

# Instruction Manual

## High Speed Laser Diode Power Supplies/Driver High Current Pulse Generator

Models: LDC-120/250



This manual contains Operating, Safety, and Maintenance information and subjects to change without notice.



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## 1.1 GENERAL

The high speed laser diode driver/power supply of LDC-120/250 is primary designed to drive a laser diode with high currents and high speed in pulse mode. However, this unit can be used as a **high peak current/high voltage pulse generator** as well. By utilizing **the water-cooled** method designed into this unit, the user can use LDC-120/250 for **unique heavy duty and high voltage/high peak current applications**.

## 1.2 DESCRIPTION

The high speed, fast rise time and high current laser diode driver, LDC-120/250 can generate a high peak pulsed current called **Super Pulse** in pulse mode. The **Super Pulse** is the Lic's original development on the early 1980s for medical CO2 laser applications. By using those experience Lic engineering achieved a high peak current with a fast rise time up to **250A/1-3ns** for laser diode applications as well.

The LDC-120/250 can generate the high speed pulse of **800 picoseconds/15MHz**, with the pulse width of **1.5ns**, or a fast rise time of **1-3ns**, high voltage to **900V** and a high current to **250A** (LDC-250).

This unit contains a precise (**40ppm/C**), high frequency (**15MHz**) internal PWM-pulse generator and can be used as **a high current pulse generator as well as a high speed pulse generator**.



### 1.3 SPECIFICATIONS of LDC-120/250

#### Output1 (Burst Pulse):

- Rise Time: 800ps
- Min. Pulse Width: 1.5ns
- Output Voltage: 7V
- Output Current: 2A
- Max. Pulse Rate: 15Mhz
- Burst rate & width: 10KHz-1MHz, 200ns-10us

#### Output2:

- Rise Time: 7ns
- Min. Pulse Width: 30ns
- Max. Pulse Width: 1us
- Max. Output Voltage: 90V
- Max. Output Current: 50A \*1)
- Max. Pulse Rate: 1Mhz

\*1): Max. Current is limited by the pulse rate & width selected.

#### Output3: (Fixed Pulse Width)

- Rise Time: 3ns
- Min. Pulse Width: 10ns
- Max. Pulse Width: 50ns
- Max. Output Voltage: 450V(LDC-120), 900V(LDC-250)
- Max. Output Current: 120A(LDC-120), 250A(LDC-250) \*1)
- Max. Pulse Rate: 1KHz-50KHz (depends on the pulse width selected)

\*1): Peak Current is limited by the pulse rate selected.

• Dimension	2.40"H x 5.1"W x 5.1"L inch
• Weight	0.5 lb
• Cooling	Air Cooled/Water Cooled
• Option 1	No Option Available

