



UV-10

Conveyorized UV Curing System

(Model #A012-023: UV-10 Conveyor 10"W x 36"L)
(Model #A012-018: UV-10 10" Shuttered UV Curing System)
(Model #A012-022: UV-10 10" Unshuttered UV Curing System
w/parabolic reflector)



DISCLAIMER

WARNING: 1.) When operating this unit, airflow must remain fully unobstructed. 2.) User must provide appropriate shielding to protect employees against UV radiation exposure.

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Introduction

This manual provides information regarding the different components (irradiator, lamp, reflectors, power supply and conveyor belts) for operating and maintaining your UV-10 system. It also includes directions and guidelines for operating the irradiator system, including proper lamp mounting and focusing, at optimum efficiency. In order to help prevent costly downtime and to ensure maximum UV output, this manual contains important advice on proper clean-up and maintenance procedures

Please note high intensity, medium pressure mercury vapor lamps can generate extreme heat and corrosive temperatures. However, the UV-10's components (thin reflector sheets, gap for cooling and fans) are designed to withstand the harsh environment created within the UV curing chamber, and to provide optimum cooling.

IMPORTANT: UV radiation can cause severe burns to eye and skin. Use protective materials (goggles, glasses, lotions) to ensure personnel safety. Proper maintenance procedures, including maintaining an inventory of spare lamps and reflectors, should also be practiced in order to ensure maximum efficiency and to prevent costly downtime.

Overview

Designed to produce the maximum curing power from a standard 110v outlet, the UV-10 delivers 1600 watts of curing energy economically and within a fully encased system. Each unit incorporates a complete power supply and is equipped with a Lighthouse irradiator with an effective arc length of 5 to 10".

The UV-10 Lighthouse utilizes an irradiator positioning system that allows the operator to adjust lamp holders to handle different diameter lamps and to effectively adjust focused cure energy. The Lighthouse irradiator can accept different arc lengths with minimal field modification when higher intensity curing power is required. By reducing the size of the lamp, energy usage is more concentrated to produce higher intensity exposure.

The UV-10 conveyor features a variable speed DC drive with a maximum belt speed of 100 feet per minute ...nearly doubling the standard speed of most duplicator presses! Featuring a thermal-resistant mesh belt to withstand heat build-up and degradation, the UV-10 conveyor also features speed and belt tension/tracking adjustment, plus belt height adjustment between 24 to 48" for meeting in-line demands of individual production lines.

Sturdy, lightweight frame with 4-leg conveyor leveling offers excellent portability for use anywhere in the shop or lab. Maintenance-free gear belts, gear motor and bearings greatly minimize maintenance and downtime. Compact size fits into confined work environments. The complete UV-10 system (cure unit and conveyor) requires only two 110v outlets.

Assembly and Installation

This unit was shipped disassembled and will require assembly prior to use. Please follow the directions below to ensure proper operation.

Conveyor Assembly

Remove the conveyor, curing system components, and assembly hardware from the shipping carton. Stand the conveyor vertically on the floor, with the conveyor leg brackets facing toward you. Be careful not to pinch any wires.

The conveyor is shipped with four (4) leg brackets secured to the conveyor chassis. Rest the conveyor on the infeed end (opposite the control panel; be careful not to damage the belt), and attach one 2-leg support to the outfeed conveyor leg brackets provided. Tighten to minimize instability, but to permit further adjustment when fully erected. Subsequently attach the remaining 2-leg support to the brackets positioned near the infeed.

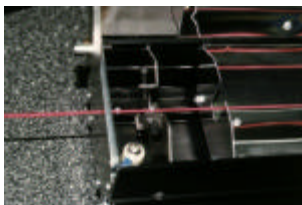
Conveyor Control Panel Mounting

The housing that covers the conveyor drive belt is secured by two cap nuts. While viewing the housing from the front, remove the right cap nut and slide the control box's mounting slot over the exposed fixed bolt. Retighten the nut to fasten the control box in place.

Curing System Enclosure Mounting

Remove the UV-10 irradiator, also called the "housing", from its protective enclosure. Insert the four (4) mounting nuts into the conveyor side channels. Position the enclosure over the conveyor belt. While supporting the enclosure, align the enclosure mounting holes with the mounting nuts. Hand-tighten each of the allen bolts into the mounting nuts allowing the enclosure to slide along the conveyor channels. Position the enclosure at the point along the conveyor which conforms with your production line requirements (required infeed conveyor length vs. required outfeed conveyor length). Once positioned, tighten the allen bolts to secure the enclosure in place.

