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Jelight Company, Inc.
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ISO 9001

UVO-CLEANER®

Model 18, 24, 30

Instruction Manual



Original Instructions REV. E

Jelight Company, Inc.
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Safety Guide



WARNING! Hazardous Voltage
Do not remove the cover while the equipment is plugged to an electrical outlet; risk of electric shock.



WARNING! Inhalation Hazard
Ozone is produced by this equipment during operation and appropriate ventilation must be provided for exhaust purposes. If ozone is detected in the area surrounding this equipment, immediately switch the machine off.



WARNING! Ultraviolet Light
The low pressure mercury vapor grid lamp inside this equipment emits harmful UV radiation. Avoid exposure at all times! Protect eyes and skin.
This equipment should be operated by qualified personnel.

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Introduction

The UV+O (atomic oxygen) cleaning method is a photosensitized oxidation process in which the contaminant molecules of photo-resists, resins, human skin oils, cleaning solvent residues, silicone oils, and flux are excited and/or dissociated by the absorption of short-wavelength UV radiation. Atomic oxygen is simultaneously generated when molecular oxygen is dissociated by 184.9nm and ozone by 253.7nm.

253.7nm radiation is absorbed by most hydrocarbons and also by ozone. The products of this excitation of contaminant molecules react with atomic oxygen to form simpler, volatile molecules which desorb from the surface. Therefore when both wavelengths are present, atomic oxygen is continuously generated and ozone is continually formed and destroyed.

By placing properly pre-cleaned samples within five millimeters of ozone producing UV source, such as the low pressure mercury vapor grid lamp inside the UVO-Cleaner®, near atomically clean surfaces can be achieved in less than one minute. In addition, this process does not damage any sensitive device structures of MOS gate oxide.

The UVO-Cleaner® is the safest and most effective method of removing organic contaminants from silicon, gallium arsenide, quartz, sapphire, glass, mica, ceramics, metals, and conductive polyimide cements. It is built to last with low maintenance and trouble free service.

Applications:

- Substrate cleaning prior to thin film deposition/descumming and stabilizing photo-resist
- Cleaning of silicon wafers, lenses, mirrors, solar panels, cold rolled steel, inertial guidance subcomponents, and GaAs wafers
- Cleaning of flux, hybrid circuits, and flat panel LCD
- Etching Teflon®, Viton®, and other organic materials
- Enhancing oxide passivated surfaces of GaAs and Si
- Reduce out-gassing of glass
- Wafer tape removal
- Improve adhesion of coatings on plastics
- Ink removal from wafers after testing
- Stripping photo-resist
- Removing latent images from lithography plates
- Cleaning lithography plates
- Growing oxide layers on silicon wafers
- Cleaning circuit boards prior to packaging/adhesion
- Increase hydrophilic characteristics of surfaces
- Cleaning and sterilization for bioscience applications
- Cleaning electronic microscope probes/slides or optical fibers/lenses
- Details of each application's data/journal/article: www.jelight.com/applications.php

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Specifications

Outer Dimensions without Ozone Filter

Length	Width	Height	Media Inlet Port	Exhaust Port
11.50″ [292mm]	9.25″ [235mm]	8.50″ [216mm]	Ø 0.375″ [9.5mm]	Ø 1.0″ [25.4mm]

Outer Dimensions with Ozone Filter

Length	Width	Height	Media Inlet Port
11.50″ [292mm]	10.50″ [267mm]	10.50″ [267mm]	Ø 0.375″ [9.5mm]

Weight

UVO Cleaner®	Ozone Filter
16.5lb [7.5kg]	1lb [.5kg]

Tray Dimensions

Model	Width	Length	Height (Adjustment Range)
18	3.50″ [88mm]	7.00″ [177mm]	0.25″ ~ 1.25″ [6mm ~ 31mm]
24	4.25″ [107mm]	7.00″ [177mm]	
30	5.00″ [127mm]	7.00″ [177mm]	

Grid Lamp

Type	Average Intensity	Distance Measured Away From Lamp
Low Pressure Mercury (Hg) Vapor	28 ~ 32mW/cm² @ 253.7nm	.12″ ~ .20″ [3 ~ 5mm]

