

LaserBench

PRECISION CONSTANT CURRENT **LASER CONTROL BENCH**



User manual

Basic function – Laser control bench

1. Remove the cover. Install the laser diode into the ZIF socket: Open the ZIF socket clams. Insert the laser into the mount in such way, that the pins fit easily into the slots of the ZIF socket.

Note: Make sure, the laser pin numbering matches with the imprint on the laser socket. Close the clamps of the ZIF socket.

2. Power the laser bench. After the power is applied, push the power button on the backside of the driver. Turn the key to the unlock position.

3. Select “Precision CW driver” in Main menu on touchscreen (fig. 1), you may return to the main menu by pressing button.

4. In CW driver menu that appears (fig.2), press to go to the settings menu

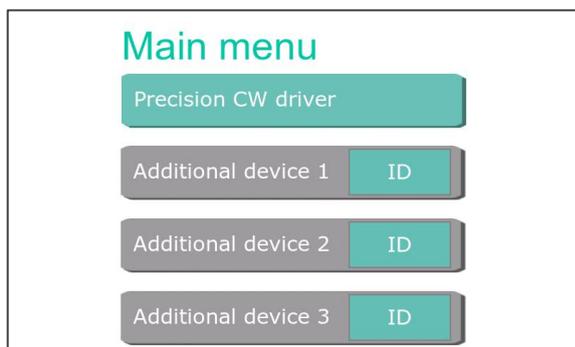


Figure 1 – Main menu

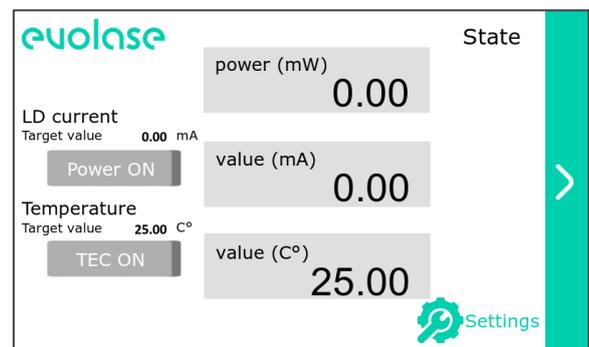


Figure 2 – CW driver menu

5. In the settings menu (fig. 3), set the laser parameters according to its datasheet. The user can set the allowed ranges for the operation temperature and current, the values of thermistor resistance at 25 °C and beta parameter, the maximum current of the TEC and the monitor PD responsivity.

Note: the correct values of thermistor resistance at 25 °C and beta parameter are necessary for proper thermal stabilization.

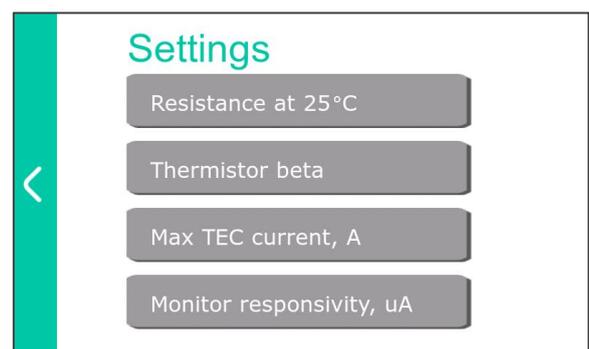
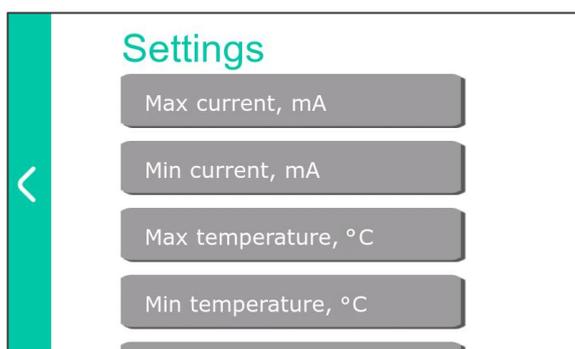


Figure 3 – Settings menu

6. To set the parameter select it from the list. The new window displays the parameter value stored in the laser memory. To change it, click on the window (fig. 4). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

