
# WIDECURE®

## UV Light-Curing Conveyor System User Guide

DYMAX®

# 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

This guide describes how to assemble, use, and maintain Dymax WIDECURE® light-curing conveyor systems 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 sources 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 (SDS) provided with shipments of Dymax adhesives

# Safety

***WARNING!*** *If you use a Dymax light-curing conveyor system without first reading and understanding the information in this user guide, injury can result from exposure to UV light. To reduce the risk of injury, read and ensure you understand the information in this user guide before assembling and operating the system.*

## General Safety Considerations

All users of Dymax light-curing conveyor systems should read and understand this user guide before assembling and using the system.

To learn about the safe handling and use of light-curable formulations, obtain and read the SDS for each product. Dymax includes an SDS with each adhesive sold. In addition, fluid product SDS can be requested on the Dymax website.

**CAUTION!** Always wear protective goggles or face shield when working near UV light. Both the front and the rear of the unit may emit UV light. **Never look directly at light!**

***WARNING!*** *Always observe safety requirements!*

## Specific Safety Considerations

Dymax light-curing conveyor systems are designed to maximize operator safety and minimize exposure to light-curing energy. To use the unit safely, it must be set up and operated in accordance with the instructions in this user guide. Please also read and understand the safety considerations unique to light-curing systems as described below.

***WARNING!*** *Looking directly at the UV light emitted by a light-curing conveyor can result in eye injury. To prevent eye injury, never look directly at the high-intensity light and always wear protective goggles (provided).*

***CAUTION!*** *This unit generates ozone during operation. Adequate ventilation should be provided or the unit should exhaust to outside.*

*There is a risk of electrical shock if the control cabinet is opened during installation and operation. A certified electrician should install the proper connections to the system.*

*The sides of the unit are warm to the touch when the unit is in operation.*

# Dymax Light-Curing System Safety Considerations

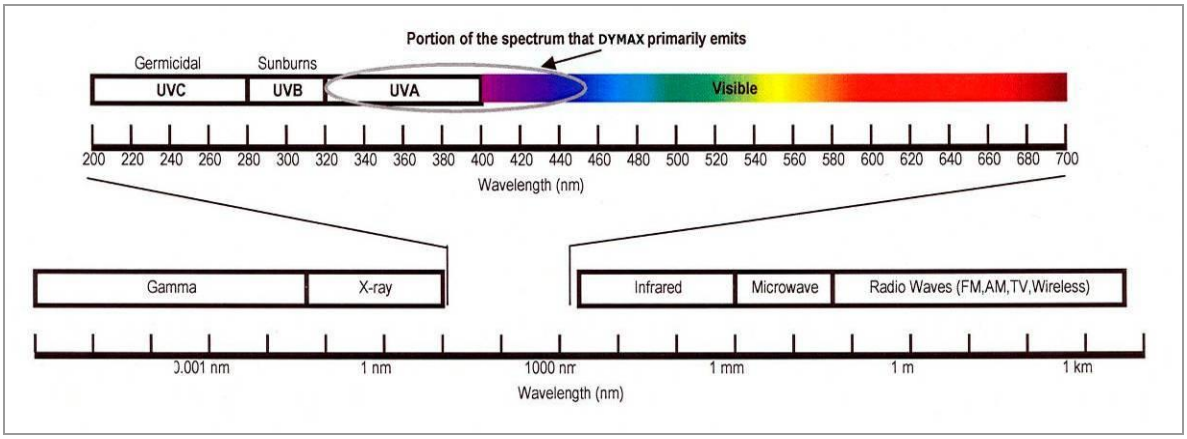
Operators must understand these three concepts to use the light source safely: UV exposure, high-temperature surfaces, ozone, and bright, visible light. Each is described below.

## UV Exposure

Standard Dymax UV light-curing systems and bulbs have been designed to primarily emit UVA light (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 (TLV's) for ultraviolet light.

The strictest interpretation of the TLV (over the UVA range) for workers' eyes and skin is 1 mW/cm$^2$ (intensity), continuous exposure. Unless workers are placing bare hands into the curing area, it is unusual to exceed these limits. To put 1 mW/cm$^2$ limit into perspective, cloudless summer days in Connecticut regularly exceed
3 mW/cm$^2$ of UVA light and also include the more dangerous UVB light (primarily responsible for sun tans, sun burns, and skin cancer) as well.

Figure 1. Light Spectrum




### Checking the Workstation

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 light-curing process. A workstation that exposes an operator to more than 1 mW/cm$^2$ of UVA continuously should be redesigned.

### Protecting Operators

Light-curing technology 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.

### Shield the Source of UV

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, call for assistance.

## 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 light-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 (O2) split into oxygen atoms (O) and recombine with O2 to create ozone O3. The current, long-term ozone concentration limit recommended by ACGIH, NIOSH, and OSHA is 0.1 ppm (0.2mg/$m^3$).

## Bright, Visible Light

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

## Summary

UV light sources can be more “worker friendly” than many commonly accepted industrial processes provided the potential concerns are addressed. Contact your Dymax representative for information regarding the proper use of Dymax UV light-curing systems.

# Unpacking

## Inspecting Your Shipment

Your *WIDECURE* light-curing conveyor will arrive in one crate. Inspect the crates and boxes for damage and notify the shipper of 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

- *WIDECURE* Conveyor
- *WIDECURE* Conveyor System User Guide

## Unpacking Your Shipment

Follow these steps in unpacking the conveyor:

1. Remove the 4 Lag Bolts that are holding the machine onto the crate.
2. Remove the Plastic Banding that is wrapped around the machine.
3. Remove the Bottom Panel from the front of the machine to gain access to the Forklift Pockets (Figure 2).