Electrical Characteristics

Output Power

Voltage	Current
3000 $V_{peak\text{-}peak}$	30mA

Available Input Power Requirements

Model Type	Designation	Voltage	Frequency	Current
18	18	120 V_{AC}	60 Hz	3.0 A
	18-220	220 V_{AC}	50 Hz	3.0 A
	18-220-60	220 V_{AC}	60 Hz	2.0 A
	18-100-50	100 V_{AC}	50 Hz	3.0 A
	18-100-60	100 V_{AC}	60 Hz	3.0 A
24	24	120 V_{AC}	60 Hz	3.0 A
	24-220	220 V_{AC}	50 Hz	3.0 A
	24-220-60	220 V_{AC}	60 Hz	2.0 A
	24-100-50	100 V_{AC}	50 Hz	3.0 A
	24-100-60	100 V_{AC}	60 Hz	3.0 A
30	30	120 V_{AC}	60 Hz	3.0 A
	30-220	220 V_{AC}	50 Hz	3.0 A
	30-220-60	220 V_{AC}	60 Hz	2.0 A
	30-100-50	100 V_{AC}	50 Hz	3.0 A
	30-100-60	100 V_{AC}	60 Hz	3.0 A

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Machine Description

Front Panel

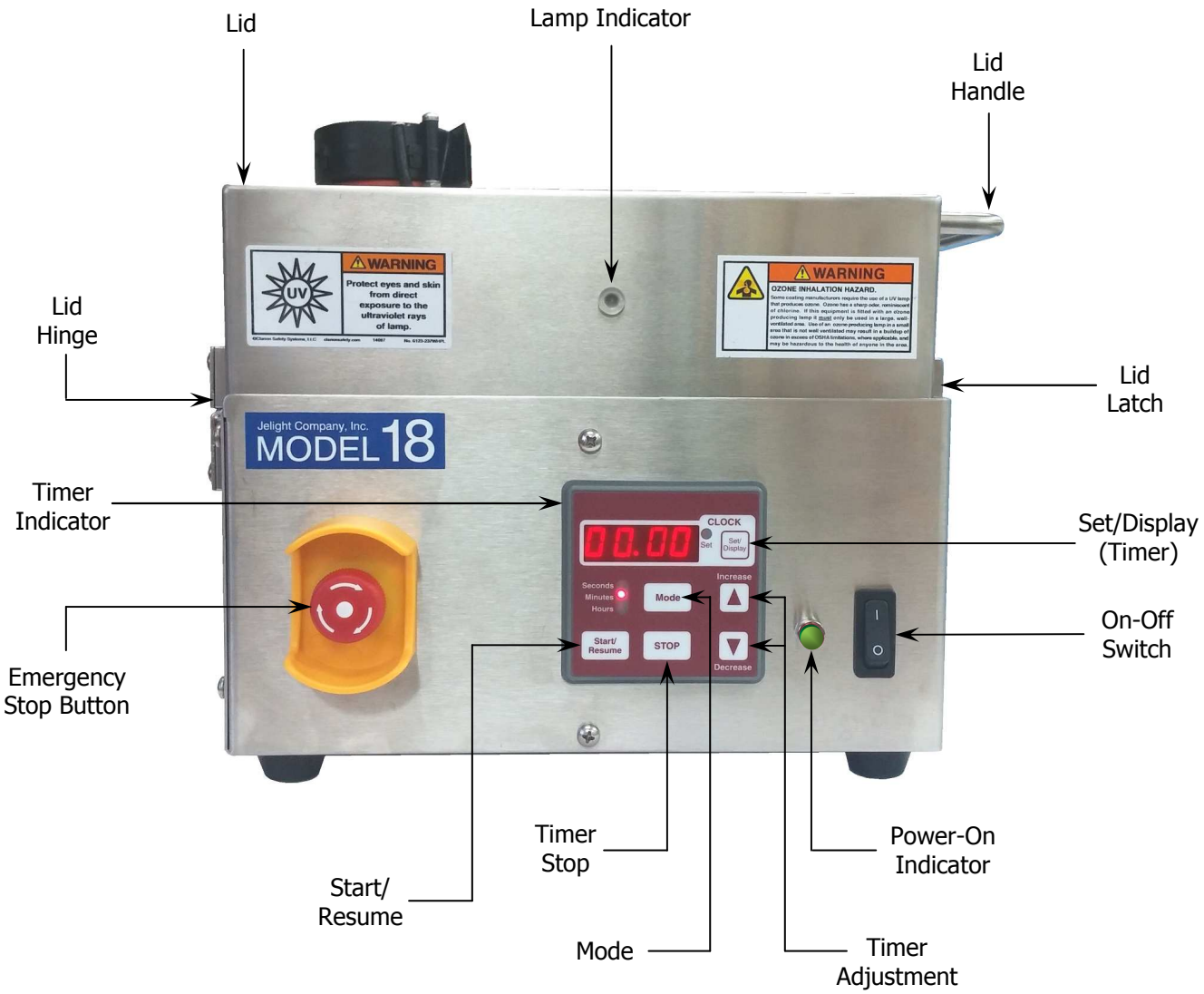


FIG. 1

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Machine Description (Continued)

