ULTRA OPTICS

MR III

ENGINEERING MANUAL

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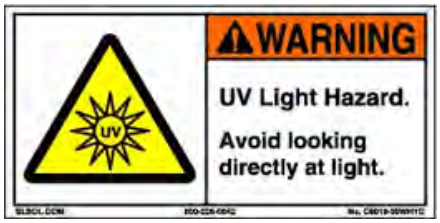
Ultra Optics MR III

Warning: Do not service the machine while plugged in.



Warning: This machine contains a UV Light and may cause damage to the Eye.

Caution: The rear panels may be hot due to UV Light. If IPA or other cleaning agents are used, they can be a fire hazard

Ultra Optics MR III

Warning: never change or deactivate safety switches or protection devices in any way.

INTENDED USE OF MACHINE

The MR III is a backside scratch-resistant coating system for coating optical lenses.

RISK – REDUCTION PROCEDURES

The MR III should not be used for any purpose other than coating optical lenses, as this may result in injury.

TECHNICAL DATA

Dimensions: 76” high x 30” deep x 25” wide
Compressed air supply – constant 80 PSI / 9-10 CFM
Voltage range: 110/115 VAC, 1000 VA, 50/60 HZ

SYSTEM INSTALLATION

Choose a physical location in an area accessible to power disconnection and with good ventilation and an air exchange rate of 4-5 times per hour. A normal Heating/Cooling A/C system will provide about
3 -6 air exchanges per hour.

PROTECTIVE EARTHING

The MR III machine requires Protective Earth grounding.

ADDITIONAL ACCESSORIES

The MR III is equipped with three outlets in the lower back of the system, one for the main power, one for the Hepa filter and the other for the Foot Pedal.

GENERAL SAFETY INSTRUCTIONS

- The MR III has been designed and built in accordance with European and International safety standards. The MR III machine design is such that it can be used safely.
- Work on the MR III must only be performed with the working chamber closed. The working chamber window must not be removed or altered.
- If a lens is lost from the Vacuum Chuck at any time, at any time, remove all remaining lenses from the remaining spindles, turn off the power, and retrieve the lens accordingly.
- The MR III should be checked for visible damage during each shift. Any changes, including changes in operation behavior, must be reported to the supervisor in charge.
- The MR III Coating System is intended to have an operator present at all times during equipment operation.

MR III Set-Up

DIMENSIONS

The Stand-Alone Unit; 25" x 30“X 76”

PHYSICAL LOCATION:

Choose a physical location with good ventilation and an air exchange rate of 4-5 times per hour. A standard Heating/Cooling A/C system will provide about 3-6 air exchanges per hour.

The MR III has a clean room environment.

CUSTOMER SUPPLIED:

√ 3/8” X 25’ Airline with a ¼ Female Quip Coupler
“Quick disconnect”

COMPRESSED AIR:

The system requires a minimum of 80 psi (10 CFM) of air at a constant source.

An air regulator is supplied on the system.

ELECTRICAL:

One 115 VAC/15 AMP with a grounded three-prong receptacle.

WATER:

Deionized or Distilled water is adequate for the cleaning system.
A five-gallon reservoir is supplied. A direct water source and/or drain is unnecessary but can be used as an option.

Preventative Maintenance Schedule

Daily duties and inspection:

- Wipe out the wash bowl and deck area with a clean, damp cloth.
- Wipe out the coating bowl with a lint-free cloth dampened with Acetone.
- Clean the wash bowl and the coating bowl screen.
- Check the level of deionized water refill as needed. Empty wastewater pail.
- Check the coating level in the reservoir refill as needed.
- Check the coating fountain height the level should be even with the top edge of the coating bowl.
- Check lamp hours (replace at 1,000 hours).
- Check that the lens is dry after the wash and air-dry cycle (Check by pushing the stop button after the air-dry turns off). If they are not dry see Operations Tip section “C” for instructions.

Weekly duties and inspection:

- Visual check suction cups for deterioration, replace as necessary.
- Check the top pre-filter on the HEPA filter system. Replace with a 14 x 20 x 1 Furnace filter as needed.
- Check spindle speeds:

Coating speed	400 RPM (+ or– 25 RPM)
Coat spin-off speed	2000 RPM (+ or – 50 RPM)
Wash speed	1800 RPM (+ or – 50 RPM)

- Lamp cycle 25 seconds
- Check regulator PSI left @ 80 PSI, right @ 60 PSI.

Bi-Monthly duties and inspection:

- Flush out the coating reservoir with Acetone. See flushing instructions.
- Check vacuum pressure using the digital Convoom gauge.
- Inspect the complete Vacuum Chuck assembly for any dried coating and or debris. Clean as needed.

Monthly duties and inspection:

- Lubricate the spindle shaft, upper and lower with a silicone spray. DO NOT spray directly onto the spindle shaft assembly. Failure to do so could result in contamination of coating and wash chamber.
- Replace your Meissner filters every 8-10 weeks. (One should be in the wash bucket, and one should be on the coating line).
- Check the Air Dryer filer gauge. Replace all three if indicate “change”. (part #1428)

MR III Operation Tips

A) To adjust coating height:

1) Go into Machine Set-Up
2) Press coating prime
3) Press vacuum
4) Chuck lens up on the coating side
5) Press coating on/off
6) Adjust height flow to the top of the coating bowl using the “coating pump” pot
   ~Clockwise to increase
   ~Counter-clockwise to decrease

B) To prime high-pressure wash:

1) Go into Machine Set-up
2) Press vacuum
3) Chuck lens up on wash spindle
4) Press “wash prime” and “Dump Valve” allow to prime for 45 seconds
5) Release the Dump Valve to ensure a constant beat (like a heartbeat)
   If wash prime has not been achieved, allow it to run with the Dump Valve on for another 45 seconds
6) After your wash is primed, press the Dump Valve again and allow it to run for 20 seconds
7) Press Wash Prime first, then Dump the Valve, release the vacuum, and remove the lens

C) To ensure the lens is dry before it is coated:

1) Go into Production
2) Press on/off
3) Prepare the lens and chuck up onto the wash spindle. Allow it to wash and dry
4) When spindles start to come up, press “E-Stop”.
5) Release the lens and ensure the backside is dry. If not dry, ensure the wash tip is clean and free of debris. Then repeat priming high-pressure wash again.

D) To replace the Coating Filter:

1) Disconnect the nut on the fitting at the bottom of your coating filter.
2) Insert loose nut and tubing into a clean container.
3) Press the coating on/off Button. The coating will pump out of the loose nut and tubing into the clean container.
4) Press the coating on/off button when the reservoir is empty to turn off the coating pump.
5) Hold a clean container below the coating filter and loosen the “bleed’ cap on the filter. This will allow the coating to drain out of the filter.
6) Place Teflon tape on the new coating filter before reassembling.
7) Pour the coating back into the coating bowl chamber and re-prime the system.
8) Release all air in the coating filter. While priming, turn the “bleed” cap ¼ of a turn. This will allow air to escape.