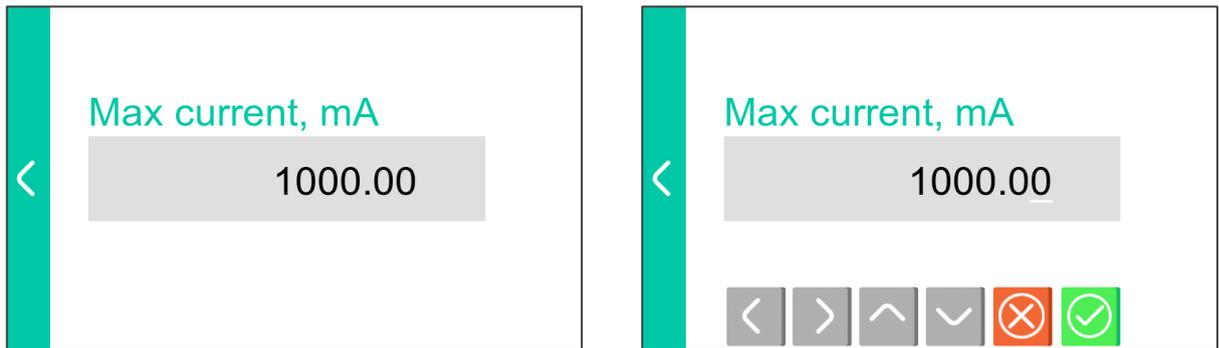


Figure 4 – Setting the parameter

7. After setting all the parameters, click to return to the CW driver menu.
8. Tap on temperature value to set the laser diode temperature (fig. 5). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.
9. Tap on “TEC ON” button to turn on the thermal stabilization of the laser diode. The button will light up green. The temperature target value is displayed above the button; the current temperature value is displayed to the right of the button.
10. Tap on LD current value to set the laser diode current (fig. 6). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

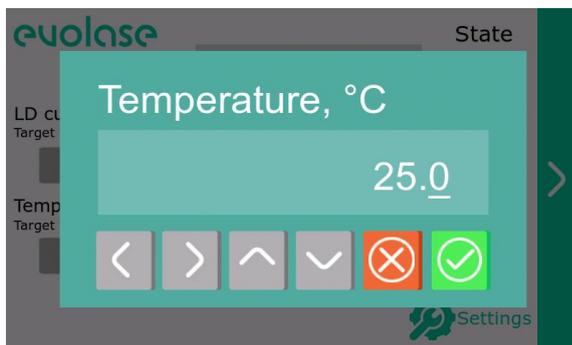


Figure 5 – Temperature setting

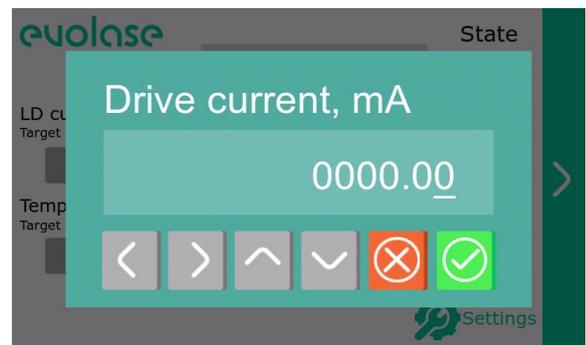


Figure 6 – Driver current setting

11. Tap on “Power ON” button to turn on the laser diode emission. The button will light up green, a laser light icon will appear in the state column on the right side of the screen (fig. 7). The LD current target value is displayed above the button; the LD current value is displayed to the right of the button. The upper window displays the value of the optical power in accordance with the readings of the built-in monitor PD.

Note: The monitor PD readings may differ significantly from the actual values of optical power.

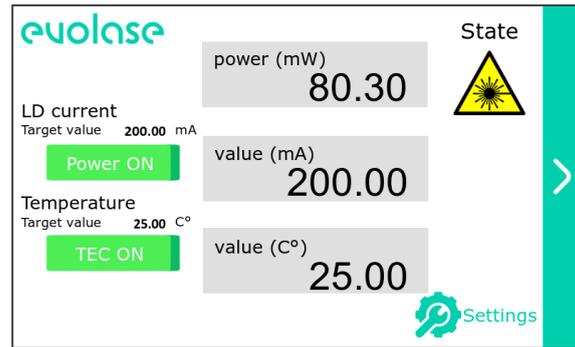


Figure 7 – Emission on state

12. The user can change the values of the LD current without turning off the laser emission.
13. To turn off laser emission tap on “Power ON” button. The button will light up grey, a laser light icon will disappear.
14. To turn off the thermal stabilization of the laser diode tap on “TEC ON” button. The button will light up grey.

Note: Don't turn off the thermal stabilization, while laser emission is on, this can lead to the LD breakdown.

15. The laser emission wouldn't turn on if there is no interlock jack in laser bench. In this case, when the “Power ON” button is taped an interlock icon will appear in the state column on the right side of the screen (fig. 8). To turn on the laser emission, return the interlock jack to its place and tap the “Power on” button.
16. The laser emission wouldn't turn on if there is no Key in laser bench or the key is in the locked position. In this case, when the “Power ON” button is taped a key icon will appear in the state column on the right side of the screen (fig. 9). To turn on the laser emission, Turn the key to the unlock position and tap the “Power on” button.

