

# L15 Laser Series

\*Image of L15-D-FC\*



**ACCESS LASER**  
Member of the TRUMPF Group



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## Thank you for purchasing an Access Laser product

Access Laser specializes in RF Excited Longwave Infrared & Mediumwave Infrared lasers for custom applications in scientific experimentation, research and development, medical and high-performance material processing. Our system architecture emphasizes flexibility, and we take pride in ensuring that every product delivers optimal performance and satisfies your precise needs. We view our role as project collaborators, striving to offer transparent information about each product to make integration with your application successful.

Access Laser remains dedicated to your needs long after your initial purchase. Our technical support and service teams are available, regardless of the warranty period, and we welcome you to contact us whenever you have questions, concerns, or additional requirements at:

Email: [sales@accesslaser.com](mailto:sales@accesslaser.com)

Phone: [425-582-8674](tel:425-582-8674)

## The L15 Series

The L15 is ideally suited for use in high volume, in-design integrated applications. The economical design allows for competitive pricing and leading performance among similar sealed RF excited CO<sub>2</sub> lasers.

Available technology upgrades:

**Acousto-Optic Modulation:** Mounting an AOM external to the laser cavity can increase the pulse repetition frequency to 200kHz without optically saturating sensitive targets.

<https://accesslasers.wpengine.com/acousto-optic-modulator-aom/>

**Isotope Gas Mixtures:** The standard CO<sub>2</sub> laser provides spectral output between 9.2-10.8µm. For applications requiring other wavelengths, Access Laser can extend our lasers' spectral reach and power by varying gas mixtures.

<https://accesslasers.wpengine.com/isotope-gas-mixtures/>

**Polarization:** Augment your beam for polarization-dependent performance. We can add specialized coatings to internal optics that greatly improve the polarization extinction ratio.

<https://accesslasers.wpengine.com/enhanced-polarization-l/>

**Piezo Tuning:** Laser performance is highly correlated to maintaining precise control over resonator length. Command-driven frequency compensation is one way to enable high performance.

<https://accesslasers.wpengine.com/piezo-cavity-modulation-z/>

**Super Pulse:** By driving the laser gain three times harder for a shorter duration than standard pulse width modulation a discrete pulse train can be generated.

<http://accesslasers.wpengine.com/super-pulse-p/>



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## Warranty

All of Access Laser Company's lasers come with a one-year standard warranty. This certifies that your laser is free of any defects in material or workmanship.

Please see <https://accesslasers.wpengine.com/legal/> for detailed warranty information.

Upon final inspection of your order, please complete the information below and email to [service@accesslaser.com](mailto:service@accesslaser.com). If Access Laser Company is not notified within 14 days of delivery, we will assume that the shipment arrived in satisfactory condition.

Date Received: \_\_\_\_\_

Laser Model: \_\_\_\_\_

Laser Serial Number: \_\_\_\_\_

RF Driver Serial Number: \_\_\_\_\_

Received By: \_\_\_\_\_  
(Name and title)

## Returns

If a failure should occur, please contact your Access Laser Company representative or contact Access Laser headquarters directly at 1-425-582-8674 or [service@accesslaser.com](mailto:service@accesslaser.com).

A company representative will determine whether your laser should be returned for repair or maintenance. If the laser needs to be returned, a Return Merchandise Authorization (RMA) will be issued. Any laser returned without an RMA will be at the client's sole expense.

An ALC representative will make a determination regarding shipping costs. Typically, for failures within the first 45 days, ALC pays all shipping costs to and from ALC. For failures after 45 days, but within the first year, the client shall be responsible for shipping costs to ALC; ALC will pay all shipping costs to return the item(s) to the client. Please be sure to verify shipping costs in advance with your ALC representative, as special considerations may apply.

When requesting an RMA, please have the following information ready:

- Date of purchase
- Laser model
- Serial number for the laser
- Serial number for the RF driver
- Brief description of the issue
- Date the issue was first discovered

Fill out the RMA as completely as possible and include a copy of the RMA with the shipment. Include the laser and ALL accessories when returning the laser. This allows ALC to test each component and determine the source of the issue.