Installing the Lamp



Focus Reference Hole

IMPORTANT: Before installing or focusing the lamp, unplug this unit from its power supply to ensure complete safety.

To secure and focus a lamp within the universal lamp holder, remove the hardware securing the end caps (left and right) which encase the lamp holders.

The standard UV-10 elliptical reflector uses highly focused geometry to converge all lamp energy 3.25" from the center of a focused lamp

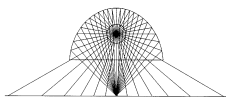
– the exact focal point needed for maximum efficiency. **Lamp position, focus and distance have been initially calibrated during manufacturing for maximum efficiency and do not require adjustment during installation.**

Refocusing the Lamp

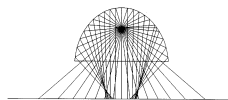
IMPORTANT: THIS UNIT IS SHIPPED FULLY FOCUSED AND DOES NOT REQUIRE ADJUSTMENT UPON RECEIPT. SHOULD THE UNIT REQUIRE REFOCUS AT ANY TIME, FOLLOW THE INSTRUCTIONS PROVIDED BELOW.

Centering the lamp's focus is found to be more critical than expected. Mounting the lamp ¼ of an inch upwards, downwards or to the left will greatly affect the efficiency and intensity of the lamp's ultraviolet energy.

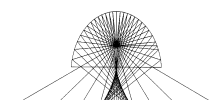
Should the lamp require position verification and refocus at any time, the irradiator is equipped with two Focus Reference Holes found in each end plate. To allow for repositioning, this housing features universally adjustable lamp holders to permit adjustment as necessary.



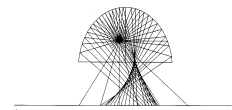
CON-TROL-CURE 3/4
Elliptical Reflector with
adjustable lamp
positioning



Typical Reflector
Lamp 1/4" too high



Typical Reflector 1/4"
too low



Typical Reflector 1/4"
too far left.

To focus a lamp, string a wire through the Reference Holes located at each end of the reflector. Note the wire's position in relation to the lamp holders. As mentioned previously, the center of the lamp in relation to the conveyor belt should be 3.25". If the holder appears at variance with this measurement, raise or lower the lamp holder by adjusting the nuts that secure the lamp holders in place.

To ensure the lamp is properly centered, the lamp should be positioned 2.75" left-to-right as measured from outside of the lamp housing. The lamp should also be centered directly over the reflector strip. If corrections are required, loosen the lamp holder and pivot the brackets until the holder is aligned with the reference wire.

Once all corrections have been made, retighten the holder hardware to prepare for lamp mounting.

Lamp Mounting

When focus is complete, and with the end caps removed, the UV-10's lamp holder mounts are exposed. Loosen and remove one wing nut per side and swing the lock-down clamp away from

the reflector. Place the lamp's ceramic or metal ends into the v-notched universal holders, and swing the lock-down back into place. For ceramic end lamps, finger-tighten so as not to crack ceramic encasement; for metal end lamps, tighten firmly in place.



Hold-down bracket unlocked for lamp placement.



Lamp locked in place; hold-down bracket secured.

If you are installing a wire end lamp, connect the wire ends to the appropriate grounding posts. If the lamp requires refocusing (see "Refocusing" above), do not connect the wire ends until the lamp is properly focused.

When installing any lamp, do not touch the quartz envelope directly. Always wear cotton inspection gloves (Men's - #1004-022) (Ladies' - #1004-031) when handling the UV lamps.

Do not allow fingers or hands to touch the lamp body after cleaning or during lamp mounting. Dirt and foreign particles can cause a lamp to fail or create an obstruction of the UV light. Once the lamp is installed, reattach and secure the end caps covering the lamp holders and reflector.

Power Supply Connection/Installation

Connect the power supply to the irradiator as detailed in the attached electrical schematic.

Curing System Mounting

With the enclosure and lamp securely mounted, slide the irradiator housing into the enclosure by aligning the ¼" channels on the housing with the channel guides within the enclosure. (If your unit is a shuttered system, position the pneumatic piston on the side of the conveyor control panel). Slide the unit into the enclosure until it is centered over the conveyor. Hand tighten the allen set bolts located on the outside of the enclosure to fix the irradiator in place. Install the blue UV filter material to cover the exposed sides. Adjust filters over conveyor so substrate can pass beneath unobstructed while also providing maximum protection against UV light exposure.

