



Design-In Manual

QDP-50™ OEM POCKELS CELL DRIVER

Double Pulse Q-Drive™ for Flash Lamp Pumped Lasers

APRIL 2018

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WARNINGS

This equipment must only be used by qualified personnel.

This device produces up to 4.0 kV high voltage pulses. Normal precautions for working with high voltage must be followed.

When operating in a Q-switched laser this equipment is part of a system that generates high energy pulses of laser light that can cause serious injury.

The pulses produced by the driver are very fast - the wiring between the driver and the Pockels cell, and the Pockels cell itself, can be expected to produce a great deal of EMI. It is the user's responsibility to insure that systems incorporating this driver do not cause undue interference.

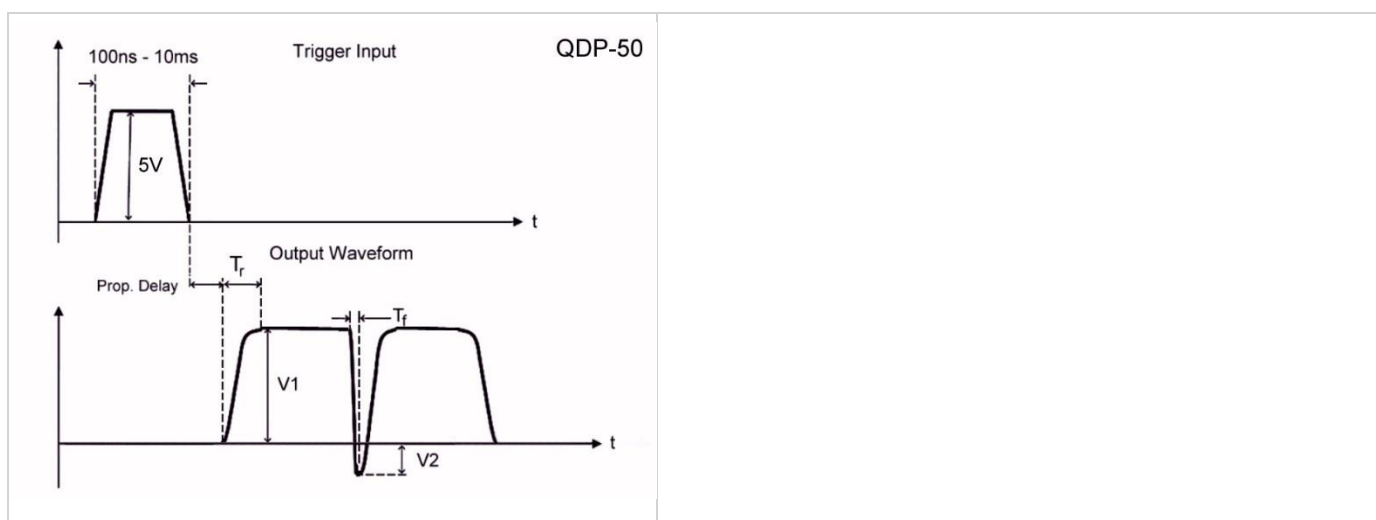
There are no user serviceable parts in the driver. It should be returned to Gooch & Housego for service if required.