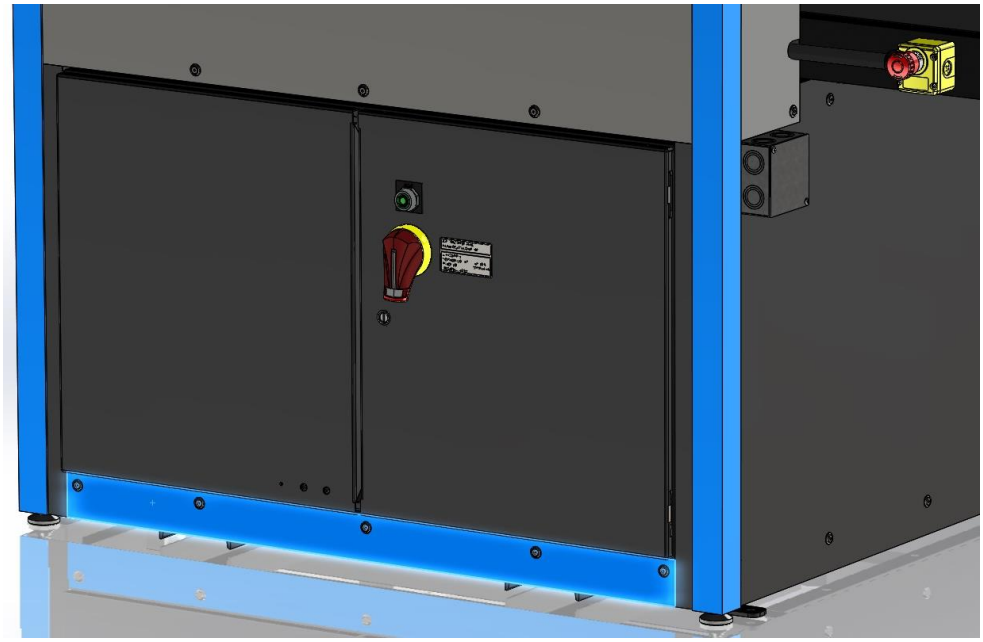
   ***CAUTION:*** *Long fork lift forks may require remove of the unit's rear panel to prevent damage to the panel.*

4. Lift the machine using a forklift and place the unit in its permanent location.

   ***CAUTION:*** *The machine weights approximately 1,200 pounds. Exercise all safety precautions and ensure the forks are seated sufficiently so the machine will not tip when lifted.*

5. Temporarily remove the 4 blue Corner Trip Pieces. They are magnetically attached and could come loose during movement and shipping.
6. With the machine in place, adjust the Leveling Feet so the machine's Conveyor Bed is level and the machine does not rock on the floor.
7. Reattach the Bottom Panel to the front of the machine.
8. Remove the Foam Shipping Blocks that supported the Lamps during shipping.

Figure 2. Front Bottom Panel for Access to Forklift Pockets



# Product Overview

## Description of the *WIDECURE* Conveyor

The *WIDECURE* conveyor system is designed to offer consistent, fast, and safe curing. Equipped with a 25”-wide belt and a 24” curing width, this system is ideal for curing light-curable materials on larger parts or larger quantities of smaller parts. It can be outfitted with either a longwave or a shortwave bulb, giving manufacturers the ability to cure a wider range of light-curable materials.

Designed to help manufacturers build a more reliable cure process, users can easily control various curing parameters through a touch-screen control panel. This feature gives the user greater curing flexibility and enables them to tailor the curing conditions to their specific application. The system’s tightly controlled belt speed and minimal bulb degradation also allow better control over cure. This provides repeatable curing profiles and a more reliable process with less risk of variance.

### Standard Features

Adjustable Lamp Height – The system’s internal lamp may be adjusted from 4" to 24" above the belt. This allows curing of a wide variety of larger parts.

Adjustable Leveling Feet – The conveyor is equipped with ½”-13 threaded holes with leveling feet installed. The machine also features 4 mounting brackets with ½” clearance thru-holes, so the machine can be permanently installed to the floor.

Direct-Drive Motor – The conveyor runs off a 1/3 HP 50:1 ratio right angle gear motor, coupled to a 1:1 ratio cogged belt. The motor is VFD controlled.

Integrated Cooling System – After the lamp is turned off, there is a 5-minute time off delay on the irradiator cooling fans. Do not turn off main power to the system until this 5-minute delay has elapsed. Failure to wait can cause damage to the irradiator cooling assembly or the UV lamp.

UV Blower – The UV blower removes heat and ozone produced by the UV bulb. A 6”-round duct for the UV blower exhaust is provided on the top of the curing system. Additional ducting should be added to vent the exhaust outside of your building. You may need to add an additional blower to your system depending upon the length and configuration of your exhaust ducting.

**UV-Resistant Belt** – Belt speeds can be adjusted from 4-30 feet per minute.

**UV-Light Shielding** – The shielding prevents operators from exposure to stray UV light.

**Ventilation System** – The system's integral vacuum hold-down ventilation system keeps parts securely on the conveyor belt. The ventilation system has an external exhaust duct that can be attached to standard exhaust ducting. Exhausting the blower's cooling airflow out of the operating work environment is recommended to avoid any ozone effects on workers or materials. All medium-pressure arc lamps generate and emit ozone during start-up and operation. External exhaust installation is recommended because the unit produces a small amount of ozone that might be a problem when exhausted to a confined or poorly ventilated space.

## Main Components

Figure 3. *WIDECURE* Conveyor

# Conveyor Setup

## Installation and Interconnection

Your *WIDECURE* UV light-curing conveyor system requires minimal assembly once removed from the packing skid or crate.

1. A certified electrician should provide 460 VAC, 3Ø, 60Hz, 30A supply. The junction box on the right side of the system contains four #8 AWG MTW wires. The electrical supply connection must be hard-wired by a professional, licensed electrician. (Figure 4)

   ***NOTE:*** *The machine will ship with a blank cover-plate installed. The end user shall decide whether the machine is hard-wired with a flexible cable, or routed with metallic conduit. Suggested conduit entrances are from the top, bottom, or rear of the machine.*

2. Verify that the UV shielding is installed on the outlet side of the conveyor. The shielding is designed to minimize UV exposure to the operator.

Figure 4. Power Supply Wiring

Figure 5. UV Shielding


3. The irradiator is mounted on a linear stage that allows the height of the curing lamp to be adjusted from the conveyor belt. Use the control functions on the HMI to move the UV irradiator up or down as needed to allow for parts clearance and/or optimized cure height.

   ***NOTE:*** *The UV light should be turned off before you look into the curing chamber to make an adjustment on the irradiator height or for any other purpose.*

Figure 6. Irradiator

4. The curing chamber is surrounded by an enclosure, and has a perforated screen on top. Adjustable panels are located on the infeed and outfeed openings of the cure chamber area. Slide the panels up and down to allow for clearance of the parts being run, but low enough to reduce stray light emissions from these openings. There are two layers of light-blocking curtains (Figure 7 & Figure 8) after the entrance to the curing chamber and before the exit of the curing chamber.

