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# UVO-CLEANER<sup>®</sup>

## Model 5144AX Series

## Instruction Manual



Original Instructions REV B



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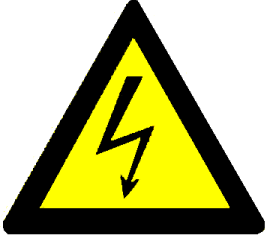
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## Safety Guide

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### 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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## TÜV Rheinland® Approval

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This UVO Cleaner is certified for cTÜVus Cert# CU 72080216 with UL fulfillment standards UL 61010-1:2004 & CAN/CSA-C22.2 61010-1:2004.



Also certified for EC conformity in accordance with EC Council Directive 2004/108/EC  
Reg. # AE 720801320 0001



For more details, please log on to:  
[www.jelight.com/certifications.php#UVO](http://www.jelight.com/certifications.php#UVO)  
[www.tuvdotcom.com](http://www.tuvdotcom.com)



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## Introduction

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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<sup>®</sup>, 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<sup>®</sup> 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/descuming 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<sup>®</sup>, Viton<sup>®</sup>, 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](http://www.jelight.com/applications.php)



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## Specifications

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### Outer Dimensions

Length	Width	Height	Exhaust Port	Media Inlet Port (4x)
28.00" [711.2 mm]	16.30" [414 mm]	14.00" [355.6 mm]	Ø 2.0" [50.8 mm]	Ø 0.375" [9.5 mm]

### Tray Dimensions

Width	Length	Height (Adjustment Range)
12.00" [305 mm]	12.00" [305 mm]	0.25" ~ 5.00" [6 mm ~ 127 mm]

### Grid Lamp

Type	Average Intensity	Distance Measured Away From Lamp
Low Pressure Mercury (Hg) Vapor	28 ~ 32 mW/cm <sup>2</sup> @ 253.7 nm	.12" ~ .20" [3 ~ 5 mm]

### Electrical Characteristics

#### Output Power

Voltage	Current
7500 V <sub>peak-peak</sub>	65 mA

### Available Input Power Requirements

Model	Voltage	Frequency	Current
5144AX	120 V <sub>AC</sub>	60 Hz	5.0 A
5144AX-220	220 V <sub>AC</sub>	50 Hz	3.0 A
5144AX-220-60	220 V <sub>AC</sub>	60 Hz	3.0 A
5144AX-100	100 V <sub>AC</sub>	50/60 Hz	6.0 A



