

# LaserFlash Plus



## Manual

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# 1. Juridical Information

## 1.1. Copyright

This manual is copyrighted and is not allowed to be copied, reproduced or modified, complete or partly, without written confirmation by OptoPrecision. There is an exception made for backups for personal usage. Passing on this manual and the information it contains, is only allowed with written confirmation by OptoPrecision.

## 1.2. Trademark

All trademarks are the property of each particular company.

## 1.3. Warranty

This manual has been written with utmost accuracy and was checked according to correctness due to the state of the art. OptoPrecision is only liable in case of intention or gross negligence for direct or indirect damages in connection with the manual as well as casual or consequential damages. For loss or damage of data due to direct or indirect mistakes as well as for costs which can be traced back to the manual or to installations which were not made by OptoPrecision, all liability claims are explicitly excluded. The information in this manual can be changed due to technical progress without extra notice.

# 2. Safety Instructions

**Before installing the LaserFlash Plus please study the manual carefully!**

- The laser class of the device is mentioned in the inspection sheet. Furthermore there is a mark at the device due to Lasernorm DIN EN 60825-1.
- Is the device marked with laser class 1, there is no danger for human eyes or skin.
- Is the device marked with laser class 3R, please make arrangements due to laser norm DIN EN 60825-1. While the device is operating, please wear safety goggles and avoid to look into the beam. **Attention:** Danger of irreversible damage of eyes.
- For changing the front lenses (lenticular lenses in the front frame) please take notice of the safety instructions mentioned in this manual.
- **Attention:** Please never operate the device without properly fitted lenticular lenses. There is danger of irreversible damage of eyes.
- While changing the front lenses an interlock is switched, which prevents that the LaserFlash emits light. **Attention:** Bridging of the interlock pins can lead to burnings and irreversible damages of eyes through laser radiation.
- Within the device there are no parts which can be repaired or maintained by the operator. Maintenance and repair work can only be done by qualified personnel.
- Within the device dangerous radiation is generated. The device is not allowed to be opened by other than authorised personnel with knowledge of laser norm DIN EN 60825-1.
- In operation the casing can heat up to 60°C. The fitting cooling fan for LaserFlash Plus is IP55.
- The device is operated standardly with 12V (see specifications). If required, higher voltages are deliverable.

### 3. Laser Class

The device is classified in laser classes due to DIN EN 60825-1. The compliance with laser classes is guaranteed by the device's hardware, so that the stated laser class can not be exceeded. The laser class is marked on the device. All power data, permissions and certifications are mentioned in the attachment and the inspection sheet.

### 4. The System

The LaserFlash Plus is a light source based on a laser diode. It is used for illumination purposes. If an appropriate signal is applied to the trigger input, the LaserFlash Plus emits light pulses in the near infrared spectral region. The light pulse length is as long as the electrical input pulse, only limited if the laser norm is exceeded. The pulses have a defined maximum intensity, defined beam angles and a fixed maximum duty cycle.

The system is designed for applications, where high intensities of light are required. The detection or documentation of car registration numbers in the case of tolling may be an example for an application. For diverse applications very effective systems can be created by adequate combinations of camera, TrigBox and LaserFlash Plus. The LaserFlash Plus is superior to other light sources, such as LED or Xe-Flash, when the application is characterized by longer working distances or a higher energy demand, or typical laser attributes such as spectral characteristic, polarization or free design of the pulse shape are required. The spectral emission is alternatively 785nm, 808nm or 940nm.