SHIP TO:

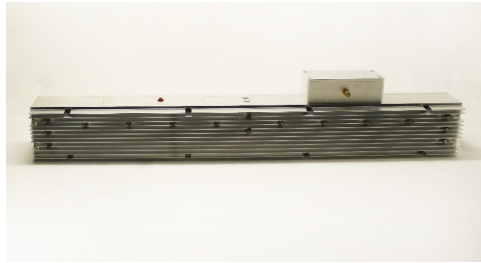
Access Laser Company  
Attn: Service Department  
2211 W. Casino RD Suite A  
Everett, WA 98204

## Laser Shipment Contents

The following items are included with each standard laser shipment:

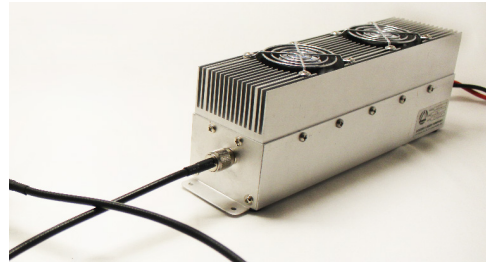
- L15 Series Laser
- RF Driver
- TNC to BNC Coax Cable
- DB15 Dongle
- Laser Test Documents
  - Final Test Document
  - Power Plot

If you have questions about the contents of your shipment, please contact us.



L15 Series Laser

Figure. A1



RF Driver

Figure. A2



BNC to TNC Coax Cable

Figure. A3



DB15-Dongle

Figure. A4

## FDA and International Regulations

Access Laser Company (ALC) lasers are designed, tested, and certified to comply with United States (US) and European Union (EU) regulations. For commerce within the US, laser safety requirements are governed by the Center for Devices and Radiological Health (CDRH) as set forth by United States Radiation Control for Health and Safety Act of 1968. For International commerce outside the US, laser safety is commonly governed by IEC Standards.

If you are an OEM that manufactures a laser product that is sold in the US or imported into the US, you are required to file a Product Report with the CDRH, prior to entering commerce in the US, that demonstrates compliance to 21 CFR 1040.10. If you are an OEM that operates and sells outside of the US, use IEC 60825-1 for laser safety compliance. It is the responsibility of the OEM or system integrator to assure complete compliance with any and all applicable regulations when an L15 series laser is integrated into their system.

Since ALC is a US-based company with international sales, ALC has filed an OEM Product Report with the CDRH for all lasers in the L15 series; the Product Report shows that our warning labels comply with IEC 60825-1. The L15 laser complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Both 21 CFR 1040 and IEC 60825-1 require OEM lasers to be incapable of lasing when removed from the OEM system. In such cases the laser must comply with all applicable requirements of 21 CFR 1040 or IEC 60825-1. When wired compliant to laser safety regulations the L15 does not operate when removed from the OEM system.

## Safety Information

### Safety Symbols and Terms

Commonly used safety symbols and terms are used throughout this manual and on our products. Please familiarize yourself with the definitions and use of the terms and symbols.



Indicates a hazardous situation which will result in **DEATH** or **SERIOUS INJURY**.



Indicates a hazardous situation which could result in **DEATH** or **SERIOUS INJURY**.



Indicates a hazardous situation in which could result in **MINOR** or **MODERATE INJURY**.



Indicates an unsafe practice that can result in **PROPERTY DAMAGE**.



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## Safety Information

### Safety Label Definitions and Locations

1. Product Identification label on the top of the laser towards the back – Indicates model, serial number and date of manufacture.
2. Yellow Danger label on top of the laser, towards the middle – Calls out the edition of IEC 60825-1 used for label compliance and the maximum power output and frequency. Indicates laser class and includes explanatory data such as power and wavelength.
3. Safety Compliance label on the side of the laser, towards the front – Indicates whether the laser was manufactured in compliance with United States Code of Federal Regulations and/or International standards. (For OEM lasers, the laser component does not comply with all standards for complete laser products as specified by 21 CFR 1040.10 or IEC 60825-1: 2014-05.)
4. Aperture label on the top of the laser (towards the front of laser) – Indicates location of laser beam exit (aperture).



