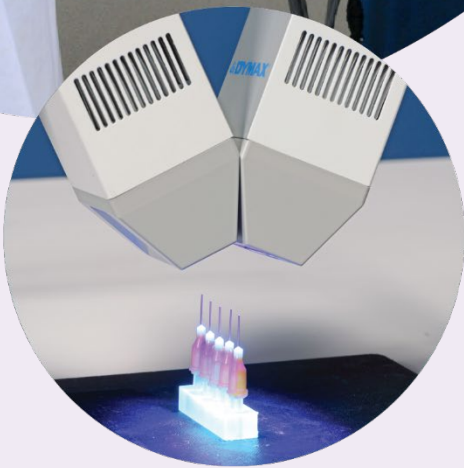
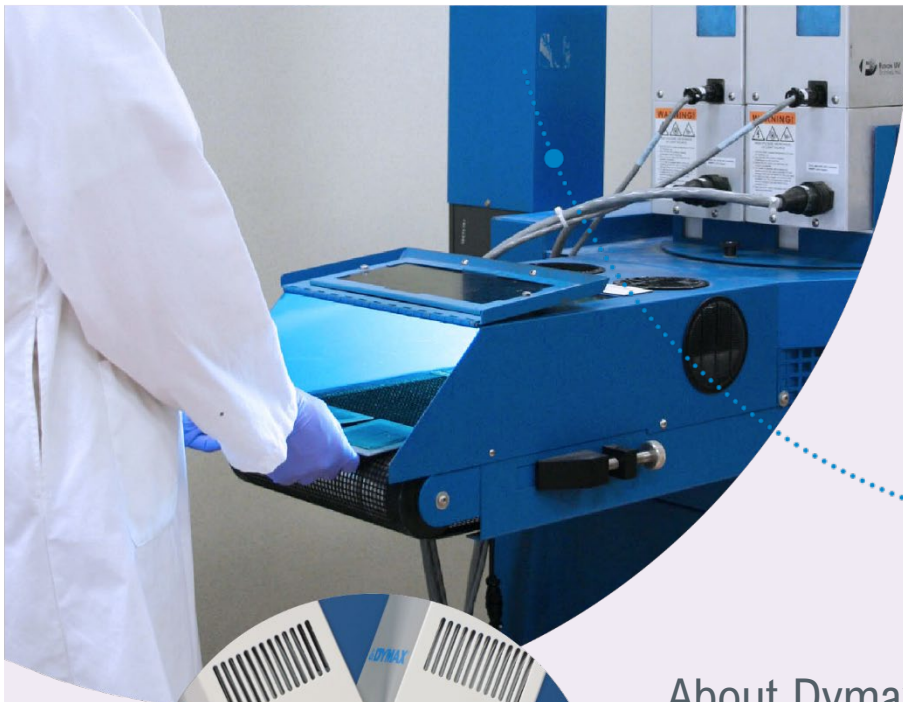




PORTA-RAY® 400R

Portable UV Light-Curing
Flood Lamp User Guide



About Dymax

UV/Visible light-curable adhesives. Systems for light curing, fluid dispensing, and fluid packaging.

Dymax manufactures industrial, light-curable, epoxy, and activator-cured adhesives. We also manufacture a complete line of manual fluid dispensing systems, automatic fluid dispensing systems, and light-curing systems. Light-curing systems include LED light sources, spot, flood, and conveyor systems designed for compatibility and high performance with Dymax adhesives.

Dymax adhesives and light-curing systems optimize the speed of automated assembly, allow for 100% in-line inspection, and increase throughput. System designs enable stand-alone configuration or integration into your existing assembly line.

Please note that most dispensing and curing system applications are unique. Dymax does not warrant the fitness of the product for the intended application. Any warranty applicable to the product, its application, and use is strictly limited to that contained in the Dymax standard Conditions of Sale. Dymax recommends that any intended application be evaluated and tested by the user to ensure that desired performance criteria are satisfied. Dymax is willing to assist users in their performance testing and evaluation by offering equipment trial rental and leasing programs to assist in such testing and evaluations. Data sheets are available for valve controllers or pressure pots upon request.

Contents

Introduction.....	4
Where to Get Help.....	4
Safety	4
UV Light-Curing System Safety Considerations	4
Electrical Safety	6
High Temperatures	6
Shielding.....	6
Product Overview	6
Description of the PORTA-RAY 400R.....	6
System Components.....	6
Assembly and Setup.....	8
Unpacking and Inspecting Your Shipment.....	8
Parts Included	8
Mounting.....	8
System Operation	9
Start Up.....	9
Shut Down	10
Accessories Storage, Packaging, and Carrying	11
Maintenance	11
Maintenance Considerations	11
Cleaning of Optics and Bulb Replacement	11
Troubleshooting	13
Spare Parts and Accessories.....	13
Specifications	14
Definition of Terms	16
Warranty.....	17
Index	18

Introduction

This guide describes how to assemble, use, and maintain the Dymax PORTA-RAY® 400R flood-lamp system safely and efficiently.

Intended Audience

Dymax prepared this user guide for experienced process engineers, technicians, and manufacturing personnel. If you are new to UV light-curing systems and do not understand the instructions, contact Dymax Application Engineering to answer your questions before using the equipment.

