

# boxford

## BGL690

## Manual



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## Regulatory information

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### Compliance standards

This hardware was designed and built in compliance with the relevant EC marking and EEC directives :

- EMC Directive 2014/30/EU
- LDV Directive 2014/35/EU
- MD Directive 2006/42/EC



**Any change or transformation made to this equipment, any adaptation or installation of accessories not recommended by BOXFORD, any installation of this equipment in a manufacturing process, any piloting by a robot, any connection to an external automaton, any change to the characteristics of this material, can make it become non-compliant with the European Directives it is subjected to. Such changes void the manufacturer's responsibility. In this case, the person who fits the machine and the equipment is responsible for the EC compliance of the final work station.**

### Electrical security

This hardware complies with standards EN 60204-1 and EN 60950-1, which also refer to the LASER system safety standard CEI 825-1 (08/2001).

### Machine security

This hardware complies with standards EN ISO12100:2010, EN 60204-1:2006+AC:2010.

### Electromagnetic compatibility

This hardware complies with the following electromagnetic compatibility standards:

- EN 61000-3-2:2014
- EN 61000-3-3:2013



**This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.**

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### Electrical security



**This material is «class 1». The mains plug MUST always be connected to a neutral socket and comply with the regulations in force in the country of installation. If you do not have a plug of this type, have one installed by an approved electrician. Under no circumstances should you depart from this instruction.**

The manufacturer bears no responsibility towards any user where alterations have been carried out contrary to the manufacturer's specifications, notably with respect to electrical/electronic elements.



**Any operation, other than those mentioned here, must only be carried out by an approved Boxford technician. Do not take the machine apart to repair or clean it : this will void your guarantee.**



**This symbol indicates that once this equipment has reached the end of its useful life, it must not be disposed of with non-sorted municipal waste, in accordance with the European Directive 2002/96/EC.**

**The equipment must be disposed of at an appropriate collection point for processing, sorting, and recycling of Waste Electrical and Electronic Equipment (DEEE).**

**The elements which compose Electrical and Electronic Equipment may contain substances which have harmful effects on the environment or on human health.**

**By following these instructions, you are helping the environment, contributing to the preservation of our natural resources, and protecting human health.**

## Overview

### Introduction

Thank you for purchasing the BGL machine. Years of testing and refinements have made this unit the ultimate LASER engraving and cutting system.

Thanks to its innovative design with :

- the **"A-sens" Auto sensor concept**, which adjusts the focal length automatically for you according to the surface to be worked on (even when engraving a hollow item),
- the beam concentration with the **"X-beam" eXpanding beam concept** designed to produce perfect quality engraving over the entire surface of the table,

and with its performance results (speed, power and engraving areas), the BGL Machine combines flexibility and full featured performance without sacrificing simplicity, ease of use, or ease of maintenance.



To begin with, we highly recommend that this entire safety manual be read before attempting to use the LASER system.

### Contra-indications



Do not use the controls or settings and do not carry out procedures other than those specified in the guides & training, to avoid risking exposure to dangerous radiation.



The machine must never be handled without an adult present. Keep the machine, wires and cables out of children's reach. This machine is only designed for one user. Do not let several people use the machine simultaneously.



The LASER engraving machine is a high performance machine : All safety instructions must be complied with.



Exposure to the LASER beam may cause physical burns or severe eye damage. Proper use and care of this system are essential to safe operation.



This machine is only designed for engraving and cutting purposes and must never be used for other applications.



The LASER machine must be properly installed and connected to an appropriate discharge system.

Do not use this machine in an explosive environment.

The processing materials must be introduced entirely into the machine.



Never expose yourself to the LASER beam. It could cause severe physical burns and irreparable eye damage.



Never operate the LASER engraving machine close to a pacemaker.



# Overview



Never operate the LASER Beam without closing the guard or wearing protective glasses. Never operate the LASER system if the doors are in bad condition or can not be closed properly.



Never operate the LASER system without constant supervision of the cutting and engraving process. Exposure to the LASER beam may cause ignition of combustible materials and start a fire. A properly maintained fire extinguisher should be kept on hand at all times.



Never operate the LASER machine without a properly configured, installed, maintained, and operating fume/smoke exhaust system. Fumes and smoke from the engraving process must be extracted from the LASER system and exhausted outside.



Never engrave or cut with LASER materials which may produce toxic and corrosive fumes. DISCONTINUE processing any material that shows signs of chemical deterioration of the LASER system (Systems damaged from this abuse will NOT be covered under warranty).



