

**PEPC Test Stand Laser Startup Procedure**  
Photonics Industries Q-Switched YLF (Model DC50-1053)

**S-AB-P-044 Rev A**

**Precursor:**

Four procedures are given. The first procedure provides for starting the laser in Q-Switched mode. The second procedure provides for starting the laser in CW mode. There may be times where the laser is powered ‘on’ and the operator wishes to convert the laser from Q-Switched to CW or vice versa without having to do a complete shutdown and restart. The inter-mode conversion procedures make this possible using the third or fourth procedure provided below.

This is a Class 4 laser operating at 1053nm. Appropriate eye protection must be worn prior to performing any of the procedures listed below.

**Procedure 1**

**Startup Procedure for Q-Switched Operation:**

- Request the Shot Director **ENABLE** the PEPC Test Stand Laser interlock on the
- 1 Facility Interlock Executive.

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  - 2 Turn **ON** the fan to cool the laser head using the switch on its power cord and ensure that it is blowing **UP** onto the heat sink of the laser head.

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  - 3 Turn on the **“POWER”** switch on the front of the power supply.

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  - 4 Press the **“SHUTTER”** button. The green LED above this button should illuminate.

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  - 5 Turn the **“LASER ENABLE”** key switch to the **“ON”** position.

To ensure that the laser is receiving a proper trigger for the Q-switch:

- 6 Press the “MENU” button, use the “NEXT” button to highlight “Pulse Setting” on the LCD screen, and press “ENTER”.

On the LCD screen, check to make sure “FREQ” reads “EXT” and “Rep. Rate” reads a non-zero number.

- 7 **Note:** If the trigger rate is < 1Hz, the displayed rate will fluctuate between 0 and 1 Hz, changing to 1 on the arrival of a trigger pulse.

- 8 Press the “MENU” button, highlight “Diode Setting” on the LCD screen, and press “ENTER”.

- 9 Press “ENTER” again to enable control of the laser diode current setting (“Is =” on the LCD screen).

- 10 Set the current to < 0.5A using the knob.

- 11 Press the “LDD” button to turn the laser diode on. The green LED above this button will illuminate.

Press the “Q-SW” button. The green LED above this button will illuminate.

- 12 **Note:** Do NOT press the “Q-SW” button when the laser is above 3.5A. In order to safely switch between Q-switched and cw operation, use one of the inter-mode conversion procedures detailed below.

- 13 Slowly **INCREASE** the laser diode current to 4.5 +/-0.1 A using the knob.

Hold an IR card in the beam path and **check** for the presence of the beam before increasing the power beyond 4.5A.

- 14 **Note:** If the laser is being switched at a slow rate (i.e.: 0.1 Hz), you will need to hold the card in the beam until the trigger arrives.

- 15 Slowly **INCREASE** the laser diode current to 6.0 +/-0.02 A (nominal operating current) using the knob.

(End of procedure)

Procedure 2

Startup Procedure for CW Laser Operation:

- 1 Request the Shot Director **ENABLE** the PEPC Test Stand Laser interlock on the Facility Interlock Executive.

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- 2 Turn **ON** the fan to cool the laser head using the switch on its power cord and ensure that it is blowing **UP** onto the heat sink of the laser head.

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- 3 Turn on the **“POWER”** switch on the front of the power supply.

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- 4 Press the **“SHUTTER”** button. The green LED above this button should illuminate.

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- 5 Turn the **“LASER ENABLE”** key switch to the **“ON”** position.

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- 6 Press the **“MENU”** button and highlight **“Diode Setting”** on the LCD screen, press **“ENTER”**.

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- 7 Press **“ENTER”** again to enable control of the laser diode current setting (**“Is =”** on the LCD screen).

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- 8 Set the current to **< 0.5A** using the knob.

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- 9 Press the **“LDD”** button to turn the laser diode on. The green LED above this button will illuminate.

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- 10 Ensure that the **“Q-SW”** button is off. The green LED above this button should **NOT** be illuminated.

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- 10 **Note:** Do **NOT** press the **“Q-SW”** button when the laser is above 3.5A. In order to safely switch between Q-switched and cw operation, use one of the inter-mode conversion procedures detailed below.

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- 11 Slowly **INCREASE** the laser diode current to 4.5 +/-0.1 A using the knob.

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- 12 Hold an IR card in the beam path and **check** for the presence of the beam before increasing the power beyond 4.5A.

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- 13 Slowly **INCREASE** the laser diode current to 6.0 +/-0.02 A (nominal operating current) using the knob.

(End of procedure)

Procedure 3

**Inter-mode Conversion Procedure from CW to Q-Switched Laser Operation:**

- 1 Press the “**MENU**” button and highlight “**Diode Setting**” on the LCD screen, press “**ENTER**”.

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- 2 Press “**ENTER**” again to enable control of the laser diode current setting (“**Is =**” on the LCD screen).

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- 3 Slowly **DECREASE** the laser diode current to **<0.5A** using the knob.

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- 4 Press the “**LDD**” button to turn off the laser diode. The green LED above this button will go out.

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- 5 To ensure that the laser is receiving a proper trigger for the Q-switch:  
Press the “**MENU**” button, use the “**NEXT**” button to highlight “**Pulse Setting**” on the LCD screen, and press “**ENTER**”.

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- 6 On the LCD screen, check to make sure “**FREQ**” reads “**EXT**” and “**Rep. Rate**” reads a non-zero number.  
**Note:** If the trigger rate is < 1Hz, the displayed rate will fluctuate between 0 and 1 Hz, changing to 1 on the arrival of a trigger pulse.

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- 7 Press the “**MENU**” button and highlight “**Diode Setting**” on the LCD screen, press “**ENTER**”.

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- 8 Press “**ENTER**” again to enable control of the laser diode current setting (“**Is =**” on the LCD screen).

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- 9 Set the current to **< 0.5A** using the knob.

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- 10 Press the “**LDD**” button to turn the laser diode on. The green LED above this button will illuminate.

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- 11 Press the “**Q-SW**” button. The green LED above this button will illuminate.

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- 12 Slowly **INCREASE** the laser diode current to **4.5 +/-0.1 A** using the knob.

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- 13 Hold an IR card in the beam path and **check** for the presence of the beam before increasing the power beyond 4.5A.  
**Note:** If the laser is being switched at a slow rate (i.e.: 0.1 Hz), you will need to hold the card in the beam until the trigger arrives.

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14 Slowly **INCREASE** the laser diode current to 6.0 +/-0.02 A (nominal operating current) using the knob.

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(End of procedure)

#### Procedure 4

##### Inter-mode Conversion Procedure from Q-Switched to CW Operation:

1 Press the “**MENU**” button and highlight “**Diode Setting**” on the LCD screen, press “**ENTER**”.

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2 Press “**ENTER**” again to enable control of the laser diode current setting (“**Is =**” on the LCD screen).

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3 Slowly **DECREASE** the laser diode current to <**0.5A** using the knob.

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4 Press the “**Q-SW**” button “**OFF**”. The LED above this button will go out

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5 Slowly **INCREASE** the laser diode current to 4.5 +/-0.1 A using the knob.

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6 Hold an IR card in the beam path and **check** for the presence of the beam before increasing the power beyond 4.5A.

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7 Slowly **INCREASE** the laser diode current to 6.0 +/-0.02 A (nominal operating current) using the knob.

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(End of procedure)

**S-AB-P-044 PEPC Test Stand Laser Startup Procedure**

**Document Release:**

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