Assembled Conveyor Leveling

To ensure proper belt tracking, the full system must be assembled and properly positioning in-line before leveling. Once assembled and in place, position a carpenter's level along the infeed conveyor roller. Loosen the infeed leg insert and adjust leg height until conveyor height properly meets production line needs. Hand tighten infeed leg in place. Repeat this procedure for the outfeed conveyor legs, leaving the bolts hand tightened to permit final adjustment.



Place the carpenter's level along the length of the conveyor to check front-to-back leveling. If significant height adjustment is still required, adjust the appropriate leg by sliding the leg insert up

or down. If the adjustment required is minimal (1/2" or less), tighten the legs in place and adjust the individual leveler pad height accordingly.

For final height adjustment, only make adjustments on three of the four legs. Use the fourth as a "master position." Recheck height at all four corners making slight adjustments to the remaining three legs with the leveler pads if necessary. Tighten all hardware in place after final adjustment and perform a final check of all corners with the carpenter's level.

NOTE: Should the conveyor be repositioned at any time, the unit will require releveling to ensure proper belt tracking.

UV-10 Cure System Control Panel

1. On/Off Pushbutton: Pull switch to turn curing unit "On". Push to turn system "Off". Note: Be sure conveyor belt is moving whenever the curing system is operating to prevent scorching.
2. Ammeter: Indicates amperage draw of UV-10 curing system. Use to gauge lamp energy level during startup and throughout operation to verify stabilization and energy consumption.

UV-10 Conveyor Control Panel

1. On/Off Switch: Turns conveyor "On" and "Off" separate from the curing system. Switch will illuminate when system is On. When shutting this system down, be sure to continue conveyor operation until curing system cools sufficiently (prevents belt scorching).
2. Speed Control: Stepless potentiometer permits infinite adjustment of belt speed. Adjust to meet cure energy and production speed, or UV dosage, requirements (energy+speed=dose).

Operation

Electrical/Start-up

With the lamp and reflector secured in place, and all shields locked down, you are ready to power up the unit.

With the reflector and lamp shielded against harmful exposure, turn the power supply "On". Adjust belt speed control to start conveyor movement to protect against belt damage.

Refer to your lamp manufacturer's specifications indicating the length of time required for the lamp to reach stabilization (may vary from 5 to 15 minutes). After the warm-up period is complete, the lamp is ready to use for your curing application.

IMPORTANT: Remember to wear UV protective eye-wear and clothing when operating this system. Also protect from heat exposure as unit temperature may exceed 125°F.



Belt Tension Adjustment/Tracking

With the UV-10 lamp and conveyor "On", set conveyor speed to "8" and allow the curing system and conveyor to run continuously until the system stabilizes to normal production levels. Carefully monitor belt tracking during this period and make slight adjustments to belt tension using the allen bolt adjustments located at the infeed conveyor. Continue to operate the system for at least ½ hour to ensure consistent tracking at production temperature. Be sure not to overtighten the belt by allowing for 1" deflection.

Production/Operation Settings

Through trial and error, and with the significant assistance of radiometers and polymerization testing devices, you can develop performance benchmarks for establishing performance standards and parameters of similar production jobs. As different jobs using different inks and substrates have their own unique requirements (gloss, hardness, durability, etc.), only final cure and system performance testing will indicate whether acceptable results have been achieved.

We highly recommend the usage of these instruments and the development of historical spreadsheets to help build job parameters and to minimize potential errors. It is only through the use of a combination of these instruments that you can identify level of cure, system performance, cure energy, and dose. Understanding how each of these parameters relates to a specific job is critical to understanding the cure process, to evaluating lamp degradation and system performance, and to establishing repeatable system parameters for similar production jobs.

Maintenance

Cleaning

Dust and dirt on the lamp should be removed prior to installation and during regular maintenance to prevent contamination of the lamp's quartz envelope. Dirt and other contaminants can greatly reduce a lamp's effectiveness, and will prevent uniform delivery of light to reduce UV intensity and efficiency. Lamp contamination will also cause the quartz tube to absorb the UV energy, thus generating unwanted infrared.

