1560 nm** wavelength

Material	Max repetition rate, kHz	Ø CA, mm	Phase retardation	HV pulse duration	Pockels cell	Driver	HV Power supply
BBO	1000	3.5	λ/4	100 – 5000 ns	PCB4D	DPB2-1000-3.8-AI	HV-2x200-2.0 or HVS100-4x60-2.0
KTP / RTP	500	5.5			PCK6 / PCR6	DP-500-2.6-AI	HVS100-120-2.6
BBO	250	3.5			PCB4D	DP-250-3.6-AI	HVS100-80-3.6
KTP / RTP	2500	3.5	λ/2	100 – 5000 ns	PCK4 / PCR4	DPB3-2500-3.1-AI	HV-2x200-2.0
BBO	500	3.5			PCB4D	DPB3-500-7.2-AI	HV-2x200-3.6
BBO	300	2.5			PCB3D/25	DPB1-300-4.6-AI	PS2-60-2.6 or HVS100-2x60-2.6

All combinations of Pockels cell, driver and HV power supply can be integrated into a single pulse-picking system UP2 or MP1.