Figure A5

**AVOID EXPOSURE**  
Invisible laser radiation  
is emitted from this  
**aperture**



This device is a  
laser component which  
must be installed and  
operated in compliance  
with IEC 60825-1  
and 21 CFR 1040.10



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## Operating Instructions

### Operating the laser

1. Close the laser shutter (if present).

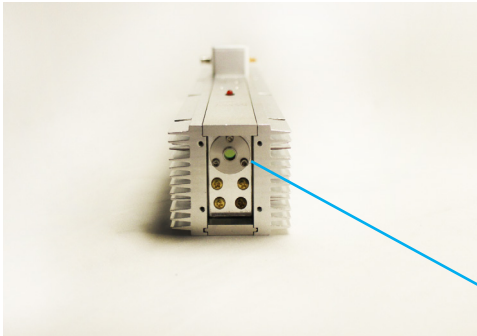


Figure. 1

2. Direct the laser toward an appropriate beam dump.



Figure. 2

3. Secure the laser to a bench top.



Do not torque, twist or bend the laser body during the mounting process.

Applying uneven pressure to the laser body may distort the laser body, causing poor performance and possible damage.

4. Connect the Cooling System



Figure. 3

5. Connect the RF Driver to the laser with the coax cable using the TNC and BNC connectors, as shown in the Connection Diagrams on page 14.

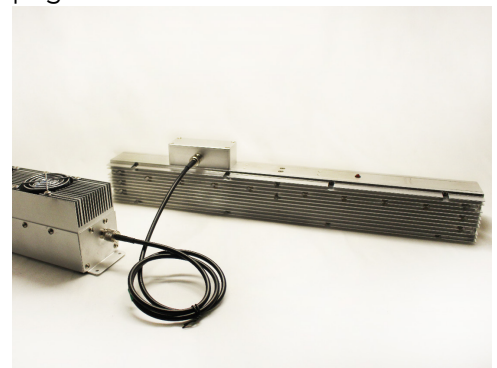


Figure. 4

6. Connect the RF Driver to the DC power supply.

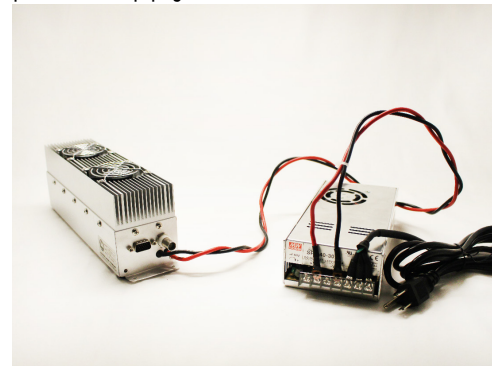


Figure. 5

## Operating the laser (Continued)

7. Verify the DB-15 Dongle is installed on the RF driver.



Figure. 6

8. Verify the beam path is pointed at an appropriate beam dump



Eye Protection Required.

This laser can cause mild to severe burns if skin or eyes are exposed to the beam or scattered radiation. Protective eye wear should be worn at all times.

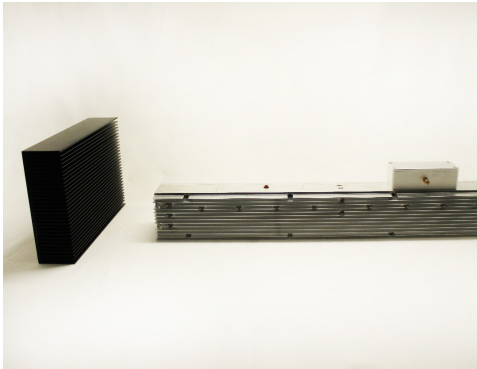


Figure. 7

9. Remove the protective tab from the aperture.



Figure. 8

10. Open the laser shutter (if present).



Operate the shutter using the lever closest to your body. Never pass your hand in front of the laser beam to open or close the shutter.



Figure. 9

11. Plug in the DC power supply to enable RF Driver.



The red LED on the laser indicates the laser is powered. When the laser is powered it is able to lase upon application of a control signal.