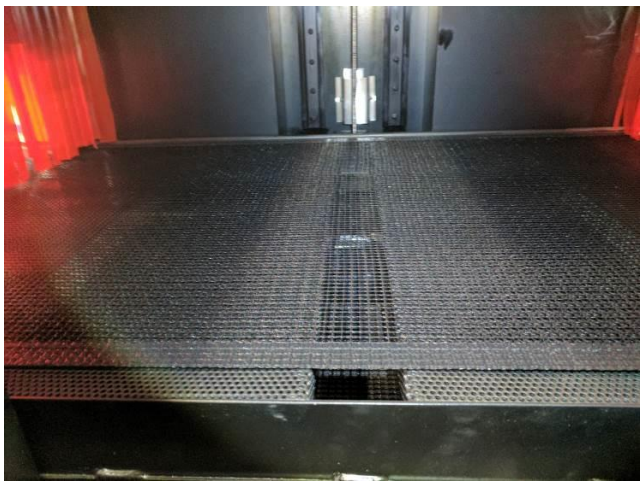
Figure 7. Conveyor Curing Chamber Entrance


Figure 8. Light-Blocking Curtains in Curing Chamber (Top View)

5. The conveyor-bed assembly has 2 mesh plates on either side of the center of the conveyor (Figure 9). Between these mesh plates is an open gap space of 4.5". Caution must be exercised to ensure that parts will not bind or get caught at this gap point. If small parts are being processed, they should be placed on a jig or fixture that will allow them to run through the conveyor without binding or catching.

6. Jig plates must be designed to minimize the pressure on the mesh belt. If too much pressure is applied, it could cause the belt to tear if a sharp edge from a part were to get caught on the conveyor slide plate.

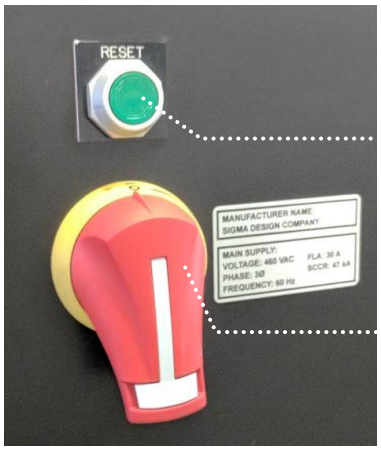
Figure 9. Mesh Plate Gap



# Operating the Conveyor

1. Using the Main Power Switch located on the Front Panel, turn on the main power to the conveyor (Figure 10).
2. Press the Reset Switch on the Front Panel to turn on the Safety Relays.

Figure 10. Main Power Switch & Reset Switch

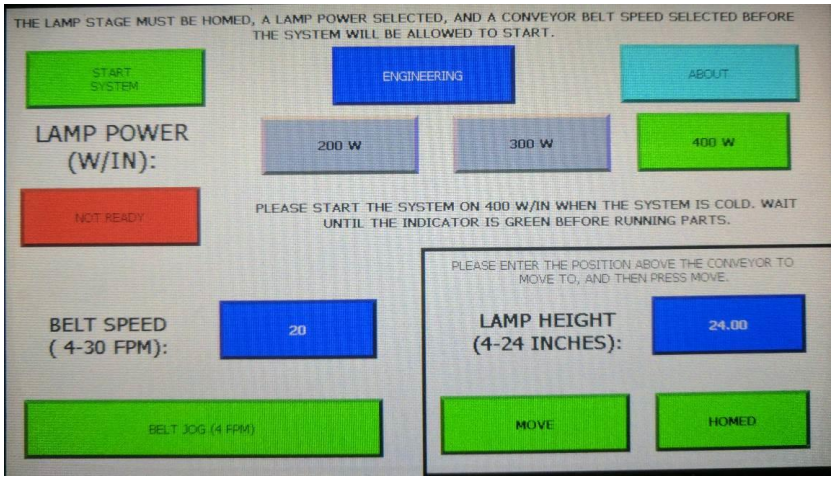



Safety Circuit Reset Switch

Main Power

3. Make sure the foam used to support the lamps during the shipping process has been removed.
4. From the HMI Screen, press the Home Button to home the lamp stage. Once homed, move the Lamp to the desired height setting by pressing the “Move” section on the screen.
5. Select a power level setting and a belt speed. The Start Button will not appear until all of these choices have been made.

Figure 11. Main Operating Screen




6. Press “Start System” to turn on the Conveyor, UV Lamp, Exhaust Blower, and Irradiator Fans.
7. The UV Lamp will begin warming up and the power level will increase. Do not run parts through the Conveyor until the Indicator (Figure 11; located under the lamp power text) turns green.
8. The Irradiator Cooling Fans are programmed to have a 2-minute delay before turning on. This gives the lamps time to warm up to operating temperature. The fans also have a 5-minute delay after the system has been turned off. Do not turn off the main power until the fans have turned off.

*NOTE: Always start the system on high (400 w/in). After reaching a "ready" status, other power level settings may be selected. This is to give the lamp sufficient time to heat up. Starting the lamp in other than the 400 w/in setting may cause unreliable ignition and/or unstable lamp operation.*

## Safety & E-Stop Conditions

The system features a category-3-rated safety circuit that features two e-stop stations, an access door, and electrical panel door interlocks. These four devices are wired in series to a guard relay. All four devices must be in their normal operating position (normally closed) to allow the safety circuit to engage power to the lamp, conveyor motor, and stage assemblies.

If an e-stop button is depressed, power to the blower, UV lamp, conveyor, and stage will immediately be cut out. The e-stop button then needs to be twisted and pulled to be released, and the green reset switch pressed to re-engage the safety circuit.

During an e-stop event, the irradiator cooling fans will continue to run to prevent the lamp from overheating if the cooling is suddenly removed from it. After an e-stop event, the operator must wait 5 minutes before the start button will become visible again. This is to allow the lamp enough time to cool. It can be damaging to both the lamp and the UV power supply if the lamp is re-ignited while still hot.