Rear Panel

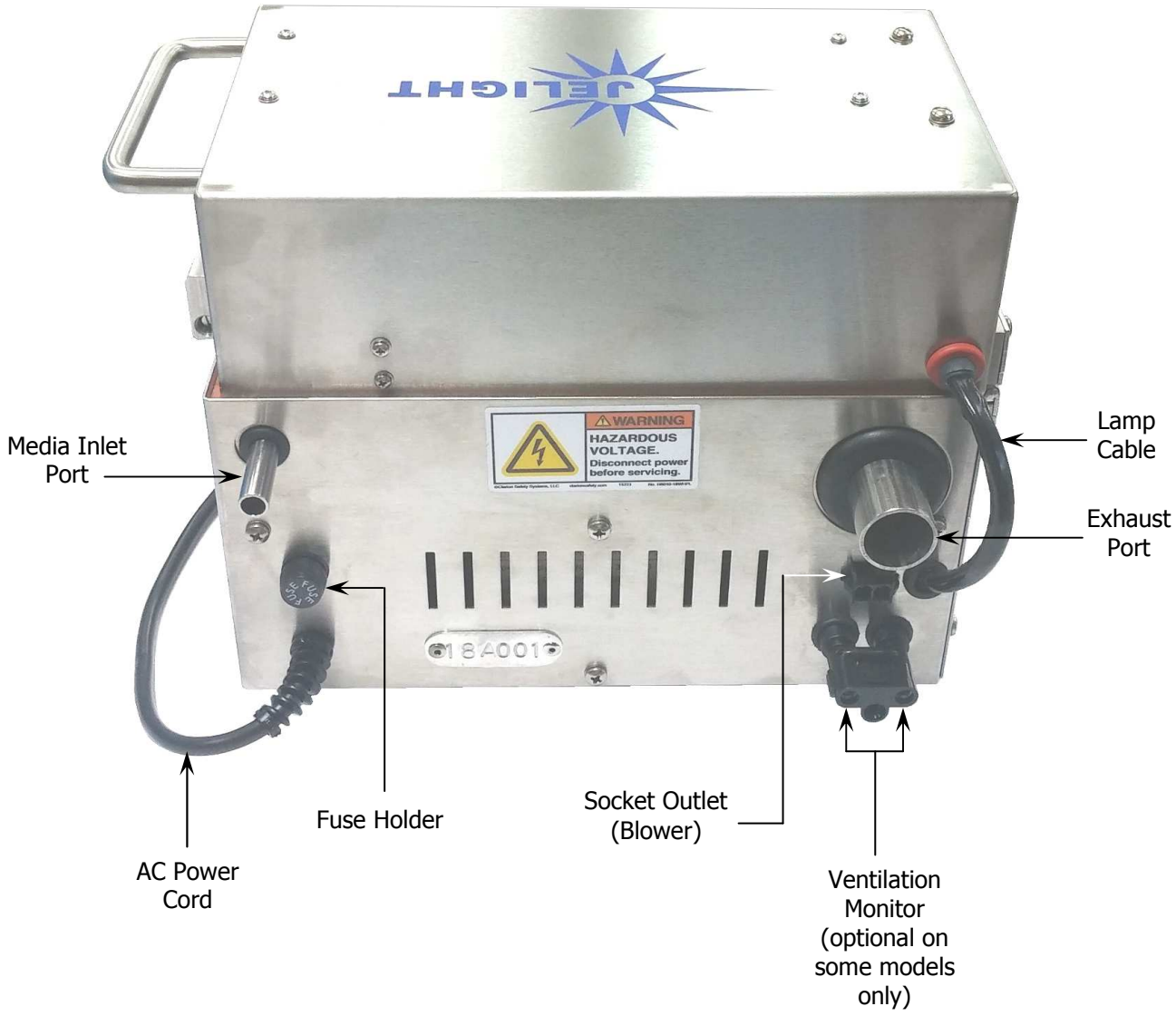


FIG. 2

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Machine Description (Continued)