### 1.3.1 PROTECTION CIRCUIT

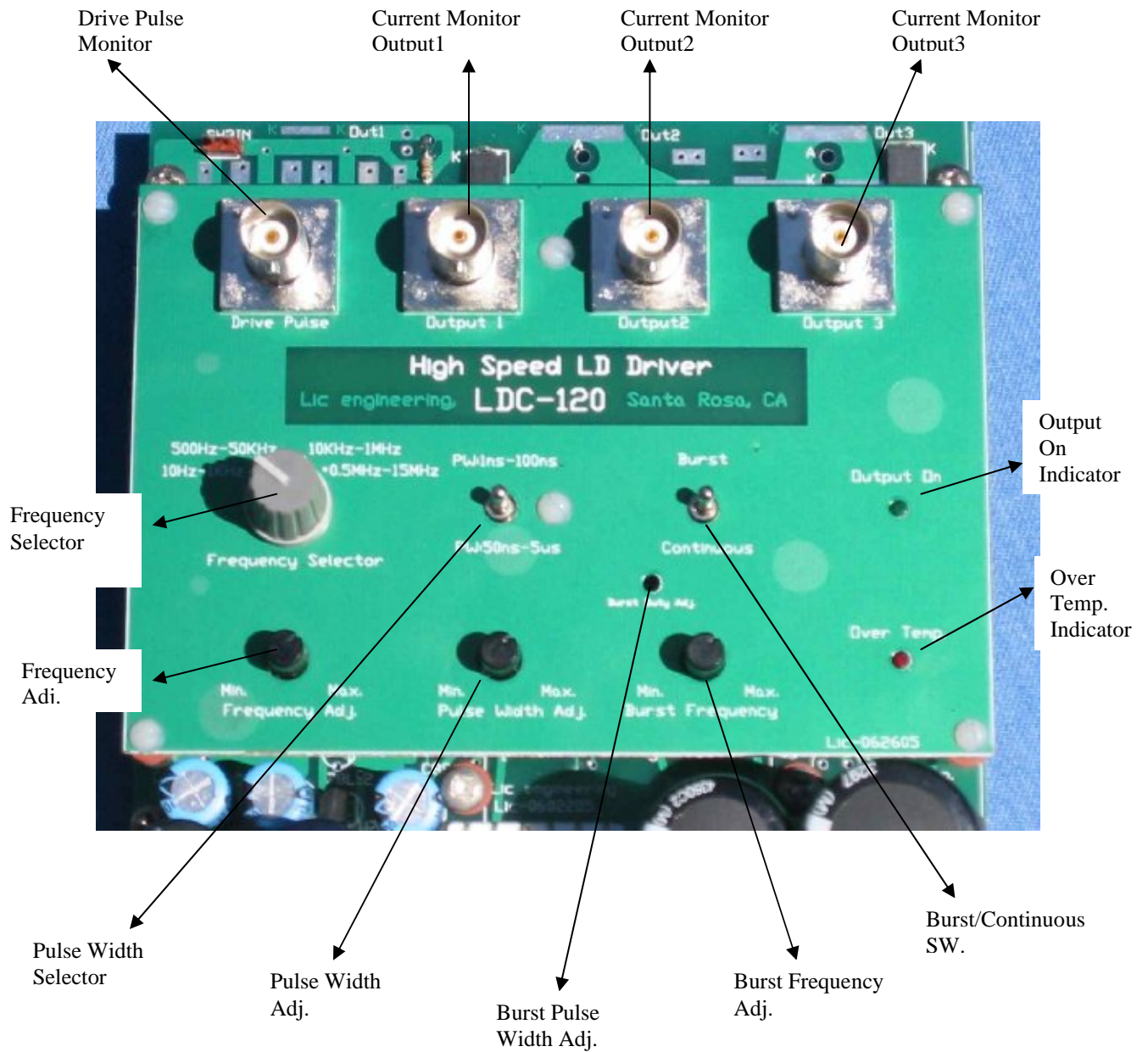
**Over temperature protection:**

Detects a base temperature on which main switching devices and other power semiconductors are mounted. When the protection circuit detects these fault conditions, the unit will be shut off instantaneously, sending FAULT signal to main unit of LD-1500/3000.

### 1.3.2 OPERATING TEMPERATURE

Ambient temperature: +10 to 40C

## 1.4 FRONT PANEL



**Front Panel of LDC-120**

1.5

**EXPLANATION OF FRONT PANEL**

#### 1.5.1 Drive Pulse Monitor

This signal can be used to monitor the input drive signal. Also it can be used as a trigger signal for the output current waveform. 50ohm BNC.

#### 1.5.2 Current Monitor Output 1

This monitors the current waveform of the output1. The sensitivity is 1A/V, with 50ohm BNC connector.

#### 1.5.3 Current Monitor Output 2

This monitors the current waveform of the output1. The sensitivity is 10A/V, with 50ohm BNC connector.

#### 1.5.4 Current Monitor Output 3

This monitors the current waveform of the output1. The sensitivity is 10A/V, with 50ohm BNC connector.

#### 1.5.5 Output On indicator

Indicates the Output On signal is sent by the main unit of LD-1500/3000.

#### 1.5.6 Over Temp. Indicator

Indicates the Over Temp. Protection on the board is activated. When this protection is activated, all the tree outputs are shut off.

#### 1.5.7 Burst/Continuous SW.

This SW. changes the output pulse for either continuous pulse, or burst pulse. Since the pulse rate can be as high as 15MHz, some outputs become over load under certain pulse condition. By using this burst pulse mode, the output can be the maximum peak current even at high pulse rep. rate.

#### 1.5.8 Burst Frequency Adj.

This knob can change the burst frequency to set a proper gating for the setting frequency.

#### 1.5.9 Burst Width Adj.

This trim pot can change the pulse width of the burst pulse. Each pulse width of the burst pulse is set by this adjustment.

#### 1.5.10 Pulse Width Adj.

This knob changes the pulse width of the setting frequency made by Frequency Adj. & Frequency Selector.

#### 1.5.11 Pulse Width Selector.

This knob select the pulse width for high side, or low side, since only Pulse Width Adj. can not cover the pulse width from 1.5ns to several ms.

#### 1.5.12 Frequency Adj.

This along with Frequency Selector changes the setting frequency continuously.

#### 1.5.13 Frequency Selector.

Since the Frequency Adj. cannot cover the entire frequency range, this knob selects the base frequency range.