## Part Description

### Model 5144AX - Front Panel

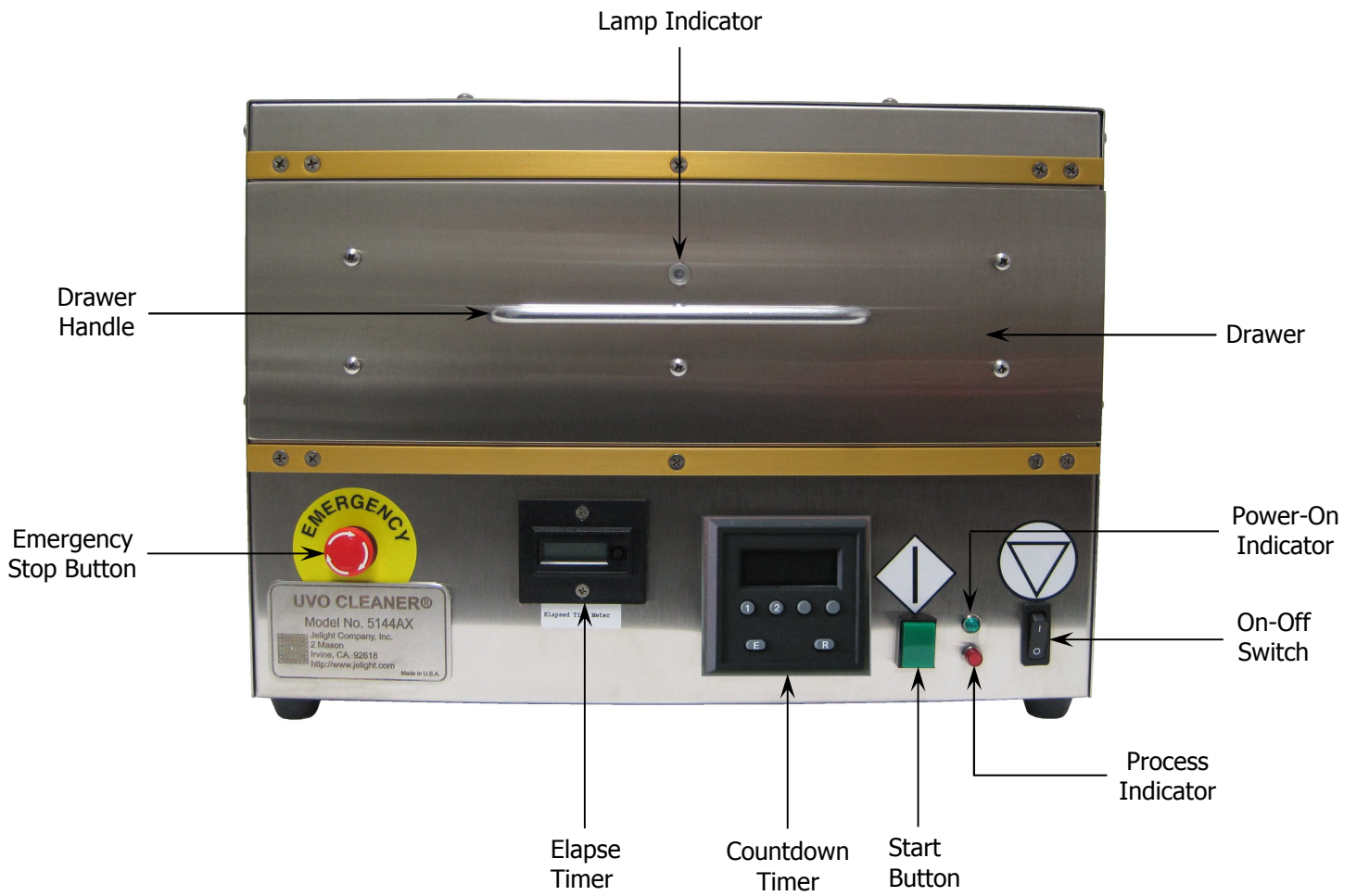


FIG. 1



## Part Description (Continued)

### Model 5144AX - Rear Panel

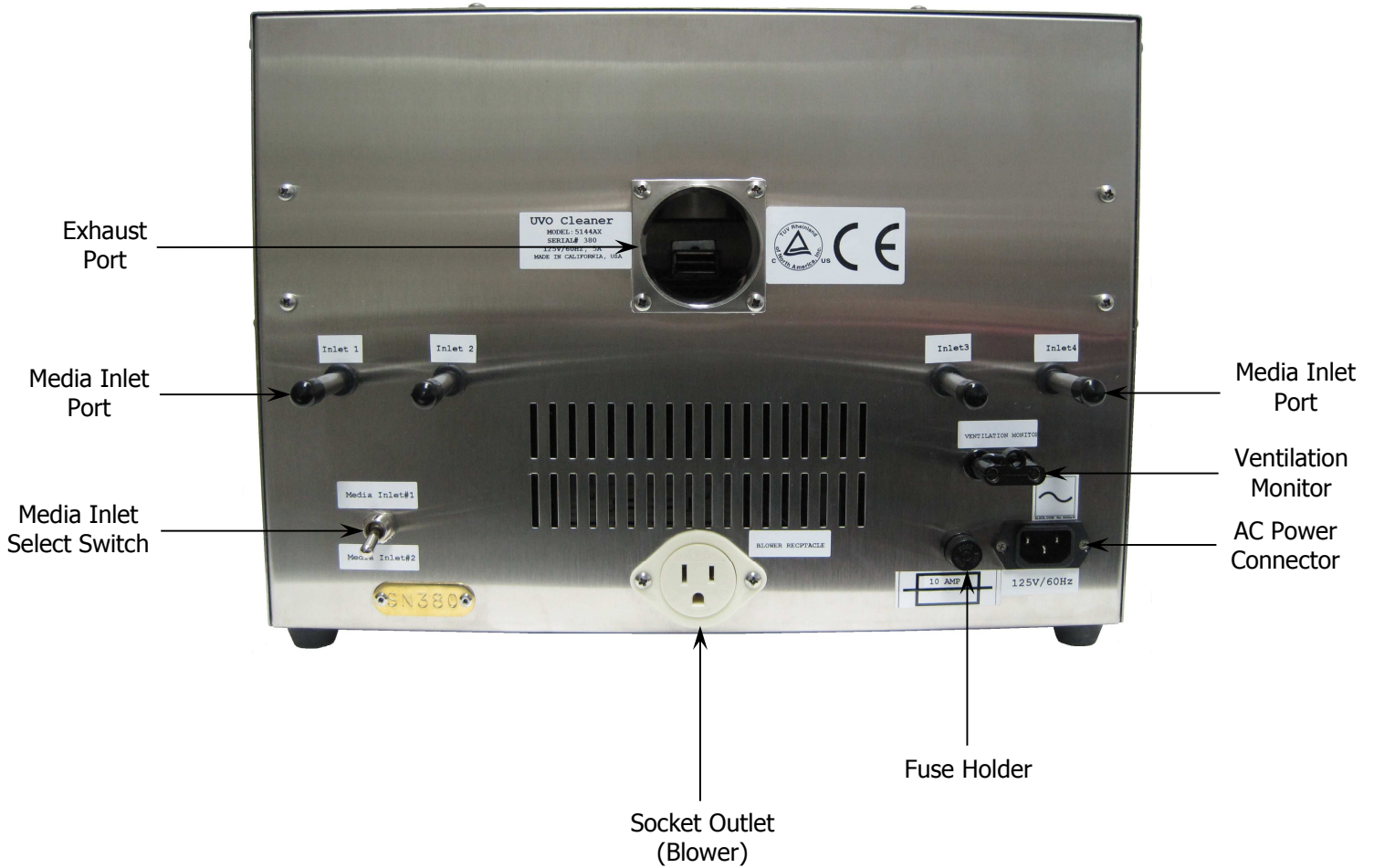


FIG. 2





# Parts Assembly

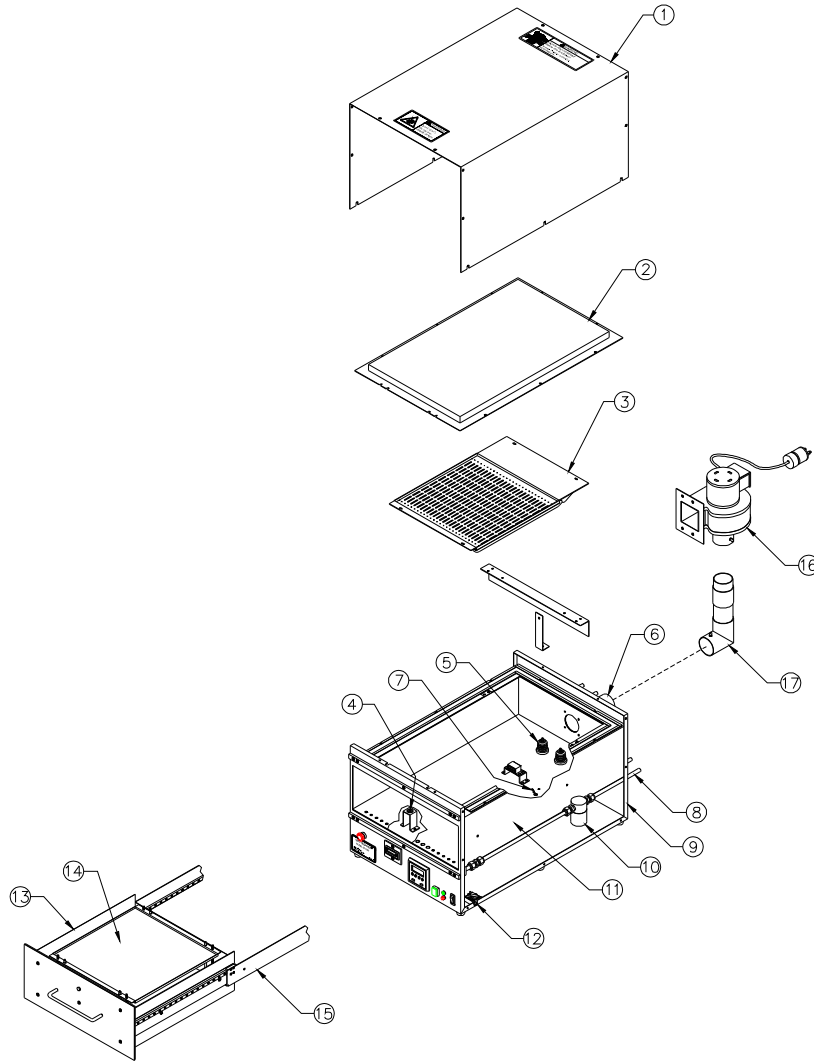


FIG. 3

- |                             |                          |                       |
|-----------------------------|--------------------------|-----------------------|
| ① Case Cover                | ⑧ Media Inlet Port (4x)  | ⑮ Slide Assembly (2x) |
| ② Lamp Cover                | ⑨ Base                   | ⑯ Blower Assembly     |
| ③ Lamp Assembly             | ⑩ Valve (4x)             | (Optional Equipment)  |
| ④ Elapse Timer/Reset Switch | ⑪ Support Shelf          | ⑰ Ozone Killer        |
| ⑤ Ceramic Feed-Through      | ⑫ Cover Interlock Switch | (Optional Equipment)  |
| ⑥ Exhaust Port              | ⑬ Drawer                 |                       |
| ⑦ Drawer Interlock Switch   | ⑭ Cleaning Tray          |                       |



## System Setup

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Refer To Figure 2 & 3