Where to Get Help

Dymax Customer Support and Application Engineering teams are available in the United States, Monday through Friday, from 8:00 a.m. to 5:30 p.m. Eastern Standard Time. You can also email Dymax at info@dymax.com. Contact information for additional Dymax locations can be found on the back cover of this user guide.

Additional resources are available to ensure a trouble-free experience with our products:

- Detailed product information on www.dymax.com
- Dymax adhesive Product Data Sheets (PDS) on our website
- Material Safety Data Sheets (MSDS) provided with shipments of Dymax adhesives

Safety

To use this system safely, it must be set up and operated in accordance with the instructions given by Dymax. Using the system in any other manner will impair the protection of the system. Dymax assumes no liability for any changes that may impair the protection of the system.

UV Light-Curing System Safety Considerations

Dymax UV light-curing technology has been used successfully for over 30 years. The fast-cure, one-component nature of our UV light-curing technology has made it the process of choice for many manufacturers requiring a cure-on-demand assembly process.

There are four common questions/concerns related to UV light-curing systems: UV exposure, high-temperature surfaces, ozone, and bright, visible light.

UV Exposure

Standard Dymax UV light-curing systems and bulbs have been designed to primarily emit UVA light (as shown in Figure 1). UVA light is generally considered the safest of the three UV ranges: UVA, UVB, and UVC. Although OSHA does not currently regulate ultraviolet light exposure in the workplace, the American Conference of Governmental Industrial Hygienists (ACGIH) does recommend Threshold Limit Values (TLVs) for ultraviolet light. The strictest interpretation of the TLV (over the UVA range) for workers' eyes and skin is 1 mW/cm² (intensity), continuous exposure. Unless workers are placing bare hands into the curing area, it is unusual to exceed these limits. To put 1 mW/cm² limit into perspective, cloudless summer days in Connecticut regularly exceed 3 mW/cm² of UVA light and also include the more dangerous UVB light (primarily responsible for sun tans, sun burns, and skin cancer) as well.

The human eye cannot detect “pure” UV light, only visible light. A radiometer should be used to measure stray UV light to confirm the safety of a UV-curing process. A workstation that exposes an operator to more than 1 mW/cm² of UVA continuously should be redesigned.

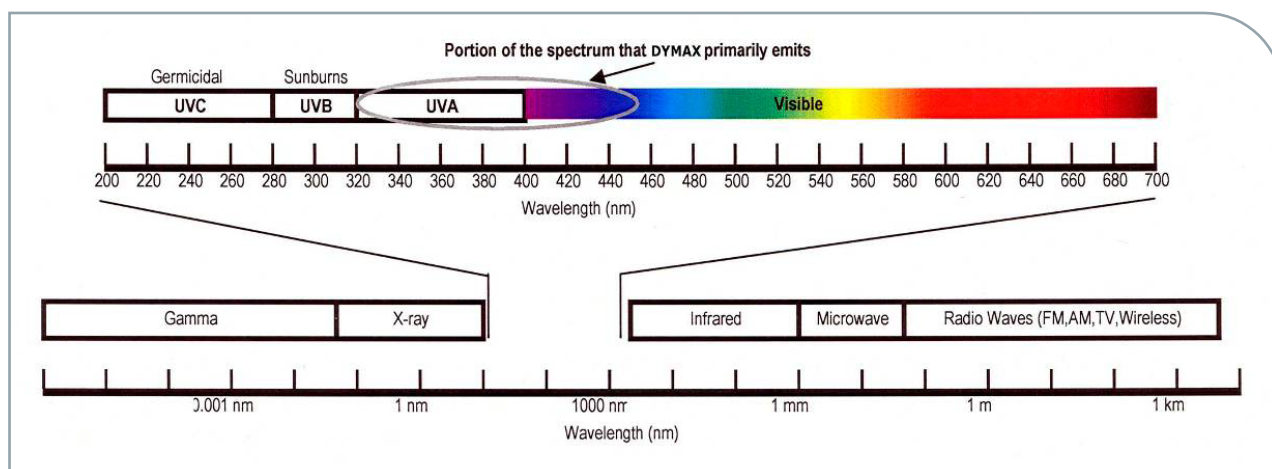
UV-adhesive curing can be a regulatory compliant, “worker-friendly” manufacturing process when the proper safety equipment and operator training is utilized. There are two ways to protect operators from UV exposure: shield the operator and/or shield the source.

Shield the Operator

UV-Blocking Eye Protection – UV-blocking eye protection is recommended when operating UV light-curing systems. Both clear and tinted UV-blocking eye protection is available from Dymax.

UV-Blocking Skin Protection – Where the potential exists for UV exposure upon skin, opaque, UV-blocking clothing, gloves, and full-face shields are recommended.

Figure 1.
Spectrum of Light



Shield the Source of UV Light

Any substrate that blocks UV light can be used as a shield to protect workers from stray UV light. The following materials can be used to create simple shielding structures:

Sheet Metal – Aluminum, steel, stainless steel, etc. Sheet metal should be coated black or black anodized to minimize reflection of UV and visible light toward operators.

Rigid Plastic Film – Transparent or translucent, UV-blocking plastics (typically polycarbonate or acrylic) are commonly used to create shielding where some level of transparency is also desired.