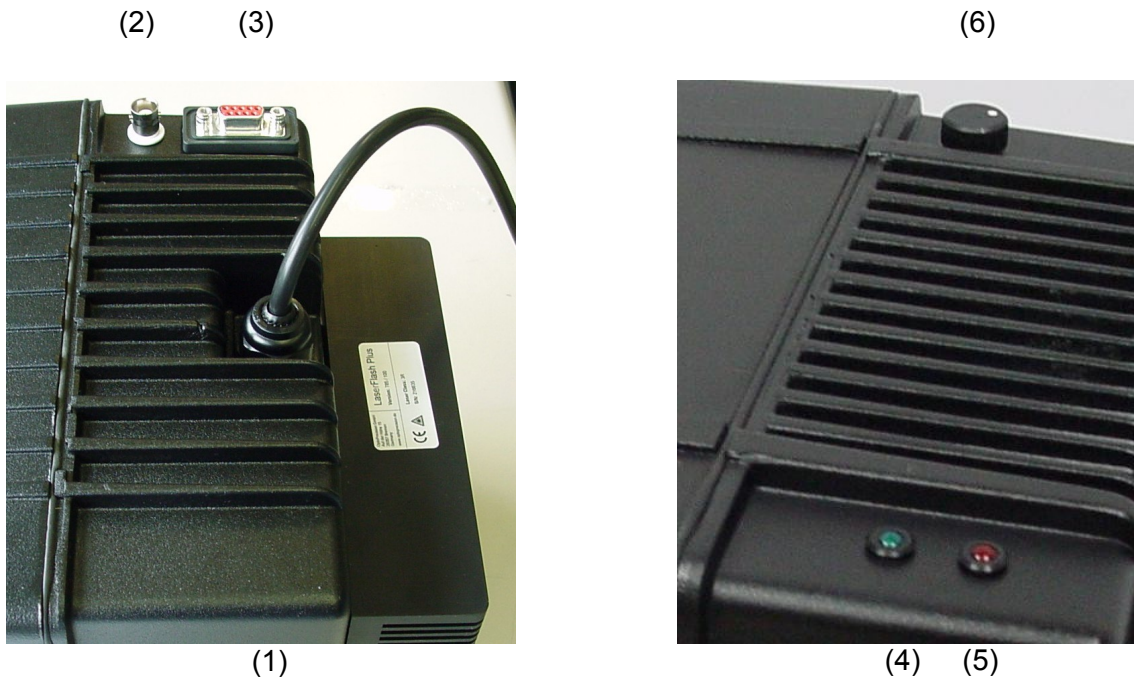
### 5. Operating Principle

The laser radiation is emitted through a rectangular beam window. On the rear of the LaserFlash Plus, there are several electrical connectors, LEDs and actuators. The laser radiation is generated by a QCW laser diode (LD), implemented in the LaserFlash Plus. An electronic circuit provides current pulses of maximum 150A to drive the LD. The duration of the light pulse corresponds to that of the trigger signal. However, internal circuits restrict pulse height, length and repetition rate in a way that safe operation is given (here laser class 3R!) and that degradation of the LD is avoided. In order to guarantee a long life time for the LD, its internal temperature is held by 25 °C. The produced waste heat is emitted to the ambient air. Water cooling is not necessary. The LaserFlash Plus has an external cooling fan (IP55).

The LaserFlash Plus is protected against overheating. Over-temperature can occur at high duty-cycles together with high ambient temperature. If, due to over-temperature, the LD-temperature rises above 25°C, flashing is stopped by an internal protection circuit. The LaserFlash Plus re-starts flashing, as soon as the unit is able to cool the LD down to 25°C, again. To run the LaserFlash Plus at maximum duty-cycle, please take care to keep the temperature of the case below 45°C. **Attention, in operation, the casing can heat up to 60°C!**

The LaserFlash is equipped with an internal heating. If the device is operated at temperatures below 20°C, the device heats automatically up to an operating temperature of 20°C. Only then light pulses can be emitted. At low temperatures this can last up to 40 minutes. If the ambient temperature exceeds 20°C, the device automatically keeps the optimal operating temperature.

## 6. Interface



#	Assignment	Comments
1	Power Supply	12 V nominal
2	Trigger Input	TTL Trigger Input (max 12 V signals)
3	RS232 Interface	Communication with PC (readout and modification)
4	LED Green	Flashes when a pulse is emitted
5	LED Red	Flashes in operation
6	Potentiometer (optional)	Adjustment of pulse length from 100 $\mu$ s-2 ms

### 6.1. Power Supply

The supply voltage is applied via the fixed cable. The pin plug is fixed via the storage battery or the power supply unit. The nominal working voltage amounts to 12 V (see specifications). The power input is dependent on the kind of application and can vary from 1 A to 15 A (see test report).

## 6.2. Trigger Input

The light pulse is generated by applying a voltage (12V) to the BNC-pulse input. The duration of the light pulse corresponds to the length of the applied electrical pulse, up to the adjusted maximum pulse length.