- 1 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 2-inch [50.8mm] 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 that of 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 Blower Assembly ⑩ and Ozone Killer ⑪ onto Exhaust Port ⑥ and install the Blower plug into the Socket Outlet (Blower) at the rear of the machine.
- 2 Optional: The Ventilation Monitor in Figure 2 may be connected to a customer supplied flow meter measuring the exhaust system
- 3 Remove the vinyl caps from the Media Inlet Ports ⑧ located at the rear of the system.
- 4 Optional: Connect the Media Inlet Ports ⑧ to a media supply.
- 5 Install Lamp Assembly ③ per Lamp Installation Procedure.
- 6 Connect the Main power cord into the AC Power Connector at the rear of the UVO Cleaner® and to a socket outlet.
- 7 Switch the ON/OFF button to ON; the green power on indicator will illuminate.
- 8 Program the Countdown Timer as detailed in this instruction manual.



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## Lamp Installation

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Refer To Figure 3

Procedures:

- 1 Remove the Case Cover ① .
- 2 Remove Lamp Cover ② .
- 3 Carefully place the Lamp Assembly ③ on top of the Support Shelf ⑪ with lamp side facing down.
- 4 Connect each lamp wire to a Ceramic Feed-Through ⑤ . The terminals must not come in to contact with enclosure.
- 5 Position the Lamp Cover ② on top of Lamp Assembly ③ . Use the #8-32 screws provided to screw both the Lamp Cover ② and Lamp Assembly ③ to the Support Shelf ⑪ .
- 6 Confirm Drawer Interlock Switch ⑦ is activated when Drawer ⑬ is fully closed.
- 7 If the UVO Cleaner<sup>®</sup> is equipped with an Elapse Timer, press the button on the Reset Switch ④ .
- 8 Place the Case Cover ① onto the system and secure with #8-32 screws.



## Countdown Timer – Program and Operation

Model 5144AX utilizes a timer with two timing cycles:

- Program 1 controls the exhaust time.
- Program 2 controls the total time for cleaning and exhaust. This program duration must always be longer than program 1.

The timer will display the set time for Program 2 by default. When the UVO Cleaner® is operating, the display will indicate the remaining process time and count down to zero.