I Introduction

Description

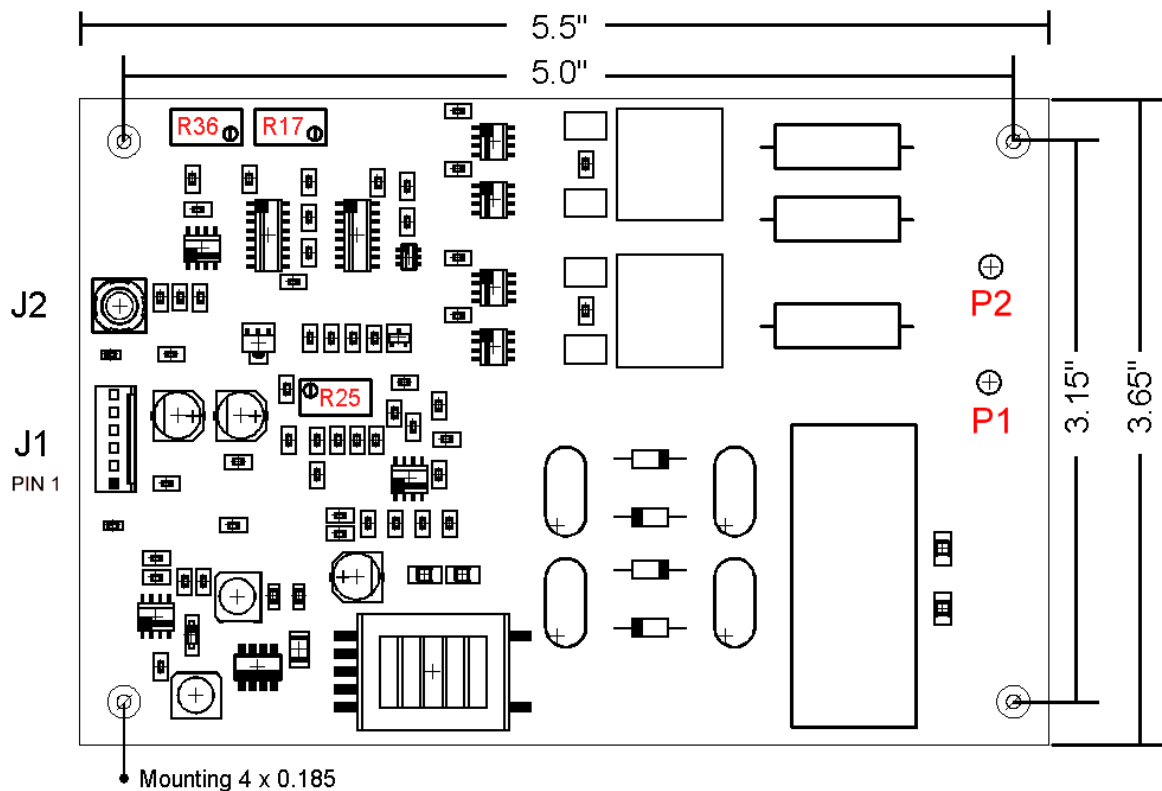
The Gooch & Housego QDP-50™ is an OEM Pockels cell driver for Q-switched laser systems. This driver is designed for Q-switching of lasers without the need for phase retardation plates. Once triggered, high voltage is applied to inhibit the laser output. After a preset delay, the Pockels cell is opened by a fast negative pulse to allow laser output, then it returns to high voltage to inhibit additional lasing.

Parameter	Conditions	Min	Max	Units
OUTPUT PULSE PARAMETERS				
Pulse repetition rate	Same as trigger input	1	50	Hz
Amplitude (V1+V2)	Adjustable (V2 = 10% of V1)	1.2	4.0	kV
Total HV on time	Adjustable or fixed	300	600	μs
Delayed center pulse	Adjustable (range can be modified)	160	200	μs
Fall time	3.5 kV, 6 pF		< 10	ns
Rise time	3.5 kV, 6 pF	1	5	μs
Load capacitance	With Pockels cell leads		30	pF
POWER REQUIREMENTS				
Input voltage	Exceeding 20 VDC will damage driver	15	18	VDC
Input current	4.0 kV, 50 Hz, 10pf load		250	mA
TRIGGER				
Input impedance	Nom. 50 Ω	48	52	ohms
Amplitude	Nom. 5 V	4	10	V
Pulse width	Set by user	100n	10m	sec
Propagation delay	After trailing edge of trigger	80	100	ns
ENVIRONMENTAL				
Ambient air temperature			50	°C



II Installation

Dimensions and Connector Locations



Connections

J1–J2 Power, trigger and control

Pin 1 is at the right of all the MTA connectors as shown in the illustration above.