Lens Retrieval from UV Bulb Module

1. Detached remaining lenses off the Spindle arm Suction cups.

2. Turn off the power to the machine and disconnect the power cord from the electrical outlet.

3. With the power off and disconnected from the outlet, open the back doors of the MR III

4. Remove the two pan-head Allen screws that hold the UV Bulb in the carriage.

5. After the screws are removed, remove the UV Bulb Module for the carriage.

6. Allow the UV Bulb Module to cool for a minimum of 15 minutes or until the UV Bulb Module is at room temperature.

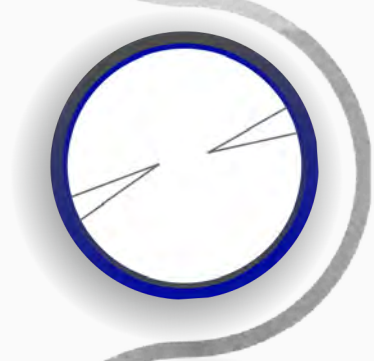
7. Remove the lens from the lamp area.

8. Check for lens debris. If the lens is clear, return the UV Bulb to the carriage and return to the machine operations. If lens debris cannot be removed, replace the UV Bulb Module with a new one and return to machine operation.

Trouble Shooting Solutions

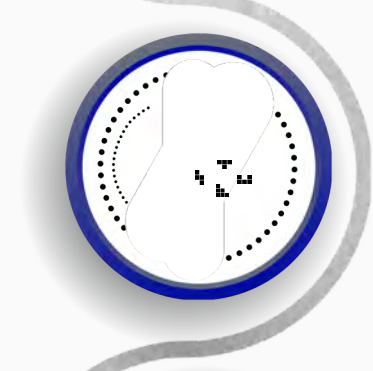
ULTRA OPTICS

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

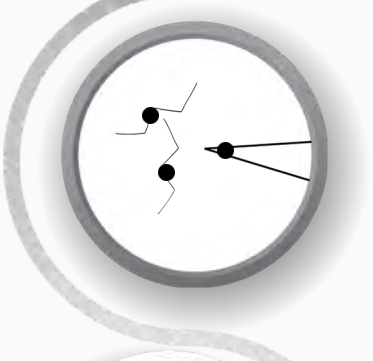


1–2 single streaks across the lens
This may result from air in the coating filter while the pump is running. Open the bleed valve on the Mizner filter 1/4 turn to allow air to escape.

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.

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Flushing Ultra Optics MR III Coating System

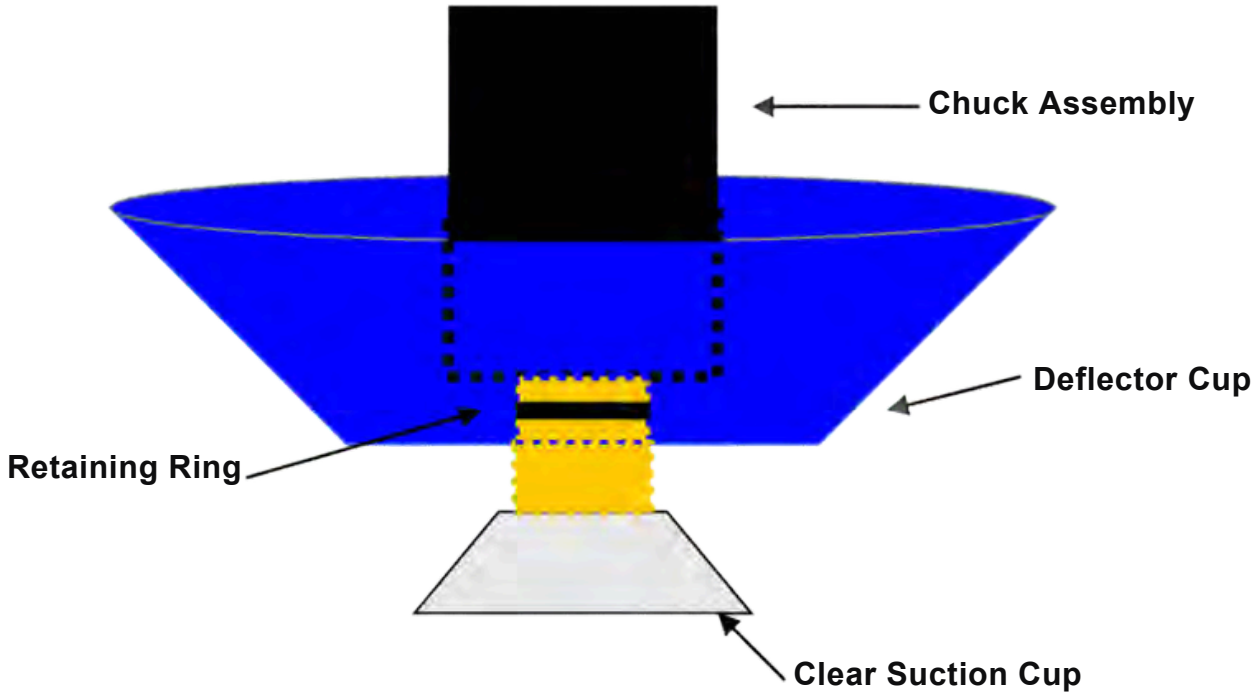
1. Go into the Machine Set-up screen
2. Press the Coating Prime button.
3. Press Vacuum and chuck a lens on the chuck over the coating bowl.
4. Disconnect the nut on the fitting at the bottom of your coating filter.
5. Insert the loose nut and tubing into a clean container.
6. Press the coating on/off button; the coating will be pumped out of the loose nut and tubing into the clean container.
7. When the reservoir is empty, press the Coating on/off button to turn off the coating pump.
8. Hold the clean container below the coating filter and loosen the “bleed” cap on the filter. This will allow the coating to drain out of the filter.
9. Follow the other black tube to the coating reservoir and disconnect. Both coating tubes should now be free.
10. Check the coating sensor on the left side of the reservoir. Verify it is disconnected.
11. The coating reservoir can now be unscrewed and removed from the bowl for easy cleaning.
12. Once the coating reservoir is out of 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.
13. Unscrew and discard the coating filter.
14. Wipe out the coating bowl using a clean, lint-free towel.
15. A coating bowl screen sits on the bottom of the bowl; clean it before reassembling.
16. Apply Teflon tape on both ends of the new coating filter before reattaching the fittings. The Stainless-Steel adapter attaches with the arrow facing up on the top of the filter and the Nylon elbow on the bottom,

Now, you can reassemble the coating side and either put in a new coating or reuse your old coating if it has not been contaminated. Re-prime the system and release air in the coating filter using the bleed valve.

Optional:

**Allow the machine to “cool off” for thirty minutes before flushing with acetone.
If your coating has been contaminated, it may be necessary to flush the coating pump. With the tubing disconnected from the bottom of the filter, pour acetone into the machine as you would with the coating. DO NOT run acetone through the coating filter, simply flush it into a waste container.

Ultra Optics Deflector Cup Assembly



MR III Pocket -Tach Instructions

1) Preparation:

To prepare the rubber chuck for non-contact measurement of speed, carefully clean an area on the rubber chuck of all grease and dirt. Apply approximately a 1/8 inch piece of reflective tape to the shaft. Always use the T-5 reflective tape supplied.

