ULTRA OPTICS

MINI 2
ENGINEERING MANUAL

Introduction

This manual is intended for Ultra Optics customers to use. It is essential to read and understand the information in this manual before installing or operating the system. Ultra Optics provides this manual 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-partymanufacturers (including, but not limited to, the PLC, motors, etc.) shall take precedence over information contained within this manual concerning third-party equipment.

Thank You

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 Mini2 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 that is not consistent with the instructions outlined in this manual!

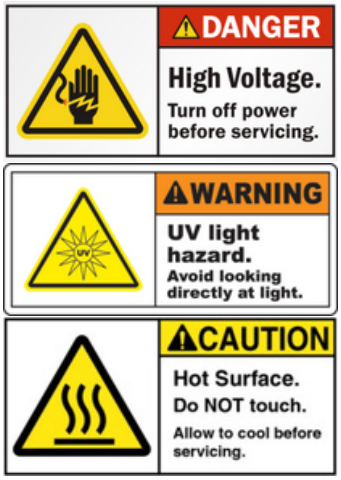
NEVER alter the design or perform service that is not consistent with the instructions outlined in this manual, without the prior written approval of Ultra Optics.

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.

WARNING!: Do not turn on or operate this machine until this manual has been read and understood. If anything is unclear, please call our technical support team immediately for help at 763.488.6030 TechnicalSupport@ultraoptics.com.

Safety

The Mini2 is a complex piece of equipment that contains various safety hazards. Some of these hazards include, but are not limited to:



Do not service the 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 always be worn 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 thoroughly clean the lens. If directed at the skin, this water jet could cause injury.

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.

Only trained and qualified technicians must operate and work on this machine. 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, and a protective gown/coat.

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

General Safety

Notes:

- Never change or deactivate safety switches or protection devices in any way!
- Work on the Mini2 must only be performed with the power disconnected.
- 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 Mini2 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 Mini2. 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 power disconnect and has good ventilation with an air exchange of 4-5 times per hour. It should be located in a low-traffic area to minimize possible dust contamination. While installing the Mini2 in a clean room is unnecessary, it is not a good idea to place it near a lens edger either.
Dimensions	Coating Unit 21” D x 25” W x 36” H Cure Unit 25” D x 16” W x 13” H
Electrical Power	Coating Unit • 115 VAC, 5 amp circuit required. Machine is supplied with a grounded three-prong receptacle, OR • One single phase 220 VAC/5A circuit. Cure Unit • 115 VAC, 15 amp circuit required. Machine is supplied with a grounded three-prong receptacle, OR • One single phase 220 VAC/12A circuit.
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. 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 Setup

Unpack and Inspect

Begin by inspecting all components that shipped with the coating and curing unit. These may include a HEPA filter and blower assembly, tubing, a squirt dispensing bottle, gloves, adapter suction cup, 5-gallon reservoirs, etc. If any parts or the machines are damaged in any way, contact Ultra Optics immediately. Place the coating and UV cure units on a level table/bench with the two 5-gallon reservoirs below the table/bench. It can be very helpful to install an inspection light on the bench near the coating unit as well.

Electrical connections

Plug the Mini2 coating unit into a 110V, 5A circuit, and plug the Mini2 cure unit into a 110V, 15A circuit. Each device is supplied with a power cord.

HEPA Filter System

Place the HEPA filter system on top of the coating machine and secure it with screws. Plug the HEPA system power cord into one of the provided outlets on the back of the coating unit.

Spindle Arm

Remove the bolt before connecting the air source to the coating unit (see “A” in Figure 1). This bolt is only used to secure the spindle arm during transportation. After removing the bolt, replace it with the guide pin (see “B” in Figure 1). The pin can be found in a plastic bag inside the wash bowl.