Interior

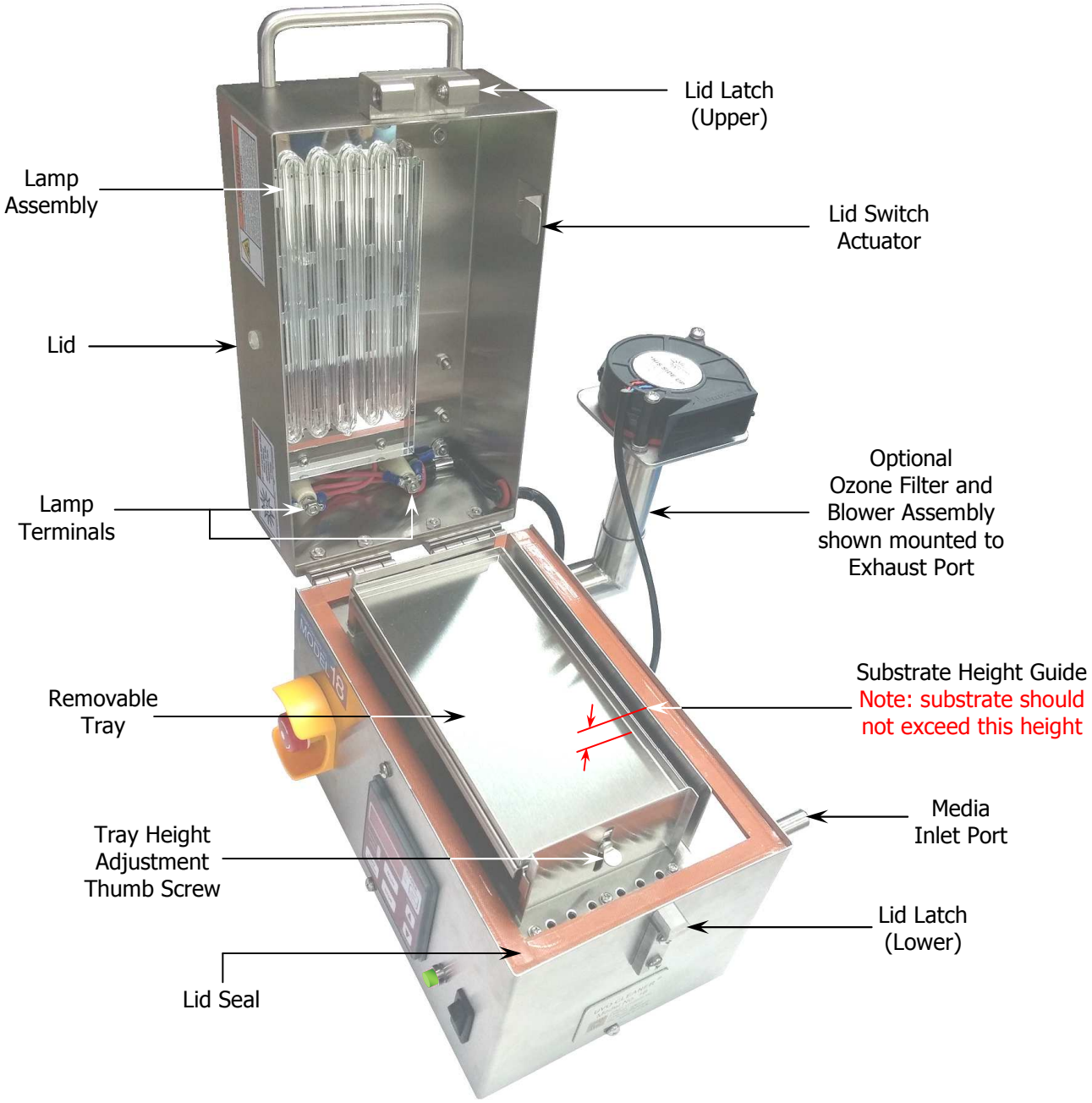


FIG. 3

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Parts Assembly

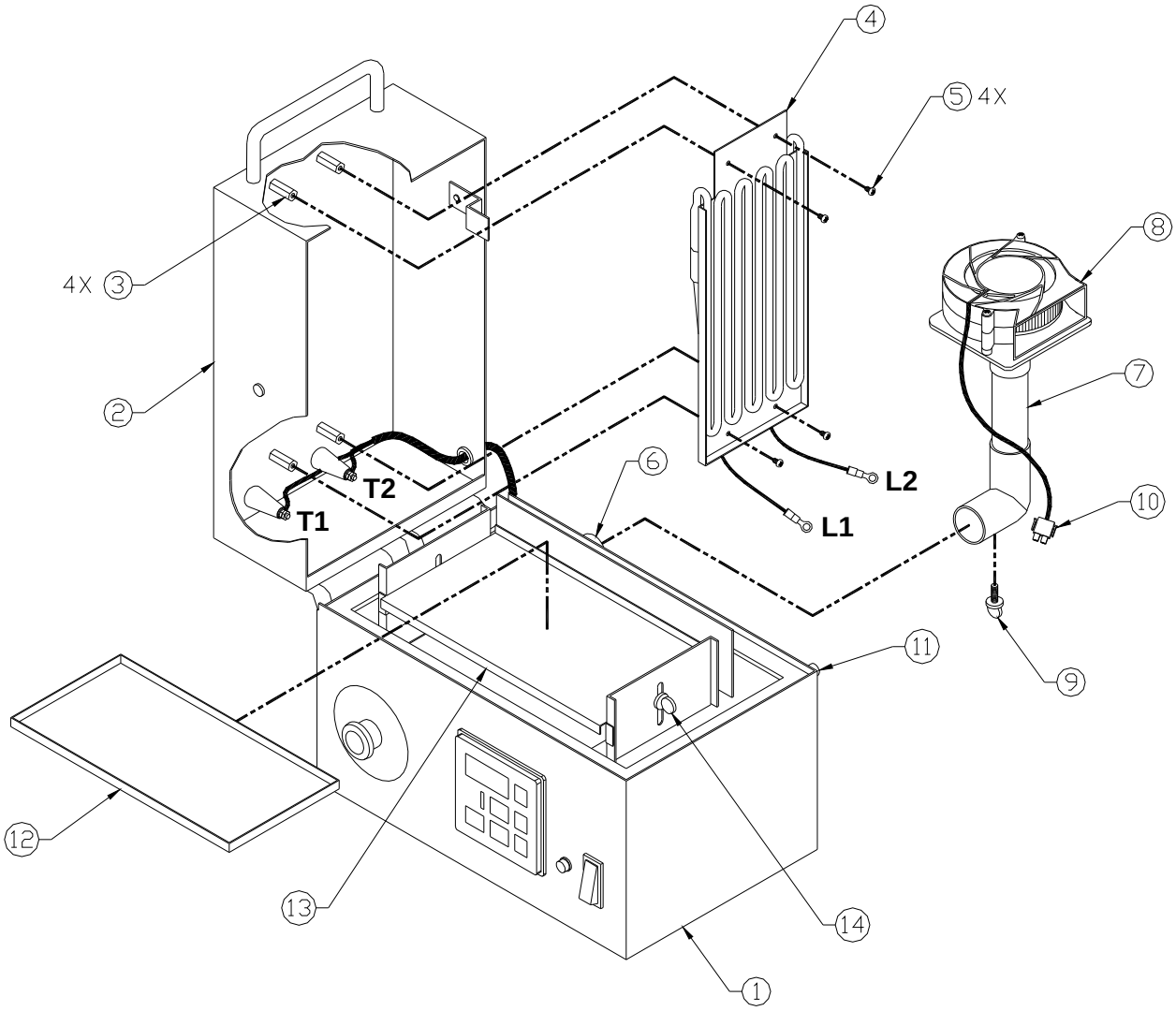


FIG. 4

1	UVO Cleaner®	6	Exhaust Port	11	Media Inlet Port
2	Lid	7	Ozone Filter	12	Removable Tray
3	Stand-off	8	Blower	13	Tray Support
4	Lamp Assembly	9	Ozone Filter Locking Screw	14	Tray Height Adjustment Thumb Screw
5	Lamp Mounting Screws	10	Blower Plug		