2) Aiming:

The ergonomic design of Pocket-Tach makes the non-contact measurement of speed extremely simple. Aim the Pocket-Tach at the reflective target using the sight bars on the top surface of the instrument to aid in locating the target. A visible light projects from the underside of the Pocket Tach parallel to the top surface and in line with the sight bars. You can view the target on the rotating shaft and the display on the instrument simultaneously.

3) Measuring:

To measure, press and hold the power button on the front panel and aim the instrument at the reflective tape on the shaft until a steady illumination of the “bull eye” symbol in the instrument display indicates you are on target. Once a measurement is complete, release the power button while viewing the target. Pocket-Tach will continue to display the last reading for approximately 90 seconds and then automatically shut off.

Start Up Screen

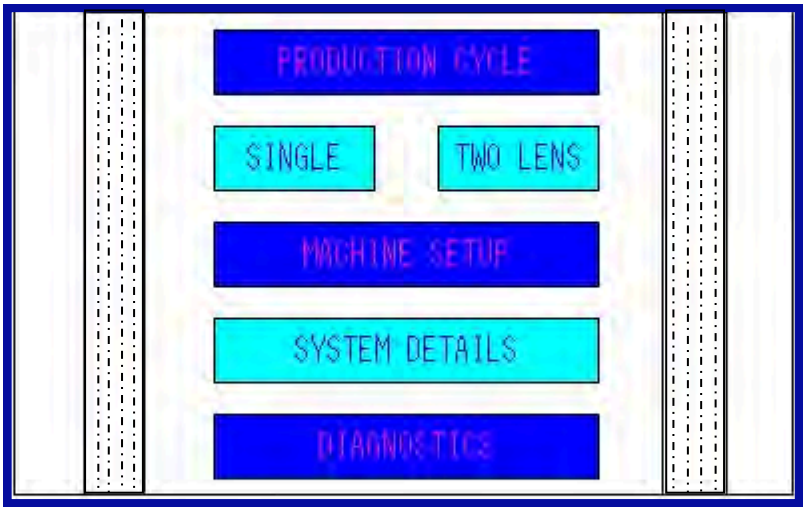
This is the initial screen that appears upon startup.

The "Lamp Not Home" indicator will flash if the lamp is not in the Home position. The lamp will automatically return to the Home position.

A five-minute UV lamp warm-up timer will begin. Once the warm-up is complete, the screen will proceed to the menu.

Press the Ultra Optics logo to skip the warm-up and go directly to the Main Screen.

Main Screen



Production Cycle Button:

Pressing this button takes you to the Production Cycle Screen. Three spindles must be utilized during this cycle.

Two Lens Cycle Button:

Pressing this button takes you to the Two Lens Cycle Screen. Two spindles will be utilized during this cycle.

Single Lens Cycle Button;

Pressing this button takes you to the Single Lens Cycle Screen. One spindle will be utilized during this cycle.

Machine Setup Button;

Pressing this button takes you to the Setup Screen.

System Details Button;

Pressing this button takes you to the System Details.

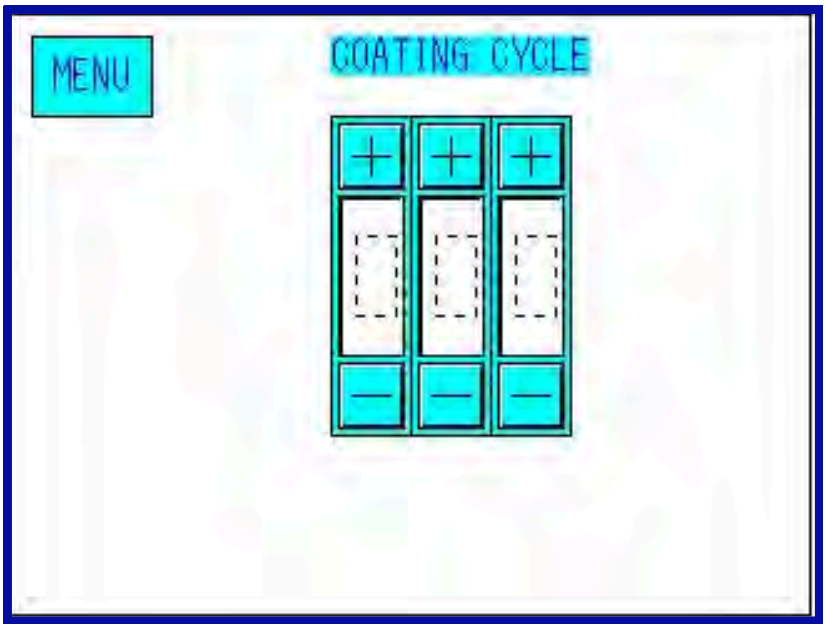
Diagnostics Button:

Pressing this button takes you to the Diagnostics Screen.

NOTE: TWO HIDDEN BUTTONS

Pressing in the dotted location of the lines simultaneously will take you to the Coating Cycle Adjust Screen

Coating Adjust Screen



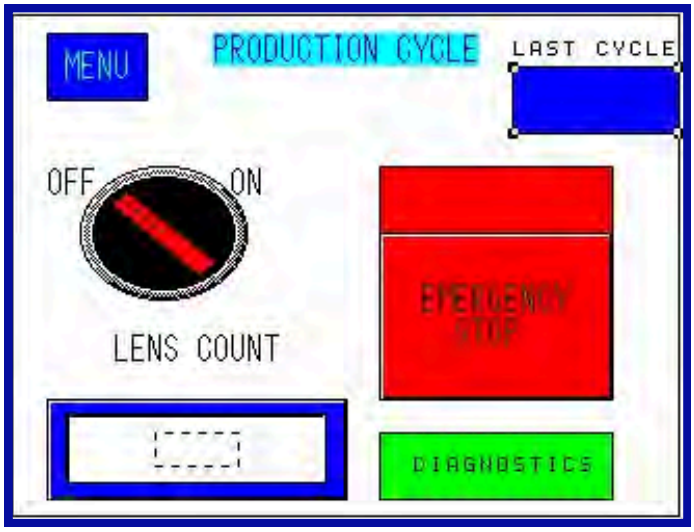
This screen will allow you to adjust the coating cycle spin-off time. Factory Setting is 17.0 seconds.

+ Button:
Pressing this button will allow you to raise the timer.

-Button:
Pressing this button will allow you to lower the timer.

Menu Button:
Pressing this button will return you to the main screen.

Production Cycle Screen



To begin the production cycle, press the on/off button to the on position. At this time, the vacuum will engage. Place the first lens on the vacuum chuck above the wash bowl (facing machine: Vacuum Chuck on operator's right side). Remove hand from machine. The window will lower, and the wash cycle will start. When the wash cycle is complete, the spindle will index to the next position, and the window will rise. Repeat placing the second lens on the vacuum chuck located in the wash position. Remove the hand. The window will lower, and the next cycle starts. The first lens will have the coating applied; the second lens will be washed. When the cycle is complete spindles will raise and index to the next position and the window will rise, place a third lens on the vacuum chuck (located over wash bowl) and remove the hand, the window will lower, and the next cycle will start. The first lens will be cured, the second lens will have a coating applied, and the third lens will be washed. When the wash, coat, and cure cycle is complete, spindles will rise and index. The window will rise, at this time depress the foot switch to remove the completed lens from the vacuum chuck in the wash position. The hand must be removed from the machine and the vacuum will be activated to place the next lens for the production cycle.

