

JetLasers

PL-E Pro

User Manual

Introduction

JetLasers' PL-E Pro series feature AC integration, robust design, flexible design, focus/defocus mechanism, added safety features, metal button, spare barrel, long runtime and high reliability make them a better option for outdoor or field use where a high power, high stability handheld laser is required. The PL-E Pro series lasers are good for lab use where portability and low cost are necessary.

What makes PL-E Pro different from previous versions?

1. The build quality strengthened, the intuitiveness enhanced in design
2. Modular battery barrel, assembling + shipping friendly, PL-E convertible
3. Tail safety pin added, more input sources explored, user safety fortified
4. Simplifying the functions and minimizing the failure rate

5. Aperture cap: anti-dust, user safety considered

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Safety

- NEVER aim a laser at people, animals, or aircrafts.
- NEVER look directly into the beam of a laser.
- ALWAYS use protective eyewear when using laser.
 - Be certain to use eyeglasses designs for the wavelength of the laser, e.g., don't use safety glasses designed with blue lasers with red lasers; the red wavelengths will not be filtered by the eyeglass.
- ALWAYS use caution when using high powered lasers indoors.

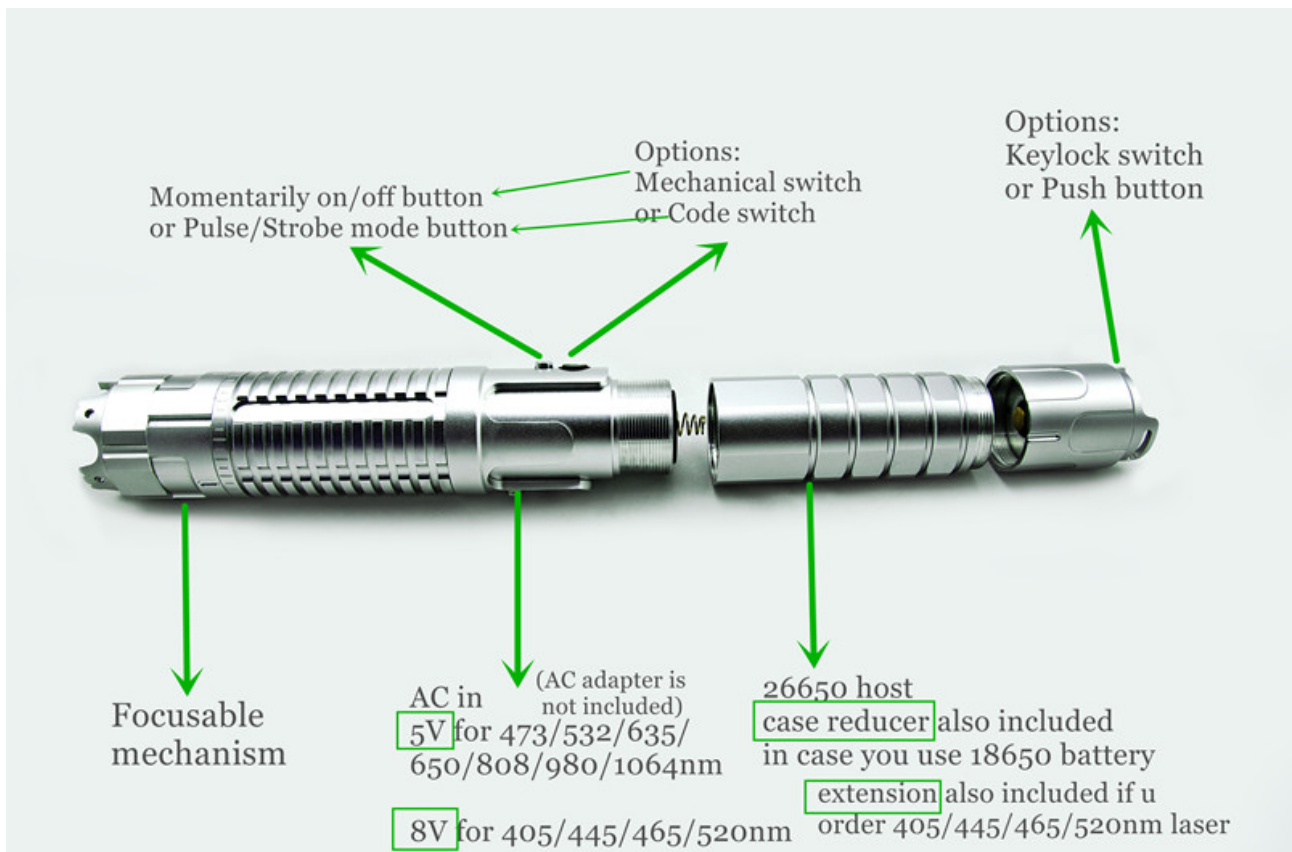
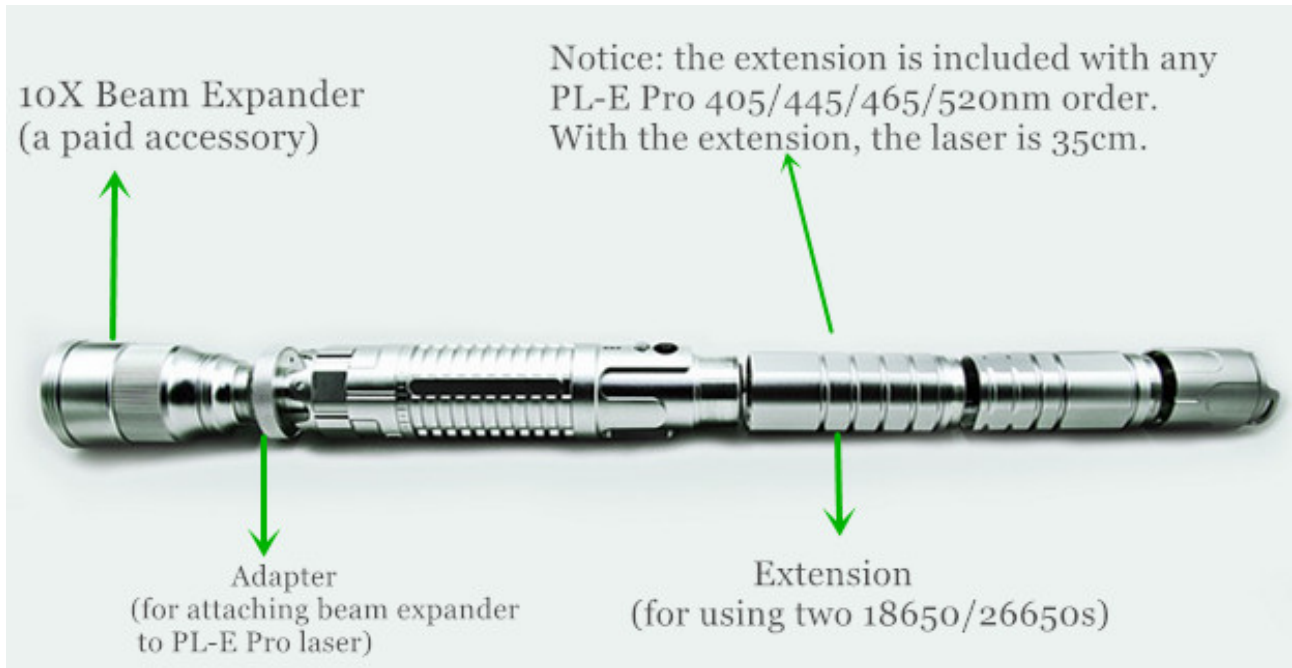
- BEWARE of laser beam reflections off of mirrors or other reflective surfaces

Batteries

- PL-E Pro series is by default a 26650 host at 28cm in length. 18650/16340 lithium-ion batteries may also be used with the included case reducers. Some lithium-ion batteries have flat-tops (as opposed to batteries with a “button-top”). Flat-top batteries must use the included button magnets to make contact with the second battery.
 - Attach the small magnets to the positive end of the flat-top batteries.
- PL-E Pro series at *473/532/635/650/808/980/1064nm* takes a single 18650/26650 (3.7v, fully chargeable to 4.2V) or 5V AC wall adapter.
- PL-E Pro series at *405/445/465/520nm* takes two 16340/18650/26650s (each 3.7v, fully chargeable to 4.2V) or 8V AC wall adapter.
 - With two batteries at full charge, the voltage will be at 8.4v and will not damage the laser diode.
- The extension tube is included for users to use two 18650/26650 batteries.
 - With the extension, the laser totals at a length of 35cm.

- AC wall adapters are not included in the packing list. If you have the right AC adapter, you can run the laser on AC without the batts needed.