Figure. 10

# L15 Laser Wiring Diagrams

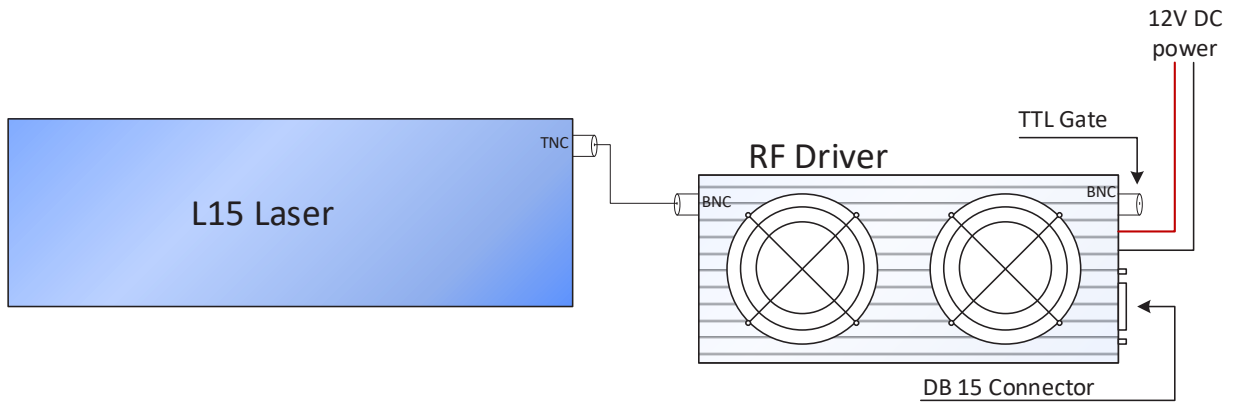


Figure. A7

## L15 Laser Connection Diagrams

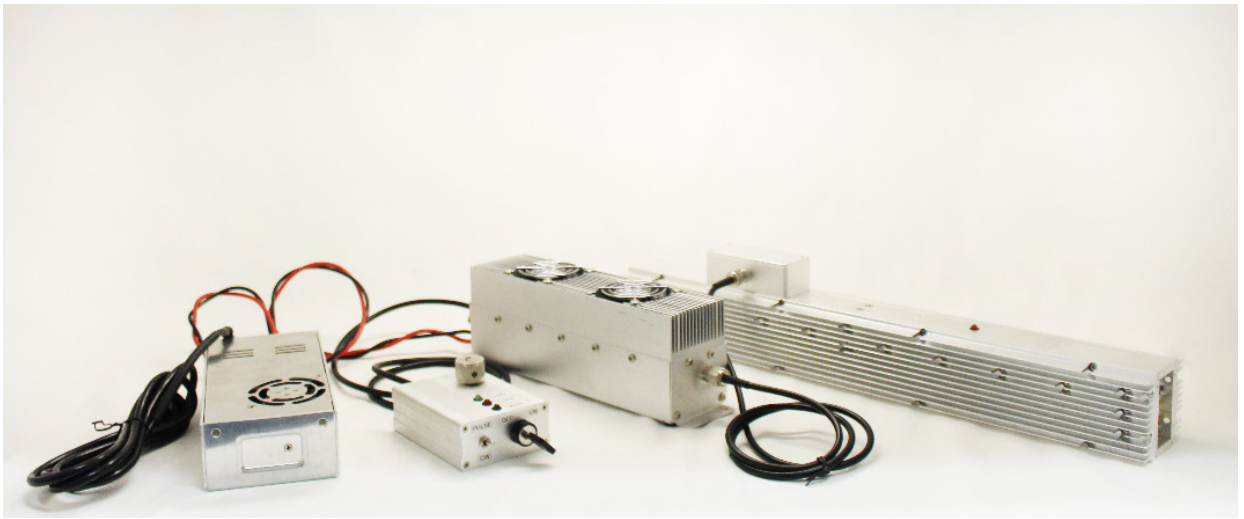


Figure. A8

Left to Right: DC Power Supply, LC3 Controller, RF Driver, TNC To BNC Cable, L15 Laser

## RF 15 Driver Specifications

Model:	RF 15
Supply Voltage:	36V DC
Supply Current:	7 Amps
Output Power:	200W
Frequency:	40.68 MHz