Trigger Input and RS232 Interface

## 6.3. RS 232 Interface

The LaserFlash Plus can optionally be connected via RS232 cable to a PC. Relevant parameters can be modified at the interfaces in several password levels.

**Attention!** : Through incorrect parameters the LaserFlash can become dangerous to human eyes (laser class 3R and 4). Furthermore, incorrect parameters can cause overstress for the LaserFlash and hence, destroy the laser diode.

## 6.4. Potentiometer (optional)

Optional, the device can be equipped with a potentiometer in order to adjust a fixed pulse length. This is independent of the input pulse and triggers to the positive side. The pulse length can be varied from 100 $\mu$ s to 2ms.

## 7. Aperture Angle of Front Frame

In the front frame there are mounted two lenses which define the cone of light's aperture angle horizontally and vertically. The aperture angle can easily be adapted to different applications by changing the front frame.

### 7.1. Change of Front Frame

The front frame can easily be changed.

**Attention:** Please take care of the surface inside the front frame. The back of the lenticular lenses is antireflective coated (microstructure). Please do not try to clean or wipe. This may destroy the microstructure and hence, cause a loss of light.



Twist off the two screws.



Lift the front frame constantly, the Interlock Pins may need a little force to come off.



The Interlock Pins act as guidance for fixing the new front frame.



Press the front frame on the LaserFlash and fasten it with two screws. The two Interlock switches will click when the assembly is accurate.

## 8. Short Instruction

### 8.1. Operation with TrigBox 3.0

- If the device is not conform to laser class 1, please make arrangements for radiation protection by wearing safety goggles.
- The LaserFlash has to be connected to power supply 12V,8A. The red LED begins to flash.
- The TrigBox has to be connected to the power supply unit. The red LED at the TrigBox flashes.
- The TrigBox (trigger output) has to be connected to the LaserFlash per BNC-cable .
- Please apply the camera's analog signal to the TrigBox Input. The green LED at the TrigBox flashes when an adequate signal (FBAS) is received.
- Simultaneously the green LED at the LaserFlash flashes, thus confirming that a pulse is applied and that light pulses are emitted. Pulse length and pulse deceleration can be adjusted by means of the Trig Box.