End Production Cycle:

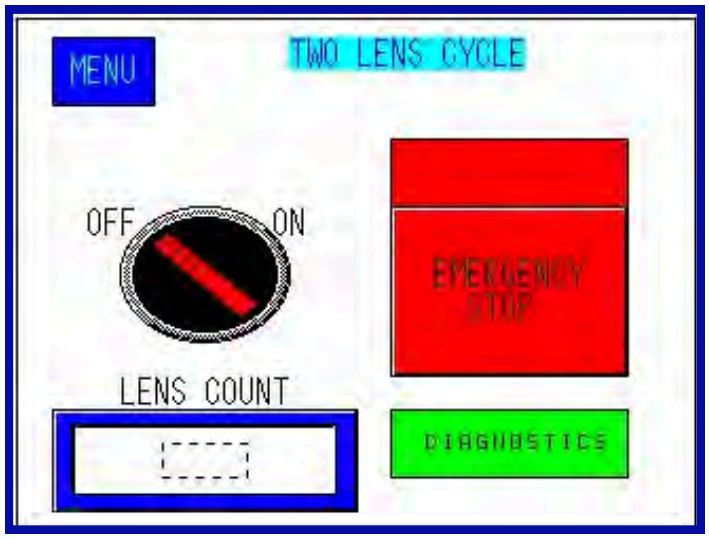
After the cured lens has been removed from the chuck and there is nothing left to coat, press the Last Cycle Button The window will lower and continue cycles until the last two lenses are completed and removed. When the last lens is removed from the machine press the on/off button to the off position. This will deactivate the vacuum. To return to the main menu screen press the menu button.

Important note:

If an emergency stop button is utilized when a machine is in production, all lenses will stay attached and must be removed from vacuum chucks.

To restart the production cycle, press e-stop and turn the production screen off then on and start new production.

Two Lens Screen



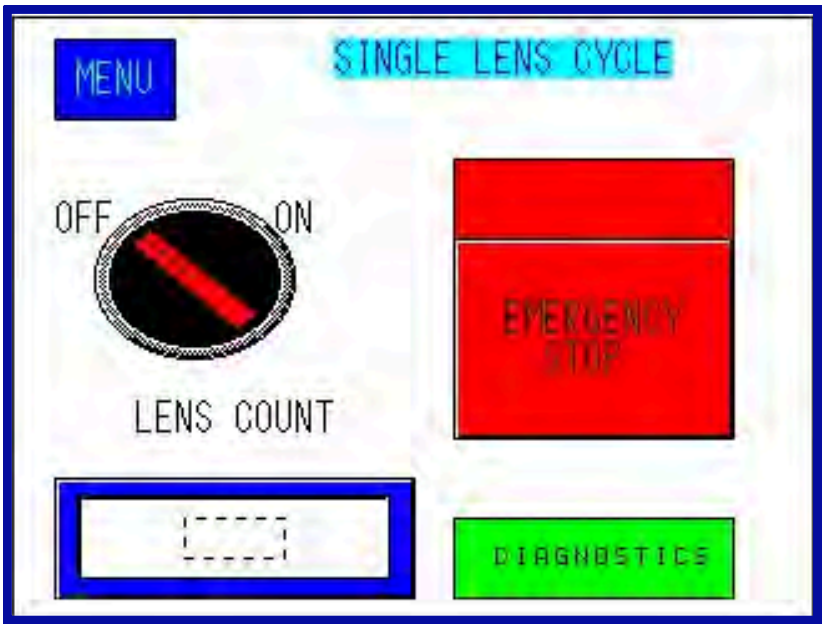
To begin two lens cycle, press on/off button to on position. At this time vacuum will engage. Place first lens on vacuum chuck above wash bowl (facing machine: vacuum chuck is on operators' right side). Remove hand from machine. Window will lower and wash cycle will start. When wash cycle is complete, spindle will rise and index to next position and window will rise. Repeat placing second lens on vacuum chuck located in the wash position. Remove hand. Window will lower and next cycle starts. First lens will have coating applied; second lens will be washed. When cycle is complete, spindle will rise and index, first lens will be cured, and second lens will be coated. When cycle is complete, spindle will rise and index, first lens will stay on vacuum chuck, second lens will be cured. When cycle is complete, spindle will rise and index, window will rise, at this time depress foot switch to remove both lenses. Vacuum will automatically deactivate at this time press the on/off button to reset the two lens program.

Important Note:

If Emergency Stop Button is utilized when machine is in production, all lenses will stay attached and must be removed from vacuum chucks.

To restart production cycle, press e-stop and turn two lens screen to off then on and start new production.

Single Lens Cycle Screen



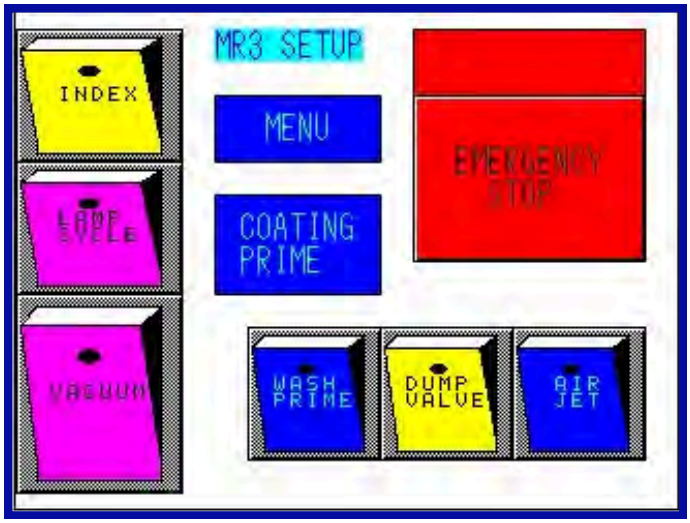
To begin the single lens cycle, press the on/off button to on position. At this time vacuum will engage. Place lens on vacuum chuck above wash bowl (facing machine: vacuum chuck is on operator's right side). Remove hand from machine. The window will lower, and the wash cycle will start. When the wash cycle is complete, the spindle will index to the next position, and the coating cycle will start. The lens will have a coating applied, and when the cycle is complete spindles will index to the next position and will be cured. When the cure cycle is complete, spindles will index, and the window will rise. At this time depress the foot switch to remove the completed lens from the vacuum chuck in the wash position. The hand must be removed from the machine to activate the vacuum for the next single lens cycle.

To end the single lens cycle, remove the completed lens from the vacuum chuck (located over the wash bowl) and press the on/off button to the off position, this will deactivate the vacuum. To return to the main menu press the menu button.

Important note:
If Emergency Stop Button is utilized when the machine is in production all lenses will stay attached and must be removed from the vacuum chuck.

To restart the single lens cycle, press e-stop and turn the single lens screen off then on and start new single lens production.