2.0 **INSTALLATION**

2.1 **GENERAL**

After unpacking, general inspection and preliminary checkout procedures should be performed to ensure that the unit is in proper working order. If it is determined that the unit has been damaged, the carrier should be notified immediately. Contact Lic directly:

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3735 Coffey Ln.  
Santa Rosa, CA 95403 USA  
Tel: (707) 575 8821  
Fax: (707) 526 3905  
email: [info@LicEngine.com](mailto:info@LicEngine.com)

## 2.2 INSPECTION

Check for damage incurred during shipment as follows:

1) Inspect unit case for cracking, bending, and other obvious signs of damage.

## 2.3 INTERFACE WIRE CONNECTIONS

Connect the interface wire supplied with between the LDC-120/250 and the main unit of LD-1500A/3000A.

## 2.4 LASER DIODE CONNECTION

Connect the laser diode to the one of each output. **You cannot connect more than one load to each output.**

**Be careful for the lead wire inductance:**

***If the lead wire is not short enough, the peak current is lowered and the rise time becomes slow.***

Refer to the following formula:

$$V(v)=L(nH)\times dl(A)/dt(ns)$$

Where, V=voltage across the lead wire (V), L=lead wire inductance (nH), DI=peak diode current (A), dt=rise time (ns)

## 3.0 OPERATION

### 3.1 PREPARATION

### 3.1.0 PRECAUTION

#### 1). Shut off the unit

Do not shut off AC line voltage while the power supply is running. This could cause damage to the power supply.

### 3.2 STARTING IN PULSE MODE

#### 3.2.1 WITH USING INTERNAL CLOCK

##### STEP 1. TURN THE KEY SW. TO ON POSITION

Turn AC power of the main unit of LD-1500/3000 power supply on. Confirm READY will come on in 10-30 seconds.

##### STEP 2. TURN OUTPUT ON/OFF SW. ON

Confirm Current Adj. is set to zero before turning this SW.

##### STEP 3. ADJUST LOAD CURRENT

Watching Current Monitor of Output1, Output2, or Output3 where the laser diode is connected, gradually increase Cur. Adj. The average load current is displayed in the LCD panel.

### 4.0 MAINTENANCE

#### 4.1 GENERAL

Lic's laser power supply contains potentiometers that are set at Lic's factory. Do not try to adjust these potentiometers. **There are no user-serviceable parts in Lic's products.**

IF USER ATTEMPTS TO OPEN, ADJUST, MODIFY, OR REPAIR THE PRODUCTS, THEN LIC ENGINEERING CAN NO LONGER BE RESPONSIBLE FOR THE SAFE OPERATION OF THE UNIT, AND THE WARRANTY SHALL BE IMMEDIATELY VOID.

## 4.2

### **CAUTION**

- 1). DO NOT ALLOW THE UNIT TO BE IN OPEN CIRCUIT.
- 2). DO NOT ALLOW THE UNIT TO BE SHORT CIRCUIT.
- 3). DO NOT ATTEMPT TO OPEN, MODIFY OR ADJUST ANY PARTS OF THE POWER SUPPLY.
- 4). DO NOT MECHANICALLY SHOCK.
- 5). KEEP WATER OR MOISTURE OUT FROM THE UNIT EXCEPT IN/-  
OUTLET  
OF THE UNIT.
- 6). DO NOT MISUSE, OVERUSE, OR ABUSE THE UNIT.

## 5.0

### **WARRANTY**

## 5.1

### **WARRANTY**

Lic engineering warrants its products against all defects in materials and workmanship to the original using purchaser for a period of one year from the date of delivery to the original purchaser.

During this period, Lic engineering will repair or replace its products if defective free of charge. This warranty applies only when the products are properly installed, maintained and used for the intended purpose, and only to the original purchase/user of the products, and only so long as the products are used in the country to which it was originally shipped by Lic engineering, or by an authorized distributor.

**Any shipping charge incurred shall be paid by the purchaser/user of the products.**

This warranty is null and void if the user attempts to service the products (other than performing the maintenance described in the Instruction Manual), or if service is performed by people who are not trained and authorized to do so by Lic engineering.

THE EXPRESS WARRANTY ABOVE IS THE SOLE WARRANTY OBLIGATION OF LIC ENGINEERING AND THE REMEDY PROVIDED ABOVE IS IN LIEU OF GUARANTEES, OR WARRANTIES--ORAL OR WRITTEN, EXPRESS OR IMPLIED-- INCLUDING WITHOUT LIMITATION WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

LIC ENGINEERING HAS NO LIABILITY WHATSOEVER FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGE ARISING OUT OF ANY DEFECT, IMPROPER USE, OR UNAUTHORIZED SERVICE OR REPAIR.

## 5.2

### **RETURN OF THE UNITS**

Prior to return of a unit, or any portion thereof, Lic must be consulted to avoid unnecessary shipping.

If returns of the units are deemed necessary, a Return Authorization Number "RAN" will be assigned. This number must be recorded on the outside of the shipping container.

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