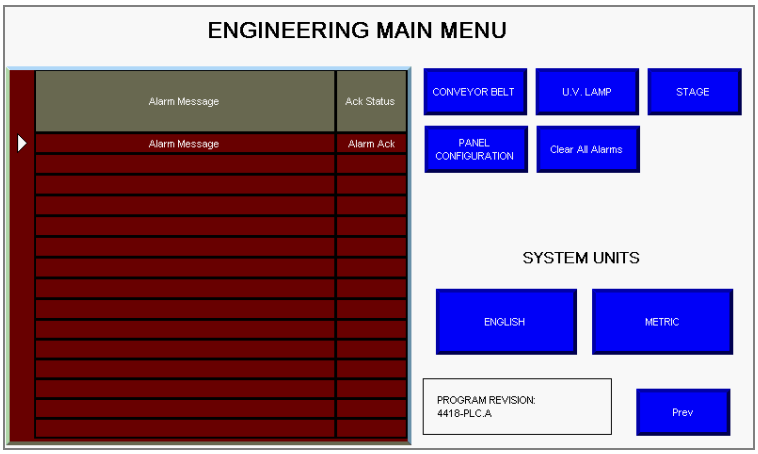
# System Adjustments

## Engineering Screen

From the Main Operating Screen (Figure 11), the Main Engineering Screen can be reached by pressing the blue engineering button centered at the top of the screen. From the Main Engineering Screen you can access various sub screens: conveyor belt settings, UV lamp settings, and panel configuration.

Under the system units heading, the user can choose either English or metric units. The English units are feet per minute (FPM) for the conveyor speed, and inches for the stage height. The metric units are meters per minute (MPM) and centimeters for the stage height.

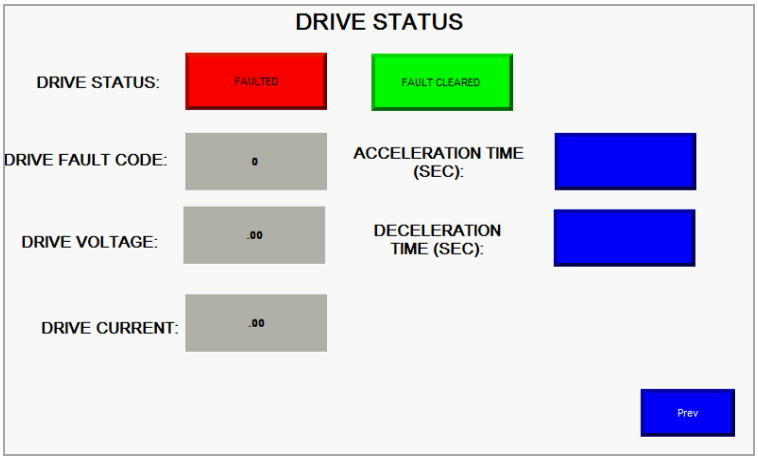
Figure 12. Engineering Main Menu




## Conveyor Belt Settings

The Conveyor Belt Settings Sub Screen (Figure 13) shows the statistics of the conveyor belt drive and if there are any fault codes. Fault codes can be referenced from the Allen Bradley Power Flex 525 Drive Manual. If a fault code exists, press "Clear Fault" to reset the drive. Additionally, the acceleration and deceleration times of the drive can be changed to accommodate the synchronizing of upstream and downstream processes. The acceleration/deceleration range is 1-30 seconds.

Figure 13. Conveyor Belt Sub Screen




## UV Lamp Settings

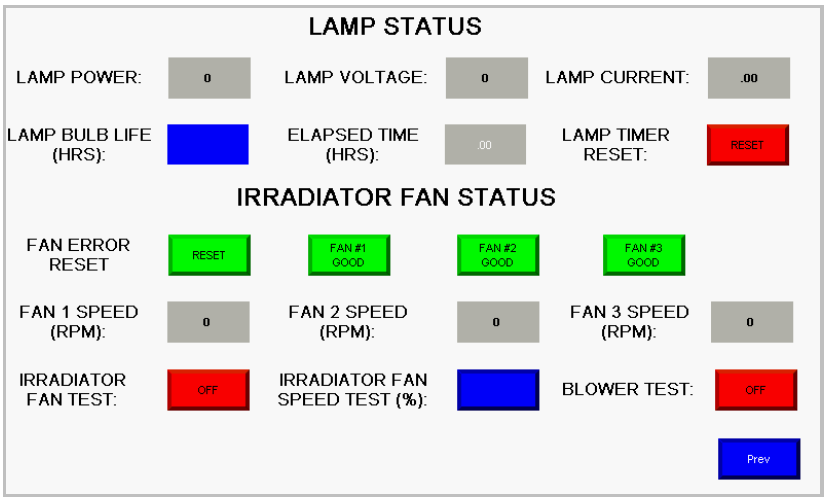
The UV Lamp Settings Sub Screen (Figure 14) shows the status of the lamp driver. This includes the current lamp power, voltage, and amperage, as well as the fan speed of each of the three irradiator fans. Diagnostic test buttons allow the operator to run the irradiator fans independent of the machine at any set speed. This is helpful for diagnosing whether a fan is operating correctly. The irradiator fans have tachometers on them, and the program is written to constantly monitor the fan speed. If the fans fall below a threshold speed, the fans will turn off, along with the UV lamp and conveyor, and a fan error message will appear. The fan that triggered the error will appear red in the fan status bar.

The user must clear the fan error by depressing the reset button before the machine will be functional. The fan levels must be above the values shown below to be considered properly working.

These values are 20 % below the fans nominal speed:

- Low Power : 400 RPM
- Medium Power: 1500 RPM
- High Power : 4000 RPM

Figure 14. UV Lamp Sub Screen




*NOTE: Due to lamp and power supply variation values (nominally, low = 5,000, medium = 7,500, high = 10,000) and the actual reported values from the power supply may vary by as much as 5%.*

## Bulb Usage Monitoring Settings

The bulb life can be entered in the box titled “Lamp Bulb Life” (Figure 14). The bulb life can be set to any value from 1- 1,000 hours. The elapsed time is displayed next to it. When the elapsed time equals the bulb life setting, a message to change the lamp will appear. After replacing the lamp, press “Lamp Timer Reset” to reset the elapsed time.  A 750-hour bulb life is expected from Dymax lamps.