Machine Set-Up Screen



This screen is used for individual activation of major functions of the MRIII.
Index button: pressing this button will index spindles to the next position.

Vacuum button: Pressing this button engages the vacuum for testing.

1) press the Vacuum button: vacuum will engage.
2) using the vacuum display located inside the front access door above the spindle motor speed pots can individually monitor each spindle.

Wash Prime button: (this sequence order must be followed to activate wash prime).

1) Press the Vacuum button: the vacuum will engage.
2) Place the lens on the vacuum chuck above the wash bowl.
3) Press the Wash Prime button: the spindle will lower, and the high-pressure pump will start.
4) Press the Dump Valve button: this will release pressure and allow to prime wash
5) Press the Wash Prime button: high pressure pump will stop, and the spindle will rise.
6) Press the Vacuum button: The vacuum will turn off and the lens will be released.

Dump Valve button: pressing this button will release pressure build-up in high pressure lines.

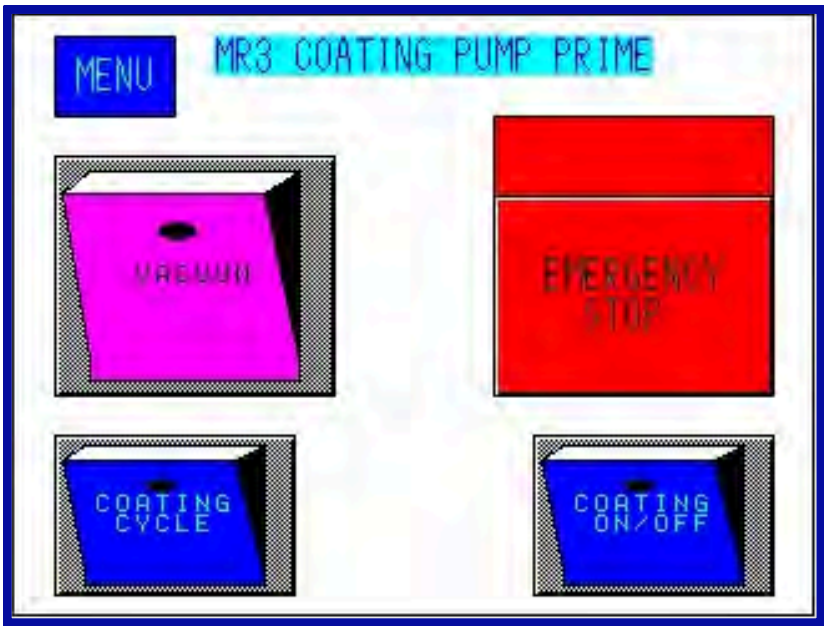
Air jet button: pressing this button will activate high-pressure airflow through the air jet nozzle.

Coating prime button: pressing this button will move you into the coating pump prime screen.

Lamp button: pressing this button will activate the travel of the UV lamp.
(Factory set time is approximately 22 seconds).

Menu button: pressing this button will return you to the main screen.

Coat Pump Prime Screen



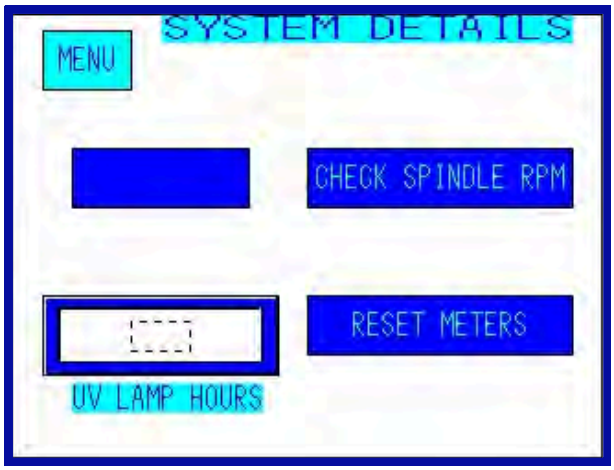
Vacuum button: This button will activate the vacuum and allow you to install a lens over the coating bowl.

Coating Cycle button: This button will activate the coating pump for one cycle (3 seconds).

Coating On/Off button: This button will activate the coating pump for continuous operation.

Menu button: This button will return you to the machine setup screen.

System Detail Screen

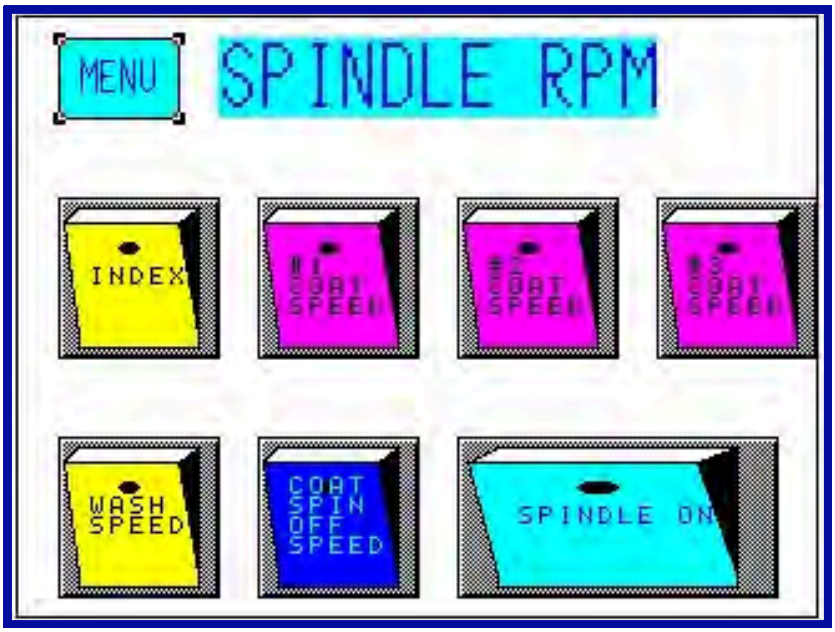


Check spindle RPM button: This button will move you to the spindle rpm screen.

Reset meters button: This button will move you to the reset meters screen.

Menu button: This button will return you to the main screen.

Spindle RPM Screen



This screen is to measure individual spindle speeds.

Note: All spindles are numbered.

Locate spindles 1, 2, or 3 by pressing the index button.

The spindle on the button: This button allows you to choose spindles 1,2 or 3 to test.

#1 coat speed button: This button allows you to adjust coat speeds for spindle #1 with a coat potentiometer.

Coat spin-off speed button: (with coat speed button on) Pressing this button allows you to adjust coat spin-off speeds with the coat spin-off potentiometer.