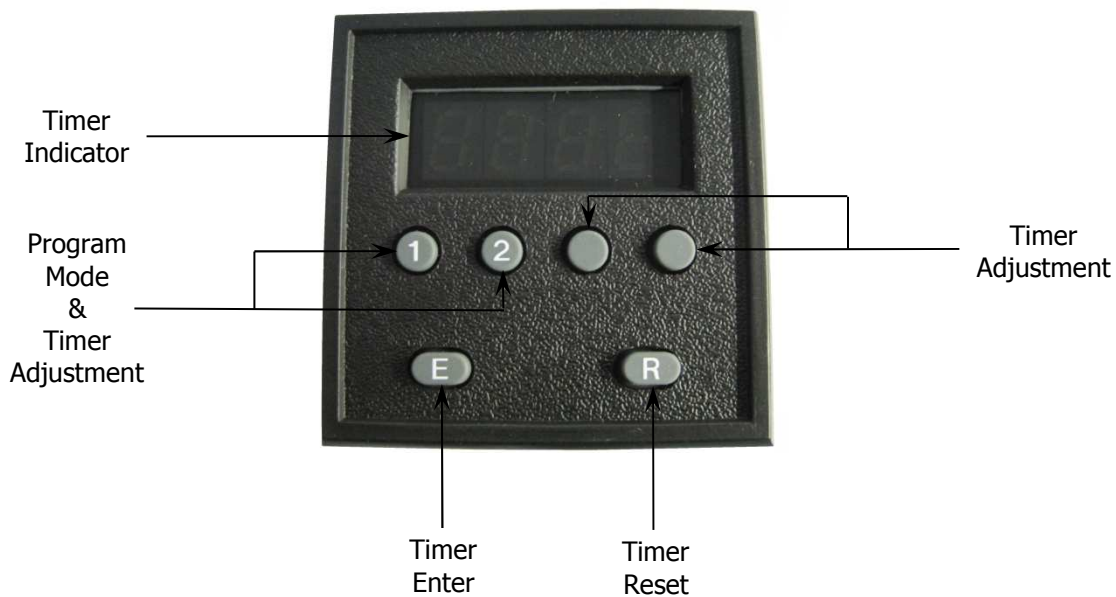


FIG. 5

Button Function	Designation	Operation
Program Mode & Timer Adjustment	1	Press once to display the set value for Program 1. The current value will display for about 10 seconds. When the set value is displayed, each subsequent press will advance the value of the time digit directly above button 1.
Program Mode & Timer Adjustment	2	Press once to display the set value for Program 2. The current value will display for about 10 seconds. When the set value is displayed, each subsequent press will advance the value of the time digit directly above button 2.
Timer Adjustment (two buttons)	Blank	In Program mode, press these buttons to advance the value of the time digit directly above the button.
Timer Enter	E	This button is used to enter Program values into memory.
Timer Reset	R	This function is disabled.

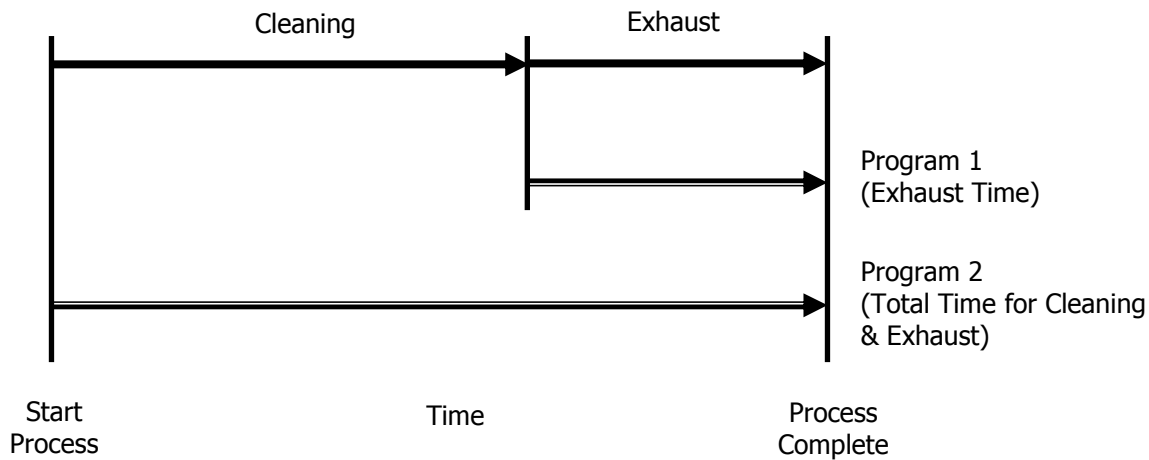


FIG. 6  
Program Overview

### Entering Timer Program Values

Note: Do not adjust timer programs while using this equipment for process.