# Stage

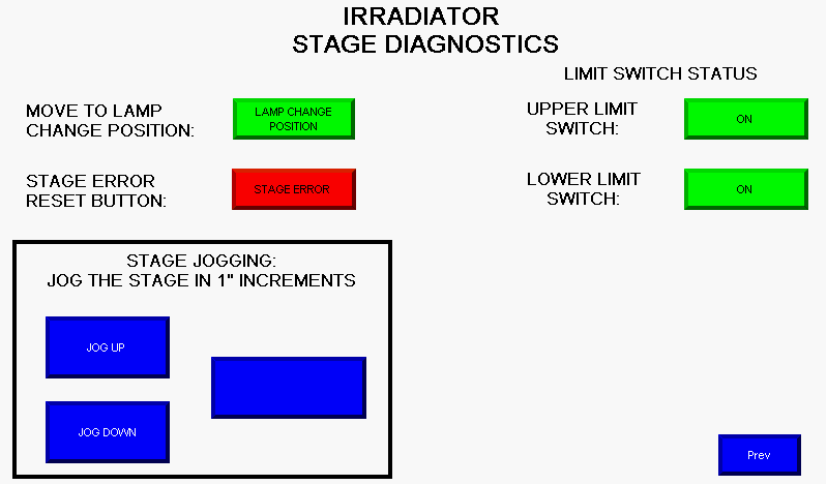
The Stage is the lamp lift assembly containing the bulb, also known as the irradiator.  The stage’s upper and lower limit switches are shown on the right side. The switch indicators will be red if the switch has not been engaged, and green if it is. The switches are wired to be normally closed. If one of the switches malfunctions, these indicators can be used to determine which switch is on or off when it should not be.

The lamp change position will move the stage to the lower limit switch (4” above conveyor belt) from any current position. This is the position the stage should be in to easily remove the irradiator cables.

The stage error reset button will clear any internal faults to the motion axis on the PLC. If the machine fails to move, cycle power to the machine and try again. If the stage still ceases to move, press the stage error reset button to clear the fault.

The stage jogging window allows the user to jog the stage up or down at any point in 1” increments. This is useful if the stage becomes stuck, and must be jogged down to get off of a stuck point.

Figure 15. Stage Sub Screen



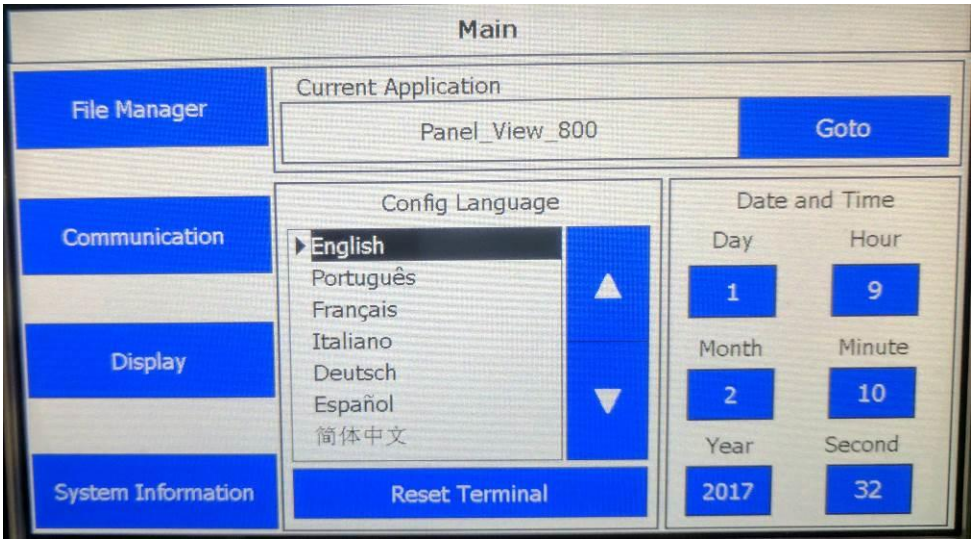

# Panel Configuration

Users can access the HMI’s settings from this sub screen. These settings include:

- Loading and unloading HMI programs
- Updating the firmware
- Changing the panel’s IP address
- Changing the system’s date, time, and time zone

Under normal circumstances, going into the panel configuration is not necessary and not recommended. If the need arises, please refer to the panel’s instruction manual for more specific instructions.

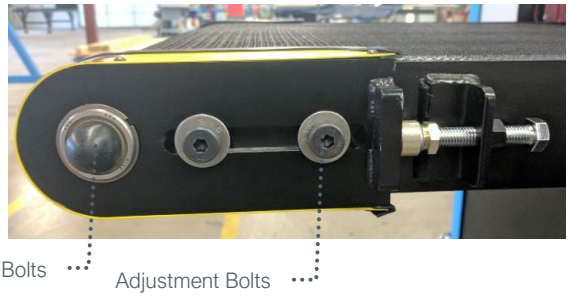
Figure 16. Panel Configuration Sub Screen




# Maintenance

The *WIDECURE* conveyor should require little maintenance. It is important that the belt be operated under proper tension and alignment. If the belt is loose, it can slip, resulting in belt and roller wear as well as improper conveyor speed. If the alignment is incorrect, the belt can track to one side, inducing wear to the side of the belt. The conveyor should be inspected daily to assure that the belt and rollers rotate in phase with one another and that the belt remains centered between the conveyor sides.

Figure 17. Adjustment Screws for Belt Tension and Alignment




## Belt-Tension Adjustment

If the belt requires an adjustment:

1. Loosen the locking bolts, then turn the adjustment screw clockwise to increase the belt tension (Figure 17). Make this adjustment equally on both sides of the conveyor to ensure proper belt tracking. Once the slack has been removed, the bolts should be evenly tightened 1 turn. Typical tension is 10 inch-pounds.

2. Retighten the locking bolts.

*NOTE: Do not over-tension the belt. Over tensioning can cause tearing of the belt seam and damage to other components.*

## Belt-Tracking Adjustment

All Dymax *WIDECURE* conveyors are factory adjusted to provide proper tracking of the belt. Should further adjustments become necessary, this is done via two adjustment bolts located at the input end of the conveyor (Figure 17). To adjust tracking, simply tighten the side to which the belt is tracking.

*NOTE: Do not over tighten the belt. This will lead to accelerated degradation of the belt. The belt should be only tight enough as to ensure it does not drag on the underside of the conveyor and machine.*

## Electrical Case Fan Filter Replacement

1. The filter used in the electrical cabinet of the *WIDECURE* conveyor is a Hoffman Replacement Filter, part #10100061 and can be obtained through www.platt.com.