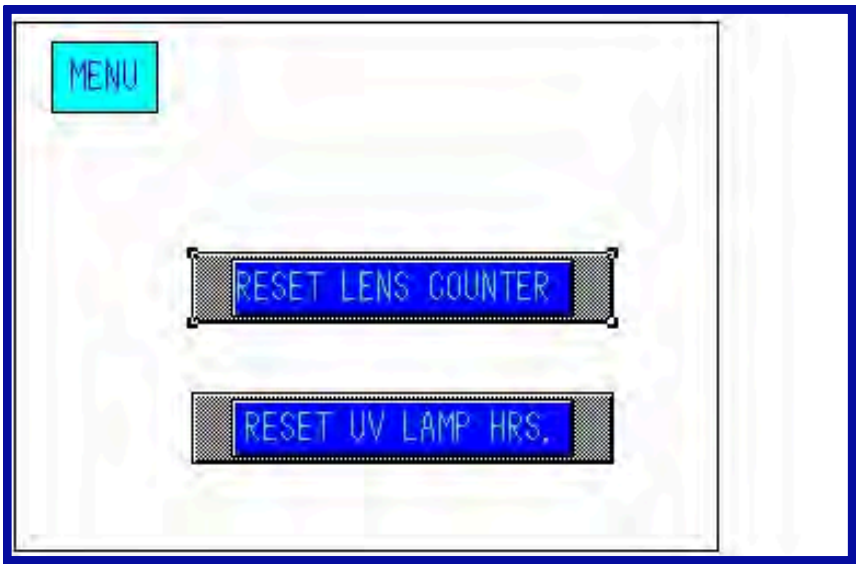
Wash speed button: (with coat speed button on) Pressing this button allows you to adjust wash speeds with a wash speed potentiometer.

Repeat steps for #2 coat speed button (spindle #2).

Repeat steps for #3 coat speed button (spindle #3)

Menu button: pressing this button will return you to the system detail screen.

Reset Meters Screen

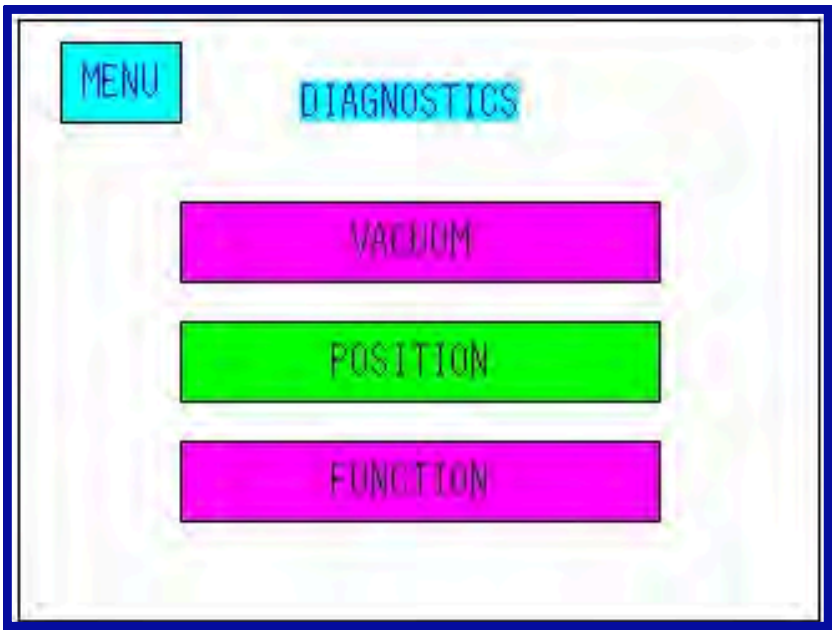


Reset Lens Counter Button: This button will reset the counter to zero.

Reset UV Lamp Hours Button: This button will reset the lamp hours to zero.

Menu Button: This button will return you to the system detail screen.

Diagnostics Screen



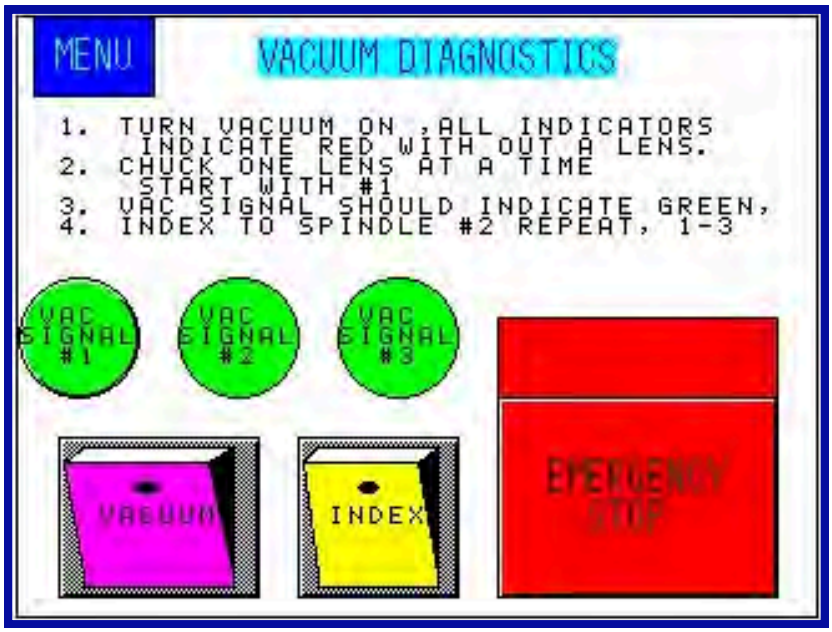
Vacuum Button: This button will take you to the vacuum test screen.

Position Button: This button will take you to the position test screen.

Function Button: This button will take you to the function diagnostics screen.

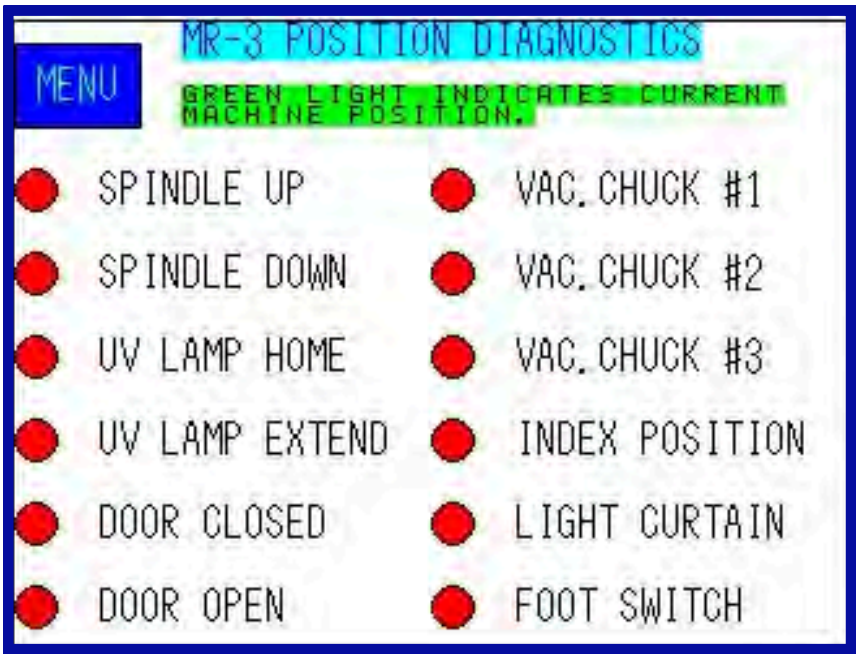
Menu Button: This button will return you to the main screen.

