

SHORT DESCRIPTION FOR THE

LDU-01D

LASER DRIVER UNIT



Version 1.0
npi 2018

1. Safety Regulations

VERY IMPORTANT: Instruments and components supplied by npi electronic are NOT intended for clinical use or medical purposes (e.g. for diagnosis or treatment of humans), or for any other life-supporting system. npi electronic expressly disclaims any warranties for such purpose. Equipment supplied by npi electronic shall be operated only by selected, trained and adequately instructed personnel. For details please consult the GENERAL TERMS OF DELIVERY AND CONDITIONS OF BUSINESS of npi electronic, D-71732 Tamm, Germany.

- 1) **GENERAL:** This system is designed for use in scientific laboratories and should be operated by trained staff only. General safety regulations for operating electrical devices are to be considered.
- 2) **AC MAINS CONNECTION:** While working with the npi systems, always adhere to the appropriate safety measures for handling electronic devices. Before using any device please read manuals and instructions carefully.
The device is to be operated only at 115/230 Volt 60/50 Hz AC. Please check for appropriate line voltage before connecting any system to mains.
Always use a three-wire line cord and a mains power-plug with a protection contact connected to ground (protective earth).
Before opening the cabinet disconnect mains power-plug.
Disconnect mains power-plug when replacing the fuse or changing line voltage. Replace fuse only with an appropriate specified type.
- 3) **STATIC ELECTRICITY:** Electronic equipment is sensitive to static discharges. Some devices such as sensor inputs are equipped with very sensitive FET amplifiers, which can be damaged by electrostatic charge and must therefore be handled with care. This can be avoided by touching a grounded metal surface when changing or adjusting sensors. **Always turn power off when adding or removing modules, connecting or disconnecting sensors, headstages or other components from the instrument or 19" cabinet.**
- 4) **TEMPERATURE DRIFT / WARM-UP TIME:** All analog electronic systems are sensitive to temperature changes. Therefore, all electronic instruments containing analog circuits should be used only in a warmed-up condition (i.e. after internal temperature has reached steady-state values). In most cases a warm-up period of 20-30 minutes is sufficient.
- 5) **HANDLING:** Please protect the device from moisture, heat, radiation and aggressive chemicals.
- 6) **SPECIAL WARNING:** THIS INSTRUMENT HAS A HIGH POWER OPTICAL OUTPUT.

2. Special Safety Notice for Instruments with high optical irradiation



**HIGH OPTICAL IRRADIATION!
RISK TO EYES AND SKIN!**

Observe extreme caution when working with this instrument!

- 1) Always attach the provided plug to the fiber output, if the fiber is not connected.
- 2) Collimated light emitted from the unit does pose a potential risk to eyes and skin if viewed directly or skin is left exposed to the light.
- 3) Protect your eyes and skin from fiber output and collimator output.
- 4) Do not wear any reflective items like watches or rings when working with the instrument.
- 5) Servicing should be only done by qualified personnel aware of the hazards!
- 6) If in doubt, return to supplier for servicing!

3. System Description

3.1. General description

The Laser Driver Unit LDU-01D is built into a desktop housing. It is to be used with an external power supply, connected to the LDU-01D rear panel (see Figure 2).

This Laser Driver Unit can be used for fiber coupled optical stimulation or similar situations, where high power fiber based illumination is required. The optical fiber is connected via an FC/PC connector.

3.2. Modes of operation

The laser output can be controlled in four different modes: CONT POT, GATED POT, GATED ANALOG, CONT ANALOG:

- CONT POT: the LED of the respective channels is continuously on, the output power is set with the ANALOG 10-turn potentiometers
- GATED POT: the LED is controlled by the TTL inputs: a TTL HIGH signal switches the LED on. The output power is set with the ANALOG 10-turn potentiometers.
- GATED ANALOG: the LED is controlled by an analog input voltage at the ANALOG IN BNC connector. Input range is 0 ... 10 V.
- CONT ANALOG: The LED is off, independent of any analog or TTL input signal or potentiometer setting.

3.3. Laser safety circuits

For laser safety regulations, several prerequisites have to be fulfilled in order to run the laser driver:

- Connect the power supply and set the power switch in ON position (rear panel).
- Make sure EMERGENCY STOP switch is in active position (green ring visible).
- Make sure INTERLOCK circuit is closed.
- Push START pushbutton on the front panel.

Activation via START button will only work as long as the above mentioned conditions are positively met. The laser driver will be deactivated as soon as one of the conditions fails. It will not be automatically re-activated – this has to be done with the START pushbutton.