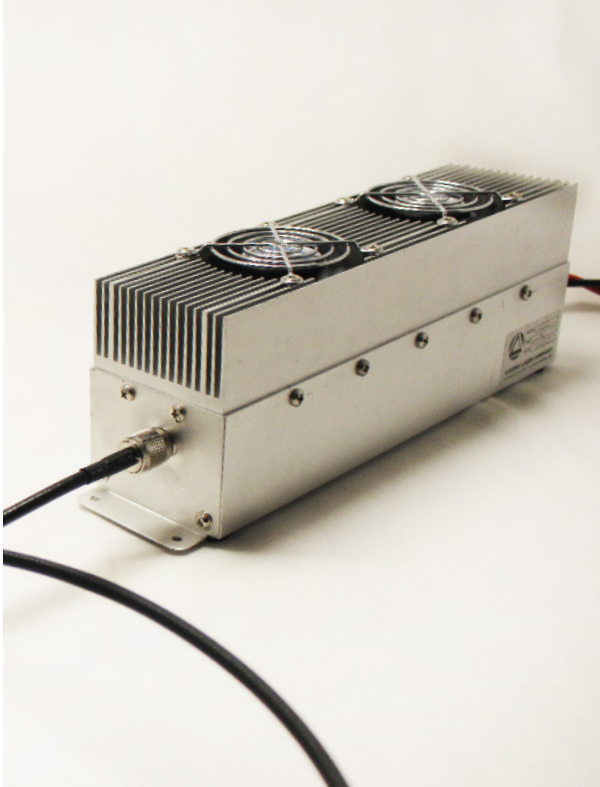


Figure. A9



Figure. A10



### Caution:

1. Never connect the DC to the RF driver with the wrong polarity, or the RF driver will be damaged.
2. Never operate the RF driver without its output properly connected to the laser.
3. Do not block the air flow to and from the heat sink, or the RF driver will be damaged.
4. If the fans fail the RF driver will stop immediately.

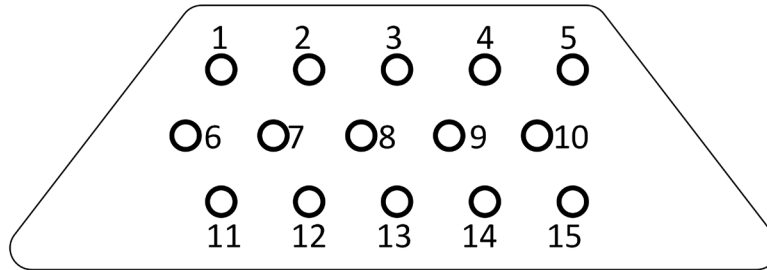


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## RF 15 Driver Operation

The laser is controlled by applying 5V DC (20 mA) to the TTL Gate on the RF Driver (0V=off, 5V=on) to PIN 7 and PIN 10. The RF driver can be modulated at frequencies from 0 Hz to 100 kHz, but optimal grating frequency is 1-15 kHz using Analog Voltage Control. AVC is implemented by enabling PIN 5 and applying 0-5V DC on PIN 11. 0V to 5V results in a proportional 0% to 100% Pulse Width Modulated laser output.



Pin #	Function
1	5 VDC, 20 mA capacity, for power ready indicator. (Can be used to drive an external red LED if current limiting resistor is used.)
2	Laser ready signal; can be connected to an external green LED to indicate laser ready status; no current limiting resistor required.
3	Safety Key Switch Connection. When this pin is enabled by PIN 6 and there is a power outage or opening interlock (PIN 4), this pin needs to be pulled high and then low again to restore laser operation.
4	Safety Interlock. Connect to pin 15 to close interlock circuit. (This function also needs to be enabled by PIN 6.)
5	AVC (Pin 11) Enable.
6	CDRH Safety Mode. Enables keyswitch on PIN 3 and Safety Interlock of PIN 4.
7	Input gate for Laser Enable
8	Time delay control: 5 seconds between initial power on and lasing
9	Plasma conditioning
10	Input for Gate 2. (Connected to BNC input.) A 5 V signal is provided by the customer to turn the laser on/off electronically.
11	Input for Analog Voltage Control (AVC)
12-14	Do not use
15	Ground