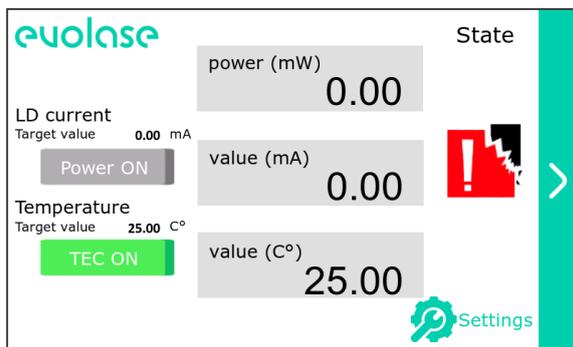


Figure 8 – Interlock

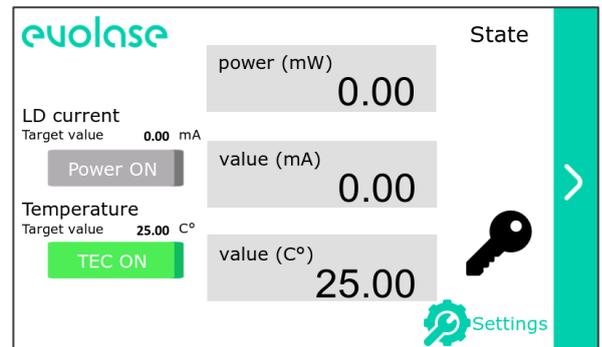


Figure 9 – Key

17. To turn off the driver, press the power button off on the back of the driver and turn the key to the lock position.

Extended function – controller for laser drivers

The user can connect several laser control boards to the Laser Bench and control them using the built-in interface via the CAN bus. The Laser Bench provides power to up to three drivers, the rest must have a separate power supply.

Connection of laser control board

1. Before connecting the laser control board to the LaserBench, set the CAN ID of the board as described in the user manual of the board.
2. Connect the laser controller board to the output connector of the LaserBench. Note pinout.
3. Power the laser bench. After the power is applied, push the power button on the backside of the laser bench. Turn the key to the unlock position.
4. Tap the ID button in Main menu on touchscreen (fig. 1).
5. Enter the ID of the connected control board (fig. 10). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes. If the entered CAN ID is already used on another additional device, an error message will appear Fig. 11.
6. Tap the “Additional device” whose CAN ID you entered. The control menu for the driver you have connected will appear.
7. If you tap on an additional device whose CAN ID is not entered, an error message will appear (Fig. 12).
8. If you tap on an additional device whose CAN ID is entered, an error message will appear (Fig. 13).

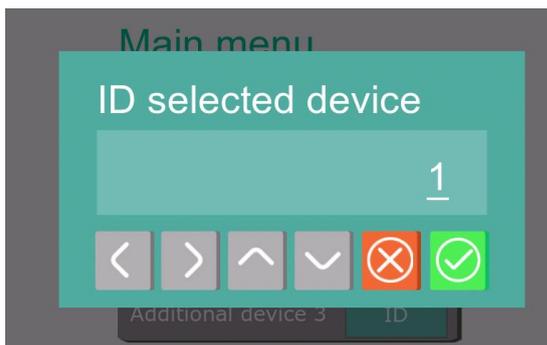


Figure 10 – CAN ID menu

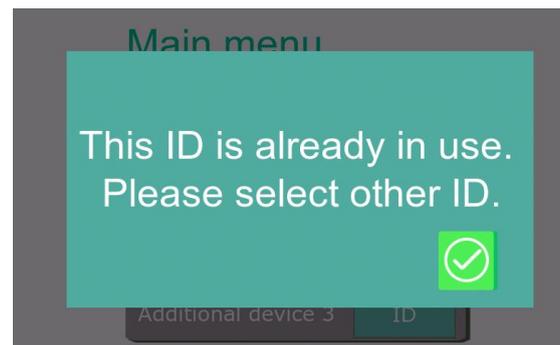


Figure 11 – CAN ID menu

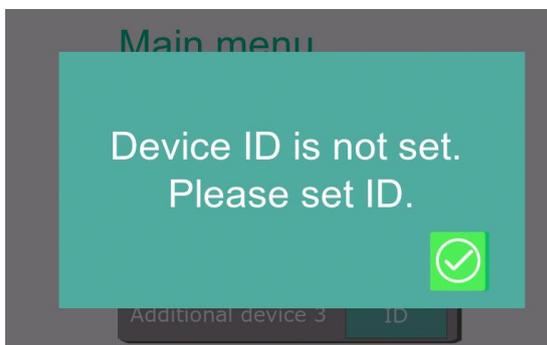


Figure 12 – CAN ID menu

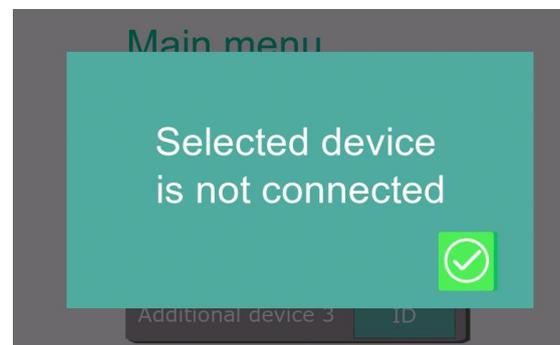


Figure 13 – CAN ID menu

PLD-CW-2000 / PLD-CW-2000-ZIF / PLD-CW-2000(H)-ZIF

The controlling of laser diode in PLD-CW drivers is completely similar to the controlling of laser diode in LaserBench.

