

## HLD 500 SERIES HIGH SPEED PULSED LASER DIODE-DRIVER

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### 1. General Instructions

!!! Observe all relevant safety regulations concerning laser radiation!

!!! Disregard of the following instructions can lead to damage both for laser diode and driver unit!

- Both leads of the laserdiode have to be shorten to a length of 5 ... 6 mm
- The emitting area of the laserdiode has to be free from dirt or dust
- While inserting the laserdiode, please observe the correct polarity
- Make sure, that the laserdiode is fully inserted into the sockets
- Do not remove the laserdiode while the driver is operating
- Ensure that the main voltage at +HV is at zero before removing the laserdiode
- An external clock generator has to be able to deliver a TTL-compatible signal into 50  $\Omega$
- Ensure, that there is no connection between driver and surrounding metallic parts

### 2. Operating Instructions

To operate the laserdiode driver, two DC voltage sources are needed:

**auxiliary supply:** 12 VDC fixed/ max. 100 mA  
apply to + 12 V and GND

**main supply:** 0 to 48 VDC adjustable/ max. 100 mA  
apply to + HV and GND

## Please proceed as follows:

- Do not apply the power supplies specified above at this time !
- Insert the laserdiode completely into the sockets to minimize series inductance, which is detrimental to the pulse rise time.
- Place a photodiode with a sufficiently fast response time with the radiation field. The distance to the emitting area should be at least 5 cm.
- Connect the photodiode to a wide band scope (BW  $\geq$  300 MHz), correctly terminated by 50  $\Omega$ .
- First apply the auxiliary voltage of 12 V, then apply the main voltage to +HV, adjusted for the present to zero.
- To use the internal clock, set the jumper JP1 to the right position (int)
- Set the repetition frequency to the desired value (1 kHz to 10 kHz)
- Set the pulsewidth to the required value ( 10 nsec to 150 nsec)
- To use an external trigger source, set the jumper JP1 to the left position (ext) and apply an external clock generator to the SMB-type input connector.
- Increase the main voltage to reach the appropriate current level.

The necessary main voltage for a certain current level can be approximated as follows:

1. Determine the laser current which corresponds to the desired optical power by the laser diode manufacturers data sheet.
2. Multiply this current (A) by a factor of 0,71 (the effective output source resistance in Ohms of the driver circuit).
3. Add the operating voltage of the laser diode (obtain the actual value from the LD data sheet)

The result is to a first order approximation the main supply voltage you have to apply.

## Example:

Laser diode:	Osram SPL PL90_3
Optical power:	60 W
Current needed:	25 A
Resulting operating voltage:	8,5 V @ 25 A

→ **main voltage you have to apply to +HV:**  $25 \times 0,71 + 8,5 = 26,2 \text{ V}$