We suggest that you obtain the Material Safety Data Sheet (MSDS) from the materials manufacturer. The MSDS discloses all of the hazards that may arise from handling or processing that material. The law requires all manufacturers to provide this information to anyone who requests it.



**DO NOT ENGRAVE OR CUT PVC (Polyvinylchloride) BASED MATERIALS.** The fumes are extremely toxic if you inhale them. The fumes are so corrosive that they can chemically destroy the metallic parts of the LASER system. Damage to the LASER system from this type of abuse WILL NOT be covered under warranty.



Never work on the electronics and LASER parts of the machine without having unplugged the machine, as hazardous voltages are present.



Although access to these areas is not necessary during normal use, should you need to open one of these enclosures for service reasons, please remember to unplug the machine first.



Never move or lift the LASER machine without the assistance of other people. Severe bodily injury may occur if improper lifting techniques are applied. Be careful not to drop the LASER system. Not only can it cause bodily harm, but it can also severely damage the equipment and render it inoperable and this will void your guarantee.



Do not move, push, press on, or shake the LASER machine while the engraving is in progress. This might shove the engraving part aside and make the engraving unsuccessful.



Do not connect this equipment to an IT power supply card.

- If the machine is to remain unused for a long period, unplug the power supply and cover the machine (packaging, cover, lid, etc.)
- Do not move the focus carriage holder manually except in case of a mechanical jamming of the machine.
- Do not spill any liquids onto the machine (drinks, cleaning fluids, etc.) unless recommended by BOXFORD (e.g. for lubrication).
- If the engraving process must be stopped, use the function key provided for this purpose on the keyboard of the machine.

## LASER safety



This LASER machine contains a sealed carbon dioxide (CO<sub>2</sub>) LASER that produces intense and invisible LASER radiation at a wavelength of 10.6 microns (μm) (0.417 10<sup>-6</sup> inch) in the infrared spectrum.



This LASER system contains a CO<sub>2</sub> LASER in a Class I enclosure. However, due to the presence of a visible red LASER diode (power < 1mW), the entire LASER system is classified as Class 2.

- The entire system is completely enclosed with a protective housing. This will completely contain the invisible CO<sub>2</sub> LASER beam under normal use. However, the red diode LASER is a visible LASER beam. **DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.**
- The key switch and user door will disable the CO<sub>2</sub> LASER beam from firing when the user door(s) are opened. The red diode LASER beam is **NOT** safety interlocked and can be activated with the door either open or closed.



**Do not modify or disable any safety feature of this system. Do not operate any system that has had its safety features modified, disabled, or removed. Improper use of controls and adjustments, or performance of procedures other than those specified in this manual, may invalidate the safety of this system.**

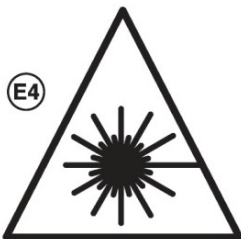
CDRH and EC regulations require all LASER manufacturers to affix warning labels in specific locations throughout the equipment.



The following warning labels are placed on the LASER system for your safety. **DO NOT** remove them for any reason. If the labels become damaged or have been removed for any reason, **DO NOT OPERATE** the LASER system and immediately contact Boxford for a free replacement.

### 4 labels

One is next to the beam window where the LASER beam enters the engraving area inside the LASER system and is visible when the door is opened.  
The second one is on the right, on the #1 mirror cover.  
The third one is located on the LASER head next to the access hole of the #2 mirror.



**DANGER - Invisible and visible LASER radiation is present at that place. Avoid eye or skin exposure to direct or scattered radiation.**

### 1 label (E6) :

On the outside of the door. Visible from the outside under normal operating conditions with the door closed.



**CAUTION LASER RADIATION.**  
**Do not stare into beam.**  
**Wavelength : 630-680 nm (25 10<sup>-9</sup> - 27 10<sup>-9</sup> inch) - Max. output : 1mW.**  
**Class 2 LASER product.**

### 1 label (E7) :

On the outside of the door. Visible from the outside under normal operating conditions with the door closed.



**WARNING.**  
**This LASER system contains a class 4 LASER in a class 1 enclosure. It has been classified as class 2 due to the presence of a visible LASER diode.**

### 1 label (E8) :

On the outside of the door. Visible from the outside under normal operating conditions with the door closed.



**WARNING.**  
**Never operate the LASER system without constant supervision. Exposure to the LASER beam may cause ignition of combustible materials which can cause severe damage to the equipment. Toxic fumes/particles may be emitted by this machine.**

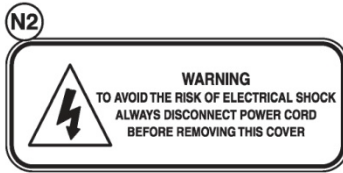


1 label (E9) :

On the outside of the door. Visible from the outside under normal operating conditions with the door closed.