1. In driver menu press  to go to the settings menu.
2. In the settings menu, set the laser parameters according to its datasheet. The user can set the allowed ranges for the operation temperature and current, the values of thermistor resistance at 25 °C and beta parameter, the maximum current of the TEC and the monitor PD responsivity.
Note: the correct values of thermistor resistance at 25 °C and beta parameter are necessary for proper thermal stabilization.
3. Set the laser diode temperature, turn the TEC on.
4. Set the laser diode current, turn the laser emission on.
5. The user can change the values of the LD current without turning off the laser emission.
6. The user can control lasers in other control boards without turning off the laser emission. To do this, press the  button in the driver menu and select the device you want to control in the main menu.
7. To turn off laser emission tap on “Power ON” button. The button will light up grey, a laser light icon will disappear.
8. To turn off the thermal stabilization of the laser diode tap on “TEC ON” button. The button will light up grey. **Note:** Don't turn off the thermal stabilization, while laser emission is on, this can lead to the LD breakdown.

PLD-PS

1. In PS driver menu (fig. 14) press  to go to the settings menu.
2. In the settings menu the user can set the allowed ranges for the operation temperature and operating voltage, the values of thermistor resistance at 25 °C and beta parameter.
Note: the correct values of thermistor resistance at 25 °C and beta parameter are necessary for proper thermal stabilization.

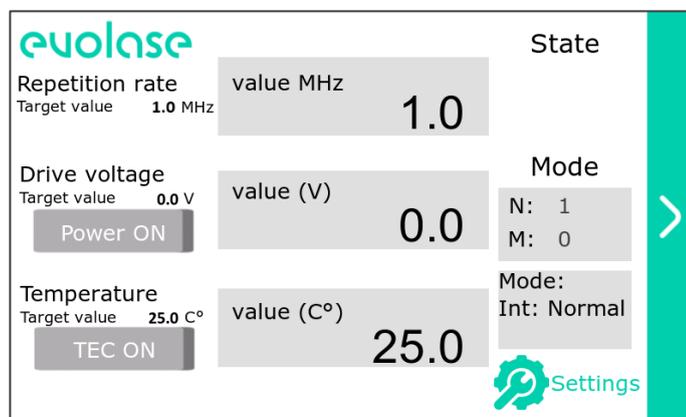


Figure 14 – PS driver menu

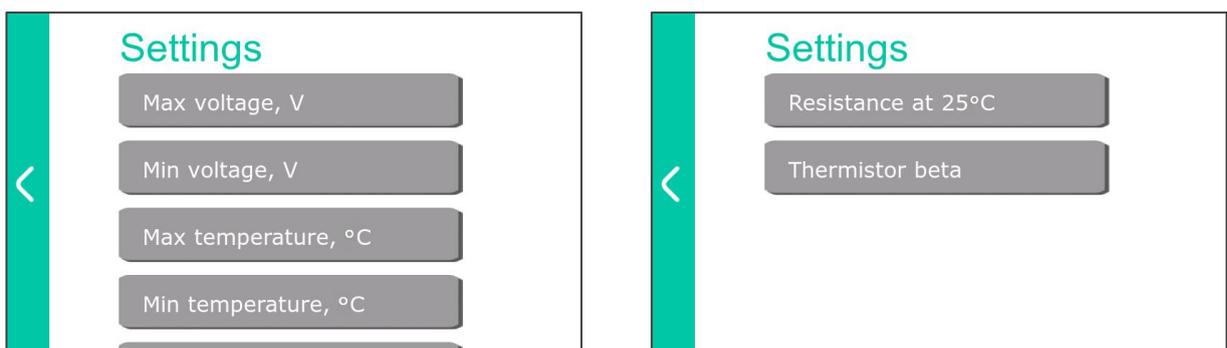


Figure 15 – Settings menu



Figure 16 – Setting the parameter

3. To set the parameter select it from the list. The new window displays the parameter value stored in the laser memory. To change it, click on the window (fig. 16). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.
4. After setting all the parameters, click to return to the PS driver menu.
5. PS driver can operate in two modes:
 - **Int: Normal** – the standard mode. The driver generates a pulse train with a constant repetition frequency set in the driver's control panel.
 - **Int: Burst** – the burst mode. The driver generates bursts of pulses at a predefined frequency from the onboard pulse generator. The user can set the number of pulses in burst (N) and the number of pulses skipped between the bursts (M).

Mode:
Int: Normal

To set the mode tap on button, use the arrows to select the desired mode in the menu (fig. 17). Press button to save the changes and exit menu. Press button to exit menu without changes.