2. Turn off the conveyor and shut down the main power supply breaker to remove electrical power at the *WIDECURE* system.

3. On the left side of the conveyor, remove the blue trim corners on the front and rear of the unit. They are magnetically held to the conveyor (Figure 18).

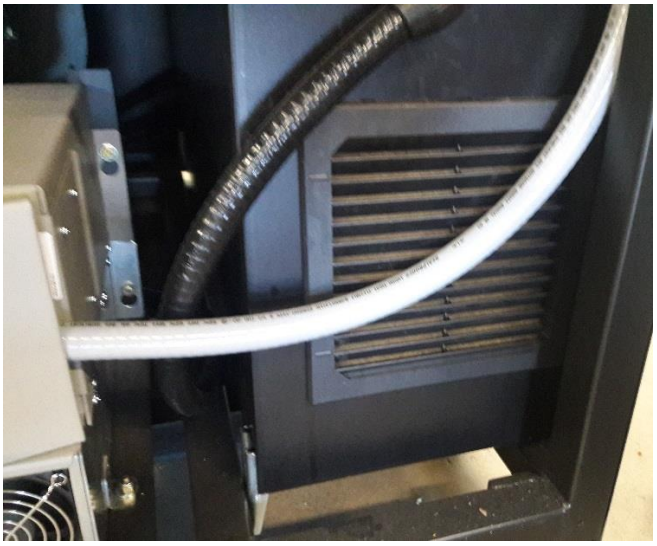
4. Remove the black lower panel on the left side of the conveyor, just below the belt, (Figure 18) by unscrewing the Phillips-head screws. This will expose the lamp power supply and blower system (Figure 19).

Figure 18. Remove Blue Corner Trim and Black Panel on Left Side of System


Figure 19. Remove Black Panel on Left Side of Conveyor

5. On the right side of the opening, towards the front of the conveyor, is a black-louvered fan cover. This cover can be removed by placing a flat-blade screw driver between the cover and the electrical housing and lifting the cover away from the housing (Figure 20).

Figure 20. Fan Cover



6. Once the fan cover has been removed, the fan filter can be lifted away from the assembly and replaced with a new filter.
7. When the new filter has been installed, replace the fan cover by lining it up to the opening and pressing it back into place.
8. Reinstall the side panel and the blue corner trim pieces before restoring electrical supply to the *WIDECURE* system.

## Bulb Replacement

***CAUTION!*** *Never touch a UV lamp with your bare hands. Always wear clean protective gloves before servicing the irradiator assembly. If accidental contact with the lamp occurs, gently wipe the lamp's surface with isopropyl alcohol (IPA) and a soft, lint-free cloth to remove any finger oils.*

1. From the UV screen, press move to change the lamp position.
2. After the lamp finishes moving, turn off the main power to the system.
3. Lock out the power interlock and circuit breaker feeding the machine.
4. Open the irradiator access door and remove both the fan and irradiator power cables.
5. Pull the yellow tabs on the drawer slides to pull out the irradiator assembly. Be careful to lift the cables above the irradiator to prevent damage to the cables or connectors.
6. Remove the 4 black thumbscrews that hold the top irradiator assembly to the base.
7. Lifting from the supplied handles, carefully remove the assembly and place it upside down on a flat, stable surface.
8. Loosen the 2 Phillips-head screws on either side that hold the sheet-metal clamp closed against the ceramic part of the lamp.
9. Remove the blue lamp power cables by removing the #6 nuts from the ceramic standoff.
10. Remove the cables from the studs.
11. Carefully remove the old bulb. Secure it for proper handling and disposal.
12. Carefully install the new bulb, then close the latch and re-secure the Phillips-head screws.

    ***CAUTION:*** *Only handle bulbs with clean gloved hands. If bulb is contaminated clean with IPA and lint free cloth.*
13. Reattach the lamp's lead wires to the ceramic standoff and reinstall their retaining nuts.
14. Ensure the bulb is secure, then flip the assembly over and install it into the irradiator housing.
15. Reinstall the 4 black hand-knobs that hold the irradiator top assembly to the base.
16. Lift the cables to prevent damage to the connectors or cables and carefully close the drawer slides until it latches in place and reattach the power cables.

***WARNING!*** *If you remove the high-voltage irradiator cable from the irradiator, use extreme care when replacing it. If the connector is not properly seated and tightened, the cable can be permanently damaged and can cause unit failure.*

Figure 21. Irradiator Assembly

## Lamp Stage Care

The lamp irradiator housing sits on a stage which includes the lift system. This system requires occasional attention to prevent dithering, as discussed in the Troubleshooting Section of this user guide. Below are instructions for caring for the lamp stage.

1. Move the lamp to the full 24" height setting and shut lamps off (Figure 21).
2. Allow the irradiator fans and blower fans to run until the curing chamber has sufficiently cooled.
3. It is not necessary to remove any of the lubrication on the lead screw (Figure 22) unless it appears to be very dirty from the collection of airborne particulates. Removing any buildup of lubrication at either end of the lead screw is advisable.
4. The two guide bars (Figure 22) should be cleaned using a new, clean cloth. Do not reuse the cloth used to clean the lead screw. It can cause cross contamination of lubrications.

Figure 21. Move Lamp to Correct Height

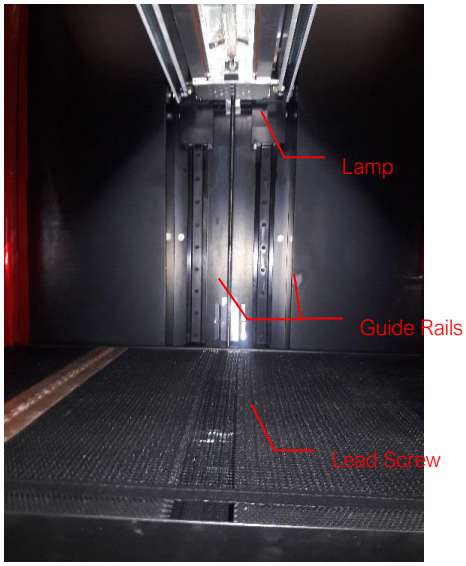
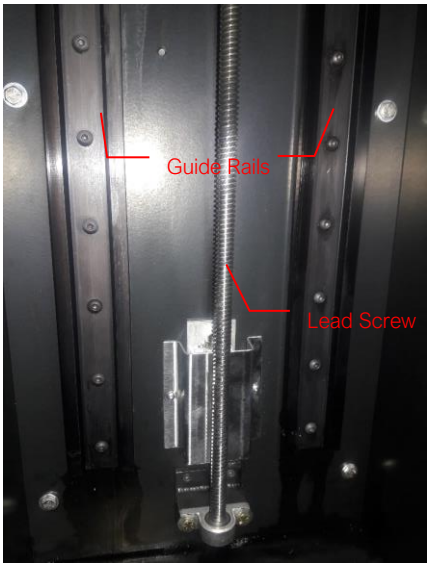



Figure 22. Guide Bars & Lead Screw (Close Up)




5. Once the lead screw and the two guide bars have been appropriately cleaned, the assemblies will need to be properly lubricated.