**CAUTION - Invisible class 4 LASER radiation if open and the lock is disabled. Avoid exposing the skin or eyes to direct or diffuse radiation.**



1 label (N2) :

One is on the back of the LASER machine next to the plug receptacle. Visible from the outside under normal operating conditions when viewed from the backside of the system.



**WARNING. To avoid any risk of electrical shock, always disconnect the power cord before removing this cover.**



labels (N7) :

Visible under normal operating conditions.



**WARNING. To avoid any risk of crushing, do not place your hands in the places announced by this symbol.**

**KEYS :-** The laser is supplied with two types of key. One type secures all access doors and panels and these should be kept locked with the keys removed. The second type enables the laser source. Only one of each key type should be kept with the operator. The remainder should be stored away safely.

## RECOMMENDATION

It is recommended the user wears suitable 10.6 micron eye protection, especially when realigning the laser beam. Remember, 1 Watt of laser power directly into your eye can permanently blind you.

**WARNING!!!!**  
**DO NOT LASER PVC OR UPVC**  
**THESE MATERIALS GIVE OFF TOXIC AND CORROSIVE GASES WHICH CAN POISON THE OPERATOR AND WILL DESTROY YOUR MACHINE.**

## FIRE SAFETY

Laser engravers represent a potential fire risk.

Most engraving material are combustibile and whilst the integrated air assist system will do a good job of suppressing any combustion, the laser must NEVER be left unattended. Should a fire break out, emergency stop should be pressed immediately and then the operator should extinguish the fire



using a suitable extinguisher.

**NEVER** operate the machine without connection to either a certified fume extractor or external vent. Without a properly installed extraction system you will subject yourself and your machine to potentially harmful gases and debris.

**ALWAYS** have a fire extinguisher near the machine and ensure all operators are briefed on its location and operation.



# Unpacking and Positioning Your Machine

- Remove any wrapping and foam from the machine.
- Open the front guard and lower access panel. Remove any additional packaging and/or tools and accessories.
- Environmentally dispose of packaging.
- Ensure the machine is positioned on a level floor in a clean and well ventilated environment.
- Ensure there is at least a 300mm clearance around the sides and rear of the machine to allow cooling air to circulate.
- The connection between the Machine and the PC must be made by the cable supplied.
- Connect either the supplied filtration unit hose to the back of the machine and the filtration unit or the supplied expanding hose to the supplied blower and then to an external vent.
- Either lock the machine castors and / or wind down the ant vibration feet.
- Plug the two power cords from the back of the machine to the supply.  
**Important:-** Both these leads are required, one is to power the control side of the machine and one is to power the high voltage laser side.

## Fan Unit

On the BGL690 machine, the supplied exhaust fan is an inline unit. It has its own separate power connection and requires no further connections. It can be used for externally vented extraction using the supplied hose and hose clips. If using a filtration unit, do not use.

## Filtration Unit

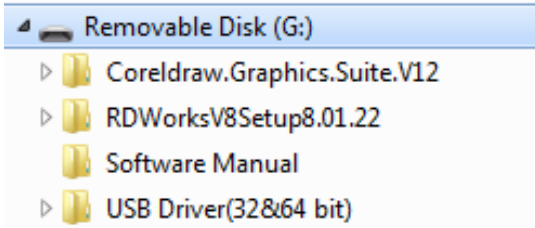
The filtration unit is shipped with a hose connection kit for connecting the machine to the unit. The hose should be secured tightly with the supplied hose clips.



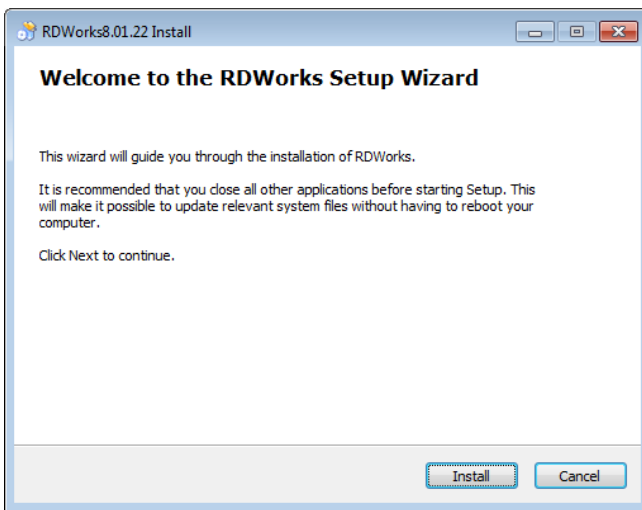
# Software Installation

Locate the USB pen drive located in the supplied zipped wallet and install the software, using the guide located in the **Important Documents** envelope supplied with the machine.