Flexible Film – Translucent UV-blocking, flexible urethane films can be used to quickly create workstation shielding. This UV-blocking, flexible urethane film is available from Dymax.

High-Temperature Surfaces

Surfaces exposed to high-intensity curing lights will rise in temperature. The intensity, distance, exposure time, cooling fans, and the type/color of the surface can all affect the actual surface temperature. In some cases, exposed surfaces can reach temperatures capable of producing a burn or causing damage to a substrate. In these cases, care must be taken to ensure either a more

moderate surface temperature or appropriate protection/training for operators.

Ozone

Standard Dymax bulbs (UVA type) generate an insignificant amount of UVC and therefore essentially no ozone. Some UV-curing systems, like those used to cure UV inks, emit primarily “shortwave” (UVB and UVC) energy. Upon exposure to UVC light (specifically <240 nm), oxygen molecules (O_2) split into oxygen atoms (O) and recombine with O_2 to create ozone O_3 . The current, long-term ozone concentration limit recommended by ACGIH, NIOSH, and OSHA is 0.1 ppm ($0.2\text{mg}/\text{m}^3$).

Bright, Visible Light

The bright, visible light energy emitted by curing systems can cause eyestrain if proper eye protection or shielding is not used. Tinted eye protection and/or opaque/tinted shielding can be utilized to address this concern.

Summary

UV-light sources can be more “worker friendly” than many commonly accepted industrial processes, provided the potential concerns are addressed. Both the lower working temperature and lack of spurious frequency transmission that this system produces make it even more user friendly. Contact your Dymax representative for information regarding the proper use of Dymax UV light-curing systems.

Electrical Safety

High voltage and current energize the UV Lamp. A high-voltage Power Supply and Igniter combination is designed to provide lamp-starting voltages, to limit current, and subsequently provide a uniform output of energy.

NOTE: To avoid the risk of electrical shock, do not attempt to replace the Lamp before turning off the Power Input Switch, and disconnecting the Input Power Cord.

The electrical system of this unit should be serviced by qualified service personnel.

High Temperatures

Due to the high output power of this system, high temperatures may be present on the surfaces of the Lamp, Reflector, Lamp Head, and Headrest.

NOTE: Extreme care should be taken to prevent touching any of the surfaces before allowing sufficient time for all temperatures to drop to safely back to room temperature after power has been removed.

The Lamp Head Assembly should never be placed on or near any flammable surface while the Lamp is on, or before its temperature has cooled back to room temperature. Never place the Lamp Head or parts to be cured on a heat-sensitive surface. Always cure parts on a metallic or non-flammable surface. When the unit is not in use, place the Lamp Head on the Headrest and switch the standby switch to the low power position to minimize temperature rise.



WARNING! Placing the Lamp Housing Assembly on or near flammable surfaces while the Lamp is on or still hot could result in fire.

Shielding

All installations should incorporate adequate shielding of radiated UV light in order to prevent eye and skin burn of the operator or others passing through the work area (refer to the UV safety warnings in the safety considerations section of this manual). The supplied Headrest/Curing Chamber can be used with the PORTA-RAY 400R to minimize the amount of stray UV light scattering in the work area. Custom shielding may be constructed using sheet metal or UV-blocking acrylic or

polycarbonate to prevent operator exposure to UV radiation.



WARNING! To prevent risk of eye or skin burn, all personnel must be protected from direct or indirect exposure to the UV light produced by the PORTA-RAY 400R light-curing system. Extreme care should be used when designing custom UV shielding to ensure personnel will not be exposed to harmful UV radiation. Additionally, UV protective glasses and protective clothing should be used at all times while working in the vicinity of the UV light-curing system.

Product Overview

Description of the PORTA-RAY 400R

The PORTA-RAY 400R light-curing system may be placed on any bench or shelf that has access to an 115 VAC 50/60-cycle single-phase power source in a clean operation area.

CAUTION: The PORTA-RAY 400R is available in 115 VAC and 230 VAC configurations. The unit's voltage configuration is clearly identified by a bright orange label, located adjacent to the unit's AC power input connector at the side of the Lamp Head. Operating with voltage outside the specified range will result in damage to the system.

Since the PORTA-RAY 400R is an air-cooled unit, dust or airborne particles can clog the internal cooling passages and cause overheating. Allow a 4-inch clearance on all sides of the Lamp Head during operation for unrestricted airflow.

System Components

- **Mounting Holes (A)** - Two threaded holes that can be used for fastening the Lamp Head to a fixture, machine, or conveyor.
- **Input Power Switch & Receptacle (B)** - Input Power Switch used to apply or remove main power to the PORTA-RAY 400R system. Co-located with the Input Power Switch is the IEC-type Receptacle where the Input Line Cord is inserted.
- **Handle (C)** - The PORTA-RAY 400R Handle can be used to carry the curing system when the Lamp Head

is latched to the bottom Accessory Compartment or to hold the Lamp Head during manual curing operations.

