ULTRA OPTICS

Rx OPERATION AND MAINTENANCE MANUAL

Introduction

This manual is intended for use by Ultra Optics customers. It is important to read and understand the information in this manual before installing or operating the system. This manual is provided by Ultra Optics to its customers as a courtesy and, except as expressly provided in this manual, **ULTRA OPTICS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, REGARDING THE CONTENTS IN THIS MANUAL. ULTRA OPTICS ASSUMES NO RESPONSIBILITY FOR ANY OUTCOMES AS A RESULT OF USING THIS MANUAL.**

Any information contained in other manuals for equipment supplied by third party manufacturers (including, but not limited to the PLC, motors, etc.) shall take precedence over information contained within this manual with respect to that third party equipment.

Thank You

The employee-owners of Ultra Optics wish to thank you for your business. If, after reading this manual, you are not confident in carrying out any task, please call Ultra Optics' technical service team at 763.488.6030 between the hours of 7:00 am – 7:00 pm cst, Monday - Friday.

Symbols

Symbols and statements used throughout this manual include:

Text following this symbol needs extra attention.

NOTE: Text like this is extra information that may be helpful to the situation.

CAUTION: Text like this is information to help avoid personal injury and/or property damage.

WARNING!: **Text like this is information to help avoid serious personal injury or death and/or property damage.**

Service

The Rx back-side coating unit was designed and manufactured for many years of safe and dependable operation. In the event service is required, please contact Ultra Optics at:

Ultra Optics
9200 Wyoming Avenue North, Suite 360
Brooklyn Park, MN 55445
www.ultraoptics.com
763.488.6030

Design Modification

DO NOT use this product in any manner not consistent with the instructions outlined in this manual!

NEVER alter the design, or perform service that is not consistent with the instructions outlined in this manual, without the prior written approval of Ultra Optics.

ALWAYS refer to the manual supplied by the component manufacturer for the most accurate and current information regarding that item and its particular use. Any information in the component manufacturer's manual shall take precedence over information contained in this manual.

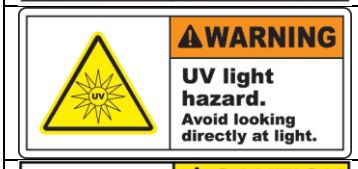
Additional Copies

Additional copies of this manual are available by contacting Ultra Optics by phone at 763.488.6030, or by visiting our website at www.ultraoptics.com. No part of this document may be reproduced or copied in any form, or by any means, without the prior written permission of Ultra Optics.

Safety

SAFETY FIRST!

The Rx is a complex piece of equipment that contains various safety hazards. Some of these hazards include, but are not limited to:

	Do not service machine while it is plugged in. Service work should only be conducted by properly trained technicians.
	UV-light is used to cure the coating on the lens. Exposure to this light can damage the eyes.
	Rear panels and top deck may be hot due to UV light source.
	Personal protection equipment should be worn at all times when operating or maintaining this equipment. Several chemicals may be used that should not come in contact with skin, eyes, etc. Refer to all SDS sheets for clear instructions.
WARNING! High pressure water wash	Water is sprayed at high pressure to provide a thorough cleaning of the lens. This water jet could cause injury if directed on skin.
WARNING! Air jet drying	Compressed air is blown at the lens surface to dry it after being washed. This compressed air could entrain particles and cause damage to the eyes.
WARNING! Moving components	The machine contains several moving components that could cause pinch points.
WARNING! Chemicals[1]	The chemicals used can cause skin and eye irritation and damage clothing. Protective gloves and safety glasses should be worn when operating this equipment.

Because of these issues, it is important that only trained and qualified technicians operate and work on these machines. When doing so, in addition to following the guidelines in this manual, appropriate personal protective equipment (PPE) should be worn. The PPE may include, but is not limited to gloves, safety glasses, protective gown/coat.

[1] All Safety Data Sheets (SDS) for Ultra Optics coatings are available by visiting our website at www.ultraoptics.com

General Safety Notes:

- **Never change or deactivate safety switches or protection devices in any way!**
- Work on the Rx must only be performed with the working chamber door closed.
- If a lens is lost from the suction cup, remove all remaining lenses from the remaining spindles, turn off the power and retrieve the lens accordingly. Take proper caution as various surfaces may be hot.
- The machine should be checked for any visible damage during each shift. Any changes, including changes in operation behavior, must be reported to the supervisor.
- The Rx is intended to run with an operator present at all times. It is not intended to be operated unattended.

Table of Contents

Required Utilities

The following facility utilities are required to operate the Rx. The provisions for these facilities are the responsibility of the customer and are not included in the scope of supply for this machine.

Physical Location	The machine should be installed in a location that is accessible for easy disconnect of power and has good ventilation with an air exchange of 4-5 times per hour.
Electrical Power	115 VAC, 15 amp circuit required. Machine is supplied with a grounded three-prong receptacle. The machine requires earth ground.
Compressed Air	80 psig, 10 cfm. The connection on the machine is a 1/4" quick connect
Deionized Water	Consumption of 7.6 L/hr at periodic rates of 0.3 L/min of deionized water flow rate with ≥ 1 megaohm resistivity[2]. The machine is supplied with a reservoir that needs to be periodically filled by the user. The pH value should be greater than 4.9 and less than 9.1.
Water Drain	The machine is supplied with a drain reservoir that needs to be periodically dumped by the user.

Machine connections

The Rx requires two cords to be plugged into the back of the machine. One cord is the power cord that connects the 115 VAC power supply to the back of the machine. With reference to Figure 1, the connector on the right is round and is used to connect the supplied foot switch.

Figure 1 - Electrical and foot switch connections

[2] It is possible to install a sensor that will test the water quality for proper resistance levels.

System Overview

General Overview

The Rx is a robust backside hard coating machine that performs all of the required operations within a single machine. The core coating functions utilize the same technology as the highly-touted MR3 coating system. These key processes are arranged and packaged in a way to reduce cost for today's small to medium sized labs.

The Rx is a completely self-contained system that is not required to be installed/operated in a cleanroom environment. The system utilizes a pre-filter and HEPA filter to maintain a continuous positive pressure of extremely clean air, which reduces the dependability on operating in a clean environment. Further, the ultraviolet (UV) curing system is an integral part of the Rx's operation, eliminating the need to transport a freshly coated and wet lens manually to an external curing system.

Lens Load/Unload

Before being loaded into the Rx, the lens should be washed by hand with a small amount of isopropyl alcohol (IPA), or Ultra Optics Lens Cleaner. When the lens is clean, center the front side of the lens onto the suction cup and remove your hand. The machine will sense when your hand has been removed and will automatically start the wash process. The PLC will control the over-all process and all subsequent steps required to coat and cure the lens. When the lens is complete, reach in and hold onto the lens while depressing the foot switch. This will release the vacuum and allow you to place the next lens into the machine. In Two Lens Mode, at cycle completion, depressing the foot switch will release both lenses.

Figure 2 - Loading a lens

Wash process

The lens is washed with high pressure, deionized water. The clean deionized water is stored in a reservoir in the bottom of the machine. When a wash cycle starts, clean water is drawn through a filter (located inside the reservoir) and out of the reservoir, into the pneumatically driven pump. The pump increases the pressure of the water to 2000 psig. The high pressure water is then sprayed through a nozzle onto the back-side of the lens. The lens is spinning during the wash process to help assure a complete surface cleaning. The spent water is collected in the bottom of the wash bowl and drained into a reservoir in the bottom of the machine. At the end of the wash cycle, the water pump stops, and any residual water downstream of the pump is emptied through the dump valve.

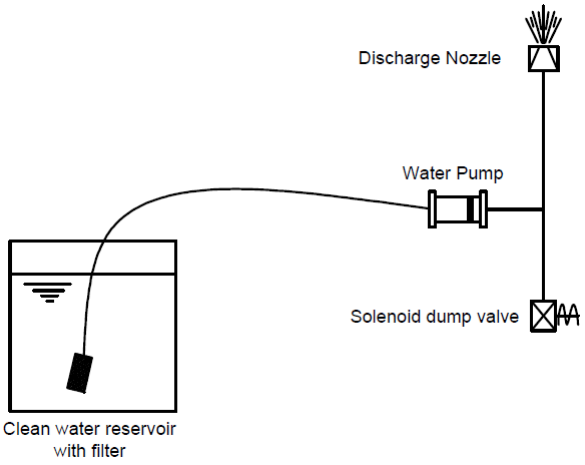


Figure 3 - Wash system schematic

The system PLC monitors all system sequencing to control the water pump and solenoid valves.

Dry process

After the wash process is complete, the machine will initiate the drying process. The lens is dried by use of compressed air. In the drying station the air nozzle is articulated in a manner that ensures a complete drying of the entire lens surface. Similar to the wash process, the lens is spun while in the drying station to help remove all of the water.

As shown in Figure 4, the air that is used for drying the lens passes through several filtration and drying stages to obtain the clear and dry air that is used for the drying process. The timing of the drying process is controlled by the system PLC.