Vacuum Test Screen



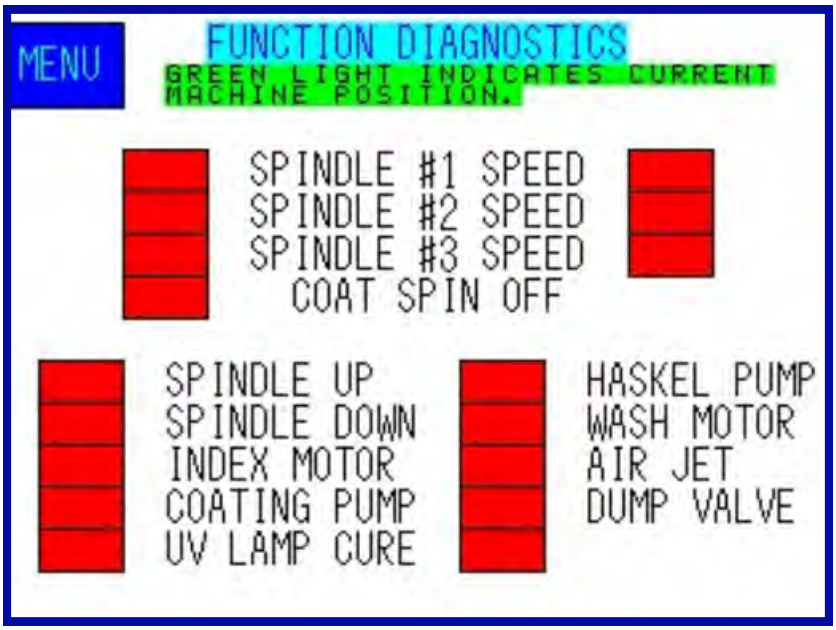
This screen checks for a vacuum on each spindle.
Vacuum button: This button will activate the vacuum. A lens can be placed on each spindle to test the vacuum. (example) when a lens is placed on spindle #1, vacuum signal #1 will light green. Spindles #2 and #3 should respond accordingly.
Index button: This button will rotate spindles to the front position for easy access.
Menu button: This button will return you to the diagnostics screen.

Position Test Screen



This visual reference screen monitors the machine's positions and inputs on the plc.
Menu button: This button will return you to the diagnostics screen.

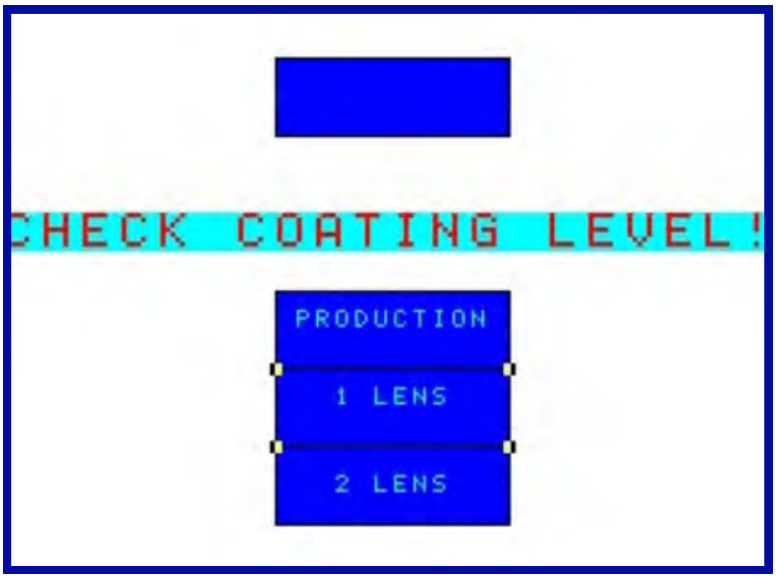
Function Diagnostics



This screen monitors the machines' positions during the production cycle, a single-lens cycle, and indicates the outputs on the PC.

Menu button: pressing this button will return you to the diagnostics screen.

Low Coating Level



This screen will appear when coating reservoir levels are low.

Production Button: This button allows you to return to the production screen and continue coating lenses 2000 times before refilling the reservoir.

1 lens Button: This button will allow you to return to the single lens cycle screen and continue coating lenses 2000 times before refilling the reservoir.

2 lens Button: This button will allow you to return to the two-lens cycle screen and continue coating lenses 2000 times before refilling the reservoir.

Replace Lamp Screen

This screen will appear when the lamp has 100 hours of lamp life left

Systems Menu: Pressing this button will move you into systems reset screen.

MRIII Subpanel Definitions

PLC Outputs

501 MERCURY SWITCH(CURING LAMP)
502 CUREING LAMP POWER
503 AIR JET SOLENOID
504 COATING PUMP MOTOR
505 DUMP VALVE(WASH)
506 WASH MOTOR
507 INDEX MOTOR RELAY
600 SPINDLE #1 ON/OFF RELAY
601 SPINDLE #2 ON/OFF RELAY
602 SPINDLE #3 ON/OFF RELAY
603 SPINDLE #1 SELECT RELAY
604 SPINDLE #2 SELECT RELAY
605 SPINDLE #3 SELECT RELAY
606 COAT SPIN-OFF RELAY
607 HASKEL PUMP SOLENOID
700 VACUUM SOLENOID #1
701 VACUUM SOLENOID #2
702 VACUUM SOLENOID #3
703 WINDOW OPEN/CLOSE SOLENOID
704 UV LAMP SOLENOID
705 UV LAMP FWD/REV SOLENOID
706 SPINDLE UP SOLENOID
707 SPINDLE DOWN SOLENOID

PLC Inputs

0 VACUUM SIGNAL #1
1 VACUUM SIGNAL #2
2 VACUUM SIGNAL #3
3 DOOR OPEN
4 EMPTY
5 L/R REAR DOORS
6 SPINDLE DOWN
7 INDEX POSITION
8 EMPTY
9 FOOT SWITCH
10 LIGHT CURTAIN
11 LAMP HOME
12 LAMP EXTEND