- **Lamp Power Select Switch (D)** - The Lamp Power Select Switch selects either the “full” or “standby” lamp power setting. When curing or warming up the Lamp, the Lamp Power Select Switch should be set to full power. Between curing operations, the Lamp Power Select Switch can be set to the half-power standby setting, which reduces the amount of heat and stray UV light radiated by the unit. The Lamp Power Select Switch should always be set to “standby” when the Lamp Head is idling on the Headrest. When switching back to full power, the Lamp will be ready for curing again after a brief 10-second re-warming period.
- **Input/Output Cooling Air Louvers (E & F)** - The Input and Output Air Louvers channel cooling air from the Fan in and out of the Lamp Head. These must remain unobstructed.
- **Cooling Fan (G)** - The Lamp Head Fan cools the Lamp, Reflector, and Internal Power Supply Circuit-Board Assembly.
- **Arc Bulb (H)** - Medium-pressure Arc Bulb which produces UV and visible light.
- **Reflector (I)** - Lamp Reflector which collects and concentrates light from all sides of the Arc Bulb. This surface should be kept clean to ensure maximum light output.
- **Accessories Storage Compartment (J)** - The Accessories Storage Compartment can be used to store and transport curing accessories (i.e. headrest, glasses, power cord, and adhesive).
- **Lamp-Head Latches (K)** - The Lamp-Head Latches are used to secure the Lamp Head to the bottom Accessories Storage Compartment during transport and storage.

Figure 2.
Lamp-Head Unit, Top View

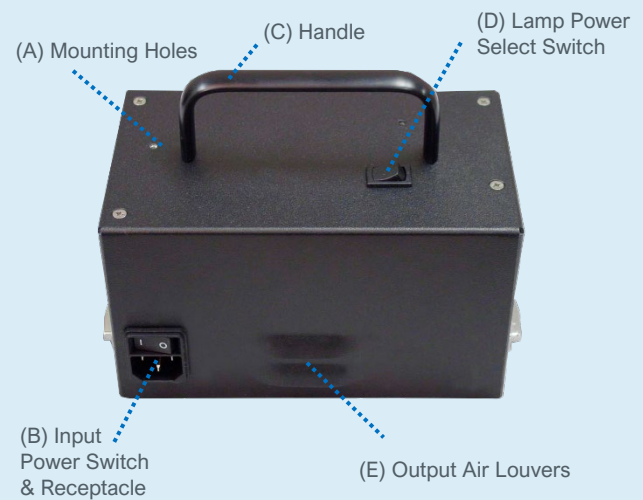
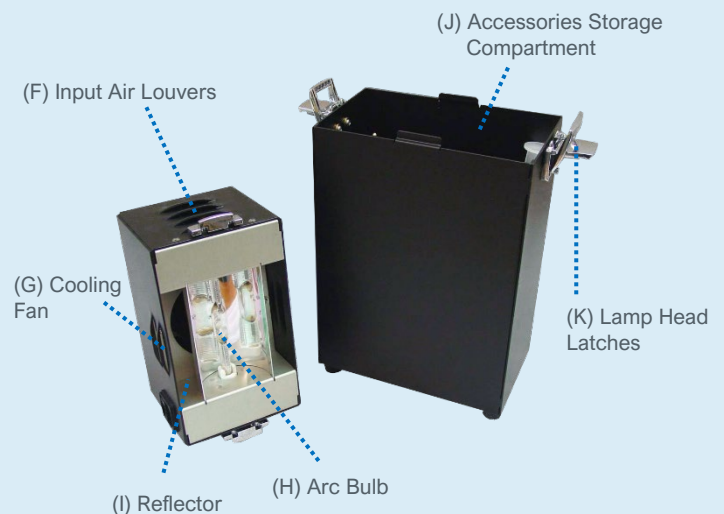


Figure 3.
Lamp-Head Unit and Storage Compartment



Assembly and Setup

Unpacking and Inspecting Your Shipment

When your PORTA-RAY arrives, inspect the boxes for damage and notify the shipper of any box damage immediately.

Open each box and check for equipment damage. If parts are damaged, notify the shipper and submit a claim for the damaged parts. Contact Dymax so that new parts can be shipped to you immediately.

Check that the parts included in your order match those listed below. If parts are missing, contact your local Dymax representative or Dymax Customer Support to resolve the problem.

Parts Included

- PORTA-RAY 400R lamp head with attached bottom accessory compartment
- 400-Watt UVA-enhanced arc bulb (installed) - other spectral versions optional
- Lamp headrest/mini curing chamber with drawer
- UV/IR protective glasses
- AC power cord
- PORTA-RAY 400R Use Guide
- Face shield

Mounting

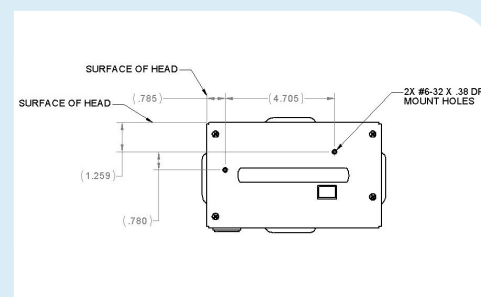
The lamp head should always be placed on the headrest or held away from any flammable surfaces. Never place the lamp head directly on the work surface. The PORTA-RAY 400R is also designed to be machine or conveyor mounted using the two threaded holes in the top surface of the lamp head.