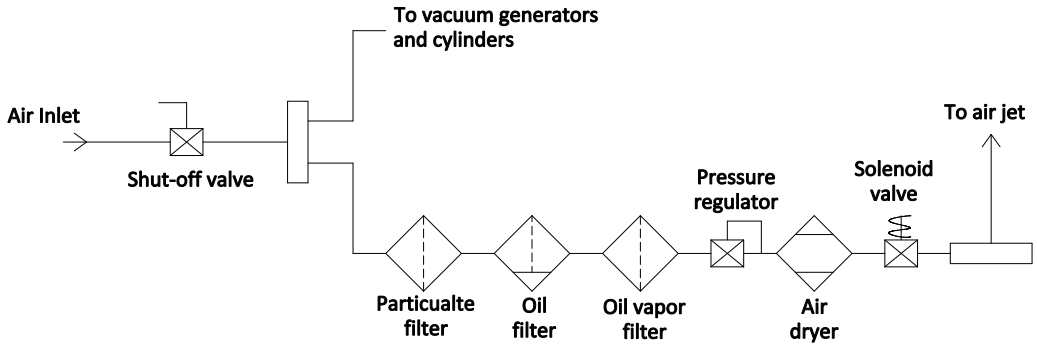


Figure 4 - Drying system schematic

Coating application

With the lens down in the coating application station, the coating pump draws coating material from the reservoir and pumps it through a filter, up to the surface of the lens. The lens is being

spun during the time of application to ensure a sufficient amount of coating is applied to the entire surface. After the coating has been applied, the pump will stop and the spin speed of the lens changes to a new value which will generate the proper film thickness of coating, based upon the specific coating being used. The timing and spin speeds are controlled by the system PLC. This process is shown schematically in the following diagram.

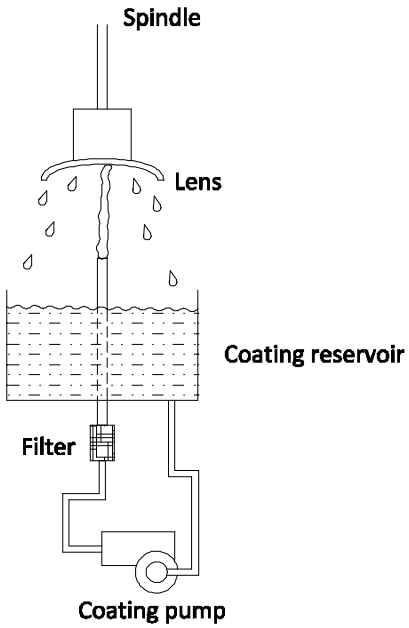


Figure 5 - Coating system schematic

Cure process

The Rx is designed to cure Ultra Optics' line of UV-based coatings. After the lens has completed the coating application cycle, the lift cylinder will raise the arm assembly, which will then rotate and drop down into the curing station. An ultra-violet lamp resides in the curing station. The radiation energy from this lamp is used to effectively cure the coating to the lens with the proper characteristics of adhesion, hardness, etc.

System Operation

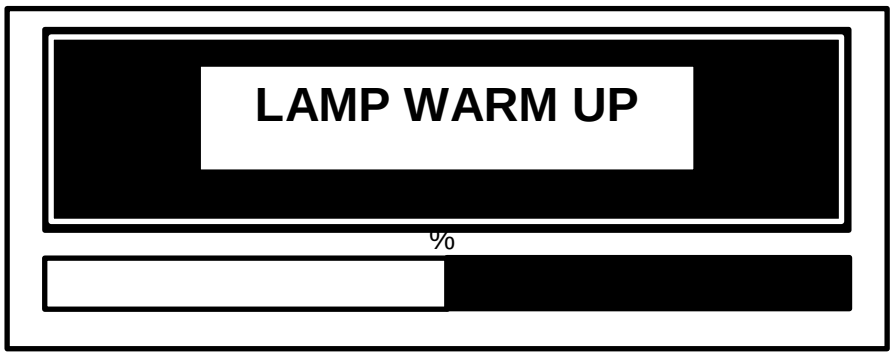
Start-up Procedure

The following procedure should be followed upon machine start-up.

1. Inspect the machine to be sure nothing is in it that would impede the movement of the spindle assembly
2. Turn air supply on
3. Fill clean/wash water reservoir with deionized water and empty the waste water reservoir
4. Turn machine power on
5. Check coating level and coating height, see procedure on page 18
6. Run test to be sure the lens is getting completely dry by following procedure on page 19

HMI Screens

Lamp Warm Up Screen

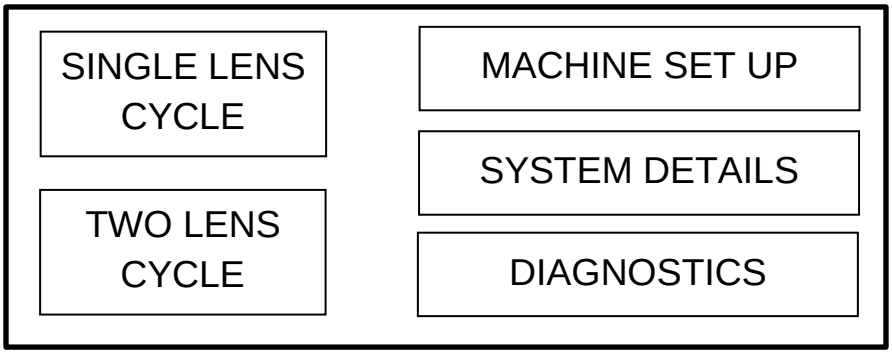


This is the first screen that will appear upon power-up of the machine. A five-minute UV lamp warm up timer will start and its progress (in %) will be indicated by the progress bar. Once the warm up is complete, the screen will advance to the Main Screen.

If needed, touching LAMP WARM UP will bypass the warm up mode and advance directly to the Main Screen.

IMPORTANT NOTE: If the machine is not given adequate time to warm up, proper curing of the coating on the lens will not occur!

Main Screen



SINGLE LENS CYCLE – Selecting this button will bring up the SINGLE LENS screen. Only one spindle will be utilized during this cycle.

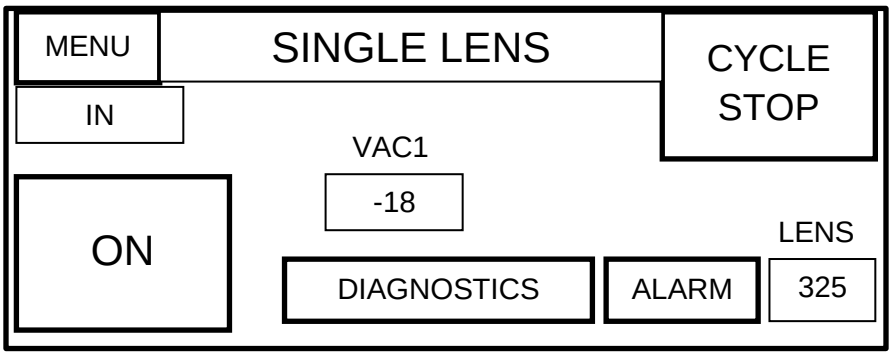
TWO LENS CYCLE – Selecting this button will bring up the TWO LENS screen. Two spindles will be utilized during this cycle.

MACHINE SET UP – Selecting this button will bring up the SET UP screen.

SYSTEM DETAILS – Selecting this button will bring up the SYSTEM DETAILS screen.

DIAGNOSTICS – Selecting this button will bring up the DIAGNOSTICS screen.

Single Lens Cycle Screen



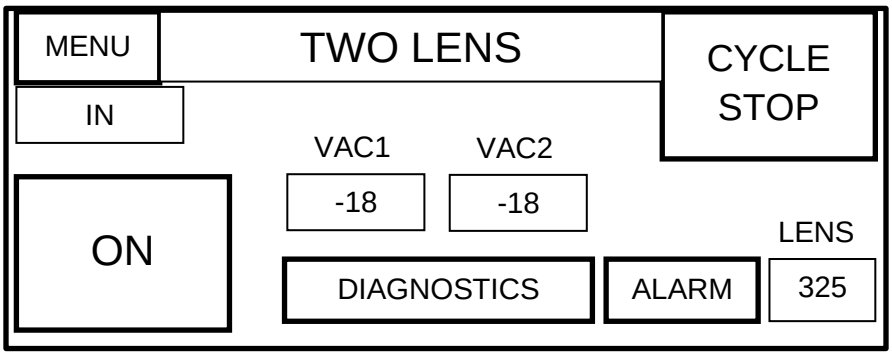
Use the following procedure to begin the single lens cycle:

1. Select ON/OFF button to put it in the ON position
    a. At this time, the vacuum will turn on
2. After pre-cleaning, center the front side of the lens on the suction cup that is above the wash bowl
    a. When facing the machine, this is on the operator's right side as shown in Figure 6.
3. Remove hand from the lens and out of the machine and the wash cycle will start
4. When wash cycle is complete, the spindle arm assembly will lift up, index to the next position, and the lens will go down into the coating station and the coating cycle will start.
5. Once the coating is applied, the spindle arm assembly will lift up, index to the next position, and the lens will go down into the curing station and the curing cycle will start.
6. When the curing is complete, the spindle arm assembly will lift up and index, bringing the lens back to the position it was in when placing the lens into the machine in step #2.
7. Place hand on lens and depress the foot switch to release the vacuum and remove the lens from the machine.