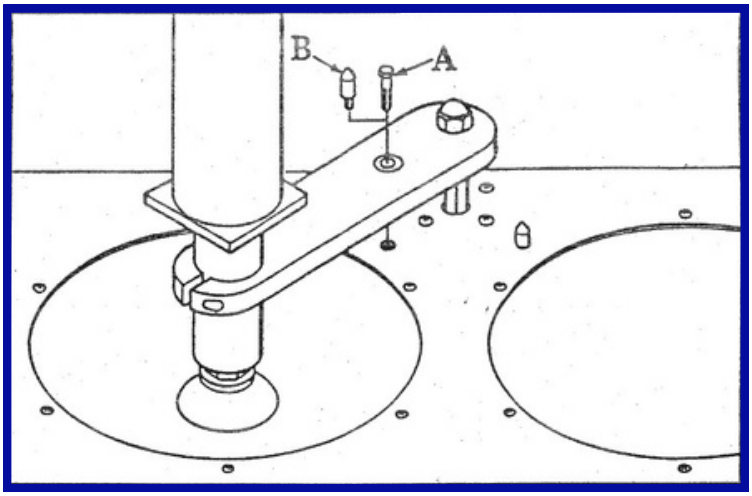


Figure 1 - Spindle arm guide pin installation

Air and Water Tubing Setup

The following diagram should be used to route the tubing between the Mini2 coating unit and the UV Cure unit, as well as the tubes that need to be run to the two water reservoirs.

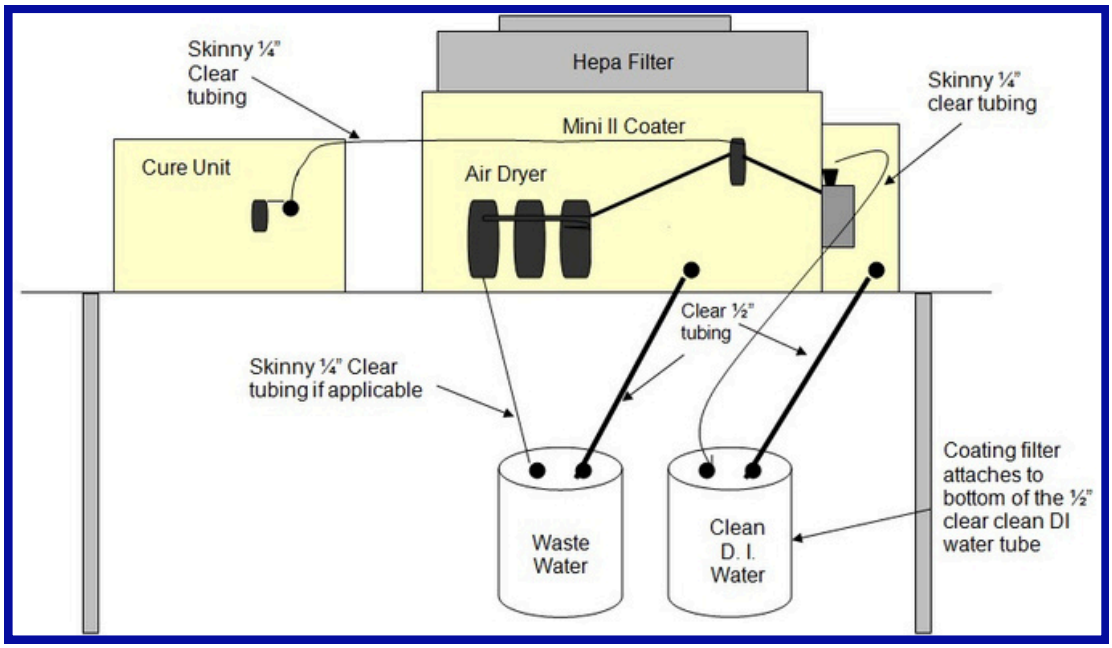


Figure 2 - Tubing setup diagram

Connect one end of the ½" tubing to the wash (Clean DI Water) connector on the lower right side (viewed from the back) of the Mini2 coating unit. Pass the other end of the ½" tubing through the hole in the lid of the reservoir and attach filter connector and filter inside of the reservoir.

Connect the small ¼" diameter clear tubing to the smaller fitting in the reservoir cover and the other end to the by-pass fitting located on the upper right side (viewed from the back) of the Mini2 coating unit. Fill the reservoir with clean, deionized water and secure the cover. Connect the other piece of ½" tubing to the water drain fitting on the rear of the Mini2 coating unit. Connect the other end of this ½" tube to the ½" fitting on the cover of the Waste Water reservoir.