The lamp head can also be placed on a shelf-type structure, supporting the unit by its bottom outside edges. For this type of mounting, a windowed hole must be cut in the shelf to provide adequate clearance for the unit's bottom-side light exposure opening, and also for the cooling air-exhaust holes.

Figure 4.
PORTA-RAY 400R (Open & Closed)
(PN 39639, PN 39640, PN 39697, PN 39713)



Figure 5.
PORTA-RAY 400R Lamp Head Mounting-Hole
Dimensions (inches)



System Operation

The PORTA-RAY 400R is designed to be an extremely user-friendly system. This system was designed with minimum controls, making it easy to operate.

Start Up

Open the Latches on the side of the storage compartment unit, and remove the Lamp Head from the bottom enclosure by lifting it by the Handle (Figure 6 & Figure 7).

1. Figure 7).
2. Place the Lamp Head on the Headrest with the drawer closed (Figure 8).
3. Plug the IEC-Type Connector of the AC Power Cord into the Power Input Receptacle in the side of the Lamp Head. Plug in the opposite end of the Input Line Cord into a nearby single-phase power outlet.
4. To start the system, turn on the Power Switch (Figure 2, B) at the side of the unit. The Lamp Head should turn on.
5. During the warm-up period, the Lamp Power Select Switch (Figure 2, D) on the top of the Lamp Head should be set to full power mode. A one- to two-minute warm-up time is required for the Lamp to reach full intensity.



WARNING! Bluish light is projected from the unit, becoming brighter as the unit warms up. This ultraviolet light can be harmful to the eyes and skin. UV protective glasses and clothing are required to prevent burns of eyes and skin. Care should also be taken to protect other personnel in the area from unintentional exposure to the UV light (see the safety section for additional UV safety information).

6. To change to the standby power mode, switch the Lamp Power Selector Switch (Figure 2, D) to the half power position (Rocker Paddle pressed toward the closest Handle stem). The Lamp Head intensity will visibly dim when the unit is in this low-power mode.

NOTE: The PORTA-RAY 400R system is designed for continuous operation. It is suggested that the Lamp remain on during work breaks. Frequent stopping and starting of the Lamp Head will reduce Lamp Head life. In general, leave the unit in standby power mode for periods of non-use of less than 30 minutes. The unit will require only a brief 10 second re-

Figure 6.
Unlatching the Lamp Head
from the Storage Compartment



Figure 7.
Removing the Lamp Head from the Storage
Compartment



Figure 8.
Lamp Head on Headrest



warming period before the Lamp Head returns to full intensity. Once the input power is switched off, the Lamp Head will require a minimum of five minutes of cooling time before restarting.

7. The Headrest can be used as a Curing Chamber for small parts. To cure parts in the Headrest, pull the drawer open using the black pull knob and load components onto the center of the tray (Figure 9). Close the drawer and set the Lamp Power Select Switch to the full power position and wait the appropriate amount of time for curing to complete.

WARNING: While the drawer is in the fully open position, the back side of the drawer will block most of the UV light and prevent it from scattering into the work area. However, UV glasses and skin protection should still be worn during curing to ensure safe operation.

8. When curing is complete, set the Lamp Power Select Switch to the standby position to minimize temperature rise of the Lamp Head and Headrest. Open the drawer and remove the cured parts.
9. To perform handheld curing (Figure 15), lift the Lamp Head from the Headrest using the Handle. Switch the Lamp Head to full-power mode and hold the Lamp Head 2-6 inches from the target substrate.

NOTE: The height of the Lamp can be adjusted up or down to control the intensity of light reaching the substrate being cured. Refer to the adhesive manufacturer's data sheet for appropriate exposure time and intensity levels. The optimum height and exposure time required to provide proper curing may need to be adjusted experimentally.

10. When curing is complete, place the Lamp Head back on the Headrest and set the Power Mode Switch back to the standby position.

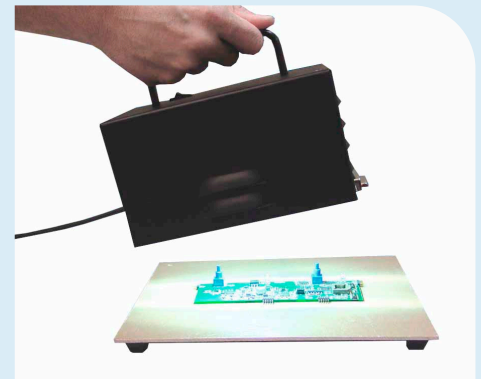
Shut Down

To shut down the light-curing system, place the Lamp Head back on the Headrest, and shut off the Input Power Switch. Allow the Lamp Head and surrounding components time to cool before placing the Lamp Head close to temperature-sensitive materials or before repackaging the system for transportation.

Figure 9.
Curing in Headrest



Figure 10.
Handheld Curing



Accessories Storage, Packaging, and Carrying

Once the Lamp Head has cooled sufficiently, the system can be re-packaged and transported. The bottom portion of the PORTA-RAY 400R can be used for storing related curing accessories (such as the Headrest, Power Cord, UV glasses, and adhesive). After accessories have been inserted, the Lamp Head can be latched onto the bottom enclosure for system storage or transportation to another location

Maintenance

Maintenance Considerations

During the production process, various deposits of foreign matter may accumulate on the lamp head and reflector surfaces. Product vapors can also condense on these surfaces over time, causing poor transmittance/reflectance of UV light and reduced curing efficiency. To ensure maximum light output of the curing system, these surfaces should be inspected and cleaned at regular intervals as required.