Figure 6 - Placement of lens in single lens cycle

Important Note: If CYCLE STOP is utilized when the lens is not in the home index position, the lens can still be returned to the home index position by touching the CYCLE STOP button. At that time, the lens will be able to be removed from the suction cup by depressing the foot switch.

Two Lens Cycle Screen



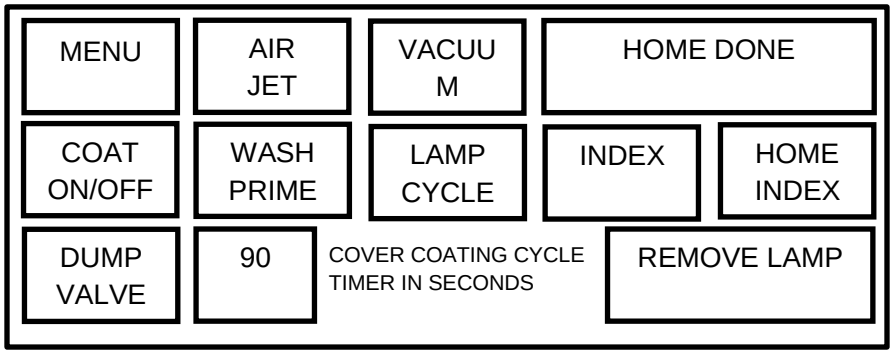
Use the following procedure to begin the two lens cycle:

1. Select ON/OFF button to put it in the ON position
    a. At this time, the vacuum will turn on
2. After pre-cleaning, center the front side of the lens on the suction cup that is above the wash bowl
    a. When facing the machine, this is on the operator's right side as shown in Figure 6 on previous page.
3. Remove hand from the lens and out of the machine and the wash cycle will start
4. When wash cycle is complete, the spindle arm assembly will lift up, index to the next position
5. After pre-cleaning, center the front side of the second lens on the suction cup that is now above the wash bowl (the first lens will now be on the left side of the machine)
6. Remove hand from the lens and out of the machine and the spindle arm assembly will drop down
    a. The coating cycle will start on the first lens and the wash cycle will start on the second lens
7. When this cycle is complete, the spindle arm assembly will lift up, index to the next position
    a. The first lens will now be in the curing position
    b. The second lens will now be in the coating positon
8. When this cycle is complete, the spindle arm assembly will lift up, index to the next position
    a. The first lens will now be cured and will index over to the wash station and will remain on the suction cup (lens will not be re-washed)
    b. The second lens will now be in the curing positon
9. When this cycle is complete, the spindle arm assembly will lift up and index to the next position with both lenses cured. Place a hand on each lens and then depress the foot switch to release the vacuum and remove the two completed lenses from the machine.
10. Select the ON/OFF button to reset the two lens program.

Important Notes: If CYCLE STOP is utilized when the machine is in operation, all lenses will remain attached to the suction cups and must be removed.

To restart the production cycle, select CYCLE STOP and turn Two Lens Screen to OFF, then back to ON, and start new production.

Machine Set-up Screen



This screen is used for individual activation of major functions of the Rx.

MENU – Selecting this button will return to the Main Screen.

COAT ON/OFF – Selecting this button will turn the coating pump on/off.

DUMP VALVE – Selecting this button will release pressure build up in high pressure lines

AIR JET – Selecting this button will activate high pressure airflow through the air jet nozzle

WASH PRIME – The following sequence must be followed to activate the wash prime:

1. Select VACUUM button – vacuum will turn on
2. Place lens on suction cup that is above the wash bowl (as shown in Figure 6 on page 7)
3. Select WASH PRIME button – spindle will lower and high pressure pump will start
4. Select DUMP VALVE button – this will release pressure and allow to prime wash
5. Select WASH PRIME button – high pressure pump will stop and spindle will rise
6. Select DUMP VALVE button to shut this valve off
7. Select VACUUM button – vacuum will turn off and lens will release

VACUUM – Selecting this button turns on the vacuum for testing

LAMP CYCLE – Selecting this button will activate the travel of the UV lamp

INDEX – Selecting this button will index spindles to the next position

HOME DONE – Indicates spindles are in the home position

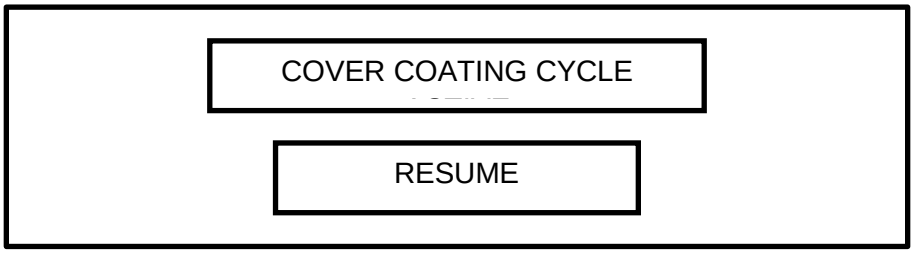
Important Note: If button reads “INDEX NOT HOME”, the spindles will rotate to the home index position by selecting the HOME INDEX button.

HOME INDEX – Selecting this button will return the spindles to the home position

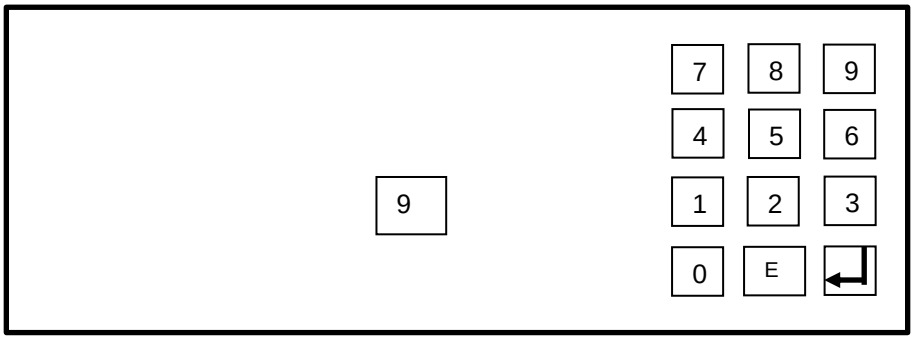
REMOVE LAMP – Selecting this button will bring up the Lamp Removal Screen

90 – Selecting this numeric button will allow changing the set amount of time (in seconds) when the spindle will rotate and drop to cover the coating bowl.

COVER COATING CYCLE TIMER IN SECONDS – Selecting this button will activate after the machine has finished the warm up cycle, or will activate once the machine has set idle for the preset amount of time (in seconds) while in the Main Menu, or after all lenses have been removed while in any production screen. To ensure proper operation, all doors must be closed and all alarms must be cleared. In addition, you must be in the Main Menu Screen or a Production Cycle screen to allow spindles to move for this function. Failure to do so could result in the coating hardening within the bowl and reservoir. Selecting this option will bring you to the cover coating cycle time adjustment screen.

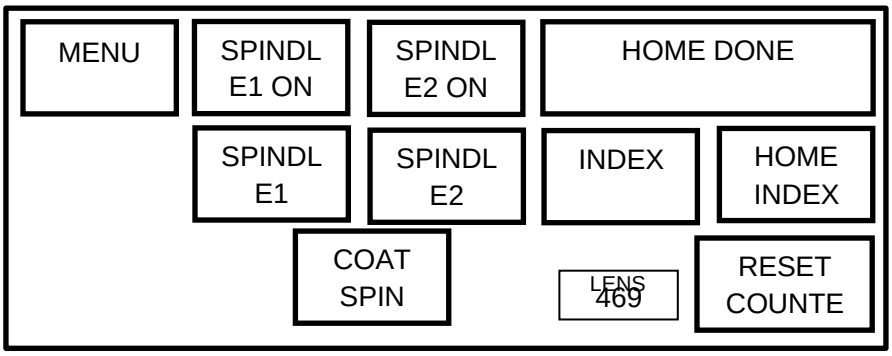


COVER COATING CYCLE RESUME – Selecting the RESUME button will return the machine and spindles to a running position after the cover timeout has been initiated.



COVER COATING CYCLE TIME ADJUSTMENT – This option allows you to set the cover cycle time out in seconds. This time should be set between a minimum of 15 and a maximum of 300 seconds.

System Detail Screen



This screen is used to measure individual spindle speeds. Each spindle is numbered. Locate spindles #1 or #2 by selecting the INDEX button.

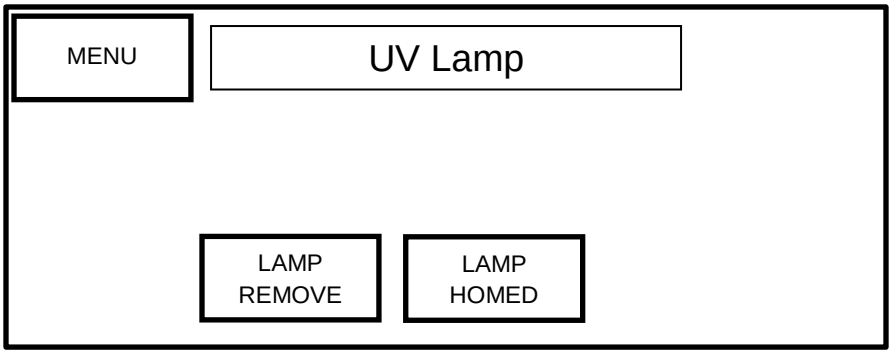
SPINDLE1 ON COAT – Selecting this button allows adjustment of the coat speeds for spindle #1 using the COAT potentiometer as shown in Figure 8 on page 18.