N: 1
M: 0

6. To set the burst mode parameters tap on button, use the left and right arrows to select the parameter to change, use the up and down arrows to change the parameters value (fig. 18). Press button to save the changes and exit menu. Press button to exit menu without changes.

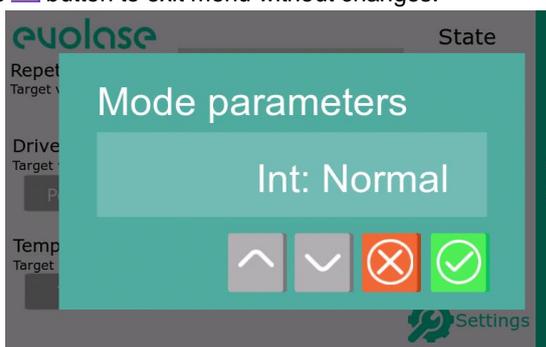


Figure 17 – Mode menu

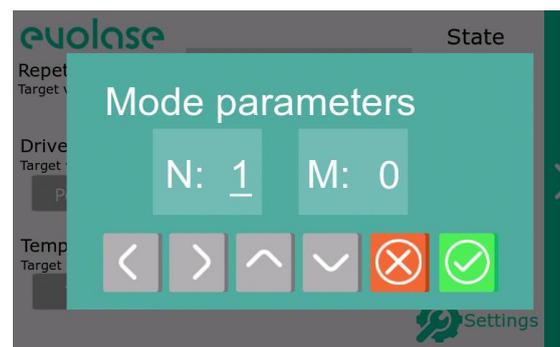


Figure 18 – Burst mode parameters

7. Tap on repetition rate value to set the pulse train repetition rate (fig. 19). Select the frequency range (Hz, kHz or MHz), then use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

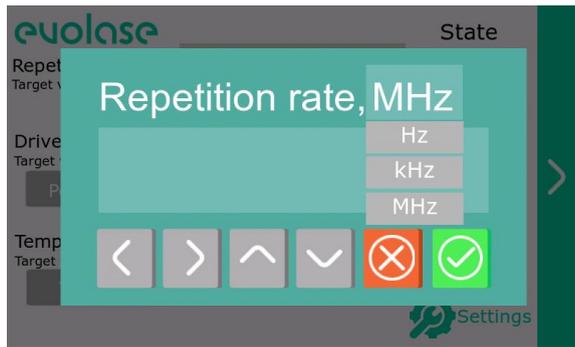


Figure 19 – Setting the repetition rate

8. Tap on temperature value to set the laser diode temperature (fig. 20). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.
9. Tap on “TEC ON” button to turn on the thermal stabilization of the laser diode. The button will light up green. The temperature target value is displayed above the button; the current temperature value is displayed to the right of the button.
10. Tap on driver voltage value to set the laser diode operating voltage (fig. 21). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

Note: The driver voltage is not the laser diode bias. The driver voltage sets the laser diode current.

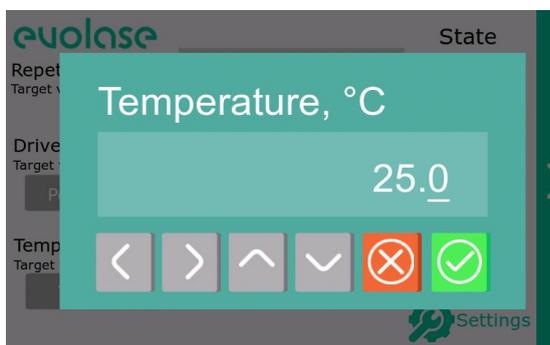


Figure 20 – Temperature setting

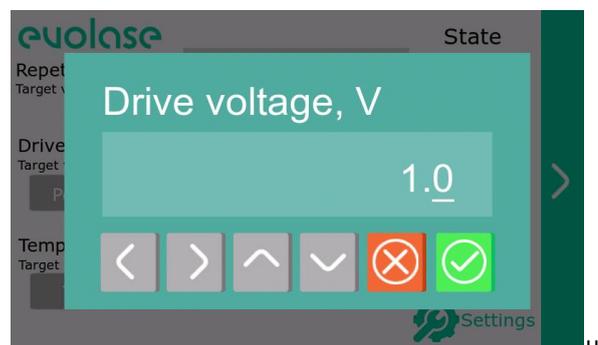


Figure 21 – Driver voltage setting

11. Tap on “Power ON” button to turn on the laser diode emission. The button will light up green, a laser light icon will appear in the state column on the right side of the screen (fig. 22).

