

BULLDOG

15-1700

15-3000

OPERATION

&

SAFETY

MANUAL

1.0.12 5/2/14
P/N 24082



HID Ultraviolet



WARNING

**THIS MANUAL MUST NEVER BE
REMOVED FROM THE MACHINE!**

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FOREWORD

THIS OPERATION AND SAFETY MANUAL WAS WRITTEN TO GIVE THE OPERATOR/OWNER INSTRUCTIONS ON SAFE OPERATION AND MAINTENANCE OF THE CURING MACHINE.

READ AND UNDERSTAND THIS OPERATION AND SAFETY MANUAL BEFORE OPERATING YOUR CURING MACHINE. If you have any questions, contact your dealer/distributor or the manufacturer.

CURING MACHINE PARTS IDENTIFICATION AND MACHINE SIGNS/DECALS/WARNING LABELS.

SERIAL NUMBER LOCATIONS

SAFETY

SAFETY INSTRUCTIONS

SAFE OPERATION IS THE OPERATOR'S RESPONSIBILITY

SAFE OPERATION NEEDS A QUALIFIED OPERATOR

USE SAFETY RULES

SAFETY

Safe Operation Is The Operator's Responsibility.



Safety Alert Symbol

This symbol with a warning statement means:
"Warning, be alert! Your safety is involved!"
Carefully read the message that follows.



WARNING

Operator must have instructions before running the machine. Untrained operators can cause injury or death.

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.



WARNING

Warnings on the machine and in the manuals are for your safety. Failure to obey warnings can cause injury or death.

The curing machine and attachments must be in good operating condition before use.

Check all of the items on the Service Schedule Decal under the 8 hour column or as shown in the Operation and Safety Manual.

Safe Operation Needs A Qualified Operator

For an operator to be qualified, he or she must not use drugs or alcoholic drinks which impair alertness or coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine as well as the influence or interaction of UV Radiation with drugs.

A Qualified Operator Must Do The Following:

Understand the Written Instructions Rules and Regulations

- The written instructions Operation and Safety Manual, Safety machine signs (decals).
- Check the rules and regulations at your location. The rules may include an employer's work safety requirements. Regulations may identify a hazard such as a fire hazard.

Have Training with Actual Operation

- Operator training must consist of a demonstration and verbal instruction. This training is given by your dealer/distributor before the product is delivered.

- The machine must be used in areas without bystanders.

Know the Work Conditions

The operator must know any prohibited uses or work areas, for example, he or she needs to know about any fire hazards. The machine must not be used in a damp or wet area.

Wear full cover clothing. Always wear approved safety glasses when operating machine.

Use Safety Rules

Read and follow instructions in the Operation and Safety Manual before operating.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Check to be sure that all safety covers and devices are in place before operating machine.

Operate the machine only from the operator's position.

When learning to operate the machine, do it at a slow rate and in an area clear of bystanders.

DO NOT permit personnel to be in the work area when operating the machine.

DO NOT modify equipment or add attachments that are not approved by the manufacturer.

DO NOT make any adjustments or repairs on the machine while it is running.

Fire Prevention

The machines have components that are at high temperatures under normal operating conditions. The primary source of high temperatures is the irradiator and lamp. The electrical system, if damaged or incorrectly maintained can be a source of arcs or sparks.

The air intake filter must be changed according to the maintenance schedule. Failure to do so will cause excessive temperatures and can cause fires.

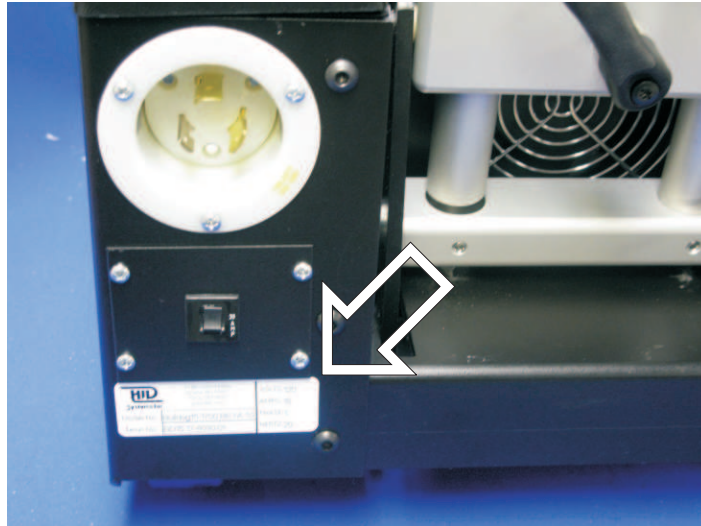
DO NOT use the machine where the excess temperatures produced by the machine can contact flammable material, explosive dust or gasses.