Adjust the air pressure regulators as follows:

- Mini2 coating unit = 80 psi
- Mini2 UV cure unit = 10-15 psi

Be sure to prime the coating and the wash systems prior to operating. These procedures can be found in the Maintenance section of this manual.

System Overview

General Overview

The Mini2 is a robust backside hard coating machine that performs all 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 to reduce costs for today's small—to medium-sized labs.

The Mini2 is an entirely self-contained system that does not require installation/operation in a cleanroom environment. The system utilizes a pre-filter and HEPA filter to maintain a continuous positive pressure of immaculate air, which reduces the dependability of operating in a clean environment.

Wash process

The lens is washed with high-pressure, deionized water. The clean deionized water is stored in a reservoir (supplied by UOC), which should be placed below the machine's shelf. 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 2,000 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 ensure a complete surface cleaning.

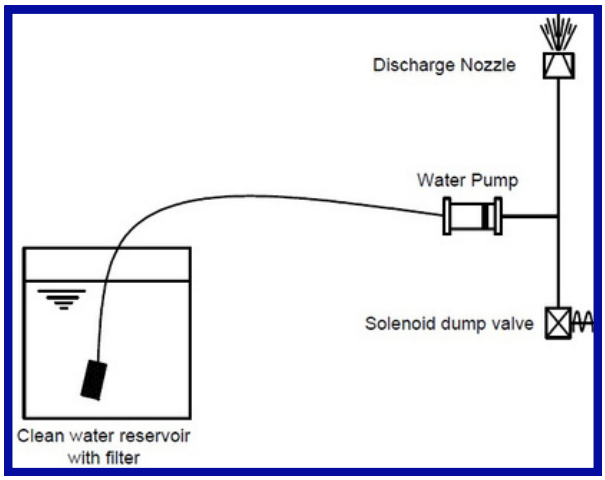


Figure 3 - Wash system schematic

The spent water is collected at the bottom of the wash bowl and drained into a waste water reservoir, which should be placed on a shelf below 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 into the clean water reservoir

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 initiates the drying process. The lens is dried using compressed air. In the drying process, the air nozzle is articulated to ensure 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 below, 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.

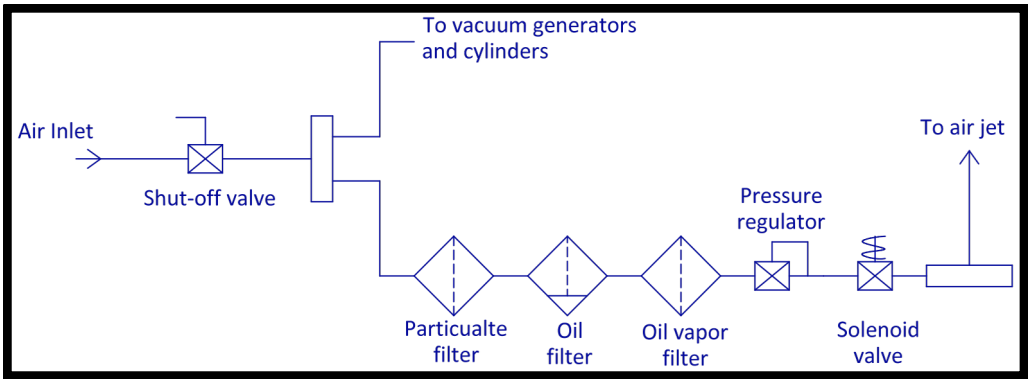


Figure 4 - Drying system schematic

Coating application

After the lens is washed and dried, the arm and spindle assembly will lift and swing to the coating application station. 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 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 the coating based on 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.