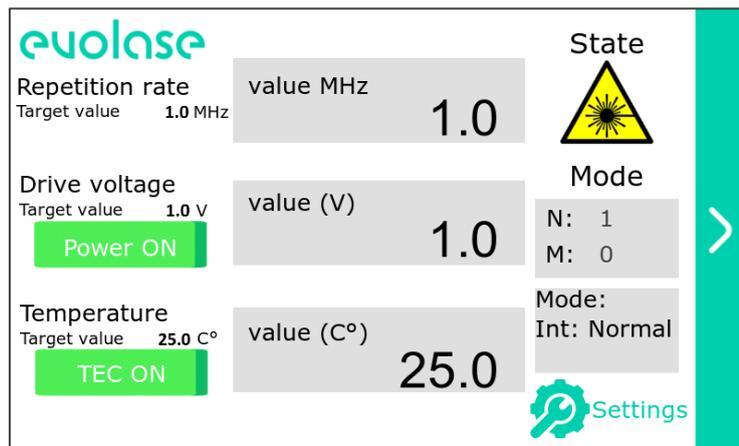


Figure 22 – Emission on state

12. The user can change the values of the driver voltage without turning off the laser emission, but couldn't change the operation mode and the frequency range without turning off the laser emission.
13. The user can control lasers in another control boards without turning off the laser emission. To do this, press the  button in the driver menu and select the device you want to control in the main menu.
14. To turn off laser emission tap on "Power ON" button. The button will light up grey, a laser light icon will disappear.
15. To turn off the thermal stabilization of the laser diode tap on "TEC ON" button. The button will light up grey.

Note: Don't turn off the thermal stabilization, while laser emission is on, this can lead to the LD breakdown.

PLD-NS

1. In NS driver menu (fig. 23) press  to go to the settings menu.
2. In the settings menu the user can set the allowed ranges for the operation temperature and current, nominal diode voltage, the values of thermistor resistance at 25 °C and beta parameter.

Note: the correct values of thermistor resistance at 25 °C and beta parameter are necessary for proper thermal stabilization.

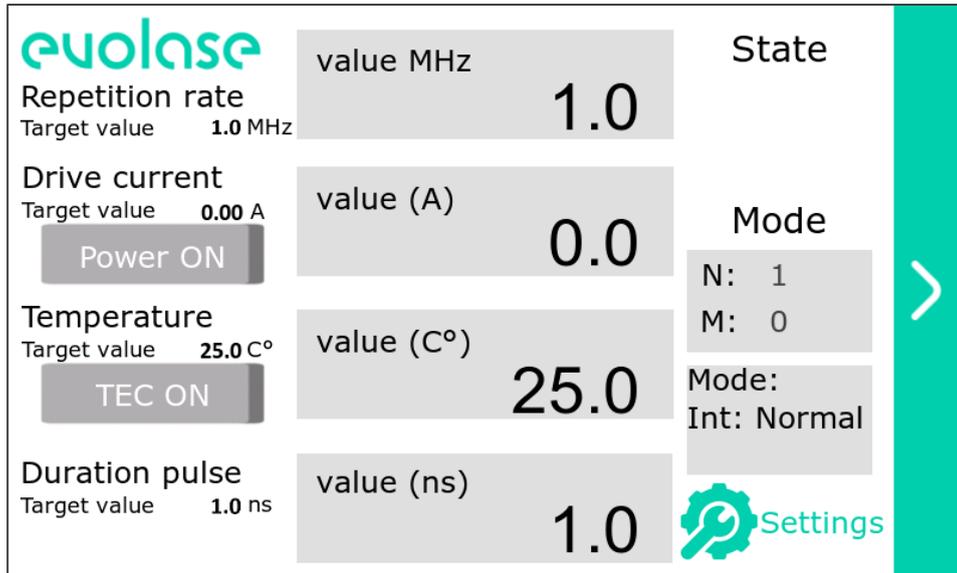


Figure 23 – NS driver menu

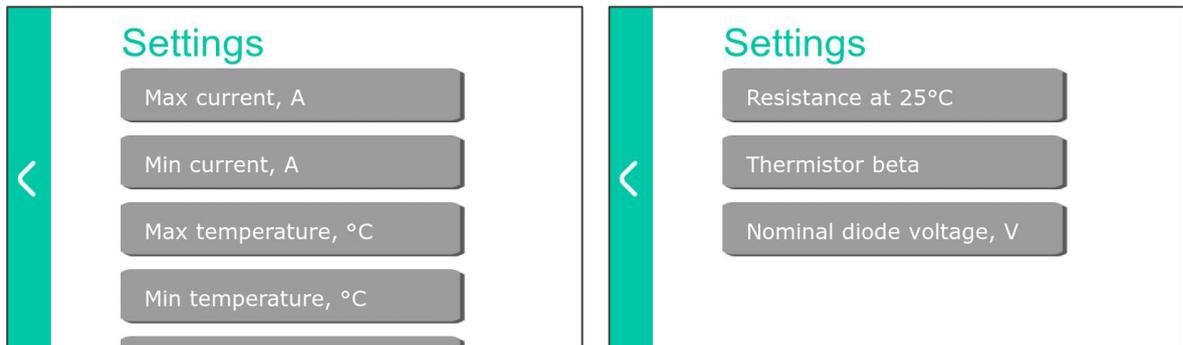


Figure 24 – Settings menu

3. To set the parameter select it from the list. The new window displays the parameter value stored in the laser memory. To change it, click on the window (fig. 25). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press  button to save the changes and exit menu. Press  button to exit menu without changes.