To Set Exhaust Time:

- Press Program Mode button 1. The current value will display for about 10 seconds.
- When the set value is displayed, use the four Timer Adjustment buttons to advance each time digit to the desired setting.
- Press the Timer Enter button E. At this time, the new setting may not be shown on the digital display.
- Continue to Set Cleaning Time Program Mode 2 or to the Power Off/On section below.

To Set Total Time for Cleaning & Exhaust:

- Press Program Mode button 2. The current value will display for about 10 seconds.
- When the set value is displayed, use the four Timer Adjustment buttons to advance each time digit to the desired setting. *Note: This program duration must always be longer than program 1.*
- Press the Timer Enter button E. At this time, the new setting may not be shown on the digital display.
- Continue to the Power Off/On section below.

Power Off/On:

- Switch the UVO Cleaner Off.
- Wait 3 seconds.
- Switch the UVO Cleaner On.
- The new time settings are now be stored in the Timer and the set value for Program 2 will be displayed.



## 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 drawer. To restart, twist the emergency button clockwise to reset. Allow the blower to operate for 5 minutes before opening the drawer.

1	Connect the Main power cord into the AC Power Connector at the rear of the UVO Cleaner® and to a socket outlet.
2	Switch the ON/OFF button to ON; the green power ON indicator will illuminate.
3	Load the substrate on the removable Cleaning Tray. 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.
4	Adjust the feet on the tray to set the desired height. The actual height of the tray will vary according to the height of the substrate. For optimum results, the surface of the substrate should be situated approximately 0.20" [5 mm] below the grid lamp.
5	Once the Drawer is closed completely, the Drawer Interlock Switch will engage. If either the Drawer or the Case Cover is removed, the Drawer Interlock mechanism will automatically turn OFF the lamp. This feature prevents operator exposure to harmful UV radiation.
6	Program the timer as desired. Press the start button to begin the cleaning process. The red Process Indicator will illuminate.
7	When the cleaning and exhaust cycles are complete, the Timer will sound an audible signal and the red Process Indicator will turn off. Do not open the drawer before the exhaust cycle is complete.
8	The Elapse Timer displays the number of hours the UV Lamp has been in service and should be reset every time the UV Lamp is replaced. To reset the Elapse Timer, refer to Lamp Installation Procedure.



## Scheduled Maintenance

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### WARNING:

- This equipment should be serviced by qualified personnel.
- Lamps are fragile, handle with care.
- Before performing maintenance, the power cord must be unplugged from system.
- 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, 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 21 mW/cm<sup>2</sup> @ 254 nm, with a measuring distance of .12" - .20" [3 - 5 mm] 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 9).