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System Setup

Refer to Figure 3 and 4

1 Unpack UVO-Cleaner® (1) from shipping box and place on a sturdy level surface.

2 Do NOT plug the machine into a Socket Outlet or apply power at this time.

3 Connect Exhaust Port (6) to a suitable exhaust system capable of maintaining negative 0.1 to negative 0.5 inches [2.5mm-12.7mm] of static water pressure while in operation. A 1-inch [25.4mm] diameter flexible metal duct or PVC pipe may be used to attach this unit to the exhaust system.
The flow rate of the media should be equal to or less than the exhaust in order to maintain a positive flow of the media through the system. Using a greater flow rate of the input media will cause a backpressure in the system forcing the exhaust gases to leak into the operating environment.
Alternatively, install optional Ozone Filter (7) and Blower (8) onto Exhaust Port (6) and secure with Ozone Filter Locking Screw (9). Install Blower Plug (10) into Socket Outlet (Blower) at the rear of the machine (see Figure 3).

4 Optional: The Ventilation Monitor shown in Figure 3 may be connected to a customer supplied flow meter measuring the exhaust system.

5 Remove the vinyl cap from Media Inlet Port (11) located at the rear of the system.

6 Optional: connect Media Inlet Port (11) to a media supply. Media supply should be limited to a maximum of 1 SCFH [.5 lpm] and pressure must be kept to a maximum of 1 psig [6.9 kPa (gauge)]. If ozone is detected outside the machine in operation, reduce flow/pressure accordingly.

7 Install Lamp Assembly (4) per Lamp Installation Procedure.

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Lamp Installation

Refer to Figure 4

Procedure:

1 Do NOT plug the machine into a Socket Outlet or apply power at this time.

2 Open Lid (2).

3 Using a Phillips #1 drive screwdriver, remove four Lamp Mounting Screws (5) from the four Stand-offs (3). Make sure all Stand-offs are secured to the lid; tighten as necessary.

4 Using an 11/32" size wrench (or adjustable wrench), remove the outermost nut on each of the insulator posts shown as T1 and T2 in Figure 4.
Do NOT remove the innermost nut securing the ring terminals with wires from the power supply.

5 Carefully remove Lamp Assembly (4) from the packing box.

6 Carefully place the Lamp Assembly (4) onto of the four Stand-offs (3). The lamp should be facing outwards as shown in Figure 4 and the lamp wires shown as L1 and L2 should hang freely at the bottom of the reflector.

7 Secure the Lamp Assembly (4) to the four Stand-offs (3) using Lamp Mounting Screws (5).

8 Using the two nuts removed in step 4 of this procedure, secure the ring terminals on the lamp wires shown in Figure 4 as L1 and L2 to insulator posts T1 and T2. Electrical polarity is not important.
Note: The ring terminals must NOT come in to contact with lid or reflector.

9 Pull the rubber sleeve on each lamp wire over the nut on the insulator post.

10 Lamp removal is the opposite of installation.
Dispose of UV lamps in accordance with local regulations.

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System Operation

WARNING:

- Follow all instructions in System Setup before applying power to the UVO Cleaner®.
- In case of emergency, push the Emergency Stop button on the front panel and unplug the machine. Do not open the Lid. To restart, twist the Emergency Stop button clockwise to reset. Allow the blower to operate for 2 minutes before opening the Lid.

Refer to Figure 2, 3 and 4

1 Open the Lid and load the substrate onto the Removable Tray (12). Substrates should be pre-cleaned before processing in the UVO Cleaner®. Removing large amounts of contamination will take long periods of time. Normal cleaning time should be determined through experimentation.

2 Adjust the Tray Height Adjustment Thumb Screws (14) at each end of Tray Support (13) to set the desired height. The height of the tray will vary according to the height of the substrate. For optimum results, the uppermost surface of the substrate should be aligned with the top of the Substrate Height Guide located at the rear of the tray – see Figure 3. This will place the substrate approximately 0.20" [5 mm] below the grid lamp.
NOTE: Substrate height must NOT exceed the height of Substrate Height Guide – lamp damage may result.

3 Connect the AC Power Cord into a socket outlet and switch the On/Off button to the on position. The timer display will illuminate.

4 Close the Lid until the Upper and Lower Lid Latches engage. At this time, the Lid Switch Actuator (Figure 3) will activate two safety interlock switches. If the Lid is not closed fully, the interlock mechanism will prevent lamp operation. If the Lid is opened during operation, the lamp will turn off immediately. This feature prevents operator exposure to harmful UV radiation.

5 To set the cleaning time, press the up/down Timer Adjustment buttons until the desired time is indicated. Push the Start/Resume button to activate the Timer. The Power-On Indicator will illuminate and the UV lamp will operate.