The machine can still be very hot even after it has been turned off.

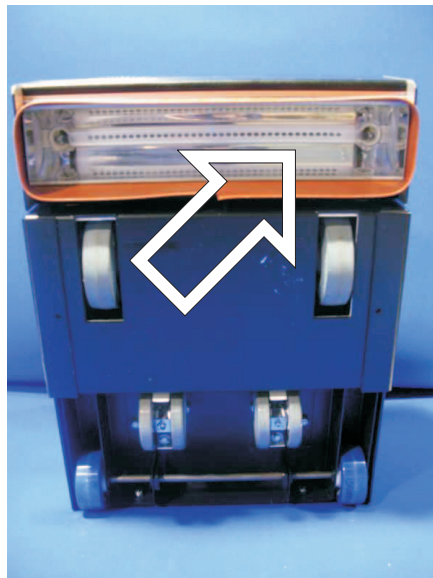
Always know the location of fire extinguishers and first aid kits and how to use them.



SERIAL NUMBER LOCATIONS

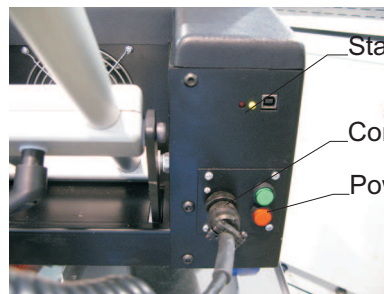


MACHINE SERIAL NUMBER PLATE LOCATION



LAMP P/N AND SERIAL NUMBER LOCATION

CURING MACHINE PARTS IDENTIFICATION AND MACHINE SIGNS/DECALS/WARNING LABELS.

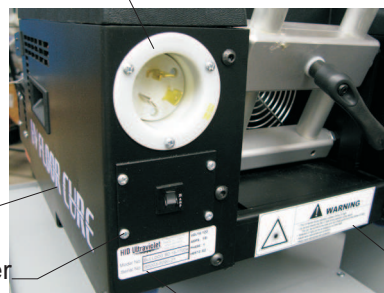


Status LED's

Control Connector

Power On/Off

Power Input



Graphic (2)

Circuit Breaker

UV Warning

Serial Label

 Optical radiation emission Category 2 (EN 12198)	 WARNING • This UV device during operation radiates intense UV light. • Do not look directly into the UV light during operation of the device. This can be harmful to the eyes even for a brief period due to the intense UV light. • Reflected UV light can be as dangerous as direct light. • Always wear appropriate eye protection. • Always wear appropriate skin protection.
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SETTING UP (BEFORE FIRST OPERATION)

READ ALL MACHINE SIGNS (DECALS) AND INSTRUCTIONS CAREFULLY

The UV Curing machine is delivered completely assembled. For safe operation check the following before operating the machine.

Make sure all nuts, bolts and set screws are tight.

Make sure nothing has been bent or broken during shipping. If damage does exist, do not use the machine until the damaged parts have been repaired or replaced.

Make sure all lamp fittings and connections are tight.

Make sure all warning signs (decals) and safety devices are on the machine and in their correct location. Replace any damaged signs (decals) or safety devices.



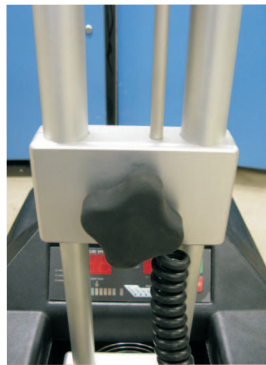
Attach the line cord to the machine and plug the line cord to an appropriate power receptacle.

OPERATOR HANDLE ADJUSTMENT

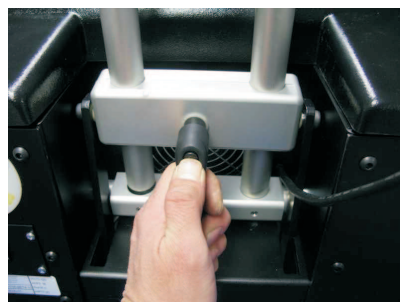
There are two operator handle adjustments.