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

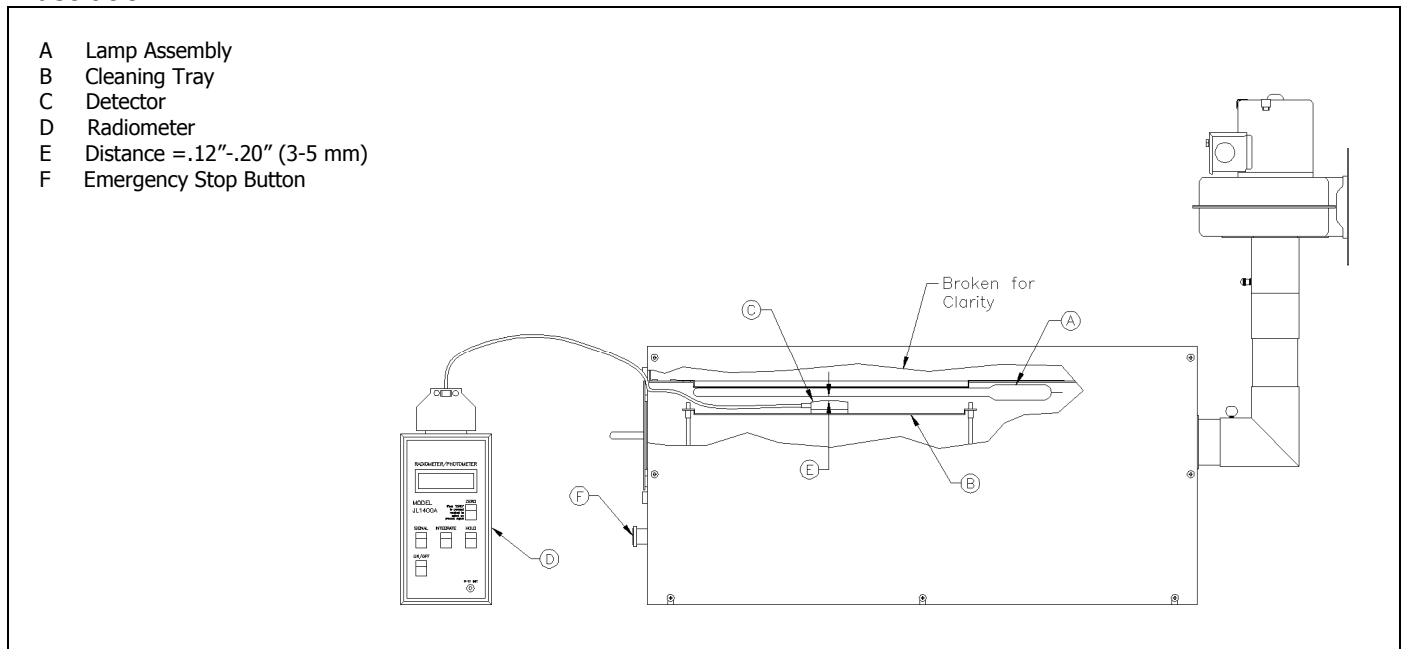


## Intensity Measurement

### Procedure:

- 1 Allow current cleaning cycle to complete and wait a minimum of 5 minutes for ozone to be removed from the UVO-Cleaner® before proceeding.
- 2 Turn ON the UVO-Cleaner® and set the cleaning time to 15 minutes.
- 3 After 5 minutes, press the STOP button and open the Drawer.
- 4 Open the Drawer and place the Detector in the center of the Cleaning Tray. Set the distance between the top of Detector © and the Lamp Assembly (A) to approximately .12 - .20" [3 – 5mm]. Adjust the height of Cleaning Tray by turning the thumb nut on 4 sides.
- 5 Position the Detector wire against the rubber surrounding the Drawer face plate and carefully close the Drawer (see illustration below). The rubber will compress to allow the Drawer to fully close and engage the Drawer Interlock Switch.
- 6 Turn ON the Radiometer.
- 7 Press the START/RESUME button to continue the UVO cleaning cycle.
- 8 At this time, the intensity reading should continuously increase; wait 5 minutes for the reading to stabilize. Record this measurement.
- 9 Press the STOP button but continue blower operation for an additional 5 minutes to eliminate excessive ozone before opening the Drawer.
- 10 Open the Drawer and remove the Detector.
- 11 The UVO-Cleaner® may now be turned off.