1. The file structure will be similar to the example shown below.

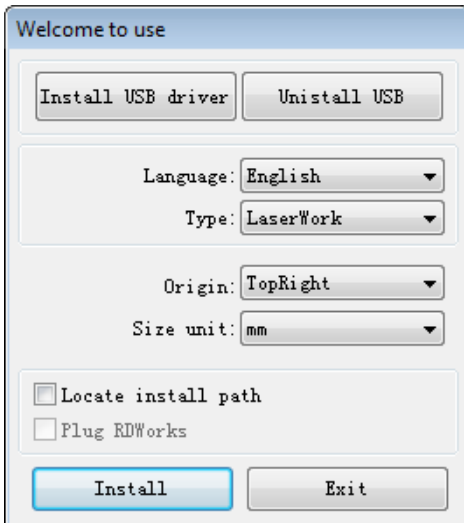


2. Open the folder **RDWorksV8Setup8.\*\*.\*\***  
Double click of the File **RDWorksV8Setup8.\*\*.\*\*.exe**  
The window below is shown.



Select **INSTALL** to begin the installation.

3. After a file copy, the window below is shown.

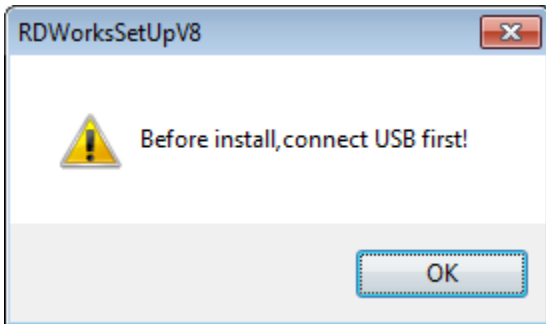


Ensure the settings are as per the window above with the exception of **BGL230** users who should select '**Top Left**' as the Origin position.

4. The default installation path will be **c:\RDWorksV8**  
if you want to specify a different path, check the **Locate Install Path**' check box now.

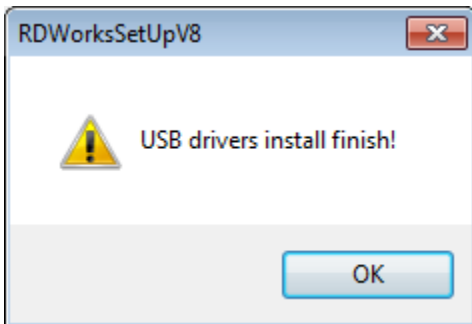
5. Select the **Install USB driver** option.

If the machine is NOT connected to the PC, you will be prompted to connect it now, as shown below.



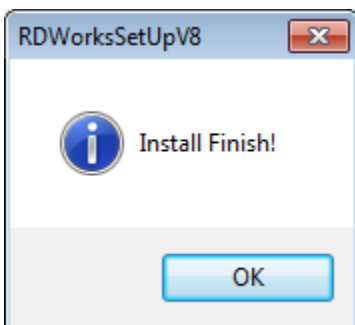
Select **OK**

Confirmation of successful installation is displayed.



Select **OK**

6. Select the **Install** option and if prompted, select your preferred installation path now. Once the installation is complete, a confirmation is displayed.



Select **OK** and then **Exit** to finalise the installation.

7. Browse to the contents of the memory stick and locate the folder **Cutting Parameters** located inside the **RDWorksV8Setup8.\*\*.\*** folder then open the folder that corresponds to your machine model.  
Copy the file **Param.lib** (it may only display as **Param**) into the RDWorks software installation folder which would be **c:\RDWorksV8** by default.
8. The RDWorks software installation is now complete. See our quick start guide titled **RDWorks – The Basics** which can be found on the USB pen drive.