COAT SPIN OFF – Selecting this button, with COAT SPEED button ON, allows adjustment of coat spin-off speeds with the COAT SPIN OFF potentiometer as shown in Figure 8.

SPINDLE 1 WASH – Selecting this button, with COAT SPEED button ON, allows adjustment of the wash speed with the WASH SPEED potentiometer as shown in Figure 8.

NOTE: The same procedures can be followed to set the speeds for spindle #2.

Lamp Removal Screen



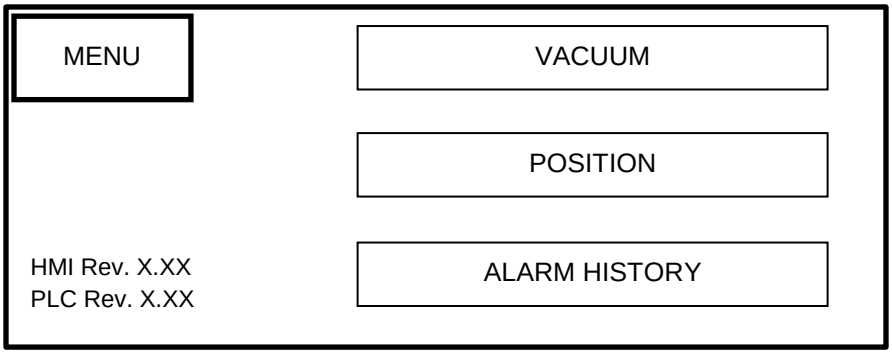
MENU – Selecting this button will return to the Main Screen.

LAMP REMOVE – Selecting this button will put the lamp in position for removal.

LAMP HOME – Selecting this button will put the lamp back in the home position.

LAMP HOMED – Must be selected to leave the Lamp Removal Screen.

Diagnostics Screen



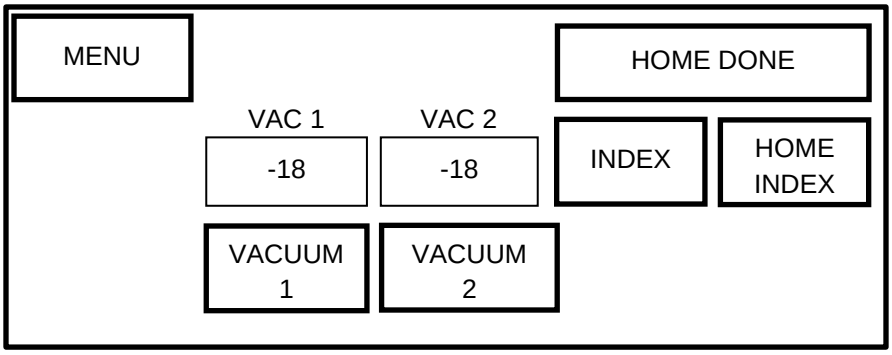
MENU – Selecting this button will return to the Main Screen.

VACUUM – Selecting this button will bring up the Vacuum Test Screen.

POSITION – Selecting this button will bring up the Position Test Screen.

ALARM HISTORY – Selecting this button will bring up the Alarm History screen.

Vacuum Test Screen



MENU – Selecting this button will return to the Main Screen.

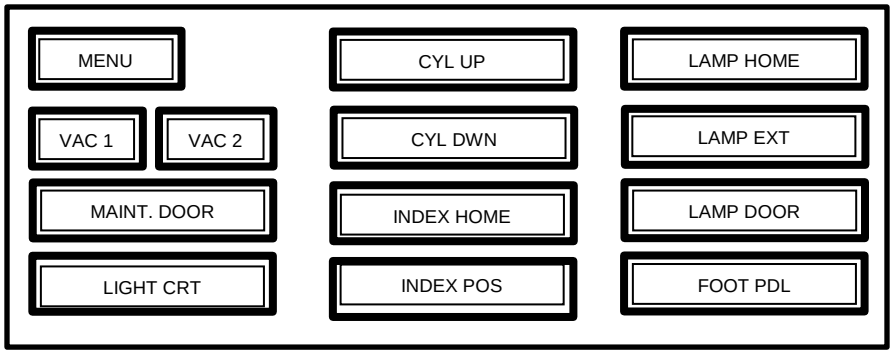
VACUUM 1/VACUUM 2 – Selecting these buttons will activate the vacuum. A lens can be placed on each spindle for testing vacuum.

> Example: When a lens is placed on spindle #1, a vacuum signal #1 will display spindle #1 vacuum. Spindle #2 should also respond accordingly.

INDEX – Selecting this button will rotate the spindles to the front position for easy access.

HOME INDEX – Selecting this button will return spindles to home position.

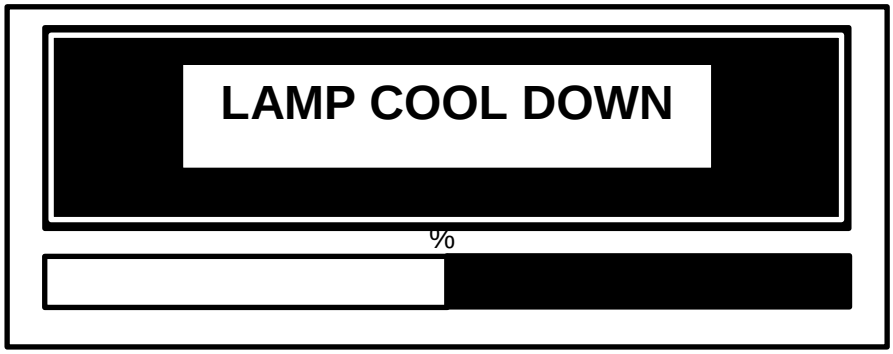
Position Test Page



This is a visual reference screen to monitor the machine's positions and inputs on the PLC.

MENU – Selecting this button will return you to the Diagnostics Screen.

Lamp Cool Down Screen



This screen will appear if the machine power is shut off, or the lamp door is opened. This screen allows the lamp module to properly cool down before the warm up screen appears.

Maintenance

The Rx system is designed to provide many years of reliable and efficient processing of ophthalmic lenses. Its ability to provide this service is significantly enhanced with proper maintenance. Due to the many integrated systems within the Rx, it is highly recommended that service and maintenance is only done by trained technicians. Failure to do so could result in damaged equipment, increased down time, or injury of personnel.

Personal protection equipment should be worn at all times when operating or maintaining this equipment. Several chemicals may be used that should not come in contact with skin, eyes, etc. Refer to all SDS sheets for clear instructions.

Preventative Maintenance Schedule

The following table should be used as a guide for performing regular preventative maintenance on the Rx to maintain ultimate system efficiency and up-time.

Frequency	Maintenance Item	Description
Daily	Check air regulator setting	Air regulator should be set to 80 psig.
	Wipe inside of wash bowl and deck area.	Use a lint-free rag to wipe out wash bowl and top of deck area.
	Clean wash bowl and coating bowl screen	Use a lint-free rag, dampen with 99% IPA
	Check the level of de-ionized water in the reservoir	Refill as needed.
	Check the level of waste water in the reservoir	Empty reservoir as needed.
	Check coating level in reservoir	Refill as needed such that the coating level is above the halfway mark.
	Check coating fountain height	Fountain should come up to the top edge of coating bowl.
	Check that the backside of the lens is dry after wash and dry cycle	Stop cycle after air jet shuts off to inspect lens
	Confirm wash pump is properly primed	During a wash cycle, count the number of audible “beats” by the wash pump. It should “beat” 20-22 times.
Weekly	Inspect suction cups for debris or deterioration	Replace as necessary with part number 1027WOA
	Check spindle speeds	Refer to setting spindle speed procedure on page 17 of this manual.
	Check lamp cycle time	Should be 16 seconds, +/- 1 second
	Check lamp module hours	Replace at 1,000 hours
	Clean out top Hepa filter housing	Replace top pre-filter as needed using a 10” x 10” x 2” filter. UOC part number 3923T999
	Check vacuum pressure	Look at digital gauges. Pressure should read 80 psig

	Inspect complete vacuum chuck assembly for dried coating or debris	Clean as needed.
	Clean the deionized water reservoir	Weekly, when the water level gets low, dump the remaining water and wipe/clean the reservoir with a lint-free cloth.
	Check air dryer filters	Replace all three if: • needle points to "change" • filters are moist/dirty • every six months
	Wipe down entire cabinet exterior	Use a lint-free cloth to remove any dust, debris, polish residue, etc.
Quarterly	Check capacitors	Primary capacitor to read 20 µf
	Ensure positive air flow	Hold tissues over openings and confirm the tissue blows out, away from the machine. Hepa fans should be on high setting at all times.
	Replace suction cups	Spindle uses clear cleated, P/N 1050
	Change coating filter	See page 20 in this manual for proper procedure.
	Change water filter in reservoir	
	Change air dryer filters	Part # 1428

Maintenance Procedures

Setting spindle speeds

The following procedure should be used to check and adjust the spindle speeds to the following settings:

Wash speed: 1800 RPM
Coating speed: 400 RPM
Coating spin-off speed: 2000 RPM, 1600 RPM if using AST-1™ coating

The following procedures should be followed to check the spindle speeds using a non-contact measurement device. This tachometer can be rented or purchased from Ultra Optics as part number 1397.