### 8.2. Operation with own Pulse Generator

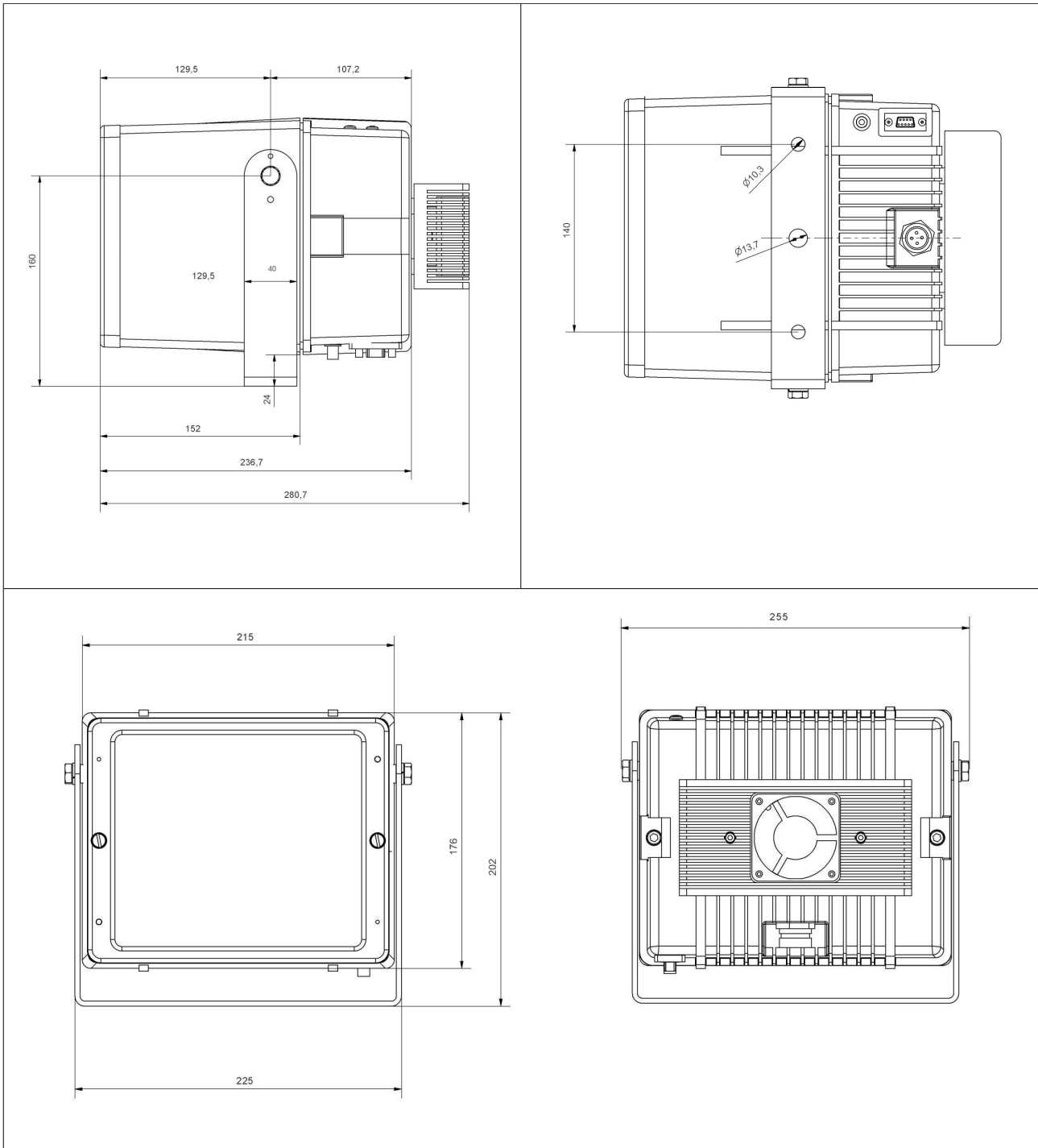
- If the device is not conform to laser class 1, please make arrangements for radiation protection by wearing safety goggles.
- The LaserFlash has to be connected to power supply 12V,8A. The red LED begins to flash.
- The pulse transmitter has to be connected with the LaserFlash. The applied pulse length corresponds to the pulse length of the light pulse.
- The green LED at the LaserFlash confirms that a pulse is applied and that light pulses are emitted.

### 8.3. Operation with fixed Pulse Adjustment per Potentiometer(optional)

- If the device is not conform to laser class 1, please make arrangements for radiation protection by wearing safety goggles.
- The LaserFlash has to be connected to power supply 12V,8A. The red LED begins to flash.
- The pulse transmitter has to be connected with the LaserFlash. The pulse length of the light pulses can be adjusted by means of the potentiometer.
- The green LED at the LaserFlash confirms that a pulse is applied and that light pulses are emitted.



## 9. Dimensions



## 10. Technical Specifications

		<b>LaserFlash Plus</b>
	Unit	Type
<b>Emission Wavelength</b>	nm	<b>785nm, 808nm 940nm</b>
<b>Pulse Width Minimum</b>	.µs	15
<b>Pulse Width Maximum (selectable)</b>	.ms	1
<b>Maximum Frequency</b>	Hz	<b>15</b>
<b>Aperture</b>	mm	150 x 170
<b>Field Angle</b>	H/V	3° to 23° (see Attachment)
<b>Power Supply</b>	V	10-14
<b>Power Consumption Max.</b>	W	100
<b>Operating Temperature</b>	°C	10°C-50°C
<b>Storing Temperature</b>	°C	0°C-50°C
<b>Relative Humidity</b>	%	80
<b>Cooling</b>		<b>fan forced cooling</b>
<b>Weight</b>	kg	<b>5</b>
<b>Dimensions</b>	mm	<b>170x210x240</b>
<b>Laser Classification</b>		1 / 3R (see Test record, see LaserNorm DIN EN 60825-1)
<b>Pulse Input (BNC)</b>	V	3V-15V Pulses
<b>PC Communication</b>		RS232 115200Baud

## 11. Attachments

- Included in delivery: LaserFlash Plus, cable power supply, manual, inspection sheet (see delivery note)