- Guide Support Bars: Use 3-in-One Drylock lubrication only (Figure 23)
- Lead Screw: Use TriGel 600SM only (Figure 24)

***CAUTION:*** *Do not use silicone-based, fluorocarbon lubricants on the lead screw or the guide supports bars. These types of lubricants will not hold up to heat & UV exposure, leading to lamp stage motion failures such as dithering, stuttering, or grinding.*

Figure 23. 3-in-One Lubricant


Figure 24. TriGEL 600SM Lubricant

# Troubleshooting

***WARNING!*** *Only qualified maintenance personnel should attempt the following procedures.*

Table 1. Troubleshooting Chart

| Problem | Possible Cause | Testing | Corrective Action |
|---|---|---|---|
| Conveyor Not Operating | Main Line Circuit Breaker tripped. | Toggle Power Switch off, then on. | Find cause of tripped breaker. |
| | Improperly fastened electrical Connections. | Check all connections. | Properly fasten electrical connections. |
| | Fuses for Motor Controller blown. | Remove Fuses from Fuse Holders (located in the left side of control box of unit) and check with an Ohmmeter. | Replace Fuses if defective. |
| | Belt is hung up. | Inspect the Belt for any signs of a mechanical bind. | Resolve bind and continue operation. |
| | Tension too low on Belt (Power Switch lights and Motor turns but Belt does not move). | Verify the operation of the Drive Shaft and Drive Rollers. | Use the tracking adjustment screws to increase the tension on the Belt. Both knobs need to be turned the same amount to maintain alignment. |
| | Error displayed on HM! screen | Find error in engineering screen | Clear error. If error repeats, investigate root cause of error. |
| Belt Tracks to One Side | Belt Adjustment Screws are out of position. | Visually inspect the Belt. The Belt will track to one side. | Tighten the Belt Adjustment Screw (the one located on the side to which the Belt is tracking towards) until Belt tracks straight. Only minor adjustments should be made at one time. |

# HMI Alarm Messages

Table 2. HMI Alarm Descriptions and Resolutions

| Error | Description | Resolution |
|---|---|---|
| Drive Communication | The PLC has lost communication with the VFD. | Press the reset switch and check that the Ethernet cable is securely connected on both ends in the control cabinet. |
| Drive Fault | The VFD has had an error occur preventing normal operation. | Refer to the Conveyor Belt screen in the engineering section. Identify the fault code displayed, and refer to the VFD's instruction manual for further instruction. |
| Emergency Switch | Either one of the E-stops, or the interlock switch has been tripped. | Reset the switch, then press the reset button. |
| Fan Error | The irradiator cooling fans are not operating correctly. | Go to the lamp's sub screen of the engineering section. Determine which fan is producing an error and clear the error.<br>If the error persists, one of the cooling fans is not functioning properly and may need replacement. Refer to the UV lamp subsection in System Adjustments (pg. 15) for a listing of nominal fan speeds. |
| Fan Low | The UV lamp power supply fans are not operating correctly. | Power down the system and remove the lower back panel. Check that the cooling fans are able to spin freely. |
| Ground Fault | The UV power supply is not properly grounded. | Power down and tag out the machine. Ensure the power supply ground is properly connected. |
| Interlock Switch Fault | The access door is/has been removed. | Re-attach the access panel and press the reset button. |
| Lamp Open | The UV lamp is not connected. | Power down the system and follow the Bulb Replacement Procedure. Ensure the lamp power cable and connections are secure. |
| Lamp Short | The UV lamp is shorted. | Replace the lamp in accordance with the Bulb Replacement Procedure. |
| Temp Alarm | The UV lamp power supply is overheating. | Ensure there is adequate ventilation and the power supply's cooling fans are not restricted. |
| TempTrip | The UV lamp temperature sensor has malfunctioned. | Contact Dymax. |
| Timer Alarm | The UV lamp has reached its expected life. | Replace the bulb. Instructions for bulb replacement can be found on page 21. |
| Timer Reset | The UV lamp timer has been reset. | No action required. |

## Stage Errors

The stage is controlled by an open-loop stepper motor. From time to time, the stage may lose count of the steps taken, and consequently, its distance from the limit switches. If this happens, please follow the steps below to remediate the problem:

If during a move the machine begins to dither (stutter, or a grinding sound) one of two things will happen:

- The machine will catch itself, and continue to finish the move.

  If this happens, the machine should be homed to re-establish the correct height and then moved to the desired original height.

- The machine will not move and just dithers in place.

  Move the machine down an inch below the original position. For example, if the machine was at 9", and 12" was commanded, the machine will report 12" without having moved. Type in 11" to move it down 1".

  After the machine moves successfully down 1", home the machine and move it to the original desired location.