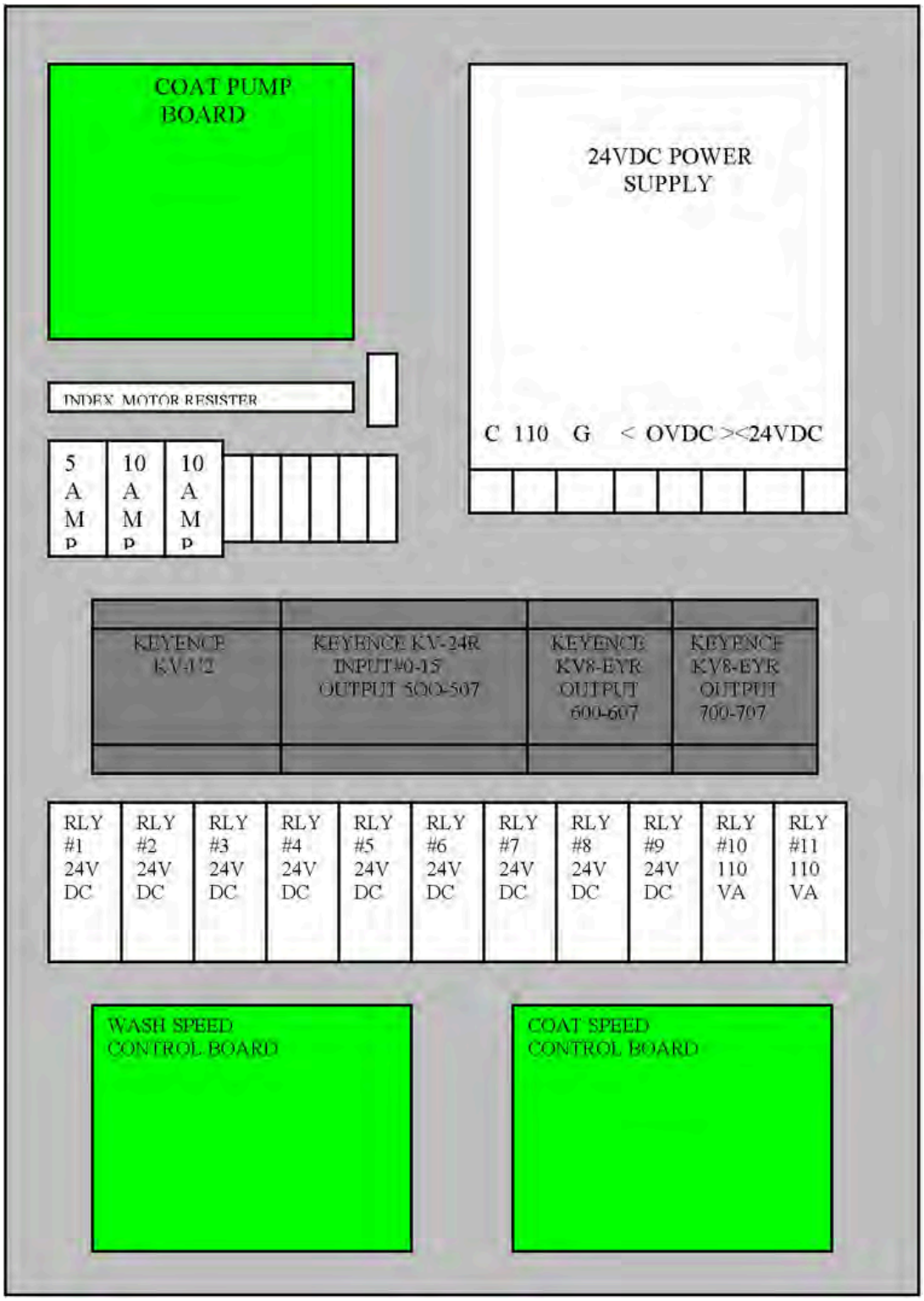
Relay Layout

RELAY 1: SPINDLE #1 ON/OFF
RELAY 2: SPINDLE #2 ON/OFF
RELAY 3: SPINDLE #3 ON/OFF
RELAY 4: SPINDLE #1 SELECT
RELAY 5: SPINDLE #2 SELECT
RELAY 6: SPINDLE #3 SELECT
RELAY 7: COAT SPIN OFF
RELAY 8: LAMP START

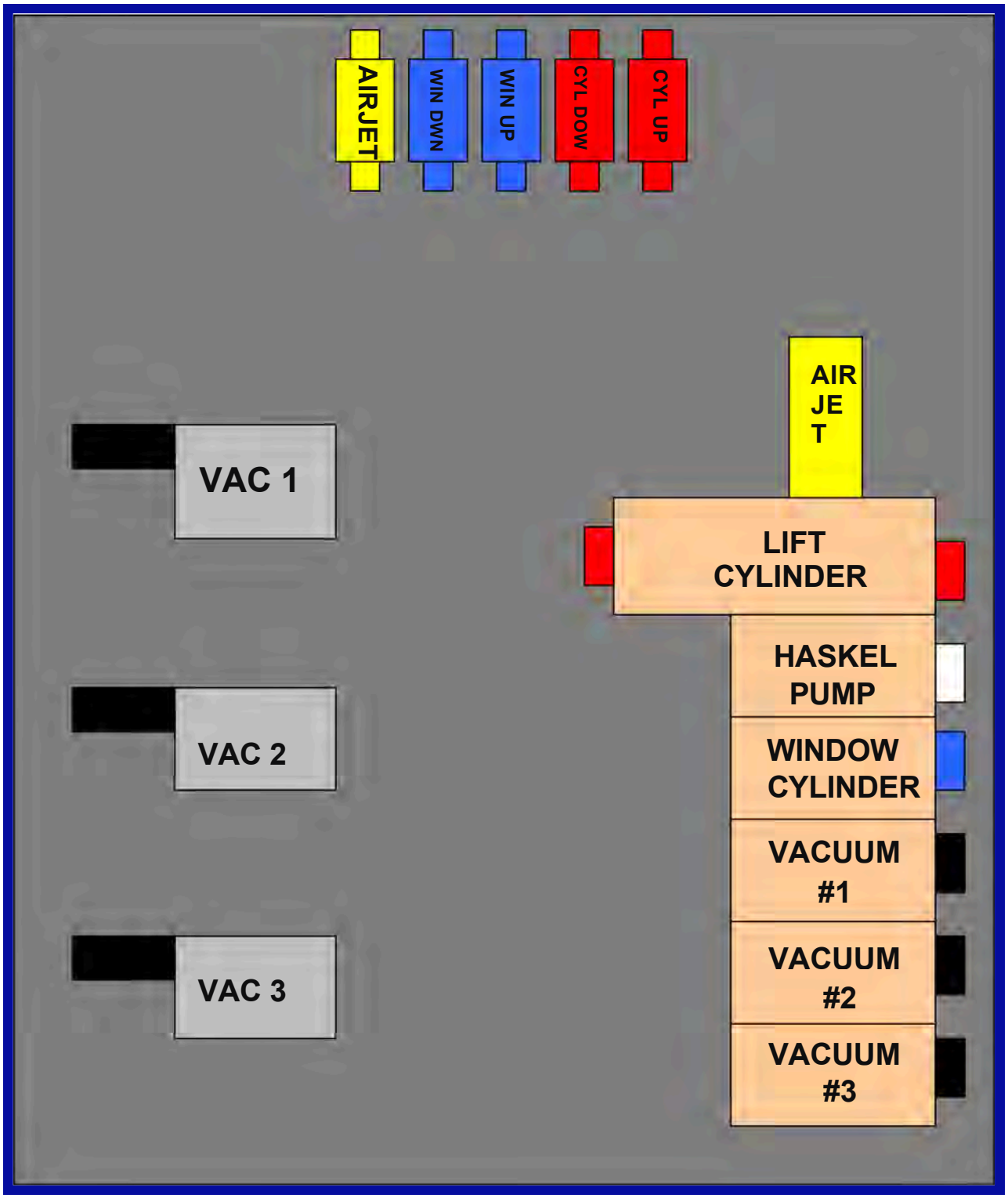
Circut Breaker Layout

5AMP: LAMP
MOTOR/FANS
10D AMP: LAMP
10C AMP: MACHINE

MR III SubPanel



MR III Valve Panel



Ultra Optics Conditions of Sale Policy

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.