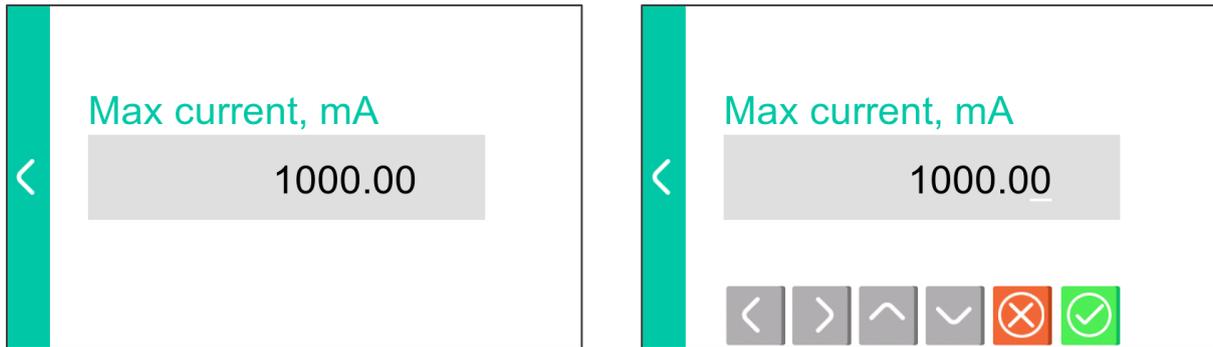


Figure 25 – Setting the parameter

4. After setting all the parameters, click to return to the PS driver menu.
5. NS driver can operate in two modes:
 - **Int: Normal** – the standard mode. The driver generates a pulse train with a constant repetition frequency set in the driver's control panel.
 - **Int: Burst** – the burst mode. The driver generates bursts of pulses at a predefined frequency from the onboard pulse generator. The user can set the number of pulses in burst (N) and the number of pulses skipped between the bursts (M).

Mode:
Int: Normal

To set the mode tap on button, use the arrows to select the desired mode in the menu (fig. 26). Press button to save the changes and exit menu. Press button to exit menu without changes.

N: 1
M: 0

6. To set the burst mode parameters tap on button, use the left and right arrows to select the parameter to change, use the up and down arrows to change the parameters value (fig. 27). Press button to save the changes and exit menu. Press button to exit menu without changes.

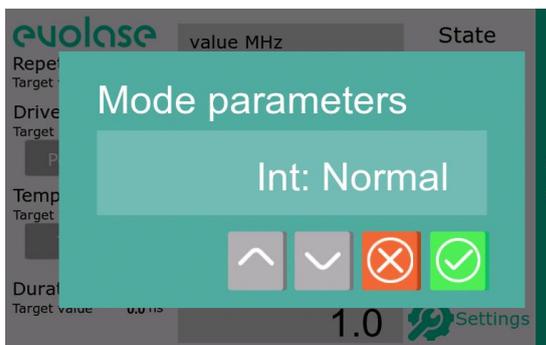


Figure 26 – Mode menu

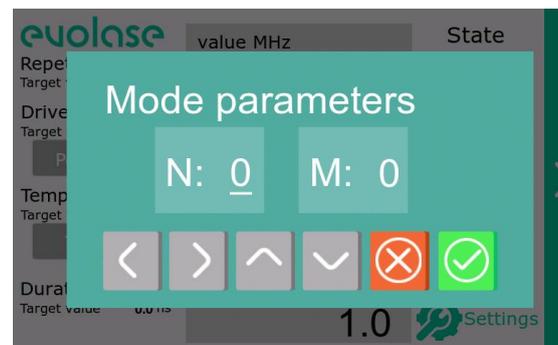


Figure 27 – Burst mode parameters

7. Tap on repetition rate value to set the pulse train repetition rate (fig. 28). Select the frequency range (Hz, kHz or MHz), then use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.



Figure 28 – Setting the repetition rate

8. Tap on duration pulse value to set the pulse width (fig. 29). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

Note: The pulse width is limited by repetition rate; the dirty cycle is less than 2 % to avoid overheating of the driver high current components.

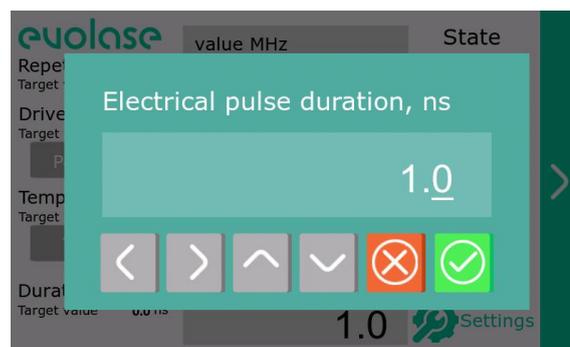


Figure 29 – Setting the pulse width

9. Tap on temperature value to set the laser diode temperature (fig. 30). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.
10. Tap on “TEC ON” button to turn on the thermal stabilization of the laser diode. The button will light up green. The temperature target value is displayed above the button; the current temperature value is displayed to the right of the button.
11. Tap on driver current value to set the laser diode operating current (fig. 31). Use the left and right arrows to select the digit to change, use the up and down arrows to change the value. Press button to save the changes and exit menu. Press button to exit menu without changes.