Preparation:

1. Carefully clean the surface of the blue deflector cup, using only water.
   a. Do not use alcohol or acetone to clean the deflector cups.
   b. If deflector has excessive coating build-up on the surface, replace with a new deflector cup, P/N 1052.
2. Apply a 1/8 inch piece of reflective tape to the deflector

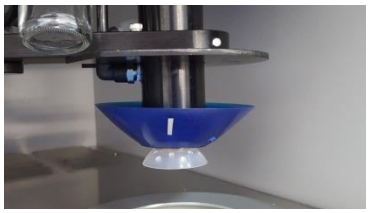


Figure 7 - Deflector cup with reflective tape

cup as a vertical strip as shown in Figure 7.

a. This reflective tape is supplied with the tachometer if acquired from Ultra Optics.

Setting Wash Speed

1. From the main control screen, select SYSTEM DETAILS
2. Select SPINDLE 1 ON COAT
3. Depress the tachometer power button and aim its light at the blue deflector cup and check the speed
    a. Adjust the speed to 400 RPM by turning the potentiometer, located behind the side access service door as shown in Figure 8, clockwise to increase or counter-clockwise to decrease the speed.
4. With SPINDLE 1 ON COAT still selected, select SPINDLE 1 WASH
5. Depress the tachometer power button and aim its light at the blue deflector cup and check the speed
    a. Adjust the speed to 1800 RPM by turning the potentiometer, located behind the side access service door, clockwise to increase or counter-clockwise to decrease the speed.
6. Select SPINDLE 1 WASH to turn it off and select COAT SPIN OFF
7. Depress the tachometer power button and aim its light at the blue deflector cup and check the speed
    a. Adjust the speed to 2000 RPM by turning the potentiometer, located behind the side access service door, clockwise to increase or counter-clockwise to decrease the speed.
8. Repeat these steps for spindle #2.

Figure 8 - Speed adjustment potentiometers

Adjusting the curing lamp time

1. Select MACHINE SET UP button from the Main Screen
2. Select LAMP CYCLE button
3. Measure the length of time for this cycle to complete
4. If the measured time is not 15 – 17 seconds, adjust the lamp potentiometer (see Figure 8) as follows:
    a. Counter-clockwise turn of the potentiometer will increase the cycle time
    b. Clockwise turn of the potentiometer will decrease the cycle time

Removing the curing lamp

1. Select MACHINE SET UP button from the Main Screen
2. Select LAMP CYCLE button
3. Wait four to five seconds, then press LAMP CYCLE
    a. This will level the lamp module for removal
4. Open lamp access panel on back of machine

5. Remove both phillips-head screws (see Figure 11 on page 21) and pull module out by handle

Adjusting the coating height

1. Select MACHINE SET UP from the main screen on the touch screen
2. Press coating on/off to turn the coating pump on
3. Adjust the height of the coating discharge to be at the top of the coating bowl by turning the "Coating pump" potentiometer. The potentiometer, shown in Figure 9, can be found by opening the front service panel and looking on the right side wall. Make sure the height is neither too low nor too high.
    a. Turning the potentiometer clockwise will increase the height
    b. Turning the potentiometer counterclockwise will decrease the height
    c. Recheck this setting after two hours of run time

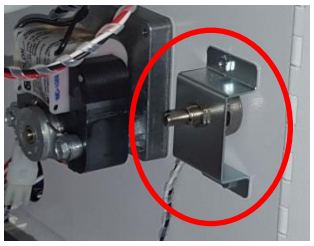


Figure 9 - Coating height adjusting potentiometer

Priming the wash pump

1. Select MACHINE SET UP from the main screen on the touch screen
2. Select VACUUM
3. Place lens on suction cup of wash spindle
4. Select WASH PRIME and then DUMP VALVE. Allow pump to run for 45 seconds.
5. Select DUMP VALVE and see if the pump is primed. If it is primed, the pump will make a pulsing sound at a regular timing of about two pulses per second. Allow it to run for 15 seconds.
    a. If the pump is not primed (pulses are much faster than two per second, or they are not a regular/constant speed), then select DUMP VALVE again and wait for 45 seconds and repeat step 5.
    b. If the pump is primed, proceed to step 6.
6. Select DUMP VALVE and allow to run for 20 seconds.
7. Select WASH PRIME and then DUMP VALVE.
8. Hold onto the lens and select VACUUM to release the vacuum and remove the lens.

Ensuring the lens is dry before coating

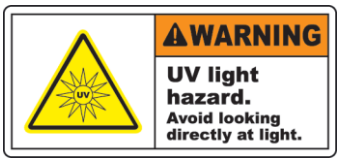
1. Select SINGLE LENS CYCLE from main screen
2. Select ON/OFF
3. Prepare a lens and place it on the suction cup of the wash spindle
4. Allow the Rx to wash and dry the lens
5. When the spindle arm assembly starts to come up, select CYCLE STOP
6. Release lens by selecting ON/OFF and ensure the backside surface is dry. If it is not dry, ensure the wash tip is clean and free of debris. Then, follow the procedure for "Priming the wash pump."
7. Return to step 1 and repeat procedure.

Replacing the coating filter

1. Open the front service panel
2. Disconnect the nut on the elbow on the bottom of the reservoir, see top red circle in Figure 10
3. Insert loose nut and tubing into a clean container
4. Select MACHINE SET UP
5. Select COAT ON/OFF and the system will pump coating through the loose nut and tubing into the container
6. When there is no more coating coming out of the tube, select COAT ON/OFF to stop the pump
7. Disconnect the nut on the elbow on the bottom of the filter. Allow coating to drain out of the elbow into the container.
8. Place Teflon tape on threads of the new coating filter, taking care to not put tape on the first thread.
9. Reconnect fittings that were removed in steps #2 and #7.
10. Pour new coating into coating bowl and check for leaks
11. Re-prime the system using the following steps and check for leaks:
    a. Select COAT ON/OFF and the system will pump coating into the filter. While the pump is running, slowly crack the bleed valve on top of the filter to remove air. Allow pump to run for five to ten minutes to release any air from the system.
    b. If the filter is free of air, run a few sample lenses to ensure there are no streaks or defects.

Figure 10 - Coating filter fittings

Lens retrieval from UV light module



It is very important to take great care and not look into the UV curing light as severe eye damage can result!

The UV light module gets very hot during use. It is very important to take great care and allow sufficient time to cool down before working on or near it.

1. Remove any remaining lenses from the spindle arm suction cups by holding onto the lens and then selecting the ON/OFF button

2. Select MACHINE SET UP
3. Select REMOVE LAMP
4. Select LAMP REMOVE
5. Turn machine power off at the red switch on the front panel
6. Disconnect power cord from the back of the machine
7. Open the back service door of the machine
8. Remove the two pan head phillips screws that hold the UV light module in place
9. Remove the UV light module by pulling on the handle
10. Allow lamp to sit for ten minutes to cool
11. Remove the lens from the lamp area when cool
12. Check for lens debris and ensure the reflectors are clean.
    a. If reflectors are not clean and cannot be cleaned, contact Ultra Optics and replace module with a new one.
13. Plug module back into carriage
14. Secure with two screws removed in step #8
15. Close back service door
16. Reconnect power cord at back of machine
17. Turn machine power back on

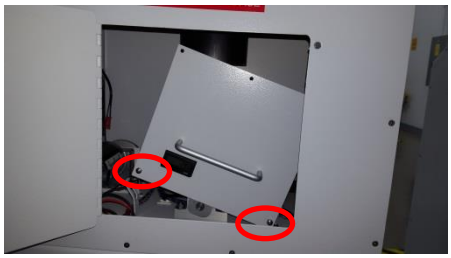


Figure 11 - UV Lamp removal screws

Flushing coating

1. Perform steps #1 - #6 of “Replacing coating filter” procedure
2. Follow the black tube up to the coating reservoir and disconnect. Both coating tubes should now be disconnected.
3. The coating reservoir can now be unscrewed and removed from the coating bowl for easy cleaning.
4. Once the coating reservoir is removed from the machine, flush it with acetone and allow it to dry. Ensure any debris in the coating reservoir has been removed. If not, flush again.
5. Unscrew and discard coating filter
6. Wipe out coating bowl using a clean, lint free cloth that is damp with acetone
7. Make sure the coating bowl screen, located on the bottom of the bowl, has been cleaned before reassembling
8. Apply Teflon tape on both ends of the new coating filter before reattaching the fittings. Take care to not get tape on the first thread of the fitting.
9. Connect both elbows with the nuts on the tubing with the arrow pointed up.
10. Snap the filter into the clip
11. When the coating system has been reinstalled and all tubes are connected, pour new coating into the coating bowl and check for leaks
12. Re-prime the system using the following steps and check for leaks:
    a. Select COAT ON/OFF and the system will pump coating into the container. While the pump is running, slowly crack the bleed valve on top of the filter to

remove air. Allow pump to run for five to ten minutes to release any air from the system.

b. If the filter is free of air, run a few sample lenses to ensure there are no streaks or defects.