### Illustration







## Troubleshooting

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**Problems:**

**Suggestions:**

<p>The system has no power.</p>	<ul style="list-style-type: none"> <li>• Twist the Emergency Stop Button clockwise to reset.</li> <li>• Check the Power Cord is undamaged and plugged into the AC Power Connector at the rear of the machine and to a Socket Outlet.</li> <li>• Check the Fuse on the rear panel.</li> <li>• Check the Cover Interlock Switch to make sure it is totally engaged.</li> <li>• Check or reset the main Circuit Breaker for the Socket Outlet.</li> </ul>
<p>The system has power but the Timer does not operate.</p>	<ul style="list-style-type: none"> <li>• Check the Drawer is closed properly. The Drawer Interlock Switch behind the Drawer should make an audible click sound when the Drawer is fully closed.</li> </ul>
<p>Lamp Indicator does not light up.</p>	<ul style="list-style-type: none"> <li>• Ensure the Process Indicator lamp is on.</li> <li>• Check the UV Lamp Assembly for breaks, cracks, or other kind of damage.</li> </ul>
<p>Ozone is present outside of the system during operation.</p>	<ul style="list-style-type: none"> <li>• Ensure the Exhaust connections are tight.</li> <li>• Make certain that the Ozone Killer &amp; Blower assembly are connected in the upright position, as shown on page 8.</li> <li>• Check the Drawer is closed properly. The Drawer Interlock Switch behind the Drawer should make an audible click sound when the Drawer is fully closed.</li> </ul>
<p>The intensity measurement is below normal.</p>	<ul style="list-style-type: none"> <li>• Replace UV Lamp Assembly.</li> <li>• Distance between the lamp and detector should be no more than .12"-.20" [3 - 5 mm].</li> <li>• 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.</li> </ul>

\* For further assistance, contact Jelight Company Inc. 2 Mason, Irvine CA 92618 U.S.A.  
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## Limited Warranty

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### **What does this warranty cover?**

This warranty covers any defects in materials and workmanship to the original end-user purchaser of this product with the exceptions stated below, provided the Warranty Registration Form has been returned to Jelight Company, Inc.

### **What does this warranty not cover?**

This warranty does not cover damage or loss of parts incurred in transit, by abuse, misuse or an act of God (such as a flood), modifications (such as the installation and use of non-approved UV Lamps or other components), damage incurred through contact with oils or chemicals other than those specified in this manual when used as directed, any component that has been subject to unusual physical or electrical stress and consumable items (such as fan filters and capacitors). Also, consequential and incidental damages are not recoverable under this warranty. This warranty is non-transferable.

### **What is the period of coverage?**

This warranty covers non-consumable components for a period of 12 months following the date of purchase, with the following exception: the UV Grid Lamp is not covered within this warranty.

### **What will Jelight Company, Inc. do to correct problems?**

We will inspect your product and contact you within three days of receipt to advise the results of our inspection. If the product qualifies for warranty repair, Jelight Company, Inc. will elect whether to provide replacement parts and labor free of charge or replace the unit. If the product does not qualify for warranty repair, Jelight Company, Inc. will provide an estimate of the parts, labor and shipping charges required to complete the repair and return the product. If you authorize repairs, Jelight Company, Inc. will fix the product and return it within 21 days.

### **How can you get warranty service?**

Contact Jelight Company, Inc. at the telephone number above for technical support and provide contact details, product name, serial number and date of purchase. If field repair is not possible, a Return Material Authorization (RMA) Number will be issued. This RMA number must be indicated on all shipping labels, documentation and communications relating to this repair.

Send the product to: Jelight Company, Inc.

2 Mason  
Irvine, CA 92618

### **How will state law affect your customer's rights under the warranty?**

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



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**Record your product information**

Please record the information below and retain this for warranty service.

<b>Date of Purchase</b>	
<b>Model</b>	
<b>Serial Number</b>	

**Disclaimer:**

Jelight Company Inc. warrants only that a product will conform to its physical descriptions, makes no other warranties and expressly disclaims any implied warranty of fitness for a particular reason. It is the responsibility of the purchaser to determine the suitability of the product for any purpose. All information provided by Jelight Company, Inc. is in good faith and when offered by another manufacturer or source is done so in good faith. In the event a warranty is offered by another manufacturer of goods or services, such warranty will convey from that manufacturer.

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## Warranty Registration Form

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Registration entitles you to product support and notification of product upgrades and enhancements. We do not sell your name to third party mailing list companies. Information you provide is for the exclusive use of Jelight Company, Inc.

Please complete and return this form by surface mail to Jelight Company Inc. Alternatively, you may e-mail this information to: [warranty@jelight.com](mailto:warranty@jelight.com)

<b>Name</b>	
<b>Title</b>	
<b>Company</b>	
<b>Telephone</b>	
<b>E-mail</b>	
<b>Street Address</b>	
<b>City</b>	
<b>State / Province</b>	
<b>Zip / Postal Code</b>	
<b>Country</b>	
<b>Date of Purchase</b>	
<b>Model</b>	
<b>Serial Number</b>	