- The telescoping adjustment for the height of the handle.
- The angular adjustment of the control handle.

Adjust the height of the handle for operator comfort as needed. Collapse the handle for shipping and storage.



Adjust the angle of the control for operator preference. The handle can be indexed by pressing the center button as desired.



 WARNING
AVOID INJURY Personnel must not be in the area when machine is operating. Never leave machine unattended when the machine is powered on.

Keep bystanders away when the machine is in operation.

 WARNING
WEAR SAFETY GLASSES To prevent eye injury from UV Radiation

Eye Safety Not all eye ware is UV safe. Verify the safety of your eye protection. EN-166:2002	
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 Optical radiation emission Category 2 (EN 12198)	 WARNING • This UV device during operation radiates intense UV light. • Do not look directly into the UV light during operation of the device. This can be harmful to the eyes even for a brief period due to the intense UV light. • Reflected UV light can be as dangerous as direct light. • Always wear appropriate eye protection. • Always wear appropriate skin protection.
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OPERATION “L” LITE or “S” Models

While standing behind the machine in the operators position, press the green or white start button located on the lower right portion of the machine. The red or black button below the start turns off the unit.

Squeeze the trigger located on the operators control and immediately move the machine at the recommended speed. See curing speed specifications provided by the coating supplier.

IMPORTANT!

120V machines

The operating range is 110v - 125v *at the machine!*

208V/240V machines

Lite “L” units do not have an automatic voltage tapping system. The unit will *not* automatically sample the voltage (*at the machine*) when the start button is pressed, and make a decision how to set the incoming power. *Not available on “L” or “S” models.*

208/240 machines are shipped with the system tapped at 240v. If the unit is attached to 208v, an internal wire tap adjustment is required! The YELLOW WIRE #14 must be moved to the 208v voltage tap. If this wire is moved to the 208v tap, it must be moved back to the 240v immediately when finished. If the unit is plugged into 240v while set to the 208v tap, **SERIOUS DAMAGE TO THE MACHINE WILL HAPPEN!**

OPERATION “A” Models

While standing behind the machine in the operators position, press the green start button located on the lower right portion of the machine. The red button below the start turns off the unit.

120V machines

The operating range is 110v - 125v *at the machine!*

208V/240V machines

These units have an automatic voltage tapping system. The unit will automatically sample the voltage (*at the machine*) when the green or white start button is pressed, and make a decision how to set the incoming power.

The control switch located on the panel switches the unit from manual operation to automatic (motorized) operation. The green LED will illuminate when in the automatic mode.



Set the desired curing speed by pressing the UP or DOWN arrow. When the SET SPEED is achieved, press the OK button.

To toggle between 1FPM Per Segment and 2 FPM Per Segment, simultaneously press OK & CANCEL.

Squeeze the trigger located on the operators control and the machine will ramp up to the SET SPEED in the automatic mode. The CURE SPEED is the real speed of the machine. See curing speed specifications provided by the coating supplier.

When curing manually (such as around objects, columns or in tight spaces) set the control to manual and the machine can be manually maneuvered without the motor drive.

The front panel also displays the following FAULTS:
(Also see alarm codes)

MOVEMENT-If the light is on but the machine does not move for a predetermined time, a visual and audible alarm will sound.

VOLTAGE-On 208/240v "A" units only. This indicates if the power line is within operating range.

FILTER-If the intake filter cartridge is not in place, the machine will not operate and a visual and audible alarm will sound.

COVER-If any of the covers are not properly installed, the machine will not operate and a visual and audible alarm will sound.

TILT-If the machine is tipped or tilted, the machine will not operate and a visual and audible alarm will sound.

TEMP-If the irradiator overheats, a visual and audible alarm will sound. The machine should not be unplugged and the internal lamp blower should be allowed to cool down the machine.