The bulb will also need to be replaced when its intensity output drops below levels to meet curing process requirements. A radiometer should be used to monitor system UV-light output.

Cleaning of Optics and Bulb Replacement

The following procedure should be followed carefully for optics cleaning and bulb replacement:



WARNING! To avoid coming in contact with dangerous high voltages or high temperatures, the following power-down and cooling procedure must be completed before attempting any maintenance operations on the PORTA-RAY 400R UV Lamp: Turn off the Input Power Switch at the side of the Lamp Head and unplug the Power Cord from the Input Power Receptacle. Wait 15 minutes or until the Lamp and other hot components cool before proceeding with any maintenance operations.

1. Remove the Lamp Head from its Headrest or fixture and place it upside-down on a soft clean surface.

CAUTION: It is extremely important to avoid touching (with your hand) the aluminum Reflector, and the glass portion of the Bulb. Contaminants from your skin will damage these components. Clean cotton gloves or a clean, soft cloth should be used when handling or cleaning the Bulb and Reflector.

2. Using cotton gloves or a clean, soft cloth, remove the Bulb by holding it near one end and pushing into the adjacent Spring-Loaded Socket. Once the other end of the Bulb has cleared the walls of its Socket, tilt the cleared end of the Bulb up slightly, and remove the Bulb from the other Socket that is still engaged.

Figure 11.
Packing and Carrying the PORTA-RAY 400R

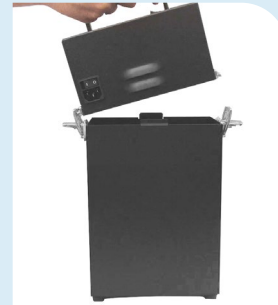


Figure 12.
Accessories Storage Compartment



3. Using a clean, soft cloth dampened with isopropyl alcohol, clean the surfaces of the aluminum Reflector.

CAUTION: *Do not use abrasive cleaning compounds or steel wool for cleaning the Reflector. These harsh products will remove the finish and reduce the Reflector efficiency.*

4. Wipe the Bulb lightly with a clean isopropyl-dampened cloth. If the Bulb shows signs of bulging or shape distortion, replace it. Otherwise, dry and polish the Bulb with a clean, dry cloth.
5. Re-insert the cleaned or new Bulb between the Bulb Sockets, with the Filler Nipple facing the Reflector. Be sure to center each Bulb Electrode in its Socket to ensure proper electrical connection and to avoid arcing (which will damage the Bulb and Socket). The Bulb is non-polarized so it does not matter which Electrode is placed in which Socket.
6. Mount the Lamp Head back on its Headrest or fixture and reconnect the Input Power Cord.
7. Re-test the unit to ensure satisfactory light intensity and cure time is achieved.

Troubleshooting

NOTE: When contacting Dymax, an authorized Dymax distributor, or a Dymax representative, be sure to know and provide the following:

- Model number of light source in question.
- Serial number of light source in question.
- Product number of adhesive in question (if applicable).
- Lot number of adhesive in question (if applicable).

All returns to Dymax must be accompanied by a Return Merchandize Number (RMA). This number must be obtained from a Dymax Customer Service Representative.

NOTE: Only qualified maintenance personnel should attempt the following procedures.

Problem	Possible Cause	Corrective Action
The lamp operates but has low output or slow curing	The lamp's power switch is in the half-power position	Place the switch in the full-power position during curing.
	The lamp too far from the substrate being cured	Adjust the lamp height to within 2" to 4" of surface being cured.
	The adhesive is not compatible with the lamp type	Compare the adhesive's light spectral requirements with the lamp's spectral chart under Specifications. Contact Dymax for optional lamp types if required.
	The reflector or bulb requires cleaning	Clean the reflector and the bulb. Instructions can be found under Maintenance.
	The bulb is past its usable life	Replace the bulb (see Bulb Replacement Procedure under Maintenance).
The lamp does not light, but the fan is running	The bulb is not properly installed	Disconnect the power and verify that both the bulb electrodes are properly centered in the sockets.
	The over-temperature protection has activated	Allow the unit to cool. Operate the unit in a cooler environment (see Specifications for the operating temperature range).
	The bulb is past its usable life	See the Bulb Replacement Procedure under Maintenance.
The lamp does not start, the fan is not running	Power Cord not properly connected or defective	Verify that both ends of the power cord are fully inserted into their sockets or replace the power cord.
	There is no power at the outlet	Test for power at the wall outlet.