6 The clock function is also available with this Timer unit. Press the Mode button once to adjust seconds by up/down buttons, press again for minutes and hours.

7 When the cleaning cycle is complete, the Timer will sound an audible signal and automatically turn OFF the UV lamp. Wait a minimum of 2 minutes for the remaining ozone to be removed before opening the Lid to unload the substrate.

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Scheduled Maintenance

WARNING:

- This equipment should be serviced by qualified personnel.
- Lamps are fragile, handle with care.
- Before performing maintenance, the AC Power Cord must be unplugged from the Socket Outlet.
- The low pressure mercury vapor grid lamp inside this equipment emits harmful UV radiation; avoid exposure at all times. Protect eyes and skin.

UVO-Cleaner® requires minimal maintenance. After every 100 hours of operation, unplug the machine, remove the lamp assembly and eliminate particles by applying deionized water, then dry with a clean cloth. Check the intensity of the lamp by using a radiometer and detector. The lamp assembly should be replaced when the intensity is measured at or less than 21mW/cm² @ 254nm, with a measuring distance of .12" - .20" [3 - 5mm] between the lamp and the detector.

The lamp assembly should be replaced after 5,000 to 10,000 hours of operation (for detailed instructions on lamp installation, please refer to page 11).

Please contact Jelight Company Inc. for pricing and availability of replacement UV lamps, radiometer, detectors, and other components.

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Intensity Measurement

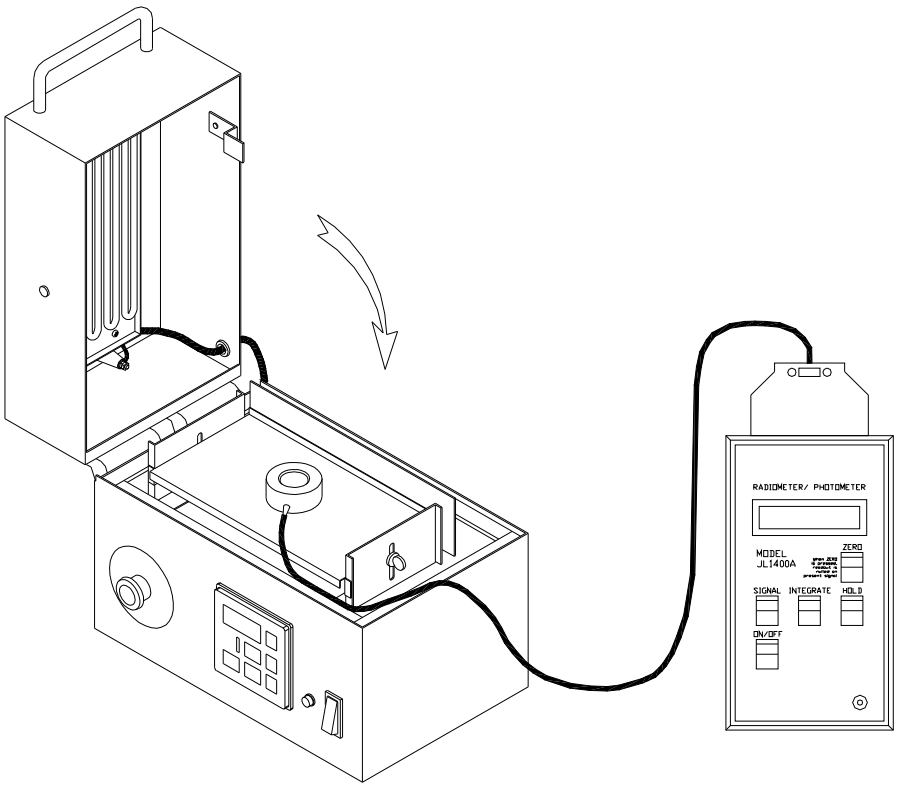


FIG. 5

1 Allow current cleaning cycle to complete and wait a minimum of 2 minutes for ozone to be removed from the UVO-Cleaner® before proceeding.

2 Open the Lid and place the UV Detector in the center of the Removable Tray – see Figure 5. The Detector window must face upward.

3 Adjust the tray height so the uppermost surface of the Detector is aligned with the top of the Substrate Height Guide at the rear of the tray – refer to Figure 3. This will place the Detector window approximately 0.20" [5 mm] below the grid lamp.
NOTE: the Detector height must NOT exceed the height of Substrate Height Guide – lamp damage may result.