Note: In pulse mode the laser diode current can significantly exceed the CW operating current, however, this can lead to accelerated degradation of the laser diode.

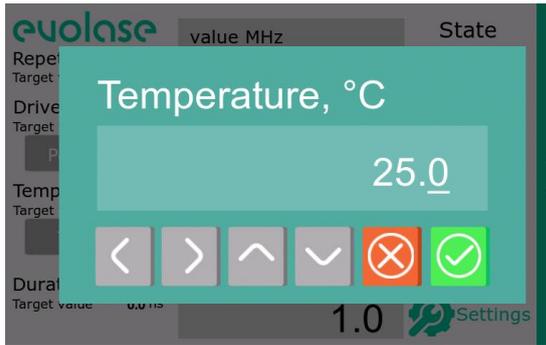


Figure 30 – Temperature setting



Figure 31 – Driver current setting

- Tap on “Power ON” button to turn on the laser diode emission. The button will light up green, a laser light icon will appear in the state column on the right side of the screen (fig. 32).

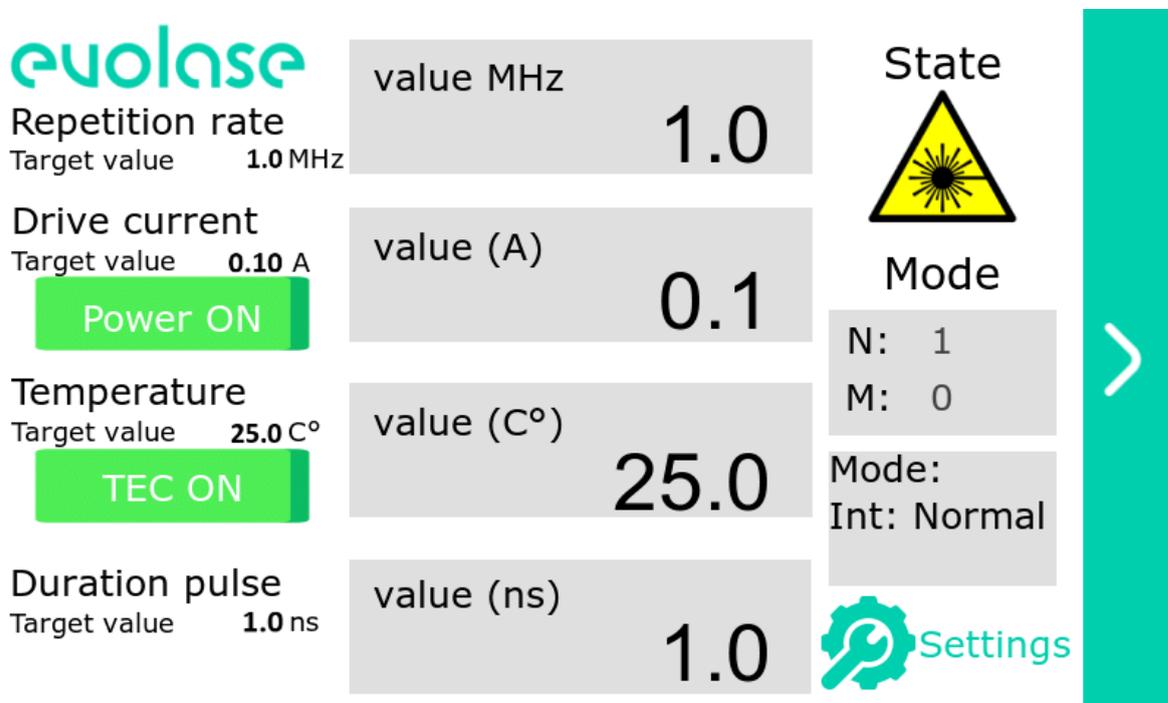


Figure 22 – Emission on state

- The user can change the values of the driver current and pulse width without turning off the laser emission, but couldn't change the operation mode and the frequency range without turning off the laser emission.
- The user can control lasers in another control boards without turning off the laser emission. To do this, press the  button in the driver menu and select the device you want to control in the main menu.
- To turn off laser emission tap on “Power ON” button. The button will light up grey, a laser light icon will disappear.
- To turn off the thermal stabilization of the laser diode tap on “TEC ON” button. The button will light up grey.

Note: Don't turn off the thermal stabilization, while laser emission is on, this can lead to the LD breakdown.