OPTIONAL:

WARNING! Allow the machine to cool for 30 - 60 minutes before flushing with acetone!

It may be necessary to flush the coating pump with acetone if your coating has been contaminated. With the tubing disconnected from the bottom of the filter, pour acetone into the machine as you would with coating. DO NOT run acetone through the coating filter, simply flush into a waste container.

Changing Filters

Hepa Pre-filter

1. Replace with new filters monthly

Hepa Filter

1. Disconnect power cable from filter unit to the top of the machine
2. Remove filter unit from machine
3. Remove 4 self-tapping screws holding filter onto filter unit
4. Place sealing foam around top edge of new HEPA filter
5. Place filter unit on top of new HEPA filter
6. Screw in self-tapping screws through filter unit into new HEPA filter
7. Place filter unit into machine
8. Connect power cord to top of machine

Replace Air Filter Packs

1. Turn air to the machine off
2. Press up on the bottom of the air filter canister and turn clockwise
3. Unscrew plastic retainer at the base of filter and remove old filter
4. Install new filters marker “DX” “BX” “000” in this order
5. Screw on plastic retainer
6. Reattach air canister pressing up and turning counter clockwise

Replacing Consumable Parts

Light Module

1. Select MACHINE SET UP
2. Select REMOVE LAMP

3. Select LAMP REMOVE
4. Turn machine power off at the red switch on the front panel
5. Disconnect power cord from the back of the machine
6. Open the back service door of the machine
7. Remove the two pan head phillips screws that hold the UV light module in place
8. Remove the UV light module by pulling on the handle
9. Insert new light module
10. Secure with two screws removed in step #7
11. Turn machine on and check to be sure lamp is in home position

Spindle Suction Cups

1. Turn suction cup until 1.5mm set screws line up with holes in chuck assembly
2. Insert 1.5mm allen wrench into set screws to lock shaft
3. With shaft locked, turn suction cup to the left to remove
4. Thread new suction cup onto chuck shaft

Replacing sensors

Prox Sensors Index, and Lamp Home and Extend

1. Disconnect Signal cable
2. Loosen jam nut
3. Unscrew sensor
4. Replace with new sensor and jam nut
5. Adjust sensor depth until it is 2mm away from flagging mechanism
6. Tighten jam nut
7. Reconnect signal cable

Lift cylinder up and down sensor

1. Make a mark on the lift cylinder at the top and bottom of bad sensor
2. Disconnect signal cable from sensor
3. Loosen set screw on sensor
4. Slide bad sensor to the bottom of groove to remove bad sensor
5. Insert new sensor and slide into position between markings
6. Tighten set screw on sensor
7. Reconnect signal cable

Vacuum Sensor

1. Disconnect air tubes going into sensor
2. Disconnect signal cable
3. Connect signal cable to new sensor
4. Connect air tubes to new sensor
5. Program sensor as per instructions

Replacing the Spindle Motor Assembly

1. Remove the suction cup.
2. Disconnect the spindle motor power cable from the back of the spindle.
3. Disconnect the vacuum tubing from back of the spindle.
4. Loosen the bolt on the front tip of the spindle swing arm.
5. Pull old assembly out through the top of the arm.
6. Remove the vacuum elbow.
7. Reattach the vacuum elbow onto the new assembly.
    a. Add Teflon tape to threads if needed.
8. Slide the new assembly in to the arm making sure to line up the bottom of the vacuum elbow with the bottom of the spindle swing arm.
9. Tighten the bolt on the front tip of the spindle swing arm.
10. Reconnect the vacuum tubing to the back of the spindle.
11. Reconnect the spindle motor power cable on the back of the spindle.
12. Reattach the suction cup.

Air Regulator Adjustment

1. Locate regulator on back panel
2. If an adjustment needs to be made, pull down on the regulator adjustment cap and turn until the air gauge reads 80 PSI.
3. Push adjustment cap back up to lock in place.

Figure 12 - Location of air regulator

Electrical Panel Layout Information

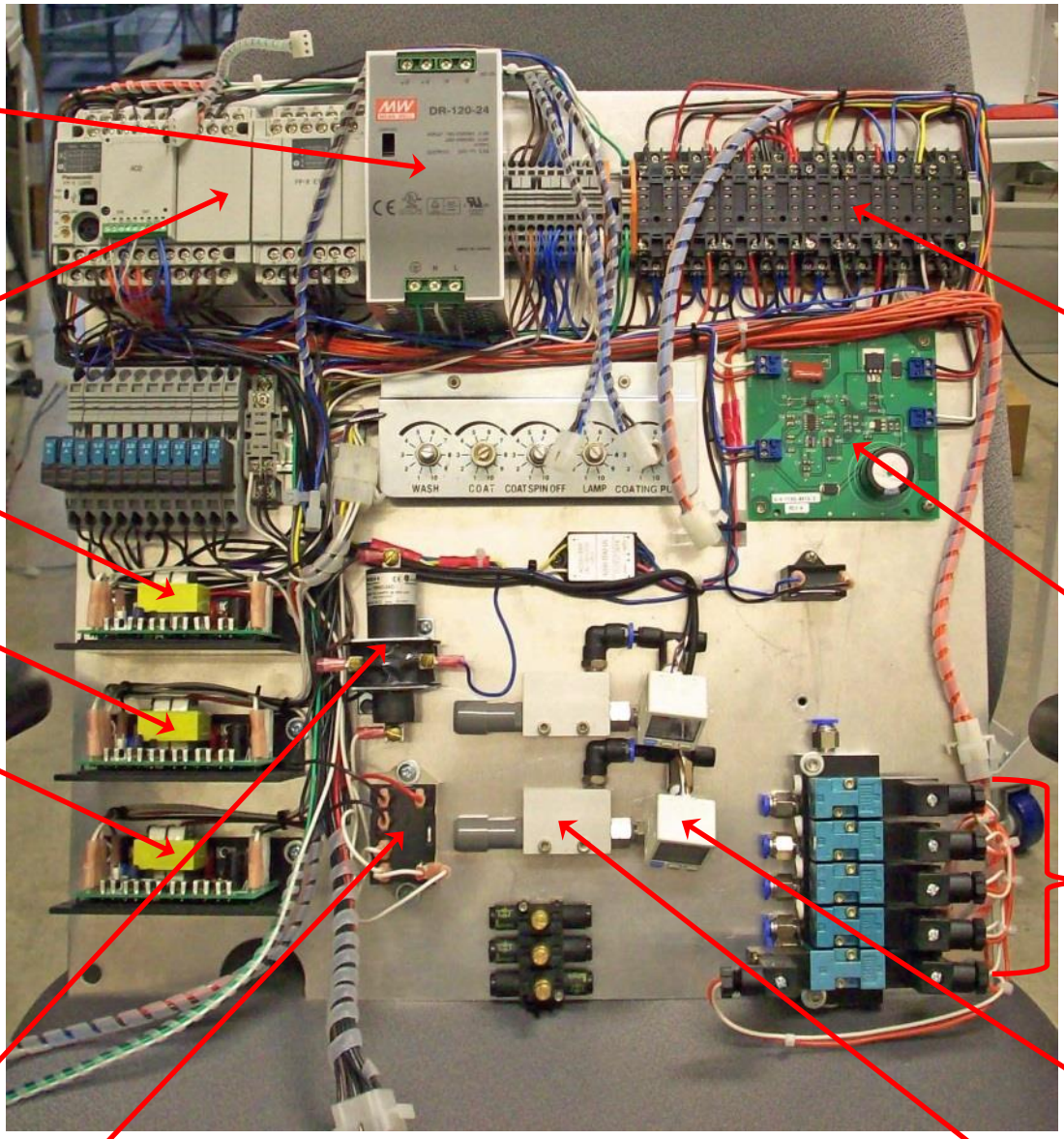
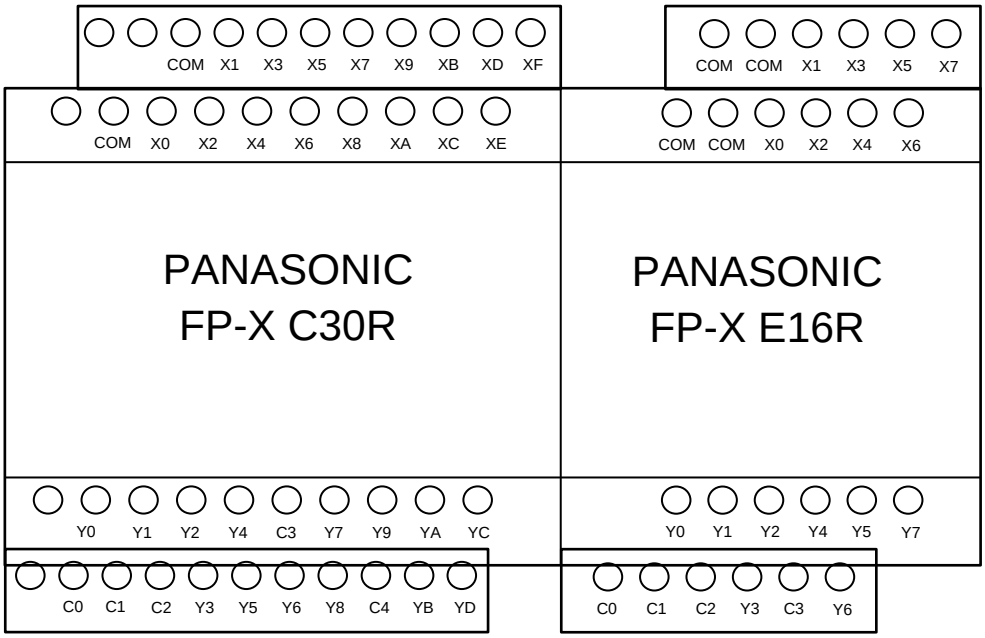