Important Voltage Information (208V/240V “A” models only)

These machines are equipped with an automatic tapping power system. Proper voltage is critical to the operation of the lamp. As power distribution can vary from area to area and building to building, your machine will automatically detect line voltage upon pressing the green or white “Power” button, and adjust the power supply’s 240V or 208V tap. If the voltage sampled is below 220V, it will operate at 208V. If it is above 220V, it will operate at 240V. To ensure proper operation of the lamp, this machine is also designed to automatically shut down the lamp in the event of a sustained voltage drop or sustained spike beyond the safe operating region for the initially selected voltage. During normal operation, there may be significant voltage drop from line voltage to the machine, especially if the power cord’s gauge is inadequate. This can decrease lamp output considerably and cause equipment failures.

IMPORTANT, Read the following, it applies to all machines.

Ensure that the building you are operating this machine in is adequately wired, and that a power cord of sufficient gauge is used. See the section for recommended extension gauges in this manual.

If a generator is used, it MUST BE DIESEL and must be sized to be 150% of machines rating.

Example:

If the machine is an 8kw unit, the generator must be 12kw MINIMUM!

Many gas generators have inadequate AVR’s (Automatic Voltage Regulators) so when a high powered system such as a UV Curing System is run on a generator with poor regulation there can be excessive spikes due to the generators initial sag and then a massive voltage overshoot. We have seen 400v which will destroy electronic circuitry.

Equipment failures due to generators are not covered under warranty!

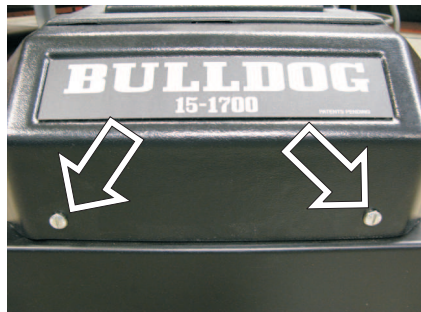
Changing The Lamp



WARNING

Disconnect power to the machine
prior to changing lamp.
Be sure the lamp and associated parts are cool.

After disconnecting power to the machine and verifying that the lamp and associated parts are cool enough to handle, remove the front cover by turning the two $\frac{1}{4}$ turn fasteners counter-clockwise.



IMPORTANT

DO NOT TOUCH THE LAMP WITH
BARE HANDS
USE GLOVES PROVIDED



Remove the two lamp lead electrical connection nuts. They are 10-32, use a 3/8" nut driver or wrench.

Bend the lamp leads straight and squeeze the spring clip tabs then GENTLY push the lamp through the insulator only enough to clear the groove from the spring clip.

Repeat this for the other side of the lamp.
**DO NOT STRESS OR BEND THE LAMP
IT WILL BREAK**



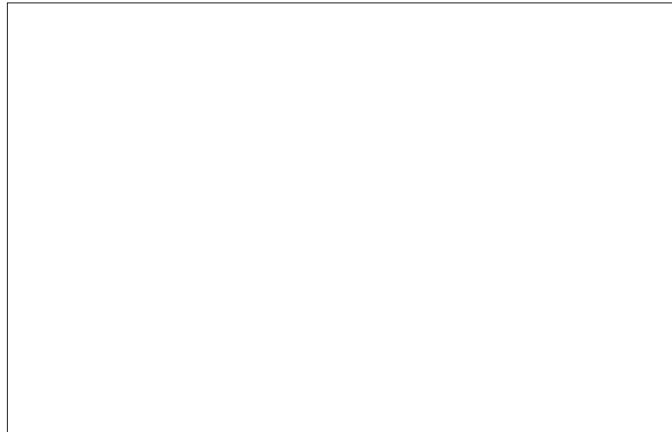
Carefully grab the lamp at both ends and remove it through the insulators.

IMPORTANT

The lamp is **EXTREMELY** fragile and **EXPENSIVE!**

Handle the lamp with extreme care.

