QCL Laser Pointer User's Manual

Version number 1.0

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I. Foreword

A. Notes on this documentation

This manual is only intended for the use of trained specialists and users in optics, optoelectronics and electrical engineering who are familiar with the applicable national standards.

It is essential that the following notes and explanations are followed when installing and commissioning these components.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, laws, regulations, guidelines and standards in the country of operation.

Disclaimer

The documentation has been prepared with the best care. The products described are, however, constantly in development.
For that reason the documentation is not in every case checked for consistency with performance data, standards and other characteristics.
If it contains technical or editorial errors, we retain the right to make alteration at any time and without warning.
No claims for the modification of the products that have already been supplied may be made based on the data, diagrams and descriptions in this documentation.

B. Documentation Issue status

Version	Comment
1.0	First Published
1.1	
1.2	
1.3	
1.4	

II. Safety

A. Personnel qualification

This description is only intended for the use of trained specialists and users in optics, optoelectronics and electrical engineering who are familiar with the applicable national standards.

B. Description of safety symbols

 DANGER	**Serious risk of injury!** Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.
 WARNING	**Caution – Risk of injury!** Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.
 CAUTION	**Personal injuries!** Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.
 Attention	**Damage to the enviroment or devices!** Failure to follow the safety instructions associated with this symbol can lead to damage to the environment or equipment.
 Note	**Tip or pointer** This symbol indicates information that contributes to better understanding.

C. Special safety instruction

Serious risk of injury through high electrical voltage

- All statements regarding safety of operation and technical data in this manual will only apply when the unit is operated correctly as it was designed for.
- Never open the product when it is live. Opening the device invalidates all warranty and liability claims.
- Negligent, improper handling of the product and bypassing of the safety devices can lead to personal injury or death through electric shock.
- Ensure that the cable and connector are connected properly and free of breach.
- Disconnect the product from the mains supply and secure it against reconnection before connecting or disconnecting the pluggable terminals. Hot plug is forbidden.
- Prior to applying power to the product, make sure that the protective conductor of the 3 conductor mains power cord is correctly connected to the protective earth ground contact of the main power socket outlet. Make also sure that the case of the product is grounded properly, either through its physical attachment points or by an additional cable. Improper grounding can cause electric shocks.

Serious risk of injury through hot surfaces

- Do not obstruct the air ventilation slots of the housing.
- The surface temperature may exceed 50°C, resulting in a risk of burns.
- Avoid touching the case during or shortly after operation.
- Leave the product to cool down for at least 15 minutes after it is switched off.
- Use a thermometer to check whether the surface has cooled down sufficiently.

Danger of explosion

The product must not be operated in explosion endangered environments.

Hazard to persons

- Carefully read this manual before using the product thoroughly, paying particular attention to the safety instruction. In the event of any uncertainties please notify your sales office immediately and refrain from working on the product.
- During the electrical installation, it is essential to ensure that the correct fuses/protective circuit breakers are used between the mains supply and the product. Further information can be found on the provided power supply.
- If a product is installed in a machine, it must not be commissioned until proof of compliance of the machine with the latest version of the EC Machinery directive has been provided. This includes all relevant harmonised standards and regulations required for implementation of this directive in national legislation.
- The product emits invisible and/or visible optical radiation that can be hazardous to eyes, skin and other living tissue. The product complies with harmonized regulation IEC 60825-1:2014 and is marked with all relevant laser safety warning label and laser class rating label. Always wear the appropriate laser safety eyewear and observe the necessary safety procedures when operating the laser system.

Attention

Hazard to equipment and environment

- During installation, it is essential to ensure that the specified ventilation clearances and climatic conditions are adhered to. Further information can be found in the “Technical data” and “Mechanical installation”.
- If the product is operated in contaminated ambient air, the cooling openings must be checked regularly for blockage. These checks should be carried out up to several times per day.
- The product contains components at risk from electrostatic discharge caused by improper handling:
    - Please ensure you are electrostatically discharged before touching the product directly.
    - Avoid contact with highly insulating material (synthetic fibres, plastic film etc.).
    - Place the product on a conductive surface.

CAUTION

EMC

- This equipment has been tested and found to comply with the limits of class A device as per EN 61326-1. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- The manufacturer is not responsible for any radio television interference caused by modification of the product or the substitution or attachment of connecting cables and equipment other than those supplied with the products. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.
- The use of shielded I/O cables is required.