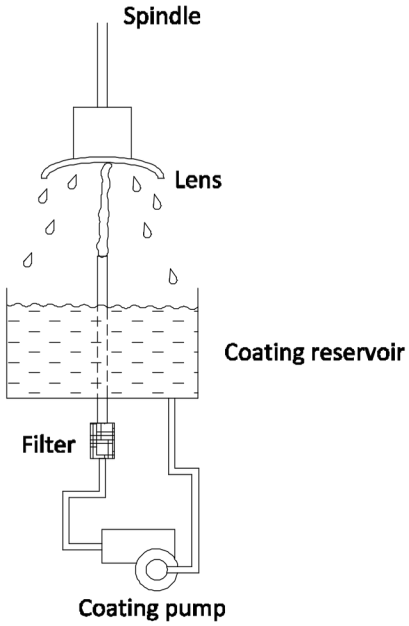


Figure 5 - Coating system schematic

Cure Process

The Mini2 is designed to cure Ultra Optics' line of UV-based coatings. After the lens has completed the coating application cycle, the lift cylinder raises the arm assembly. The user then carefully grabs the lens by the edge and flips the switch to UNCHUCK to release the lens from the suction cup. It is recommended to keep the coated surface facing down to reduce the risk of airborne contaminants settling onto the wet surface.
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 swing arm spindle assembly.
2. Turn the air supply on.
3. Fill the clean/wash water reservoir with deionized water and empty the waste water reservoir
4. Turn the machine power on with a red switch.
5. Check coating level and coating height.
6. Run a test to be sure the lens is getting completely dry.

Coating Machine Operation Procedure

The following procedure should be followed to coat a lens.

1. Inspect the machine to be sure nothing is in it that would impede the movement of the swing arm spindle assembly
2. Turn the air supply on
3. Turn UV Cure machine on using the main power switch located on the back of the unit.
   a. Wait ten minutes for the light to reach its full intensity!
4. Hold the lens in a gloved hand with the backside facing up. Apply a dime-sized amount of Ultra Optics ClearView lens cleaner, or IPA, to the backside surface. Using a gloved finger, rub the lens cleaner all over the surface to break up any dirt, polish residue, oil, etc.
5. Place lens, convex side up, centered on the vacuum chuck and flip the switch up to the CHUCK position. Let go of lens and make sure it does not fall off the vacuum cup.
6. Press the green CYCLE START button. The machine will now automatically wash and coat the lens.
   a. When the cycle is complete, the red COATING CYCLE COMPLETE light will blink

Coating Machine Operation Procedure continued

7. Remove the lens by carefully holding onto edges and flipping the switch down to the UNCHUCK position.
   a. It is recommended to keep the coated surface facing down to reduce the risk of airborne contaminants from getting on the freshly coated surface.
8. With the lens removed from the machine, this is a good time to do a quick visual inspection of the quality of the coating film. If any issues are found, it is possible to clean the wet coating off with soap and water and then re-coat the lens.
9. Take the coated lens to the UV Cure unit. Flip the VACUUM switch up.
10. Open the door and center the lens, front side up, on the vacuum cup.
11. Close the door and press the START button.
12. When the lens returns to the front of the curing unit, open the door, grab the lens, and flip the VACUUM switch down to release the lens.
    a. If there is a small amount of uncured coating on the front side of the lens, wipe it off with a non-abrasive cloth.

NOTE: The Mini2 and Cure Unit are designed with suction cups that work for nearly all lens types. If a particular lens type is not working well, contact Ultra Optics for other suction cup designs.

The lamp in the UV Cure Unit is designed to last approximately 1,000 hours. If the lamp is used over 1,000 hours, the coating will likely not be properly cured. Ensure that the hour meter display has a blinking decimal point. When the meter reads 1,000.0 hours (as detected on the hour meter), call Ultra Optics to order a replacement light module. When you receive the replacement module, return the original unit for a core credit.

Cure Unit

Set-Up

1. After carefully removing all packaging material, place it on a level working height surface.
2. Attach a clean, dry compressed air line to the fitting on the back of the unit.
3. Plug the power cord into a 110 VAC, 60 Hz, 15 Amp service grounded receptacle.