Figure 13 - Picture of Rx control panel



PLC OUTPUTS	PLC INPUTS
Y0: Lamp high mercury switch	X1: Vacuum spindle 1
Y1: Vacuum spindle 1	X2: Vacuum spindle 2
Y2: Vacuum spindle 2	X3: Cylinder up
Y3: Cylinder up	X4: Cylinder down
Y4: Cylinder down	X5: Light curtain
Y5: Wash pump	X6: Lamp home
Y6: Air jet	X7: Lamp extend
Y7: Spindle 1 coat (on/off)	X8: Foot pedal
Y8: Spindle 2 coat (on/off)	X9: Index home
YA: Spindle 1 wash	XA: Index position
YB: Spindle 2 wash	XB: Lamp door
YC: Coat spin off	
YD: Cure lamp motor	
Y301: Lamp on/off	
Y302: Coating pump	
Y303: Wash motor	
Y304: Dump valve	
Y305: Index motor	
Y306: Lamp fans	

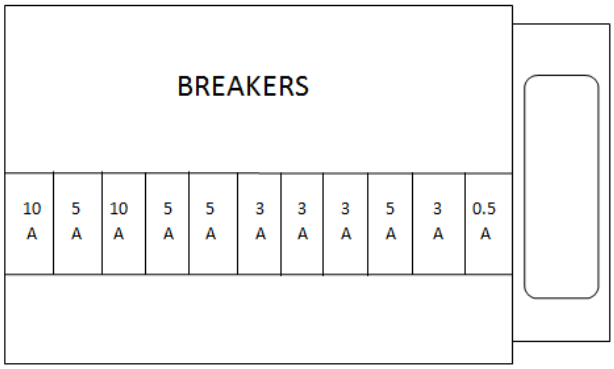


Figure 14 - Circuit breaker layout

CIRCUIT BREAKER LAYOUT	
10 AMP	Machine breaker
5 AMP	Index motor
10 AMP	Lamp breaker
5 AMP	24vdc power supply
5 AMP	PLC breaker
3 AMP	Speed board 1
3 AMP	Speed board 2
3 AMP	Speed board 3/Lamp motor
5 AMP	HEPA outlet breaker
3 AMP	Lamp fans
0.5 AMP	Wash motor

- Breakers are listed in order as they appear from left to right

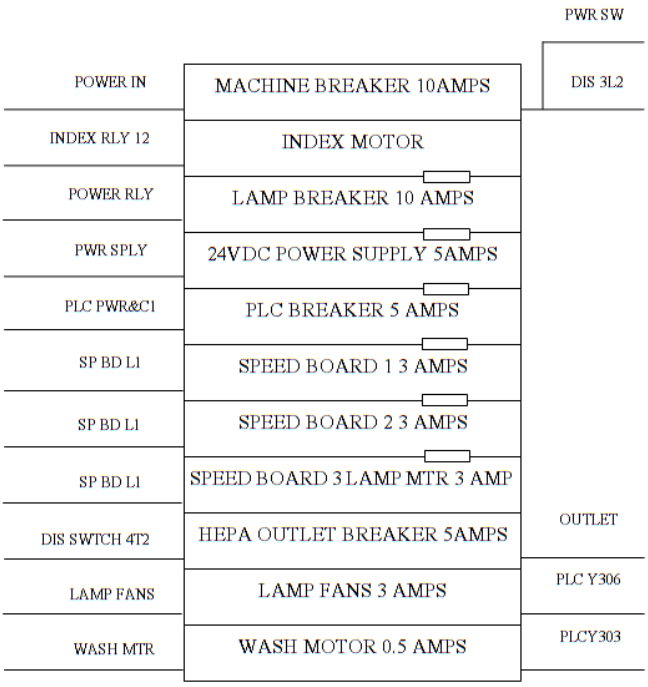


Figure 15 - Circuit breaker wiring

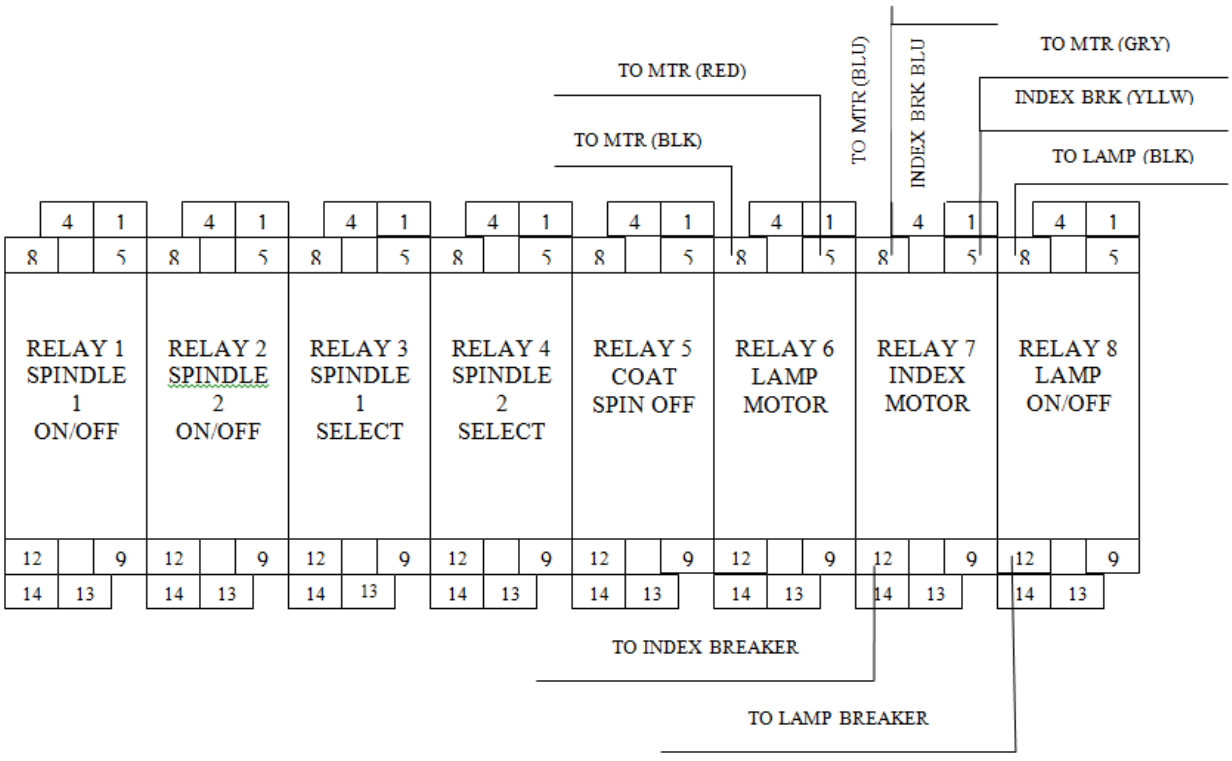


Figure 16 - Control relay layout

Common Replacement Parts

The following table identifies the commonly replaced parts on the Rx machine:

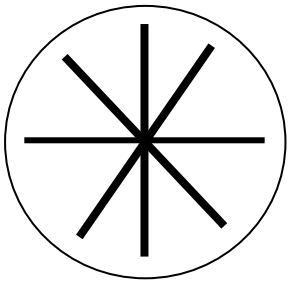
Part Number	Description	Unit	Picture
3404	UOC coating filter	Each	
4404	UOC 5 micron water filter	Each	
1428	Air dryer filter pack	Each	
1050	Suction cup – clear cleated	Each	
1052	Water deflector	Each	
1063UO	UOC UV light module	Each	

CONSUMABLES AND SUPPLIES		
Part Number	**Description**	**Unit**
1389	Nitrile gloves, 8ml – Small	1 Box (50)
1390	Nitrile gloves, 8ml – Medium	1 Box (50)
1391	Nitrile gloves, 8ml – Large	1 Box (50)
1396	Nitrile gloves, 8ml – X-Large	1 Box (50)
1333	Kim Wipes	1 Box (50)
1010/C	IPA Squirt bottle – w/OSHA label	1 Each
01084	UV-NV scratch resistant coating	1 Bottle
	UV-87 scratch resistant coating	1 Bottle
	UV-NQ scratch resistant coating	1 Bottle
	AST-1 scratch resistant coating	1 Bottle
01041	Isopropyl Alcohol (IPA)	1 Case of 4 gallons
	UOC Lens Cleaner	1 Gallon
01025	Dye Additive	1 Quart

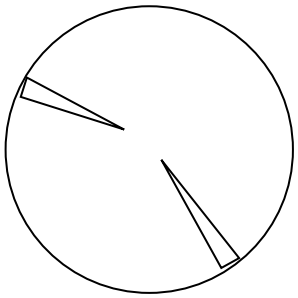
Coating Troubleshooting Solutions

The following figures are provided as a starting point to help troubleshoot any coating issues.