4 Remove the UV Detector and close the Lid.

5 Set the Timer to 15 minutes.

6 Operate the unit empty for 5 minutes. On the Timer, press Stop. The Timer display should indicate there are approximately 10 minutes remaining.

7 Wait 2 minutes for the ozone to be removed.

Continued on next page

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Intensity Measurement (Continued)

8 Reopen the Lid and place the UV Detector in the center of the Removable Tray. The Detector window must face upward. Position the Radiometer Cable carefully across the Lid Seal to the Radiometer outside of the unit. The rubber will compress to allow the Lid to fully close and engage the safety interlock switches.

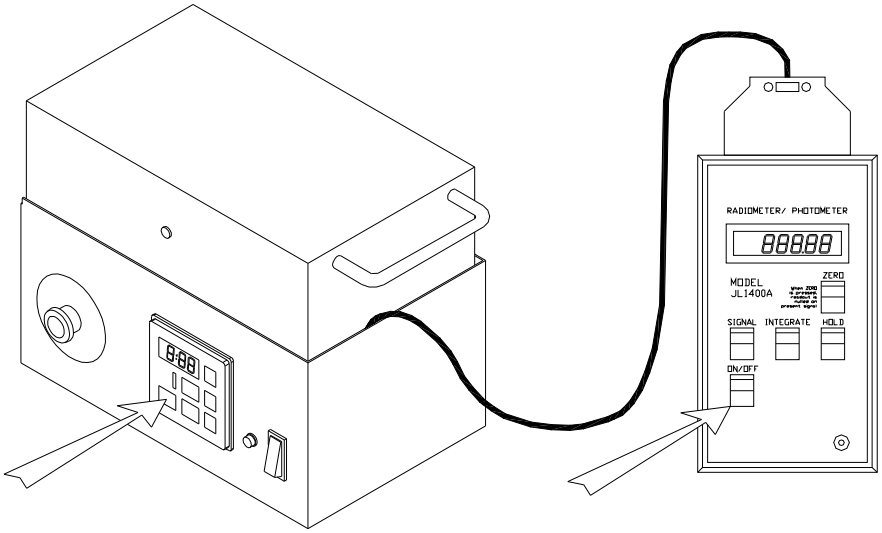


FIG. 6

9 Switch the Radiometer on – see Figure 6.

10 Press the Start/Resume button to continue the UVO cleaning cycle.

11 The intensity reading should continuously increase. Wait 5 minutes for the reading to stabilize. Record this measurement.

12 After recording the UV measurement, press the Stop button and wait a minimum of 2 minutes for ozone to be removed.

13 Open the Lid and remove the Detector.

14 The UVO-Cleaner® may now be turned off.

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Troubleshooting

Problem:	Suggestion:
The system has no power.	• Twist the Emergency Stop Button clockwise to reset. • Check the AC Power Cord is undamaged and plugged into a Socket Outlet. • Check the Fuse on the rear panel. • Check or reset the main Circuit Breaker for the Socket Outlet.
The system has power but the Timer and Lamp do not operate.	• Check the Lid is closed properly. The Lid Switch Actuator (see Figure 3) must activate two safety interlock switches before the Timer will operate.
Lamp Indicator does not light up.	• Check the Power-On Indicator lamp is on. • Check the UV Lamp Assembly for breaks, cracks, or other kind of damage.
Ozone is present outside of the system during operation.	• Ensure the Exhaust connections are tight. • If the Media Inlet Port is connected to a pressurized gas supply, reduce pressure/flow. • If using the optional Ozone Filter & Blower assembly: o Check the Blower is operating. o Check the Blower Plug is connected to the Socket Outlet (Blower) at the rear of the machine. o Make sure the Ozone Filter is connected in the upright position, as shown on page 9. o Check the O-ring between the Ozone Filter and Blower is sealing correctly. • Check the Lid is closed properly. The Lid latch may require adjustment.
The intensity measurement is below normal.	• Replace UV Lamp Assembly. • Distance between the lamp and detector should be no more than .12”-.20” [3 - 5mm]. • Radiometer/detector may require recalibration. Recommended calibration period is 3–4 months when subjected to strong UV radiation. The photodiode located inside the detector will eventually become solarized. If solarization occurs, the detector will require replacement.

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