Operation

1. Turn on the main power switch, located on the back of the unit.
2. Allow the lamp to warm up for ten minutes prior to use to reach proper operating temperature.
3. During lamp warm-up, familiarize yourself with the front control panel. The control panel has the following buttons:
   - 10A circuit breaker for the lamp circuit
   - 2A circuit breaker for the motor circuit Start button to begin the cure process of each lens
   - Toggle switch which turns on vacuum to the suction cup to hold the lens while curing
4. To start the curing a lens. Select either Cycle 1 or Cycle 2 (see below).
   a. Ultra Optics has pre-set the cure time at the factory. If this timing needs to be adjusted, there is a slot located on the lower right corner of the left side panel marked “Cycle 1” and “Cycle 2.” A small slotted screwdriver is needed to change the settings.
5. Open the door on the front of the cure unit.
6. Set the vacuum switch to the up position (on).
7. Hold the lens by the edge and center its front side on the suction cup. a. Pressure has been pre-set to 10 psi with a lens installed by Ultra Optics at the factory. Over time, adjustment may be necessary. It is advisable to check this daily.
8. Close the door. 9. Push the “Start” button. 10. When complete, open the door, grasp the lens by the edge, and set the vacuum switch down to the off position to release the vacuum.

If the UV light is turned off and on, or the door is opened during a cure cycle, a safety switch will activate and turn the light off. You must push the Start button to move the carriage back to the starting point. There will then be a 10-30 minute delay until the light can come back on and warm up.

UV Lamp Replacement

The lamp is a self-contained module. On the right side of the Cure unit, a handle and an hour meter are located. The UV lamp should be replaced every 1,000 hours.

To change the lamp:

1. Unplugging the power cord disconnects all power from the unit.
2. Remove the four Phillips head screws and gently pull straight out using the handle.
3. There are no user-service parts on the module. Contact Ultra Optics to order a replacement module and return the original for a core credit.

Maintenance

The Mini2 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 Mini2, it is highly recommended that service and maintenance be done only by trained technicians. Failure to do so could result in damaged equipment, increased downtime, or injury of personnel.

Personal protection equipment should always be worn 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 Mini2 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” ~13 times.
Weekly	Inspect suction cups for debris or deterioration	Replace as necessary with part number: - Mini2 - #1050 - Cure unit - #1064
	Check spindle speeds Check lamp cycle time	Refer to setting spindle speed procedure on page 11 of this manual.
	Check lamp module hours	Should be 24 seconds, +/- 1 second
	Clean out top Hepa filter housing	Replace at 1,000 hours
		Replace top pre-filter as needed using a 10” x 10” x 2” filter. UOC part number 3923T999

	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	Suction cup part numbers: • Mini2 - #1050 • Cure unit - #1064
	Change coating filter Change	Filter is part number 4404
	water filter in reservoir Change	Filter is part number 4404
	air dryer filters	Filter is part number 1428

Maintenance Procedures

NOTE: Many maintenance procedures are demonstrated in videos that can be found at www.ultraoptics.com/technical-support

Setting spindle speeds

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

Wash speed: 2200 RPM
Coating speed: 400 RPM
Coating spin-off speed: 2200 RPM, 1600 RPM if using AST-1TM 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.

1. Carefully clean the surface of the suction cup, using only water.
   - Do not use alcohol or acetone to clean the deflector cups.
   - If deflector has excessive coating build-up on the surface, replace with a new suction cup, P/N 1050.

2. Apply a 1/8 inch piece of reflective tape to the top of the suction cup as a vertical strip.
    a. This reflective tape is supplied with the tachometer if acquired from Ultra Optics.
3. Disconnect one of the leads of the coating pump.
    a. This allows running the coating prime operation without actually running the pump.
4. With the power to the machine still on, disconnect the compressed air line to the machine.
5. Flip the prime switch down to WASH PUMP PRIME position.
    a. The spindle will drop down and start to spin.
6. Press the white button on the handheld tachometer.
    a. This will allow the tachometer to reset to zero.
7. While holding down the white button, point the tachometer towards the silver reflective tape. Wait until you see a bullseye icon in the corner of the display.
8. If the speed is not correct, turn the WASH potentiometer.
    a. Potentiometer is located on the left side, under the control panel b. Turn clockwise to increase speed and counter-clockwise to decrease speed.
9. When the wash/coat spin-off speed is properly adjusted, re-connect the compressed air line to the machine.
10. Place the prime switch in the upper COATING PUMP PRIME position.
11. Flip the switch up to the CHUCK position. 12. Place a lens, front side up, centered on the suction cup. 13. Press the green CYCLE START button.