*Broken or Damaged lamps are
NOT COVERED UNDER THE WARRANTY!*



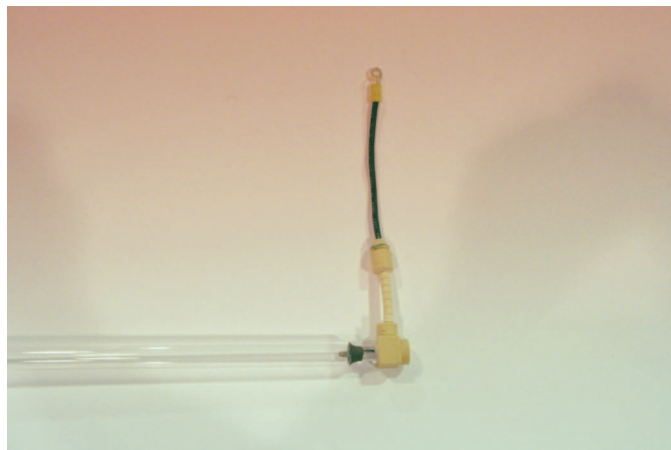
IMPORTANT

DO NOT TOUCH THE LAMP WITH
BARE HANDS
USE GLOVES PROVIDED

Lamp Installation

Using gloves packed with the new lamp, remove the lamp from its package. Carefully straighten the wires on each end of the lamp.

If the lamp is inadvertently touched by bare hands, wipe the glass (quartz) surface of the lamp with the alcohol wipe provided with the lamp then dry the lamp with a lint free CLEAN tissue or rag. Salts from hands and skin can cause premature failure of the lamp (devitrication).



Install the lamp by threading lamp wires through the feed through insulators. The spring slips must be centered in the grooves in the lamp ends!

Attach the wires to the electrical terminals as shown. Tighten the two nuts to secure the lamp wires to the terminals. The nuts should be tight but not over-tight!

After the lamp electrical connection nuts have been tightened, dress the 2 lamp wires as shown.

Replace the front cover by inserting the three top tabs into the mating slots and turning the two $\frac{1}{4}$ turn fasteners clockwise until latched.

Always carry a spare lamp

Lamps break and burn out at the most inopportune time. Don't get caught at midnight with out a spare lamp!

When To Replace The Lamp

Inspect the lamp:

It should be clear in color and not distorted or bent. Any distortion can be a sign of a dirty air intake filter or a problem with the cooling system.

Never touch the lamp with bare hands.

If a lamp is discolored the UV light it produces is much lower than a new one. Less UV means slower cure speeds. Time is money! Cure fast!

Reflector Liner Inspection & Replacement

The reflector liners are subject to dirt and chemical residue from the coatings and must be inspected daily. A dirty reflector liner can reduce machine performance and decrease cure speeds by up to 75%.

A dirty reflector liner can be cleaned by using a high quality glass cleaner. Use a glass cleaner that does not contain silicone. To clean the reflector liners, spray the glass cleaner on a clean, lint free cloth and wipe the liners.

Do Not Spray The Reflector Liners! Spray The Cloth!

Spraying the reflector liners will get over-spray on the lamp.

Less UV means slower cure speeds. Time is money!
Cure fast!

IMPORTANT

Extreme care must be taken not to damage lamp inside irradiator.



WARNING

Disconnect power to the machine prior to inspecting or changing reflector liners. Be sure the lamp and associated parts are cool.

The reflector liners require regular replacement.

Remove the two screws (6-32x $\frac{1}{4}$ ") holding the short heat shields on each end of the irradiator.

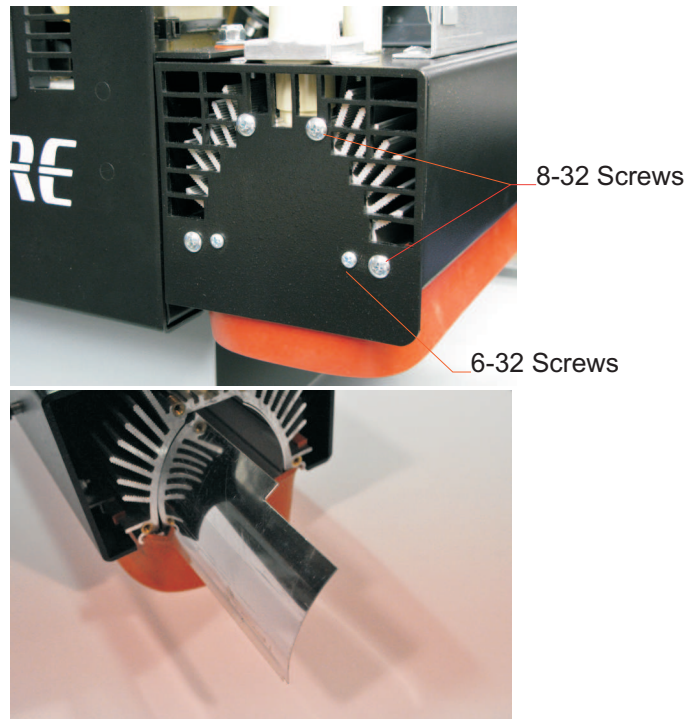
Remove the four screws (8-32x $\frac{1}{2}$ ") holding the end grills on each end of the irradiator. Remove the light shield by first removing the rear halves, then sliding the shield out one side as shown.