J1 mates with TE Connectivity (AMP) MTA100 receptacles:

		TE Part No.
6 pin	22 ga	3-640440-6
	24 ga	3-640441-6

It is possible to mate the headers to other connectors that accept 0.025" posts on 0.100 centers.

J2 is a standard SMA connector for the trigger input.

P1 and P2 are to be connected to the Pockels cell. Wire rated for 5kV is recommended.

J1 Power, control and monitoring – 6 position MTA100

Pin 1	+18 VDC
Pin 2	Ground
Pin 3	Ground
Pin 4	Ground
Pin 5	Remote shutdown – connect to ground to disable high voltage
Pin 6	Remote monitor – 1V per kV high voltage, $\pm 5\%$

P1–P2 Pockels cell – soldered wires

Connection to the cell is made with the two flying leads.

- The leads should be as short as practical and kept at a separation of 0.75"/20 mm.
- The leads must be kept as far as possible from any metal or conducting object.
- Neither wire should connect to ground or to any other circuit.
- The rise time slows down as the wire length from the driver to the cell gets longer.
- 50/75 Ω coaxial cable must not be used.

III Operation

Triggering the Driver

The trigger is electrically isolated with a high speed GMR (Giant Magneto-Resistive) device. Both the signal and the shield are isolated and no ground connection is made through the trigger input.

The triggering voltage is a nominal 5 V, with the driver triggering on the falling edge. The pulse width should be in the range of a 100ns to 10ms.

The rise time should be as quick as practicable. A slow rise time will result in increased jitter.

The trigger input is a 50 Ω terminated circuit. Drivers are available with 100 Ω inputs for use with twisted pair - contact G&H Ohio.

Although a 5 V/50 Ω signal is sometimes referred to as 'TTL' - it must be noted that TTL logic cannot drive a 50 Ω load.

The maximum trigger frequency depends on the cell capacitance and the output voltage. If the maximum frequency is exceeded then the driver's internal power limiting circuits will come into play and the output voltage will be reduced. Naturally, the driver should not normally be operated at or over its power limit.

Powering the Driver

The driver operates on 18 VDC and has a maximum current draw of 220 mA. The range of operation is 15 V to 18 V.

High Voltage Adjustment

The high voltage is set with the 15 turn potentiometer. The limits of adjustment are 1.2 kV to 4.0 kV.

The voltage setting can be monitored at pin 6 of J1 with a voltmeter. The pulses from the driver may interfere with the operation of some hand-held DVMS - if this is the case then remove the trigger signal when setting/monitoring the voltage.

The monitor voltage will be within ~5% percent of the output voltage. As the monitor reflects the driver's internal high voltage power supply, the relation of the monitor voltage to cell drive voltage will vary with normal internal component tolerances, the cell capacitance, the repetition rate, the wiring to the cell and the output voltage setting.

The final voltage setting is made by observing the operation of the optical system and adjusting the voltage for the optimum performance of the Pockels cell.

Adjusting the Output Waveform

The total ON time (from start of waveform to the end of the waveform) is adjustable from 300 μ s to 600 μ s via potentiometer R36. For most flash lamp based lasers, 400 μ s is long enough to ensure that the laser energy has dissipated.

Adjusting the Center Pulse

The center pulse should be adjusted to 'open' the Pockels cell when the laser energy is at its peak - usually between 160 μ s to 180 μ s after the start of the waveform. The pulse position can be adjusted via R17. It is best to make this adjustment during laser operation while monitoring the laser energy output.

Remote Shutdown

Connecting J1 pin 5 to ground will disable the high voltage, effectively shutting down the driver. The red LED will extinguish when the high voltage is off.

Status Indicators

Green: 18 VDC power has been applied
Red High voltage power is on

For further information

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