If during a homing sequence, the machine stalls or dithers the following should be done to correct it:

- Depress the e-stop button to disable the stepper drive
- Reset the system to try and home the machine again
- If it is still dithering, e-stop the machine and reset once more
  1. On the stage sub-screen from the engineering menu, jog the stage down in one inch increments to get it off of the "stuck spot"
  2. The numeric display next to the jog buttons will then be a relative distance from where it was stuck
  3. attempt to re- home the machine from the main screen

## Spare Parts and Accessories

| Item | Part Number |
|---|---|
| **Bulbs** | |
| 25" Metal Halide Bulb (standard) | 41247 |
| 25" Mercury Bulb | 41246 |
| Conveyor | |
| Conveyor Belt | 41248 |
| Irradiator Assembly Complete (Includes Standard Bulb) | 41249 |
| Irradiator Assembly Complete (Includes Mercury Bulb) | 41250 |
| Orange Light-Shielding Curtains | 41251 |
| HMI Screen Module | 41252 |
| **Protective Eyewear*** | |
| UV Blocking Safety Eyewear (Grey Tint) | 35285 |
| UV Blocking Safety Eyewear (Clear) | 35284 |
| **Radiometer** | |
| ACCU-CAL™ 160 Radiometer | 41590 |
| Radiometer Data Download Kit | 40629 |

*Additional safety eyewear available

## Bulb Options

*WIDECURE* conveyors can be outfitted with either a longwave (metal-halide, UVA/Visible) bulb or a shortwave (Mercury, UVB/UVC) bulb. Longwave bulbs are recommended for most Dymax UV light-curable materials while shortwave bulbs are generally recommended for UV inks. **Error! Reference source not found.** and **Error! Reference source not found.** show the spectral distribution of each type of bulb. Unless otherwise specified, Dymax *WIDECURE* Conveyors are outfitted with longwave (metal-halide) bulbs.

Figure 26. Spectral Distribution with a Metal-Halide, Iron-Doped Mercury Bulb (Standard Bulb)

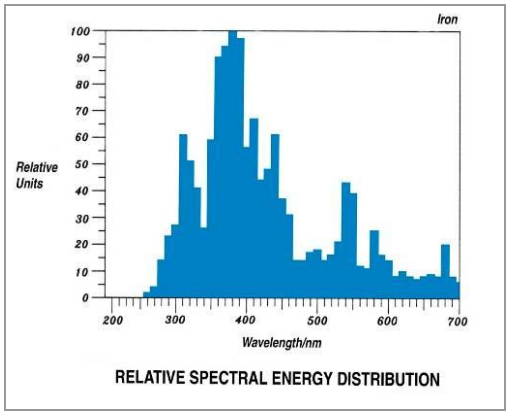
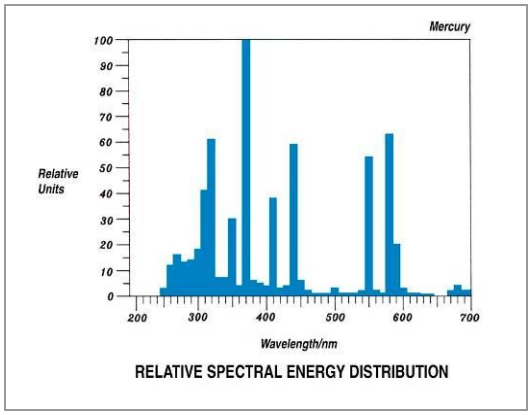



Figure 25. Spectral Distribution with a Mercury Bulb (Optional Bulb)



# Specifications

## System Specifications

| Property | | Specification |
|---|---|---|
| Part Number | Belt Travel (Left to Right) | 41245-L |
| | Belt Travel (Right to Left) | 41245-R |
| UV-Curing Information | Bulb Curing Width | 25" [63.5 cm] |
| | Peak Intensity | 700 mW/cm$^2$ nominal[1] |
| | Bulb Life | 750 hours typical[2] |
| | UV Lamp Type | 400 W/in metal halide bulb (standard) [3] |
| | Reflector Type | Focused |
| Belt Information | Belt Width | 26" [66 cm] |
| | Belt Working Height | 34"-37" [86.4 cm – 94 cm] above floor |
| | Belt Material | Teflon-coated fiberglass |
| | Belt Speed | 4 – 30 FPM |
| | Speed Control | Digitally controlled, 0.1 ft/min. resolution, 2% accuracy |
| | Maximum Belt Load | 50 lbs. (22.7 kg) total capacity |
| Dimensions | Overall Dimensions (L X W X H) | 113.5" x 46.5" x 73" [288.3 cm x 116.8 cm x 193 cm] |
| | In-Feed Length | 26" [66.04 cm] |
| | Shroud Length | 48.25" [122.55 cm] |
| | Out-Feed Length | 26" [66.04 cm] |
| | Clearance and Lamp Height | Adjustable from 4" to 24" [10.16 cm - 61.0 cm] |
| | Maximum Part Height | 18" [45.7 cm] |
| Electrical Information | System Power | 460 VAC, 3Ø, 60 Hz, 30 Amp. |
| Air Flow Information | Cooling Air Flow | 1,000 CFM rated |
| | Blower Duct Dimensions | 6" [15.24 cm] (round) |
| Replacement Bulbs | | 41247 25" Metal Halide (standard)<br>41246 25" Mercury |
| Shipping Weight | | 1,200 lbs. |
| Lead Time | | 1-2 weeks in stock |

[1] Measured with an Accu-Cal 160 radiometer at a lamp height of 4" (10.1cm).
[2] Bulb life is affected by the operating environment, duty cycles, and minimum intensity requirements.
[3] The system can also be outfitted with Mercury bulbs ("H" type) for UV inks and cationic formulations.

# Definition of Terms

**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.

**Bulb** - a light source generating ultraviolet, visible, and infrared radiant energy from burning matter stimulated by electrical power conditioned by a proper power supply. 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).

**Dose** - irradiance integrated over time, or Irradiance ($W/cm^2$) x 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).

**Intensity** - a measure of light energy over the unit of surface area (usually the surface at the specified working distance from the bottom of the reflector housing) in $W/cm^2$ or $mW/cm^2$.

**Ozone** - oxidizing agent ($O^3$) produced by the action of ultraviolet radiant energy (below 185 nm) or electrical corona discharge of oxygen on air.

**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 do not radiate energy in deep ultraviolet; there are very minute amounts below 220 nm.

- **Ultraviolet A (UV-A)** - UV of long wavelength from within approximately 400 to 320 nm of the spectral band - predominately produced by Dymax conveyors and flood systems.
- **Ultraviolet B (UV-B)** - UV of medium wavelength from within approximately 320 to 280 nm - Dymax conveyor and flood arrays produce some amount of their energy within this bandwidth.
- **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.
- Visible - Energy that can be seen by the human eye (400-700 nm).

OSHA 1910.145: "Regulation of Accident Prevention Signs and Tags" defines the following headers as:

- **WARNING** – is used when there is a hazardous situation that has some probability of severe injury.
- **CAUTION** - is used to indicate 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 (excluding LED array) 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.*

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