III. Handling

A. Transport and storage

Transport

- Only by qualified personnel
- Only in recyclable original manufacturer's packaging
- Avoid sharp impacts
- Temperature: -40…. +70°C, varying no faster than 20°C /hour
- Air Humidity: Relative humidity max. 95%, non-condensing. Protect the product with an ESD bag and desiccant.
- The product contains components at risk from electrostatic discharge caused by improper handling:
    - Please ensure you are electrostatically discharged before touching the product directly.
    - Avoid contact with highly insulating material (synthetic fibres, Plastic film etc.).
    - Place the product on a conductive surface
- If the packaging is damaged check the product and any accessories for visible damage. Inform the transport company and, if necessary, the manufacturer.

Storage

- The devices and its accessories must not be stored outdoors. The storage space must be adequately ventilated and dry.
- The devices must be stored in the recyclable original manufacturer's packaging.
- The product contains components at risk from electrostatic discharge caused by improper handling:
    - Please ensure you are electrostatically discharged before touching the product directly.
    - Avoid contact with highly insulating material (synthetic fibres, plastic film etc.).
    - Place the product on a conductive surface
- Max stack height: 8 cartons
- Storage temperature: -40…. +55°C, varying no faster than 20°C /hour
- Air Humidity: Relative humidity max. 95%, non-condensing. Protect the product with an ESD bag and desiccant.
- Duration of storage:
    - < 5 years: No limitation.
    - >5 years: The dielectric (an oxidation layer with a thickness of approx. 1um) in the DC link capacitors degrades over time, and the capacitors lose their forming. Prior to commissioning of the product the capacitor must be reformed. Release all electrical connections and feed the product for about 30 minutes with its nominal supply before operation.

Attention

B. Disposal

- Screw connections enable the products to be dismantled into main components (aluminium heat sink, steel case, PCBs)
- The device should be disposed of by a certified disposal company.
- Metal part can be sent for metal recycling.
- Electronic parts such as circuit boards and terminals must be disposed of in accordance with the national electronics scrap regulations.

C. Servicing

- The device is maintenance-free
- Opening the device invalidates the warranty, the opening is monitored by VOID stickers.

D. Cleaning

- Soiled housing: Clean with isopropanol or similar **(Do not immerse or spray!)**
- Contamination inside the device: Cleaning by manufacturer
- Soiled fan guard: Clean with (dry) brush or/and pressurized air (Max 1 Bar)

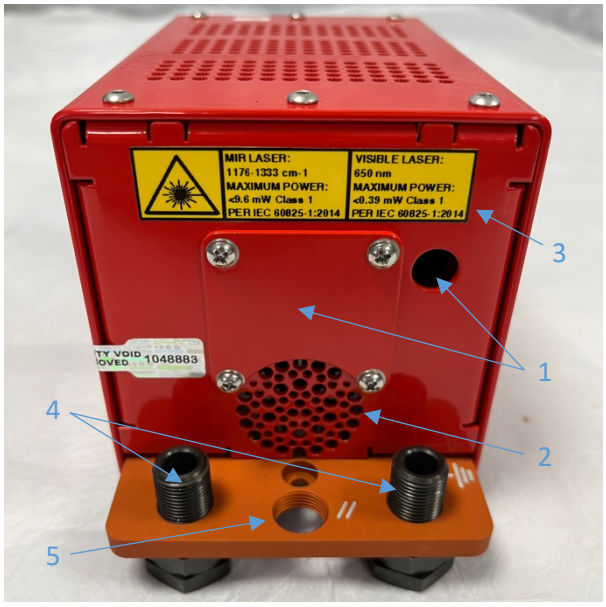
IV. Product Overview

The product is comprised of a compact laser system embedding a QCL or ICL laser encapsulated into a laser housing, a laser driver and a temperature controller, making it an all-in-one complete laser source.

Key features are:

- Turn-key solution for operating a QCL or ICL as a simple laser source
- Extremely simple operation by two push buttons
- Calibrated optical power
- Collimated output beam
- Colinear visible laser for alignment aid
- Integrated internal temperature safety monitoring
- Air cooled laser head
- Simple remote operation interface
- User-adjustable levelling legs for height and pointing adjustment
- Levelling legs spacing compatible with optical bread board with standard metric and imperial spacing
- Additional precision interfaces available for integration

V. General



Front View

Rear view

1 - Laser beam output – Option dependent, precise beam option shown.