# Machine Operation

- Switch on the power to the machine.
- If the red emergency stop button on the top of the machine is pressed in, then turn clockwise to release it. The machine axes will reset themselves after a short pause.
- **IMPORTANT** – now leave the machine to run for a minimum of 5 minutes to ensure the laser tube is brought up to a constant temperature before each use.
- Ensure the Laser Key Switch is set to the ON position.
- Ensure the extraction system is operational.
- Files can now be downloaded from the RDWorks software package. Please refer to the Quick Start guide title **RDWorks** – The Basics found on the USB drive shipped with the machine.
- Place the material on the honeycombed bed and focus the machine.
- Autofocus can be utilised as follows:-
  - Using the **X** and **Y** (front to back and left to right) arrow buttons on the machine keypad, the cutting head is positioned over the material. If the bed is too high to accommodate the material thickness, then select the **Z/U** key and then use the left and right arrow buttons to move the table up and down. When at the required position, select the **Z/U** key again to exit the mode.
  - Pressing the **Z/U** key to enters the sub-menu.
  - The **Auto Focus** option at the bottom of the list is highlighted using the down arrow key.
  - Selecting the **Enter** key on the keypad initiates the Auto focus routine.
  - The machine bed moves up until the focus rod is actuated and then retracts to the focus height. During this movement, the LCD panel indicates 'Resetting'.
  - When Auto Focus is complete, the LCD display returns to the initial screen.
- Using the **X** and **Y** arrow buttons on the machine keypad, position the red dot pointer is moved to where the drawing anchor is required to be positioned.

***Remember, the anchor point is the green square handle which in this example is in the top RH corner of the drawing geometry extents.***

- When in the desired position, the **Origin** button on the keypad is selected.
- It is now good practice the check that the extents of the laser processing a, fit on the workpiece and b, are in the desired position. This is done by selecting the **Frame** button on the keypad.  
The machine moves to the job extents.
- If the position is incorrect, then the previous 3 steps can be repeated.



- Select the **Start-Pause** key to initiate the laser processing automatic cycle.  
File details, colour settings and cycle progress are displayed on the machine LCD.

## Trouble Shooting

Problem: Laser will not cut through like it used to.

Solution:

- Clean the mirrors and lens – see maintenance section for details.
- Ensure the auto-focus is set correctly – see maintenance section for details.

Problem: Laser is not cutting through and is cutting wide lines

Solution:

- The laser is not focused correctly. Use the autofocus function and check the distance between the end of the cone and the top surface of the material is the same distance as the focus gauge attached to the laser on/off key. If necessary, adjust the position of the auto focus rod by undoing and retightening the grub screw. Recheck the autofocus function and readjust as necessary until the focus distance matches the gauge.

Problem: Laser is cutting wobbly lines

Solution:

- The lens maybe loose. Remove the end of the lens cone, unscrewing the air assist fitting first to allow the cone to rotate. Tighten the aluminium lens retaining collar finger tight using the knurled section of the collar. Refit the cone, air assist fitting and air assist pipe.

## **Maintenance**

Laser Cutters and Engraving machine are generally a low maintenance product.

KEEP IT CLEAN – look after your machine and keep it as new by spending 5 minutes every day removing residue and debris from the work area.

### **OPTICS:**

Although heavily dependent on the type of material you have been processing, approximately once a week you will need to clean the lenses and mirrors.

The Laser beam projects from the rear left of the enclosure, is reflected by a mirror on the left hand edge of the carriage to a mirror above the lens where it is focused upon the work piece.

The two mirrors and the lens must be checked regularly and cleaned if required to prevent damage. If the beam hits debris on the mirror or lens then heat is generated which can crack them.

Try not clean the Lens or Mirror unless debris is clearly visible as each time you clean then it is possible to scratch them.

Never Clean the optics within 10 minutes of operating the laser as they may be hot and can crack when the cleaning solution is applied. After cleaning, allow all optics to dry before operating the machine.

Use high quality cotton buds dipped in isopropanol alcohol.

Do not use the cotton buds for more than one mirror or lens as dirt can be transferred and can scratch or damage subsequent surfaces.

To clean the lens and mirrors, first power on the machine and move it to the front of the enclosure lowering the table.

To access the lens, unscrew the end of the lens cone, unscrewing the air assist fitting first to allow the cone to rotate. Unscrew the aluminium lens retaining collar using the knurled section of the collar. Clean the lens and refit with convex side uppermost. Refit the cone, air assist fitting and air assist pipe.

Power off the machine!

### **EXHAUST:**

Make sure the exhaust blower you are using receives proper maintenance. Periodically clean the exhaust blower and duct system to remove built-up debris. If you detect odour while engraving, or if the smoke in the cabinet is visible in the area of the lens carriage, inspect the exhaust system. Check for loose or broken pipe/hose connections, or obstructions. If utilising a filtered extract system, ensure LEV testing is performed in line with the manufacturers recommendations detailed in the supplied manual.