    a. The spindle will swing over to the coating side and spin above the bowl. 14. While holding down the white button, point the tachometer towards the silver reflective tape. Wait until you see a bullseye icon in the corner of the display.
15. If the speed is not correct, turn the COAT or PLUS potentiometer.
    a. Potentiometer is located on the left side, under the control panel b. Turn clockwise to increase speed and counter-clockwise to decrease speed.
16. When the coat speed is properly adjusted, press the red CYCLE STOP button. 17. Reconnect the coating pump wires that were removed in step 3 18. Replace the silver control panel and tighten using the thumb screws.

Adjusting the coating height

1. Obtain access to the adjustment potentiometer by removing the control panel assembly.
2. Turn the coating pump on by putting the prime switch up to the COATING PRIME position.
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 6, 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.

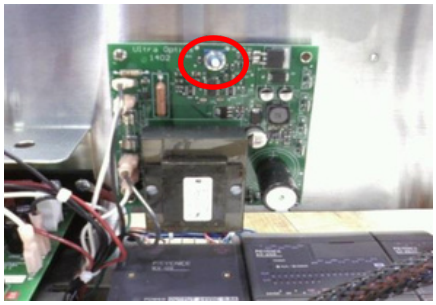


Figure 6 - Coating height adjusting potentiometer

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

Priming the wash system

1. Check and fill the clean water reservoir.
2. Flip the switch up to the CHUCK position.
3. Place a sample lens onto the suction cup.
4. Flip the prime switch down to the WASH PUMP PRIME position.
5. Press the green CYCLE START button.
6. The lens will lower into the wash chamber, and the wash pump will activate. Let the pump run for approximately 60 seconds to purge all of the air out of the lines.
7. Flip the prime switch back up to the center PRIME SELECT OFF position.
    a. The pump should now beat slower and more consistently. If the pump does not slow down, flip the switch back down to the WASH PUMP PRIME position for 20 seconds.
    b. Repeat as necessary. When the pump beats slow and consistent with the switch in the center position, the pump is primed.
8. Press the CYCLE STOP button.

 Once the CYCLE STOP button is used, the lens must be un-chucked and re-chucked in order for the cycle to be able to start again.

Priming the coating system

1. Pour two bottles of Ultra Optics coating into the coating bowl (smaller nylon bowl on the right when viewed from the front of the machine).
2. Flip the prime switch up to COATING PUMP PRIME position.
3. While the pump is running, turn the bleed cap on the top of the coating filter one half turn until there is no air left in the filter.
    a. This should only take a few seconds
    b. DO NOT REMOVE THE CAP.
4. Flip the prime switch down to PRIME SELECT OFF position.

Flushing the coating system

Along with your preventative maintenance schedule, an occasional “flushing” of your coating reservoir and pump may be needed should your coating become contaminated. The following procedure should be followed to flush the coating system:

1. Unscrew the fitting on the top of your coating filter.
2. Place the loose tube into a clean bottle, and turn on your coating pump.
    a. This will allow the coating from the reservoir to empty out into the clean bottle.
3. When reservoir is empty turn the coating pump off.

4. Unscrew the bottom fitting and place filter above your clean bottle and release the bleed valve. This will allow the coating to drain out of the filter.
5. Discard the filter.
6. Use Teflon tape on your new filter where the fittings will be screwed into.
7. Pour acetone into the coating bowl.
8. Put the top fitting from the coating filter into a waste container, turn on the coating pump and allow the acetone to flush out until empty.
9. Repeat flushing with acetone one more time to ensure any and all contaminates have been removed.
10. Allow ten minutes for the reservoir to dry.
11. Attach the new coating filter and ensure the fittings are tight and do not leak.
12. Pour at least 1-1/2 bottles of the new coating into the system and run the coating prime for approximately seven minutes to re-prime and make sure no air and debris are trapped in the coating filter.

