

Manual 20/40 W pulsed laser diode (LD-PS/20 and LD-PS/40)

The LD-PS/20 & LD-PS/40 (without synchronizer) is a laser diode array emitting light at 450 nm. It can be toggled by an external synchronizer with up to 200 kHz.

Hardware setup

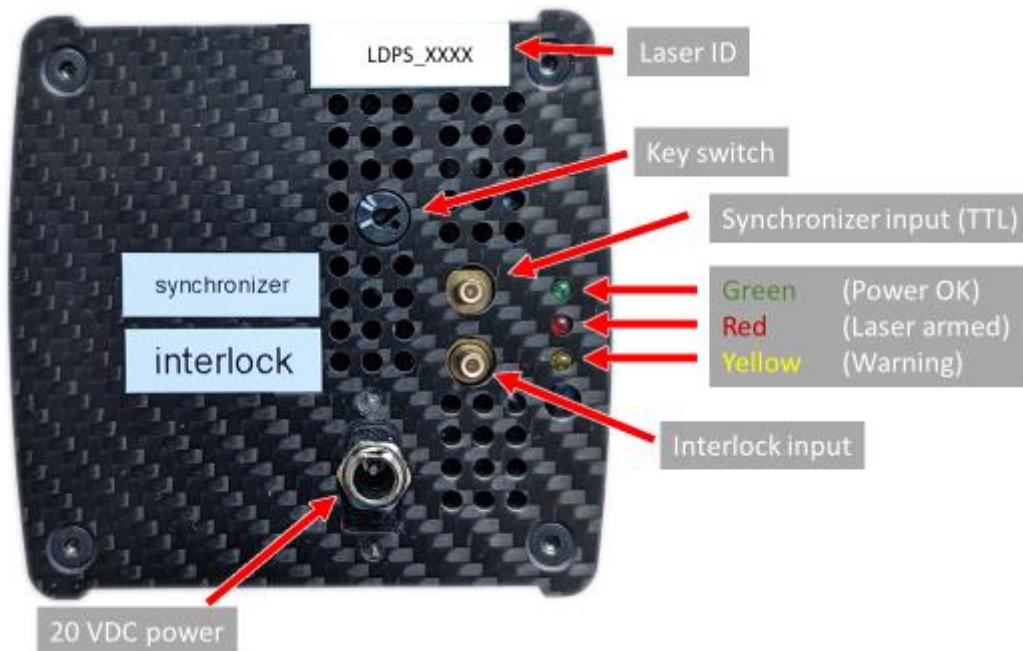


Figure 1: The back side of the LD-PS and the available connections.



Figure 2: Key to arm the laser

- Insert the 20 VDC power plug. The LEDs will flash briefly, the fan will turn on for a short time.
- Connect the synchronizer input to a suitable synchronizer (0 V = laser off, 3-5 V = laser on).
- Connect the interlock cable to a suitable mechanical switch (normally open, e.g. door switch). **WARNING: When the two wires from the interlock cable are connected, then the laser is ready to emit light. ALWAYS wear safety glasses! ALWAYS make sure that the laser light hits a suitable beam dump (e.g. a thick matte black metallic object).**
- Turn the key switch clockwise (to position "II") to arm the laser

Interlock

The cables of the interlock should be connected to a proper door switch (normally open). When someone opens the door (switch opens), the laser will turn off immediately.

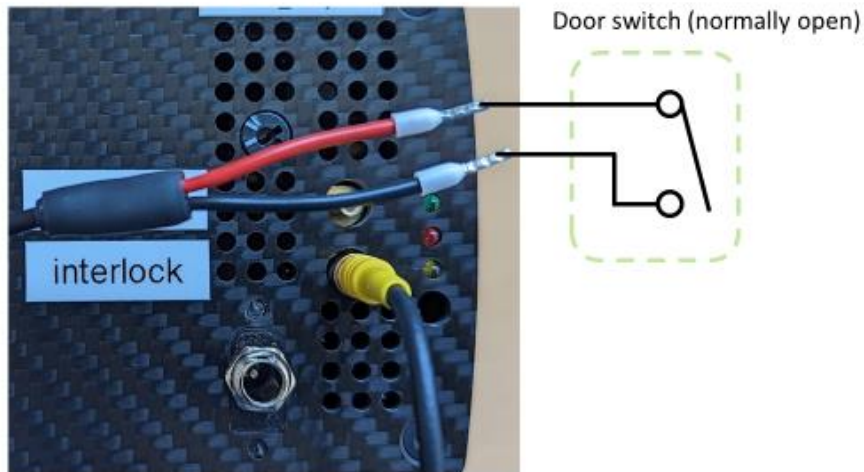


Figure 3: The interlock connection

LEDs

There are three LEDs on the back of the laser, indicating the following:

- Green LED: Power OK
- Red LED: ATTENTION! Laser is armed and can emit laser light when the interlock is closed
- Yellow LED: Warning: Duty cycle > 50% detected on synchronizer input or pulse length > 10 ms detected

Optics

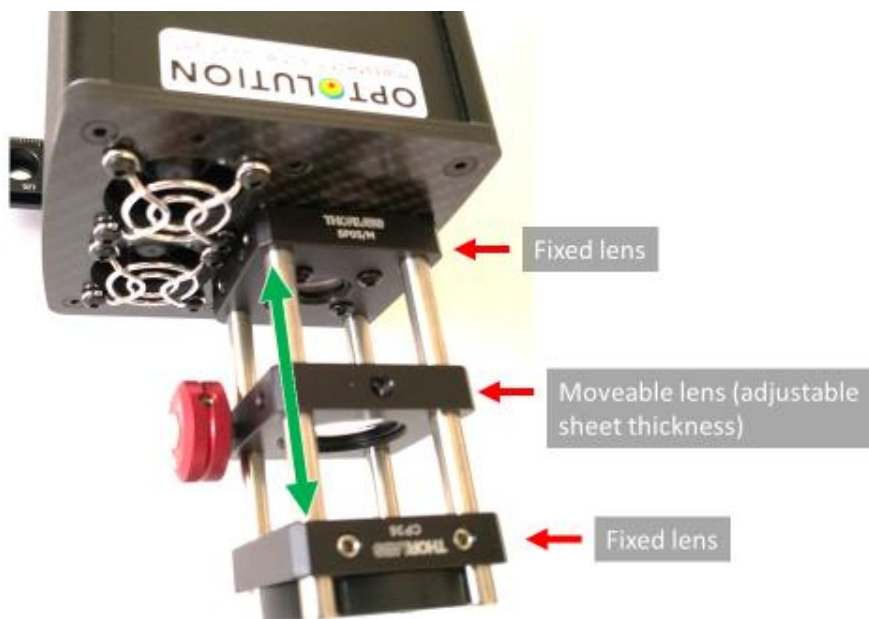


Figure 4: Light sheet optics.

The light sheet optics consists of three lenses: The central lens can be moved to minimize the sheet thickness at the desired distance (focussing). **The cylindrical lens must not be moved or rotated.** If you need to rotate the light sheet, then rotate the whole laser, not the cylindrical lens. Keep the optics free from dust, otherwise the lenses might be damaged. Installing a bandpass filter (450 nm \pm 40 nm) in the camera is highly recommended, as the exposure of PIV cameras is often longer than the laser pulses.

External TTL control (synchronizer input)

- The laser is designed to accept a TTL signal from the synchronizer. The synchronizer input is connected through a voltage divider to the enable pins of the laser driver ICs.
- **A voltage between 3.0 V (minimum) and 5.0 V (maximum)** applied to the synchronizer input **will enable light emission.**
- **A voltage between 0.0 V (minimum) and 1.0 V (maximum)** applied to the synchronizer input **will disable light emission.**
- The maximum toggle frequency is 200 kHz
- Do not supply voltages below 0 V or above 5 V to the synchronizer input!
- The lasers thermal setup is designed to operate at a maximum duty cycle of 50%. The maximum pulse length is 10 ms. It is the user's responsibility to follow these limitations. If the duty cycle is too high or the pulse length is too long, the yellow LED will start blinking. The laser will, however, still follow the signal on the synchronizer input.
- The laser drivers toggle the cathode of the laser diode array. The anode of the laser diode array is connected through a relay to the power supply. The relay is closed when the two wires of the interlock cable are connected and the key switch is turned to position "II".