Discard the old light shield if it is damaged. Slide one reflector liner out a a time by pushing on one end and pulling on the other. Repeat for the other reflector liner

Remove the masking film protecting the reflector surface of both liners.

Using gloves provided with the reflector liners, slide in one of the reflector liners at a time, being sure that the relief notches are facing the lamp.

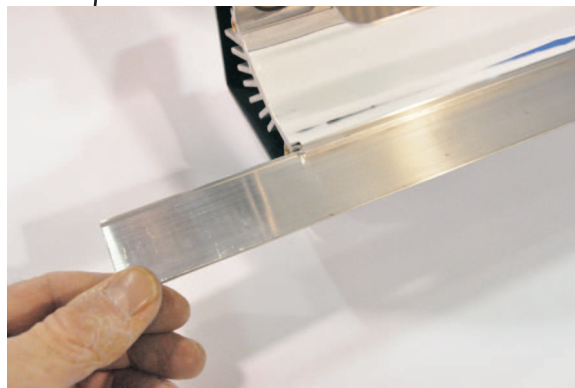
Replace all heat shields screws and covers.



IR Shields

Each system has two IR Shields, one in the front and one in the rear of the irradiator. If they become damaged, remove one of the end grills and slide the old IR Shields out, then replace with new ones.

Reinstall end grill.



IMPORTANT

Extreme care must be taken not to damage lamp inside irradiator.



Optical radiation emission
Category 2
(EN 12198)



WARNING

- This UV device during operation radiates intense UV light.
 - Do not look directly into the UV light during operation of the device.
- This can be harmful to the eyes even for a brief period due to the intense UV light.
- Reflected UV light can be as dangerous as direct light.
 - Always wear appropriate eye protection.
 - Always wear appropriate skin protection.

Light Shield Inspection

The light shield requires daily inspection to be sure it has no tears, rips, heat damage, etc.

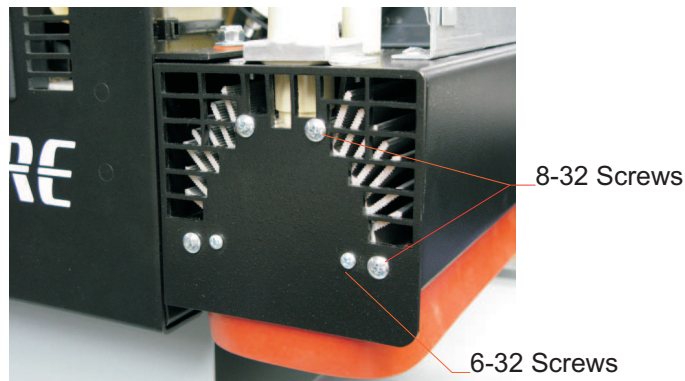
Replacing the Light Shield

The silicone light shield is subject to wear and deterioration from heat, UV light and physical damage and requires regular inspection and replacement.

Adjust the angular adjustment of the control handle to about 45° then lay the machine back on the handle.

Remove the two screws (6-32x1/4") holding the short heat shields on each end of the irradiator.

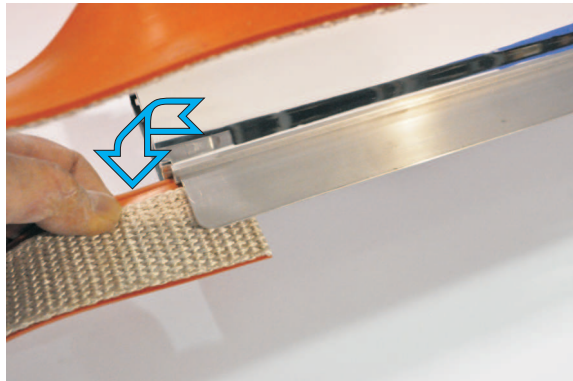
Remove the four screws (8-32x1/2") holding the end grills on each end of the irradiator.