Spare Parts and Accessories

Item	Part Number
Lamps	
Metal Halide 400 Watt UV (Standard) Lamp*	38560
Mercury Vapor 400 Watt UV (Optional) Lamp	36970
Safety Equipment	
Face Shield	35186
Safety Glasses	35285

* Recommended spare parts

Specifications

Property		Specifications	
Part Numbers		39639 120 VAC, Metal Halide Bulb 39697 120 VAC, Mercury Bulb	39640 240 VAC Metal Halide Bulb 39713 240 VAC Mercury Bulb
Typical Output Intensity		400 @ UV-A* (365 nm)	
Dimensions (L x W x H)		8" x 5" x 16.5" [20.3 cm x 12.7 cm x 41.9 cm]	
Weight		With bottom box: 6 lbs. / With lamp head only: 3.5 lbs.	
Max Chamber Part Size (for curing in Headrest)		4.25" x 4.25" x 2" [10.8 cm x 10.8 cm x 5.1 cm]	
Power Supply	Input Voltage	100-120 VAC + -10%	200-240 VAC + -10%
	Input Current (max)	7 Amperes	3.5 Amperes
	Source Input Frequency	47 Hz to 63 Hz	
	Lamp Power Regulation	± 1%	
	Protection	Inrush current limit, hot re-strike, line voltage surge, short circuit, open circuit, over temperature, ignition retry timeout	5 minutes
Lamp	Lamp Type	400 Watt metal halide	Quartz, ozone free
	Lamp Voltage	135 ± 15V	
	Arc Length	32 mm	
	Burning Position	Horizontal	
	Radiation Flux	72 Watts, 315-440 nm	
	Warm-Up Time (min)	1-2	
	Cooling Time Before Restart	5 minutes (typical)	Lamp protection prevents the restart of a hot lamp
	Lamp Peak Irradiance	500 mW/cm ² UVA	2" from base of lamp head
	Curing Area (minimum)	5" x 3" [12.7 cm x 7.62 cm]	Affected by lamp height
	Lamp Life	1,000 hours typical	Affected by # of on/off cycles
Environmental	Operating Temperature	+10 °C to +40 °C (+50 °F to +104 °F)	
	Storage Temperature	0 °C to +60 °C (+32 °F to +140 °F)	
	Relative Humidity	30 to 75% operating, 10 to 100% storage, non-condensing	
	Cooling	Forced air	
	Over-Temp Shutdown	67°C (internal)	

* Intensity with the beam focused and measured with an ACCU-CAL™ 50 UV Radiometer calibrated and traceable to NIST.

Figure 13.
PORTA-RAY 400R Lamp Head, Overall Dimensions (inches)

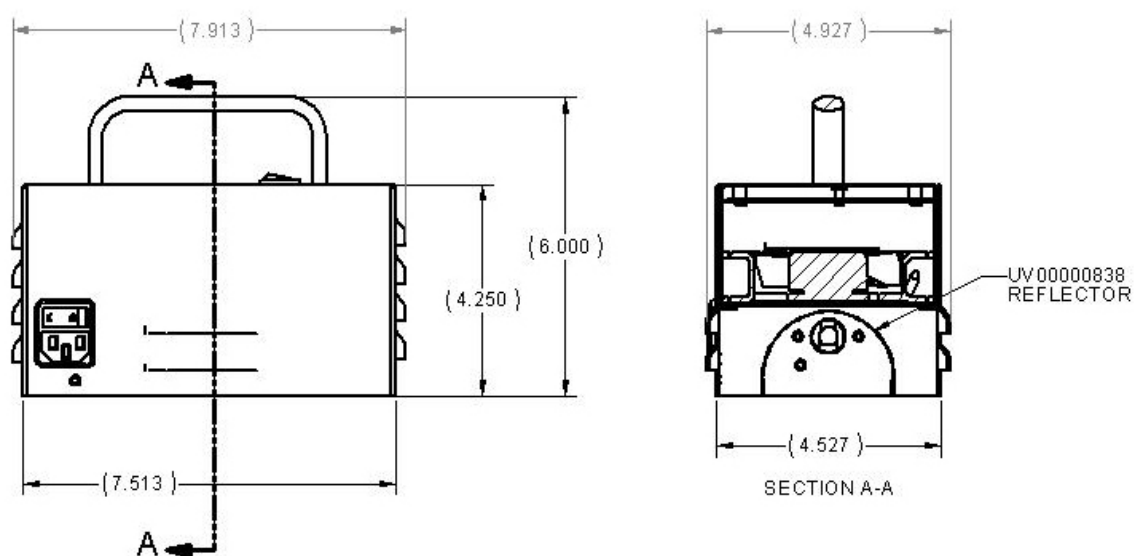


Figure 14.
Spectral Output of Standard Metal-Halide Bulb

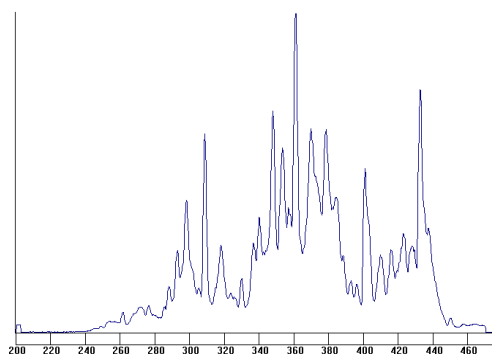
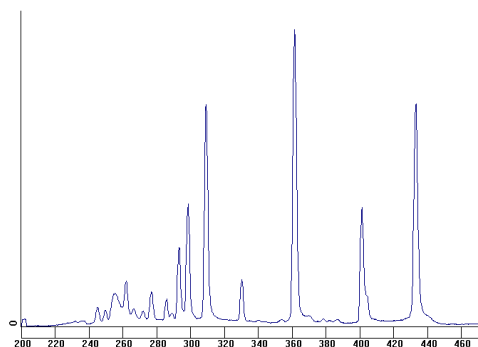


Figure 15.
Spectral Output of Mercury Bulb



Definition of Terms

Flood Lamp System - Set of components arranged to generate, collect, condition and direct UV radiant energy to perform curing of engineering adhesives, coatings, and inks within a safe and controlled process. It includes a lamp housing and power supply and may also include a shutter, workstation, UV enclosure, Dymax Light Shield, or other accessories.