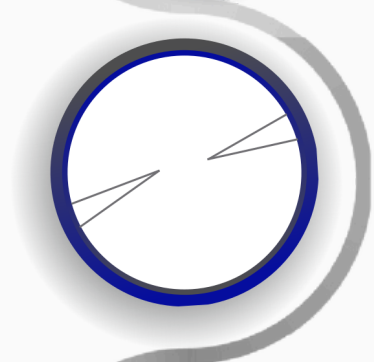
Air Regulator Adjustment

1. Locate the regulator on the 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.

Trouble Shooting Solutions

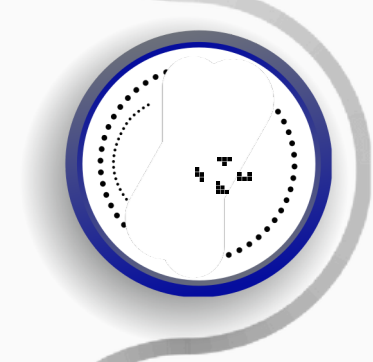
ULTRA OPTICS

Wagon wheel effect:
Adjust the coating height so that the coating flows smoothly to the top of the bowl.

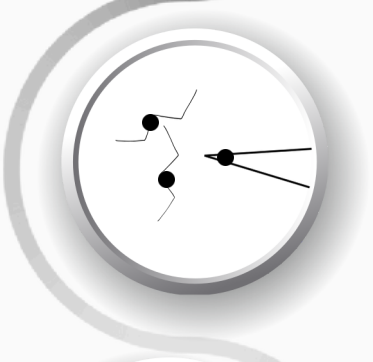


1–2 single streaks across the lens
This may result from air in the coating filter while the pump is running. Open the bleed valve on the Mizner filter 1/4 turn to allow air to escape.

Tiny pits appearing on the lens
If these pits consistently appear in the same spot, check if the spindle is spinning correctly. The indentations could be caused by the wash tip returning to the same position on a stationary



Pits on the outer edge or in clumps
These may be caused by high air jet pressure, a dirty wash tip, or insufficient priming of the wash pump. Clean the tip, prime the wash pump for 30 seconds to remove air bubbles, and adjust the airflow from the nozzle. Ensure the lens is dry after the wash and dry cycle.



Large pits with streaks behind
If pits are noticeable and can be felt, debris on the lens is likely. Review your cleaning procedure, ensure the wash tip is clear of debris, and verify the wash pump is functioning correctly.

Coating glob on the center of the lens
Confirm the spindle is spinning and check for loose wires or bearings in the vacuum chuck assembly.

9200 Wyoming Avenue North Brooklyn Park, MN 55445 Main: 763.488.6030 | Fax 763.488.6036 www.ultraoptics.com

Spare/ Replacement Parts

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

Part Number	Item	Unit of Measure
01128	UV-XBT coating	1 bottle
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)	ClearView Lens cleaner	1 gallon
01025	ConsisTint dye additive	1 quart
01034(1)	Acetone	1 gallon
01087(1)	Ink remover	1 gallon
7520-599	Latex gloves – small	1 box (100)
7520-600	Latex gloves – medium	1 box (100)
7520-601	Latex gloves – large	1 box (100)
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
4404	UOC 5 micron filter	Each
1428	Air dryer filter pack	Each
1050	Suction cup – clear cleated	Each
1052	Water deflector	Each
1063UO	UOC UV light module	Unit
shipping charge.	$200.00 credit issued upon return of used module	

(1) A hazardous shipping charge will apply per box – ground service is only available.
(2) ClearView lens cleaner is an alternative to IPA which does not require the hazardous

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 the 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 the 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 the 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 a combination of the 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 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE THATEXCEEDS 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, the 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 concerning such compliance. All Safety devices and guards included in the proposal are recommended for purchase. Should these are 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. The purchaser shall not remove or modify safety devices, guards, or warning signs, nor allow any person to remove or modify the same or 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 outlined 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, and 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 The Corporation, which results in personal injury or damage to property, 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.