3.4. Front panel elements:

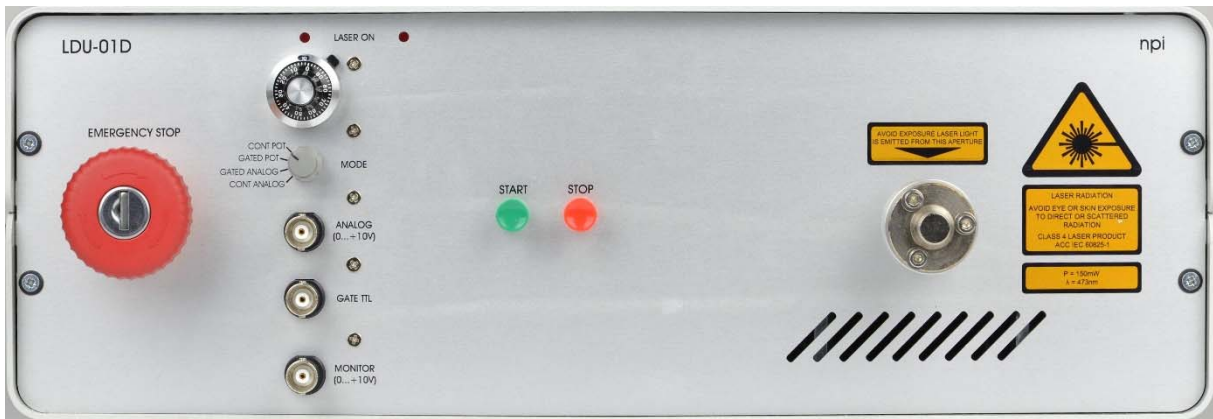
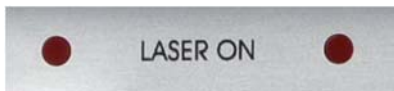


Figure 1: LDU-01D front panel view.

LASER ON LED



LED indicating that the LDU-01D is connected to the power supply and the laser driver is on.

EMERGENCY STOP switch



When pushed, this switch will deactivate the laser driver. It can be set to active with the provided key. This makes this switch also suitable to allow only authorized and personnel to use the laser.

To operate the laser driver, this switch has to be released (green ring visible) and the green START pushbutton has to be pushed.

10-turn potentiometer



Potentiometer for control of the laser driver output power in CONT POT and GATED POT mode. The setting at this potentiometer corresponds to the analog input voltage at the ANALOG BNC connector in GATED ANALOG or CONT ANALOG mode (see chapter 3.2).

MODE rotary switch



This switch select the mode of operation (see chapter 3.2).

ANALOG (0...+10 V) BNC connector



An analog input signal (0 ... 10 V) can be used to control the Laser driver output power. This input is active in GATED ANALOG mode and CONT ANALOG mode (see chapter 3.2).

GATE TTL BNC connector



A TTL signal (0 ... 5 V) can be used to switch the LASER ON (TTL HIGH) or OFF (TTL LOW). This input is active in GATED POT mode and GATED ANALOG mode. The driver's output power is controlled by the 10-turn potentiometer or the analog input voltage (see above).

MONITOR (0...+10 V) BNC connector



This is a monitor output for the laser driver. It provides an analog voltage (0 ... 10 V).

START pushbutton switch



This pushbutton has to be pushed in order to start the laser driver. The laser will be ready a couple of seconds later.

The Laser driver will be deactivated as soon as

- the STOP pushbutton is pushed,
- the EMERGENCY switch is pushed,
- the supply power is switched off,
- the INTERLOCK circuit is not connected.

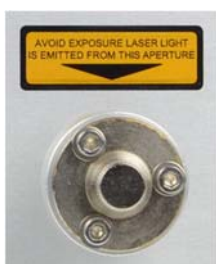
In these situations, it has to be re-started by pushing START.

STOP pushbutton switch



To deactivate the Laser driver this button can be pushed.

FIBER OUT connector



The optical fiber is connected to this port.

3.5. Rear panel elements:



Figure 2: LDU-01D rear panel view.

On the rear panel of the LDU-01D housing there is a fan outlet and the below elements (see Figure 2).

INTERLOCK connector



The interlock circuit is connected here. One mating connector is provided. The connector can be ordered e.g. from RS components (Order Nr.: 469-119).

This interlock circuit should be used to connect safety switches at lab doors, windows, cabinets etc., to prevent accidental exposure to laser light.

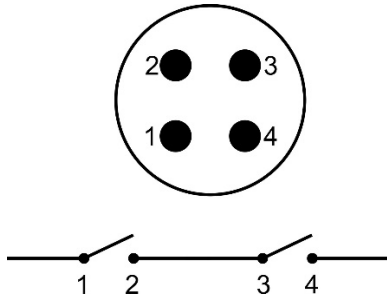


Figure 3: Schematic drawing of interlock connector (top) and circuit (bottom).

POWER switch and connector



The provided power supply is connected here. The POWER switch is in ON position when an orange label is visible.

4. Technical Data

Wavelength: 473 nm

Laser output power: 200 mW

Analog input: 0...10 V, BNC connector

TTL input: 0...5 V, BNC connector

Monitor output: 0...10 V, BNC connector

Dimensions: (W x D x H) 365 mm x 260 mm x 130 mm

Input power: 12 V, 10 A