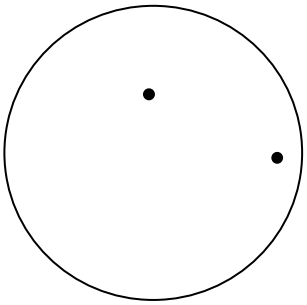
Wagon wheel effect- The coating height needs to be adjusted. The coating flow should stream to the top of the bowl.



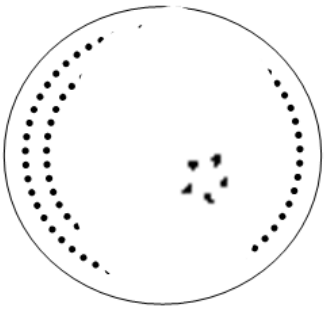
1 – 2 single streaks across the lens this would be caused from air in the coating filter. While pump is running, crack the bleed valve ¼ turn on the Meissner filter. This will allow the air to escape.



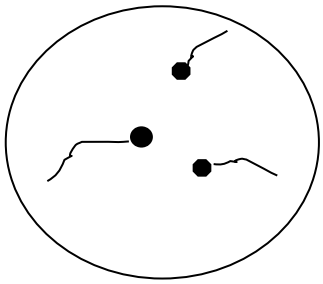
Tiny pits that appear to have indented the lens. If these pits are always in the same position check to ensure spindle is spinning at the correct speeds and or even spinning at all. The indentations may be caused from the wash tip always returning to the same position on the lens while spindle is not spinning.



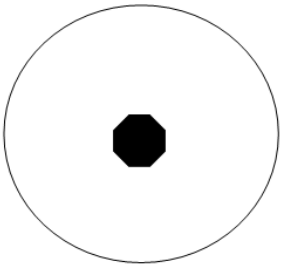
Pits on the outer edge of the lens and or in clumps may be caused by either the Air jet pressure, dirty wash tip or poor prime on the wash pump. Clean tip, run wash pump prime for 30 seconds to purge out air bubbles. If problems still exists adjust the air flow from air jet nozzle. Make sure lens is dry after wash and dry cycle are completed.



Large pits with runs behind streak: if you can feel the pit with your finger it is most likely debris on the lens. Check your cleaning procedures, ensure wash tip is free and clear of debris and wash pump is working properly.



It there is a glob of coating left on the center of the lens; Make sure spindle is spinning. Check for loose wires on spindle motor. Check and or replace bearings in vacuum chuck assembly.



Alarm Codes

ABORT CYCLE ALARMS	
****These alarms indicate a serious event and abort the lens cycle ****	
Alarm Message	**Cause**
Lost Vacuum Alarm	A lens has fallen from the suction cup
Arm Not Down	The Cylinder Down sensor is not ON three seconds after the Cylinder Down solenoid was activated
Arm Not Up	The Cylinder Up sensor is not ON three seconds after the Cylinder Up solenoid was activated
UV Lamp Not Home	The UV Lamp Home switch was not ON 35 seconds after the Lamp Cycle began
Arm Up switch is ON, Arm is down	The Cylinder Up sensor is ON but the Cylinder Down solenoid and switch is ON
Arm Down switch is ON, Arm is up	The Cylinder Down sensor is ON but the Cylinder Up solenoid and switch is ON
Index switch is ON during Index	The Index proximity switch was ON during the Index Cycle
WARNING ALARMS	
****These alarms are displayed on the Operator's screen but do not interrupt or abort the lens cycle****	
Machine Not Home	The machine is not in the home position when a Lens Cycle was requested
Maintenance Door Open	The maintenance door is open during a Lens Cycle
UV Lamp Door Open Warning	The UV lamp door is open during a Lens Cycle
Index Position sensor is loose	The index position proximity switch is OFF while the cylinder is down.

Spare/Replacement Parts

The following spare parts can be ordered by calling our Customer Service team at 763.488.6030, or by going online at www.ultraoptics.com.

Part Number	Item	Unit of Measure
01127	UV-87 coating	1 bottle
01084	UV-NV coating	1 bottle
01158	AST-1 coating	1 bottle
01041(1)	Isopropyl Alcohol (IPA)	1 case
01086(2)	UOC Lens cleaner	1 gallon
01025	Dye additive	1 quart
01087(1)	Ink remover	1 gallon
1389	Nitrile gloves – small	1 box (50)
1390	Nitrile gloves – medium	1 box (50)
1391	Nitrile gloves – large	1 box (50)
1396	Nitrile gloves – XL	1 box (50)
1333	Kim wipes	1 box (50)
1010/C	IPA squirt bottle w/OSHA label	Each
3404	UOC Coating filter	Each
4404	UOC 5 micron filter	Each
1428	Air dryer filter pack	Each
1050	Suction cup – clear cleated coater	Each
1052	Water deflector	Each
1063UO	UOC UV light module $200.00 credit issued upon return of used module	Unit

(1) A hazardous shipping charge will apply per box – ground service is only available.

(2) UOC Lens cleaner is an alternative to IPA which does not require the hazardous shipping charge.

Warranty Statement

Warranty

The Corporation warrants the new equipment of its manufacturer to be free from defective material or workmanship for a period of (12) twelve months from date of shipment from the factory when given normal and proper usage and while owned by the original Purchaser from the Corporation. The Purchaser shall notify the Corporation immediately of any defects part or parts and the Corporation shall thereupon correct the defect or defects; if such correction requires the replacement of the defective part or parts, the Corporation will supply same F.O.B. factory. The Corporation shall in no event be held liable for damage or delay caused by defective parts and will not accept any charges for work performed by Purchaser in making adjustments or repairs to the equipment unless such work has been authorized in writing by the corporation. Any equipment or components not of the Corporation's own manufacturer is sold under such warranty only as the makers thereof give the Corporation and the Corporation is able to enforce, but such items are not warranted by the Corporation in any way. When components are sold to be assembled in combination of Purchaser's design, the warranty is limited to each separate component and not upon any such combination. Any modification or alterations of the equipment or any substitution or addition of components not furnished by or authorized by the Corporation shall, at the option of the Corporation, void this limited express warranty. THE CORPORATION MAKES NO OTHER WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTIABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE OBLIGATIONS STATED ABOVE ARE HEREBY DISCLAIMED.

Responsibility

The Corporation shall not be liable for loss, damage detention, delay or failure to deliver resulting from causes beyond its reasonable control Including, without limitation, fire, flood, strike, insurrection, war, riot, embargoes, car or truck shortages, wrecks or delays in transportation, inability of the Corporation to obtain supplies of raw materials and/or obtain assemblies furnished by others, or requirements or regulations of any civil or military authority. Receipt of the equipment by the purchaser upon delivery shall constitute a waiver of all claims for loss or damage due to delay. The Corporation shall not be liable for indirect or consequential damages under any circumstances, including, without limitation, losses or expenses arising in connection with the use of, or inability to use, its equipment for any purpose whatsoever.

Product Liability

The Corporation believes that the equipment conforms to the requirements of the Occupational Safety and Health Act of 1970 but, because Interpretations of such requirements may vary no representation or warranty is made with respect to such compliance.

All Safety devices and guards included in the proposal are recommended for purchase. Should these be inadequate to meet the requirements specified by the Purchaser, the Purchaser shall notify the Corporation and the Corporation shall provide, at an extra price, such alternatives or additional safety devices and guards as are necessary to satisfy such specifications.

Purchaser shall require its employees and any other person using the equipment to use safety devices, guards, and proper safe operations procedures. Purchaser shall not remove or modify safety devices, guards, or warning signs, nor allow any person to remove or modify the same or to operate the equipment if such devices, guards, or signs have been removed or modified. Purchaser shall not permit any person other than required operating personnel to remain within ten feet of the equipment during the operation thereof. Purchaser agrees to indemnify and hold the Corporation harmless from any and all claims, actions, proceedings, costs, expenses (including attorney's fees, damage and liabilities occasioned by damage or injury to any person or person's property arising directly or indirectly in connection with the operation of the equipment, if the Purchaser: (I) fails to observe each and every obligation set forth in this paragraph; (ill) fails to purchase the safety devices and guards recommended by the Corporation (ill) fails to maintain in good working order such safety devices and guards; (iv) adds, omits, modifies, or substitutes any components on the equipment; (v) exceeds at any time the maximum safe loads and speeds recommended by the Corporation for the equipment; or (vi) makes any repairs, adjustments, or other work on the machine without following the Corporation's or component manufacturer's guidelines for Lockout or Tagout procedures or takes any such actions without first ensuring that the equipment has been unplugged or disconnected from all airline, hydraulic, electrical power sources, and drive mechanisms.

Purchaser shall notify the Corporation promptly, and in any event within 30 days, of any accidents, malfunction, or other use or misuse or occurrence involving products of the Corporation which results in personal injury or damage to property, and shall cooperate fully with the Corporation in investigating and determining the cause of such occurrence. In the event that Purchaser shall fail to give such notice to the Corporation and to cooperate as herein provided, Purchaser agrees to indemnify and hold the corporation harmless from any and all claims, actions, proceedings, costs, expenses (including attorney's fees), damages and liabilities arising from such accidents, malfunction, or other occurrence.