Operation



PL-E Pro Mechanical Switch

1. Load Batteries

- Load "-" negative end of battery first into the host
- Reattach the tail switch.

2. Switch on the Tail Switch

There are two options of tail switches:

- The Keylock Switch: Turn into the keylock on tailcap with the key Clockwise, the LED indicator will turn on.
- Simple Button Switch: Depress the button on the tailcap, the LED indicator for the

power supply will turn on.

3: Turn the Beam On

- Constantly On/Off Button (the lower button)
 - Depress *Constantly On/Off Button*, and the beam will turn on.
 - Depress it again, and the beam will turn off.
- Momentarily On/Off Button (the upper button)
 - Depress the *Momentarily On/Off Button*, and the beam will turn on.
 - Letting go of the button will turn the beam off.

4..Switch the Beam Off

- Press the *Constantly on/off button* to turn the beam off.

- The user can force switch off the laser at any state by using the tail switch.

PL-E Pro Series Code Switch

1. Load Batteries

- Load "-" negative end of battery first into the host
- Reattach the tail switch.

2. Power Select Button

- Depress the *Power Select Button* will turn the beam on.
- By default, the power level will begin at 50% of the max output.
- Pressing the button a second time will activate 100% of the max output.
 - Another single press will cycle between 50% and 100% of the max output.

3. Pulse Mode Button

- Depressing *Pulse Mode Button* will shift Continuous Wave to Pulse Mode.
- Depressing either *Power Level Button* or *Pulse Mode Button* would turn Pulse mode to Continuous Wave mode.
 - Another single press on *Pulse Mode Button* will cycle between Continuous Wave and Pulse Mode.

4. Standby Mode

- Long Hold (3 seconds) the *Power Select Button* shifts laser into Standby Mode.
- Pressing the *Power Select Button* will turn the beam on again.

5. Switch the Laser Off

- In Standby Mode, depress/keylock the Tail Switch to switch off.
- The user can force switch off the laser at any state by using the tail switch.

Focusing Mechanism

Before we can talk about how the focusing mechanism works, there is one term that you should be familiar with - beam divergence. Beam divergence is a measure of how wide a laser beam will expand from its point of focus.

Contrary to popular belief that a laser will stay as a “dot” as it reaches miles and miles in distance. All laser beams will diverge, i.e., the “dot” will become big as it reaches further distance. By using a lense or a set of lenses, we can control the divergence at a certain distance.

Understanding this concept will help you understand how a laser “burns.”

Inside the laser units, there are a set of lense that by turning the focusing ring, you can achieve the following beam configurations. When you are turning the focusing ring, you are essentially moving the lense to change the focal length of the lense and the laser diode.

figure A



figure B



figure C



- Figure A is known as a “diverging beam.” In this configuration, the beam begins as a narrow-gathered beam and eventually expands as the distance increases.
- Figure B is known as a “converging beam.” In this configuration, the beam begins as a wide beam, but at certain distance will converge, *i.e.*, come together, and then it will diverge again.
- Figure C is known as a “collimated beam.” In this configuration, the beam begins as a wide beam and remains so throughout the length of the beam. (remember that every laser beam will begin to diverge, *i.e.*, becoming wider, at some point (unless there are more lenses to refocus the beam).

A laser, like all light source, is taking that light source and focusing it to a point to increase the intensity of that light. The idea is very similar to taking a magnifying glass to focus sunlight to burn something.

On the topic of burning, a laser once again is a light source. Light in and of itself cannot burn. However, taking that same light and gathering it into

a very narrow beam will begin ignition, if there is enough intensity (the higher wattage equates to higher intensity).

The target must also be taken into account. Light (not dark) objects will reflect a light source instead of absorbing it. On the other hand, a dark object will be able to absorb light better. Remember, the more light energy an object absorbs, the more easily it will ignite something.

One last thing to note, focusing your laser according to figure B will be the best for burning things. However, take note that the point of convergence will also shift depending on your focus settings.

AC Adapter

- How to Run the laser on AC adapter:

AC adapter is also called power adapter, because it converts AC power from a wall jack into DC power for the laser module. PL-E Pro lasers can run on AC adapter either with or without batteries loaded. To use it, plug the AC cord into a wall socket, and then connect the DC end of the adapter to the DC jack on the PL-E Pro laser. The LED indicator will light up.

**ALWAYS USE PRECAUTION WHEN USING HIGH POWERED
LASERS!**