Special Note:

Remove the control handle umbilical cable when laying the machine on its back as to prevent damage, also protect other devices on the back of the machine.

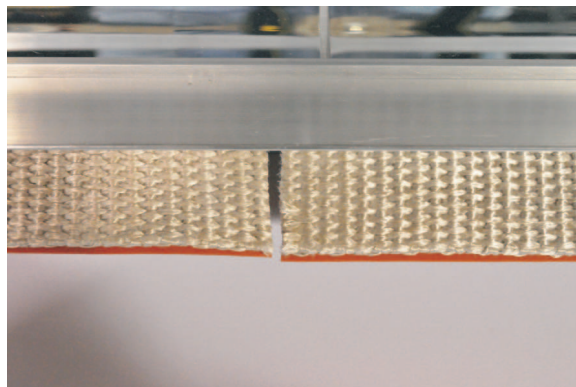
Remove the old light shield by first removing the rear halves, then sliding the shield out one side as shown. Discard the old light shield!



Light Shield Replacement

Carefully slide the new light shield through the front groove in the irradiator so it is centered from left to right. Carefully slide each end of the light shield in the rear slot of the irradiator so that the two ends meet. The seam is in the rear.

Helpful hint; Apply a small amount of “talc” to the top bead of the silicone strip, see blue arrow. This helps the silicone slide in the groove.



Replace all heat shields, screws, and covers.

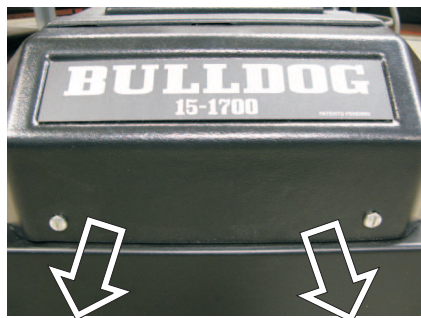
Transporting To Job Site

The machine is heavy and requires two people to lift safely.



IMPORTANT

Extreme care must be taken not to damage lamp inside irradiator.

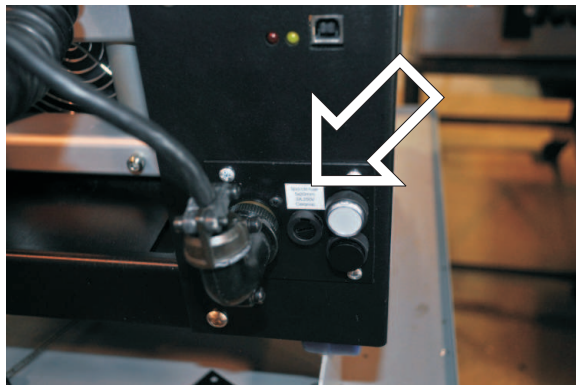


Do not lift in this area, keep hands and fingers out!

Adjust the angular adjustment of the control handle to about 45° then press back on the handle until the wheelie wheels touch the ground. The machine can now be transported using the wheelie wheels.



Motor Speed Control Fuse
5x20mm, 250v, 2A, ceramic, slow blow



Circuit Breaker Location

There are two circuit breakers on machines.



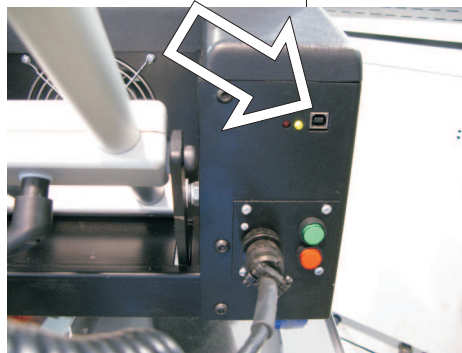
120v units

208/240v units

BREAKER LOCATION

Diagnostic Port Location

There is a USB diagnostic port located on the rear of the machine. This port is for authorized service personnel equipped with appropriate diagnostic equipment.



MACHINE USB DIAGNOSTIC PORT LOCATION

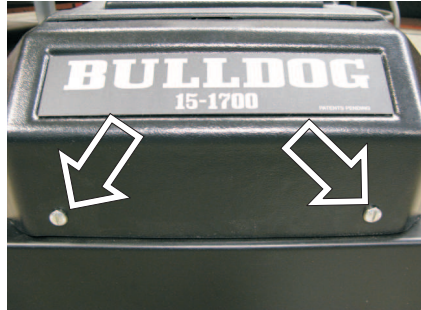
Changing The Air Intake Filter



WARNING

Disconnect power to the machine
prior to changing air intake filter.
Be sure the lamp and associated parts are cool.