Avert equipment failure by performing regularly scheduled maintenance. Keeping a log will define future operating procedures and maintenance requirements. Prevent costly downtime and ensure maximum UV output by having a routine clean up of the complete irradiator system.

Lamp and Reflector Cleaning Solution (Part #A002-019) will prevent a thin film of foreign matter from accumulating on the lamp. Use this residue-free solution to clean lamps and reflectors so no organic materials will diminish light transmission.

To clean, dampen a lint-free wiping towel (Part #A002-021) with lamp cleaning solution. Wipe the UV lamp directly with the dampened cloth. Dry and polish lamp with a clean wiper. Use a wiper that does not contain chemical binds or particles that may scratch the quartz.

Always wear cotton inspection gloves (Men's - #1004-022; Ladies' - #1004-031) when handling UV lamps. Do not touch the lamp body after cleaning or during mounting.



The CON-TROL-CURE® UV Lamp and Reflector Maintenance Kit contains everything you need to clean UV lamps and reflectors thoroughly: cleaning solution, soft, lint-free wiping towel, and cotton inspection gloves.

Changing Reflectors

The reflector is a vital component in the irradiator system since it affects the amount of light focused on the curing surface. During production, various deposits accumulate on reflector surfaces, and these deposits will greatly lessen cure efficiency. In many cases, you may choose to replace rather than clean the reflector. It is advisable to change the reflector once they lose their mirror-like quality, become contaminated, or are scratched.

This system allows quick, easy and low-cost reflector replacement. The ability to easily replace the reflector is a key design and important feature in the UV-10 Lighthouse, and allows you to change the reflector in approximately five minutes to minimize downtime.

The lamp housing reflector kit consists of “V” reflector strip and elliptical half sides. Because of the Lighthouse’s special design, changing the reflector is simple. Replace the V reflector strip (SHUTTERED - #U004-006; NONSHUTTERED - #U004-007) found on the center of the lamp housing by alternately twisting it behind the hooks of the rib. Make sure the hooks are alternately opposite each other. If the first hook on the first rib is on the right side, the second hook on the second rib must be on the left side of the lamp housing.

Lamp end reflectors are critical as output from the lamp end diminishes first as the lamp ages. The reflector end (SHUTTERED - #U004-008; NONSHUTTERED - #U004-009) is a unique design feature in the UV-10 because it reflects more light at the end of the lamp, thus maintaining the desired arc length longer. By removing the side shield on the lamp, the elliptical half side reflectors pop out for easy replacement.

Ultimately, changing reflectors frequently is a cost-effective measure. It also provides the highest level of assurance for effective UV curing along the full arc length. When cleaning reflectors, use the same cleaning procedures as when cleaning lamps. Never use abrasive cleaning compounds or steel wool for cleaning reflectors. These harsh products will remove its protective finish and reduce the reflector’s capability.

Conveyor Belts and Drive Assemblies

Heat-dissipating conveyors can withstand the high levels of radiation within a UV curing system. Conveyor belts (Part #B002-002) must be tracked properly, be set at the correct tension and be checked for rips, tears and frays.

Repair and replace worn belts with Teflon and Kevlar belts that can sustain long term exposure to UV light or ozone (Replacement Belt - # B002-001). To make emergency repair, keep a Conveyor Belt Repair Kit on hand to minimize downtime.

The conveyor drive assembly is a completely oilless, maintenance-free system. Clean moving components during regular maintenance to ensure extended life.



Specifications

UV-10 Lamp Housing Specifications

- * Power: 110, 60 Hz, 15A
- * Arc Length: 10"
- * Lamp Energy: 1600w (160 watts/inch)
- * Reflector Type: 3/4 ellipse
- * Controls: On/Off pushbutton, Ammeter

UV-10 Conveyor Specifications

- * Power: 110v, 60 Hz, 3.5A
- * Conveyor Motor: Variable speed DC motor, 1/15 HP, 130 RPM
- * Max. Belt speed: 100 FPM
- * Belt Width: 12"
- * Overall Dimensions: 36"L x 14"W x 24-48"H (adjustable)
- * Mesh construction: Nomex (heat-resistant) w/ Clipper
- * Controls: On/Off switch, speed potentiometer (0-100% in 10%)

Troubleshooting

Lamp burnout or conveyor motor failure can rarely be predicted. Avoid costly downtime by keeping a proper inventory of replacement parts. We stock a complete inventory of UV lamps and UV-10 system parts to keep your operation running.

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