Lamp - Light source (bulb or burner) generating ultraviolet, visible, and infrared radiant energy from burning matter stimulated by electrical power conditioned by a proper power supply which is an integral part of a Lamp. A light source is usually placed into a reflector (of various geometry) to increase light-source efficiency by collecting and directing radiant energy of selected spectra (for a given curing process).

Intensity - a measure of light energy over the unit of surface area (usually surface at the specified working distance from the bottom of a reflector housing) in W/cm^2 or mW/cm^2 . For the UV portion of light, this measure is often called in literature “irradiance”, i.e. radiant energy arriving at a point on a surface per unit area.

Brightness, also known as **Luminance** - description of energy in the visible region of the spectrum (approximately from 400 to 700 nm) and recorded in photometric units. “**Intensity**” (see below) of visible-light energy is called Illuminance.

Illuminance - luminous flux (energy of visible light) incident per unit area, and measured in **Lx** (lux) or **Lumen/cm²**.

Ultraviolet (UV) - The invisible region of the spectrum just beyond the violet end of the visible region. Wavelength ranges in general from 1.0 to 400 nm. Dymax bulbs (burners) do not radiate energy in deep ultraviolet; there are very minute amounts below 220 nm and practically nothing can be sensed below 200 nm. This is due to the use of an ozone-blocking quartz-bulb envelope (See Ozone).

Ultraviolet is used beneficially in various fields of industry and medicine. In order to standardize light sources used in medicine, in Copenhagen in 1932, The International Congress on Light recommended dividing the ultraviolet spectrum into three spectral parts:

1. **Ultraviolet A (UV-A)** - UV of long wavelength from within approximately 400 to 320 nm of the spectral band (4000 to 3200 $\oplus$) - predominately produced by Dymax Flood Lamps.
2. **Ultraviolet B (UV-B)** - UV of medium wavelength from within approximately 320 to 280 nm - Dymax Flood Lamps produce some amount of their energy within this bandwidth.
3. **Ultraviolet C (UV-C)** - UV of short wavelength below 280 nm (we say from 280 to 200 nm) – a large amount of this energy is present in the sunlight.

Dose - is irradiance integrated over time, or Irradiance (W/cm^2) $\times$ Time (s) = Dose (Joules/ cm^2). Note: Watt is the power that gives rise to the production of energy at the rate of 1-joule (J) per second (s).

Ozone - oxidizing agent (O_3) produced by the action of ultraviolet radiant energy (below 185 nm) or electrical corona discharge of oxygen on air.

OSHA 1910.145: “Regulation of Accident prevention Signs and Tags” defines the following headers as:

WARNING: Calls out a hazardous situation that has some probability of severe injury.

CAUTION: Indicates a hazardous situation that may result in minor or moderate injury.

NOTICE – is used to convey a message related directly or indirectly to the safety of personnel, or protection of property.

Warranty

From date of purchase, Dymax Corporation offers a one-year warranty against defects in material and workmanship on all system components with proof of purchase and purchase date.

Unauthorized repair, modification, or improper use of equipment may void your warranty benefits. The use of aftermarket replacement parts not supplied or approved by Dymax Corporation will void any effective warranties and may result in damage to the equipment.

IMPORTANT NOTE: DYMAX CORPORATION RESERVES THE RIGHT TO INVALIDATE ANY WARRANTIES, EXPRESSED OR IMPLIED, DUE TO ANY REPAIRS PERFORMED OR ATTEMPTED ON DYMAX EQUIPMENT WITHOUT WRITTEN AUTHORIZATION FROM DYMAX. THOSE CORRECTIVE ACTIONS LISTED ABOVE ARE LIMITED TO THIS AUTHORIZATION.

Index

Accessories Storage.....	11
Assembly and Setup.....	8
Bulb Replacement.....	12
Carrying.....	11
Cleaning Optics.....	12
Definition of Terms.....	16
Glossary.....	16
Help.....	4
Maintenance	12
Mounting	8
Operation	9
Shut Down	11
Start Up.....	9
Parts List.....	8
Product Overview.....	6
Safety.....	4
Electrical Safety	6
High Temperatures	6
Shielding.....	6
Spare Parts and Accessories	13
Specifications	14
Support.....	4
System Components	6
Troubleshooting	13
Unpacking	8
UV Light-Curing System Safety Considerations	4
Bright, Visible Light	5
High-Temperature Surfaces.....	5
Ozone.....	5
Shield the Operator.....	4
Shield the Source of UV Light	5
UV Exposure	4
Warranty	17