After disconnecting power to the machine and verifying that the lamp and associated parts are cool enough to handle, remove the front cover by turning the two ¼ turn fasteners counter-clockwise.



IMPORTANT

The air intake filter must be installed
properly or the machine will not operate!
Note direction of arrow on filter.

Remove the old air intake filter and discard.

Install the new air intake filter, note direction of arrow.

Replace the front cover by inserting the three top tabs into the mating slots and turning the two ¼ turn fasteners clockwise until latched.

IMPORTANT

The air intake filter must be replaced after every 10 hours of operation!
Failure to do so will cause premature lamp burn out!

Always carry spare air intake filters.

Snap filter in place



The Use Of Extension Cables

The machine is supplied with an appropriate 50' line cord. If a longer cord is required, use the following chart to determine the appropriate extension cable wire size.

Wire gauge chart

WIRE (AWG)	LENGTH(FEET)													
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	10	10	10	10										
					8	8	8	8	8					
										6	6	6	6	6



WARNING

Never defeat the electrical ground, doing so can cause injury or death.

IMPORTANT

An appropriately grounded and properly sized electrical cord is mandatory for safe and proper operation of the machine.

Error Codes

LED 1 (Red)	LED 2 (Amber)	Meaning	How to Resolve
Off	Off	No power	Turn the machine on.
Off	On	Normal Operation	
On	Off	Normal Operation	
On	On	The machine is currently being controlled by an externally connected device.	
Blinking	On	There is a problem with the filter.	If the machine is making a solid beeping noise and the lamp will not start, ensure that the filter is properly inserted. Turn the machine off and on again via the power buttons at the base of the machine. Ensure that the machine is unplugged before opening the cover. If the machine is beeping intermittently, replace the filter.
Blinking alternatively		Non-movement error	
Blinking in unison		There is a problem with voltage coming into the machine.	If the machine is beeping solid, it has detected an overvoltage condition, and disabled the lamp to protect it. If the machine is beeping intermittently, then it has detected an undervoltage condition. This may be caused by an insufficiently sized line cord. See (???) in this manual for information on proper line cord sizing.
On	Blinking	The cover is removed.	Replace the cover and turn the machine off and on again via the power buttons on the base of the machine. Do not remove the cover while the machine is plugged in.
Off	Blinking	The machine is tilted, or has detected a strong impact.	Correct the orientation of the machine and it will resume normal operation. For critical tilts, the machine may need to be restarted via the power buttons at the base of the machine.
Blinking	Off	The machine has overheated.	If the machine remains plugged in, the blower will continue to run to cool the machine off. It will resume normal operation once it has reached a safe temperature, however, check the filter and ensure that the vents are not blocked.

208/240V “A” machines only

This machine is equipped with automatic voltage selection. Proper voltage to the machine is critical to consistent light output. Because power distribution can vary from area to area and building to building, upon pressing the green ‘Power’ button, the machine will sample line voltage and determine whether to set the power supply for 208V or 240V operation. If the line voltage sampled is about 220V, the power supply will be set for 240V operation. Similarly, a line voltage below 220V will result in the power supply being set for 208V operation.

A power cord of proper gauge and length must be used at all times. If the cord is undergauged and/or too long, the high amount of power this machine draws will result in a voltage drop between the wall and the machine, and improper machine operation, potentially including damage to the lamp/machine, will follow. A table can be found in this manual which details the proper power cord gauge to use with a given length.

During 240V operation, the machine is configured to automatically disable use of the lamp if voltage at the machine falls below 210V or above 250V. During 208V operation, the machine is configured to automatically disable use of the lamp if voltage at the machine falls below 190V or above 230V. If this occurs, the machine will emit a constant beep, and the two status LEDs will blink in unison.

Specifications

Model #	Description	V	A	Ø	HZ
65003	BULLDOG 1.7kw	120	15	1	60
65006	BULLDOG 3kw	208/240	15	1	60
65008	BULLDOG 3kw	230	15	1	50
11027-1	Spare Lamp				