2 - Air inlet

3 - Laser safety label

4 - Levelling legs with lock nuts

5 - Imperial spacing levelling legs locations

6 - 12 VDC power supply connection

7 - Mid IR laser turn ON push button with status LED

8 - Visible laser turn ON push button with status LED

9 - Remote control connector

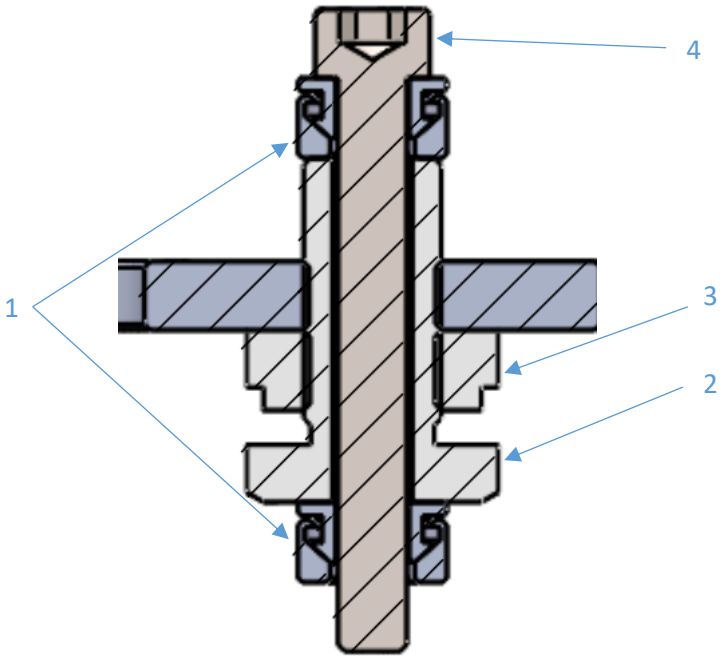
10 - Product label

11 - Air Outlet

VII. Mechanical installation

Refer to the product interface drawing for detailed dimensions and interfaces details as well as beam height and possible adjustment. 3D step file is available on request.

A. Mounting using levelling feet



SECTION D-D
SCALE 1 : 1

Provided material 3x:

1 - Spherical washers

2- Levelling feet

3 - Lock nut

4 – M6 screw

Attention

The above cross section describes each of the three levelling feet assembly, it is mandatory to mount them as describe using two spherical washers on both ends. These washers are compensating for plane mismatch due to the angular adjustment and avoid product deformation.

The levelling feet provide a vertical stroke of maximum 12 mm and an angular correction of maximum +/- 2°

To perform an adjustment, release the main screws (4) and adjust the levelling feet (2) to get the required beam pointing. Lock the nuts (3) and then lock the main screws (4).

VIII. Operation

Power ON:

Attention

Connect the 12 VDC barrel jack connector of the provided AC/DC power supply to the product and then turn the on the AC Outlet. DC hot plug is forbidden and can result in product damage.

An audible fan sound should now be heard.

Laser's operation:

The laser's operation is extremely simple and only require the press of two buttons.

Mid IR laser activation – Press the "MIR" button until the hold position, the status LED located at the center of the button will blink for a little while as the temperature of operation is stabilizing, then the LED will turn solid signalling that the laser is now ON. To turn the laser OFF press the "MIR" button again to release the hold.

Visible laser activation – Press the "VISIBLE" button until the hold position, the status LED located at the center of the button will turn solid signalling that the laser is now ON. To turn the laser OFF press the "VISIBLE" button again to release the hold.

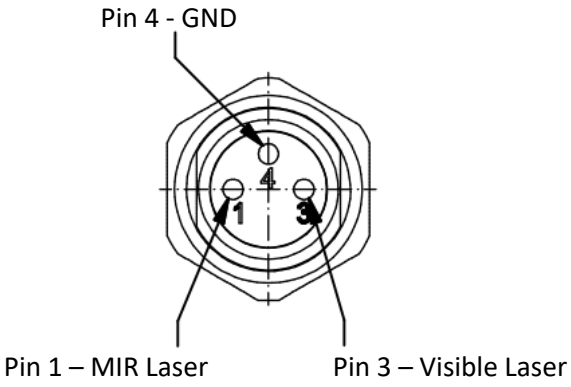
Power OFF:

Make sure that both "MIR" and "VISIBLE" status LED are OFF. If not, release the button(s) or remote activation(s).

Turn OFF the AC side of the AC/DC provided power supply. Wait until total discharge of the power supply internal capacitor (Monitor the status light brightness) before performing a new power ON.

IX. Remote control

Male socket M8 x 1 – 3 positions:



Pin 1 is the remote control for the Mid IR laser, the pin is internally pull-up to 3.3V. The remote ON is active low so bridging the pin to GND activate the lasing. This remote function is paralleled with the push button action, either one can start the lasing and the status LED is active in both cases.

Pin 3 is the remote control for the Visible laser, the pin is internally pull-up to 12V. The remote ON is active low so bridging the pin to GND activate the lasing. This remote function is paralleled with the push button action, either one can start the lasing and the status LED is active in both cases.

It is recommended to use any open collector or isolated open collector output supporting at least 24VDC (VCE) to drive these remote-control functions, refer to below examples: