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ROBOTIC LENS COATER (RLC)

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WARNING - The use of Kerosene, animal or vegetable fats should be avoided for additives or cleaning agents. Also, the use of any penetrants such as WD40 or 3-IN-ONE Oil, should NEVER be used on any rubber seals.

DISCLAIMER

The Williams-Steiger Occupational Safety And Health Act (OSHA) of 1970 And similar state and local laws and all regulations issued under such laws and subsequent laws are designed to assure a safe place to work and apply primarily to the employer, not the equipment manufacturer. The buyer will work with Ultra Optics to find technically feasible answers to possible compliance problems; however, because compliance is significantly affected by many factors over which Ultra Optics has little control including but not limited to: installation, plant layout, building acoustics, materials processed, processing procedures and supervision of employees. Ultra Optics does not represent or warranty that equipment sold by it complies with OSHA or any like state or local law or regulation, and the cost of modification and responsibility for compliance is imposed on the Buyer.

ROBOTIC LENS COATER

(WARNING * Never change or deactivate safety switches or protection devices in any way.

INTENDED USE OF MACHINE

The RLC is a backside scratch resistant coating system used for coating optical lenses.

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 RLC machine requires Protective Earth grounding

GENERAL SAFETY INSTRUCTIONS

The RLC machine design is such that it can be used safely.

Machine operation cannot commence without all entrances closed and safety devices functional.

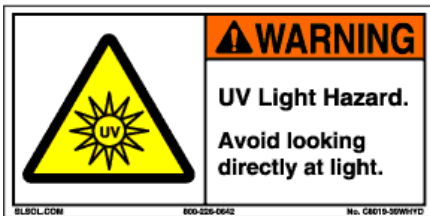
The RLC should be checked for any visible damage during each shift. Any changes including changes in machine function and quality of product must be reported to the supervisors in charge.

Ultra Optics RLC



Warning:

Do not service machine until disconnected from power and air.



Warning:

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



Caution:

Internal Panels may be hot due to UV Light.

RLC SET UP

- **DIMENSIONS**

The Stand Alone Unit; 90.25” high x 49.50” deep x 49.50” wide

- **PHYSICAL LOCATION**

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

The RLC has its own clean room environment.

- **CUSTOMER SUPPLIED**

3/8 X 25’ Air line with a ¼”: Female Quick Coupler. “Quick Disconnect”

- **COMPRESSED AIR**

80-PSI minimum air at a constant source.
An air regulator is supplied on the system.

- **ELECTRICAL**

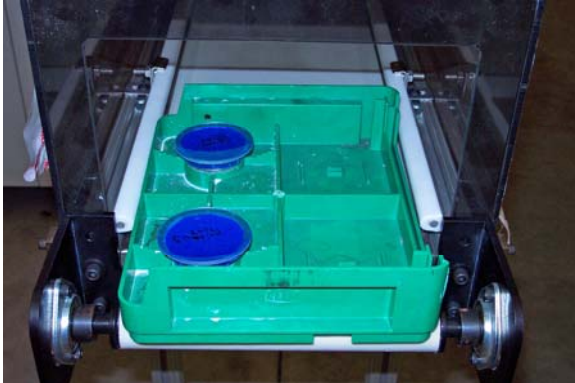
One 240 VAC 1Ø plus neutral 40 AMP

- **WATER**

Deionized or Distilled water is adequate for the cleaning system. The supply and drain can be direct plumbed or via buckets.

Basic Machine Process

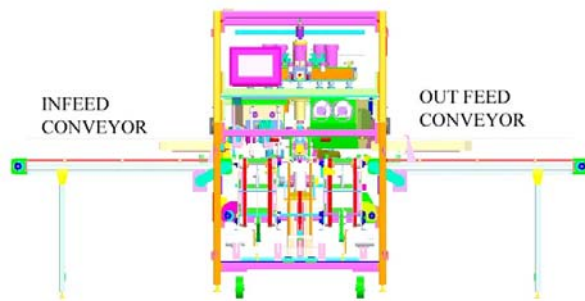
The RLC is designed to take a tray with lenses, remove the lenses from the tray, run them through a process to apply coating, and return them to the same tray. We'll start with a simple run down to familiarize you with the machine.



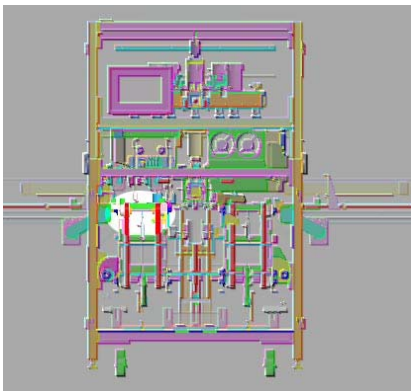
Trays entering the machine must be orientated as show in the picture to the left. Lens side of tray is towards the back of the machine. While the storage area of the tray is towards the front.

Tray handling:

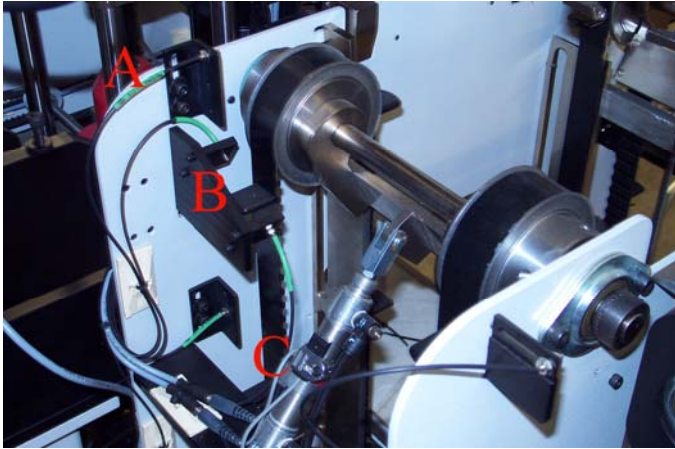
Trays are carried into and out of the machine with belt conveyors. One being the Infeed Conveyor, the other being the Outfeed Conveyor. While the machine is running, the infeed conveyor moves until the tray reaches the machine's inlet point. It is detected by a fiber optic sensor. The outfeed conveyor runs continuously while the machine is in



operation. There are two photo-eyes on the outfeed conveyor. One is right near the machine outlet and lets the machine know there is room to deliver a tray to the conveyor. The other is at the end of the conveyor and tells the machine trays are being taken away. Blocking either outfeed conveyor sensor for too long will tell the machine not to accept new trays.

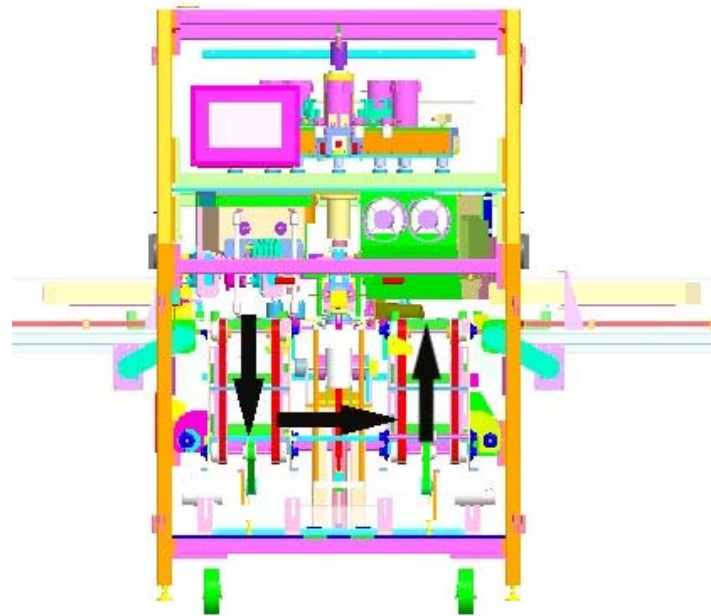


When the Infeed Accumulator is ready, a pneumatic pusher located on the infeed conveyor, will push the tray on to the infeed accumulator (see highlighted area). A gripping arm will then pick the lenses from the tray. For the infeed accumulator to be ready to accept a tray, the top must be empty (both in programming and photo-eye status), the tray catchers must be up as determined by the sensors on the cylinders driving them, the tray carrying lug on the accumulator belt must be seen by the photo-eye.



Infeed Accumulator (inside machine view)
 A - is the tray sensor
 There are actually 3 tray sensors. 1 for each stopping position
 B – is the tray carrying lug sensor
 C – is the tray catcher cylinder sensor.
 The outfeed accumulator has these same components.

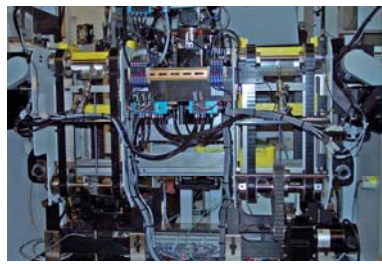
The path of the trays through the accumulator is shown with arrows to the left. The down arrow is the section known as the infeed accumulator. It can hold up to three trays. The arrow pointing to the right is the Crossover conveyor in the accumulator. It handles just one tray at a time in a transition mode. The tray is never considered to be stopped and held during this transition, but in motion from the infeed to the outfeed. The up arrow is the Outfeed Accumulator. The outfeed accumulator will hold up to three trays and with the top location being the section lenses are returned to after coating. After lenses are placed in the outfeed accumulator, a pneumatic puller located on the outfeed conveyer will pull the tray to the conveyer.



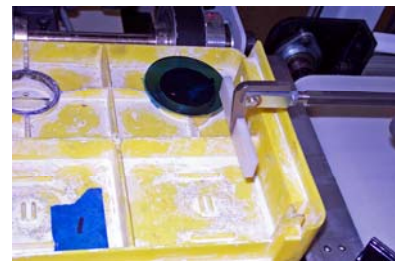
Each tray position on both the infeed and outfeed accumulators has a pair of through beam photo-eyes to detect the tray presence. These help to track the tray through the accumulators. When a set of lenses are removed from the tray and loaded into the suction cups, the tray will be electronically marked with a number in the program, 1 through 5. This matches the number on the suction cup set and is used to get the lenses back into the correct tray.



Tray entering accumulator

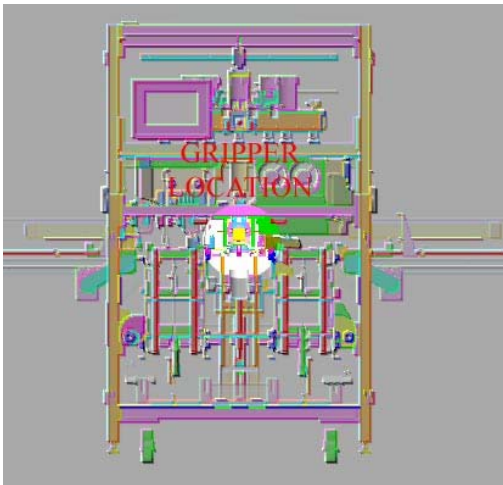


Trays moving in the accumulator



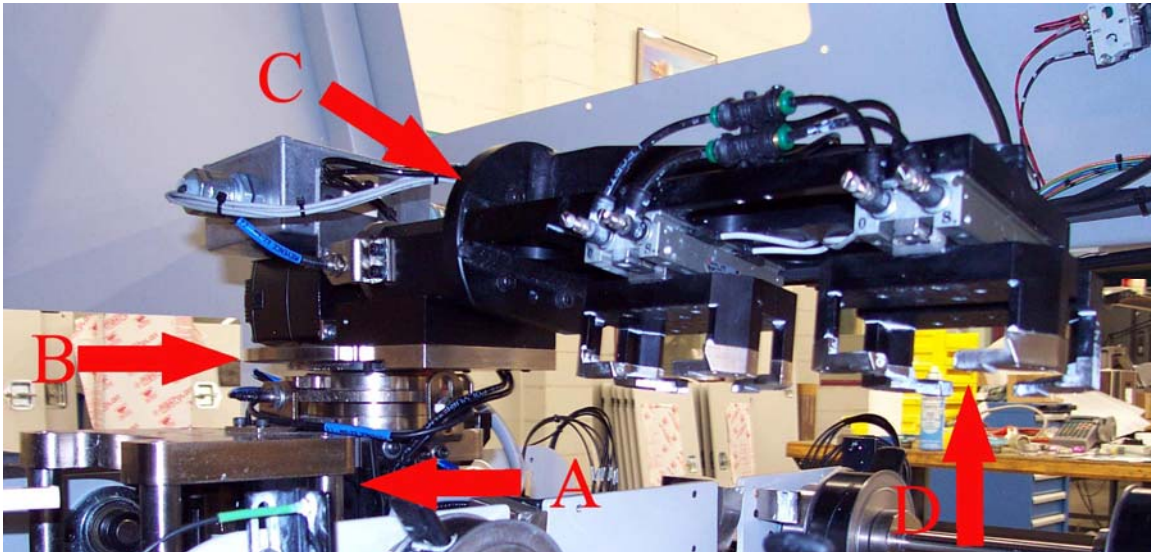
Tray Exiting accumulator

Lens Handling, Gripper Arm:



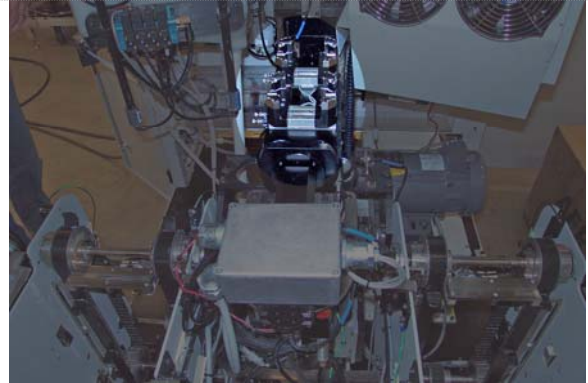
The grippers are located between the infeed and outfeed accumulator and behind the crossover conveyor. The gripper arm has three basic motions. First is linear vertical travel (A) for the differing positions the lens must be in. 2nd is horizontal rotation (B), to reach the infeed accumulator, centered for the cups and nest, on the outfeed accumulator. 3rd is the vertical rotation (C), which flips the lenses up to the vacuum cups. The lenses are gripped on the bonding material at 4 bladed points (D) and picked up a pair at a time (if both are present).

GRIPPER ARM

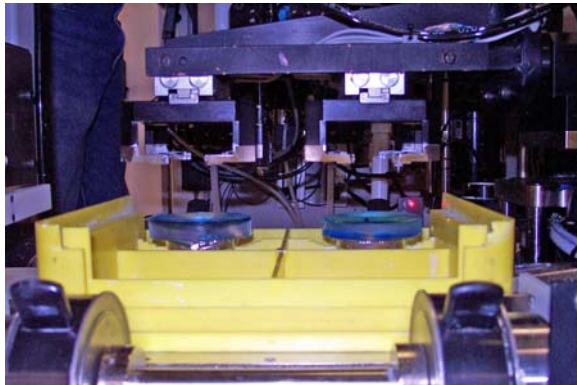


The linear vertical travel is motor driven through a jackscrew to lift and lower the gripper arm assembly using Thompson shafts as guides. Feedback for position is given with a magnetically detecting linear sensor (not shown). The vertical and horizontal rotations are motor driven with position control using proximity sensors reading cams. The cams for the horizontal rotation can be seen in the picture above at the B arrow point.

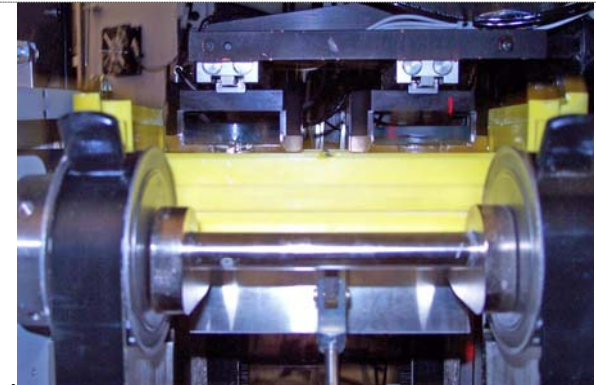
Pictorial explanation of Lens Loading with Gripper Arm



1- The gripper arm rests in a centered position, with the grippers themselves pointing up. Grippers are closed when at rest.



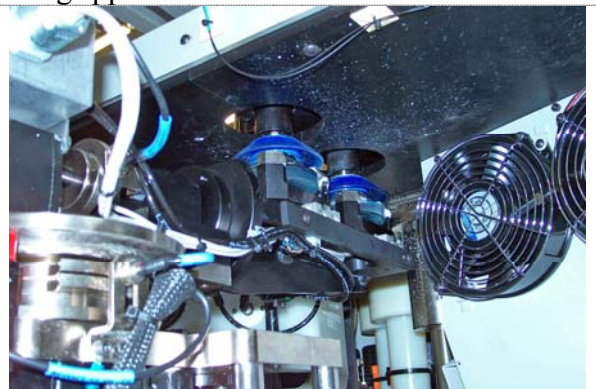
2- When a tray enters, the gripper arm horizontally rotates to the infeed accumulator, while vertically rotating the grippers down.



3- With the grippers opened, it moves down to the tray in the infeed accumulator, then closes the grippers on the lens or lenses



4- Then the arm moves straight up to the vertical middle. When clear of the tray the arm rotates towards the center while rotating the grippers up

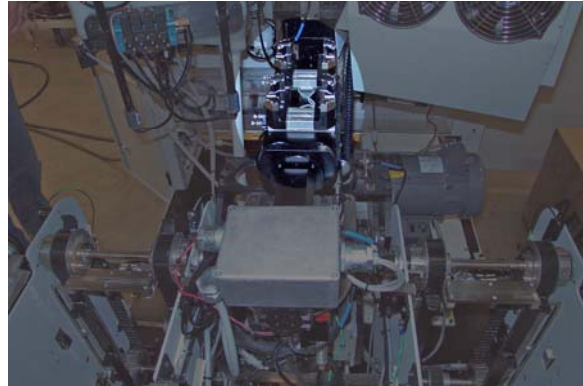


5- When the lenses are at the cups, vacuum will turn on and is sensed by the vacuum sensors. The lenses going to both the inside and outside cups are detected by photo-eyes in this step.

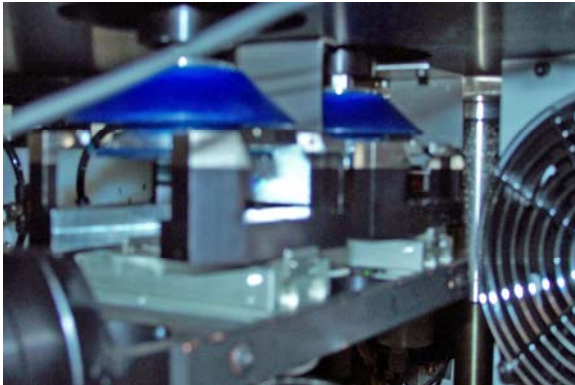
The final step would open the grippers and return to the middle, centered position. See step 1.

If vacuum is not made on a detected lens, it will re-nest the lenses and try again. See the Unloading section for a description of the nest.

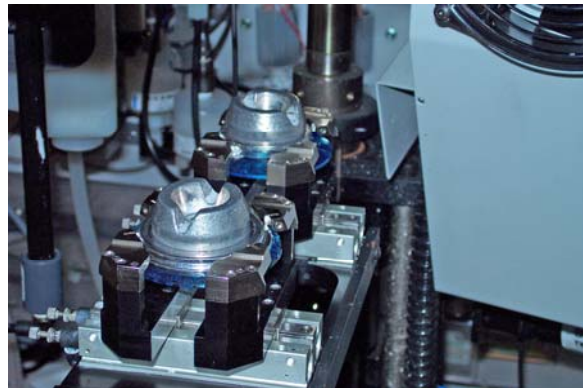
Pictorial explanation of Lens Unloading with Gripper Arm



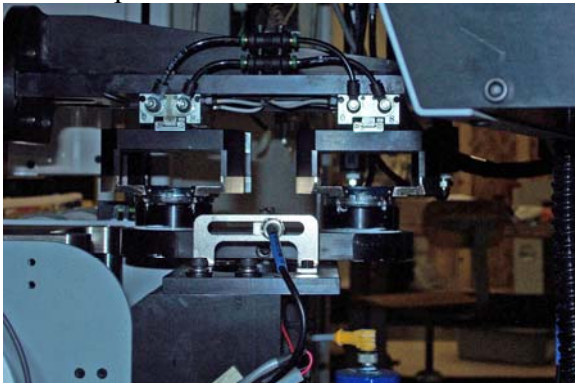
1- The gripper arm rests in a centered position, with the grippers themselves pointing up. Grippers are closed when at rest.



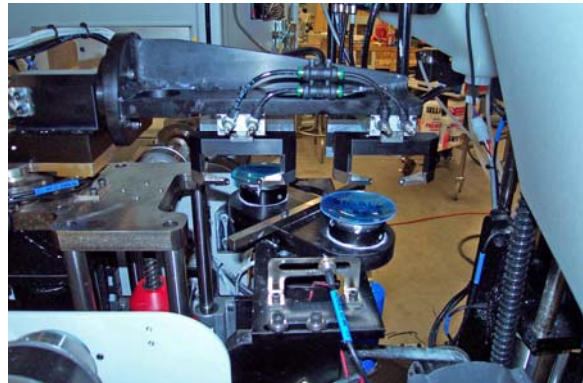
2- Grippers will open and then the arm will move vertically to the unload position. The lenses are gripped and vacuum is turned off to the cups.



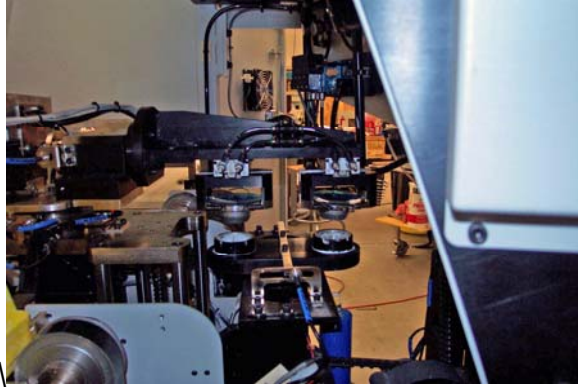
3- The arm then moves back to the middle center position and rotates the grippers down. Shown is the middle position before the down rotate motion.



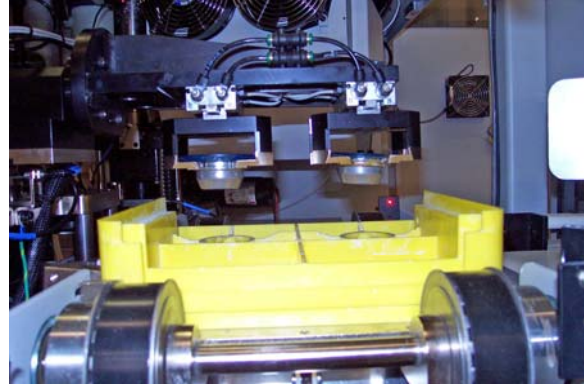
4- Lenses are moved to nest at the place position and released.



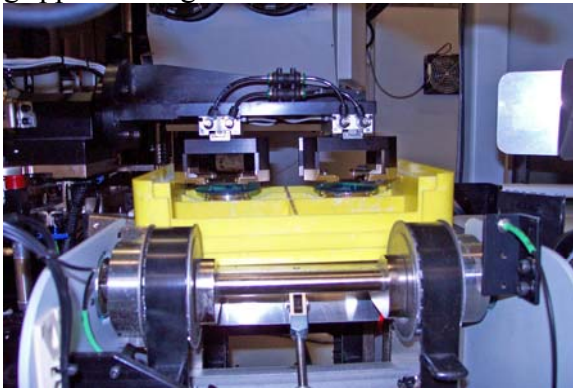
5- The gripper arm then moves above the nest and the nest rotates to swap the lens positions. The rotation gets the lenses back into the original side of the tray.



6- The lenses are picked from the nest, then lifted to the center, middle position with the grippers facing down.



7- The gripper arm then rotates horizontally to the outfeed accumulator.



8- The gripper arm moves down to the tray, opens the grippers to release the lens and moves back up.

Last the gripper arm returns the middle center position with the gripper rotated up.

Jam Detection on Gripper Arm

There are two locations where jam detection is installed to protect the gripper arm. One is the infeed accumulator, where the lenses are picked up by the gripper arm. The other location is the lens rotation nest.

The cylinders holding up the tray catchers on the infeed accumulator run at a reduced pressure allowing the tray to push them down if the arm jams while moving down on the tray. A photo-eye detects this downward motion and the gripper arm's downward motion is halted and reversed. The gripper arm will attempt one time to re-align itself and make a successful entry into the tray if a jam occurs. If it is unsuccessful the operator will need to come and determine why the gripper arm can not get into the tray without jamming. The fault reset button will need to be pressed to tell the machine to tray again after the infeed jam fault has been latched.

The Lens Rotation nest is spring loaded which allows it to move down if the gripper arm jams against it. A photo-eye detects this motion and the gripper arm moves back up and latches in a nest jam fault.

There are essentially two different nest jam conditions, while placing and while picking from the nest. The alarm notices are as follows -

Placing Jam - "GRIPPER JAMMING NEST WHILE PLACING. CLEAR AND PRESS FAULT RESET"

Picking Jam - "GRIPPER JAMMING NEST WHILE PICKING. CLEAR AND PRESS FAULT RESET"

Placing Jam Recovery – identify by lenses still in gripper on fault.

To understand how to recover, it may help to understand what the machine is attempting to do. When placing, the machine will move the lenses to the nest place position and open the grippers. If you're jamming, the lenses are not being moved into the nest do to a misalignment between the nest and the lenses. You can press the reset button and hope the lenses and nest cups are aligned on a second try. If this fails you want enter manual mode then open the grippers to drop the lenses into the nest cups. If the lenses do not fall neatly into the cups, you may need to enter the machine and hand place them. Next Press the "Vertical Place @ Nest Button". This moves the machine into the state it was trying to reach when the jam occurred. Return to automatic mode, press the reset button and the machine will continue the cycle.

Picking Jam Recovery – identify by lenses in nest on fault.

With a picking jam, the lenses are already in the nest and the gripper is trying to get down around them to pick them up. It will occur when a misalignment happens between the gripper head and the nest rotation, usually when overly large lenses are in the machine. In this case we enter manual mode, Press gripper "Vertical Middle" button, then re-center the gripper horizontal rotation, and gripper rotate down. If the nest looks as if its be misaligned also, then press the rotate nest button, wait for the rotate to finish, and press again. Now everything should be re-aligned so we can pick up the lenses. So press the gripper "Vertical Pick @ Nest" button. We should now be in the position the machine was attempting to go to when the jam occurred. So return to automatic mode and press the reset button.

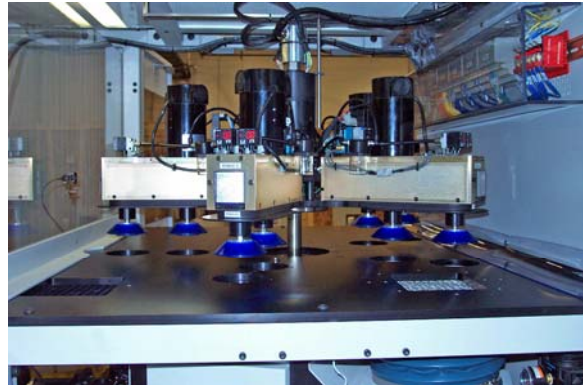
Notice that in both cases, you want the grippers down at the nest, the lenses inside the grippers, with the lenses seated properly in the nest before returning to automatic mode and pressing the reset button! This is the key to recovering properly.

Spindles Assembly and Lens processing

The gripper hands the lenses off to the suction cups on the Spindles assembly. There are 5 spindle assemblies on the Spindles Assembly. Note the use of the plural Spindles Assembly to refer to the assembly with five arms holding five Spindle Assemblies. Each Spindle is labeled with a number 1 through 5. The machine tracks the trays with the spindle number from which the lenses were loaded into. Homing the Spindles Assembly will bring Spindle 1 to the front loading and unloading position. Homing the Spindles Assembly normally only occurs on apply power to the machine.

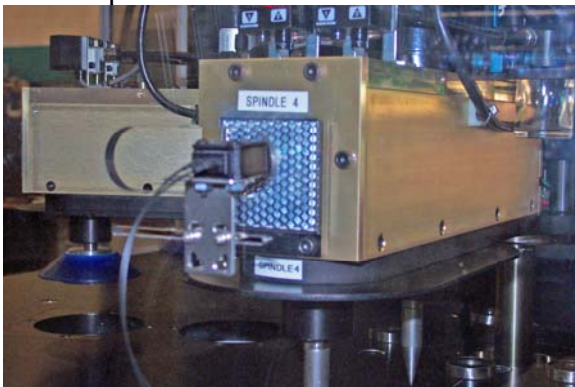


A Spindle Assembly removed from the machine.

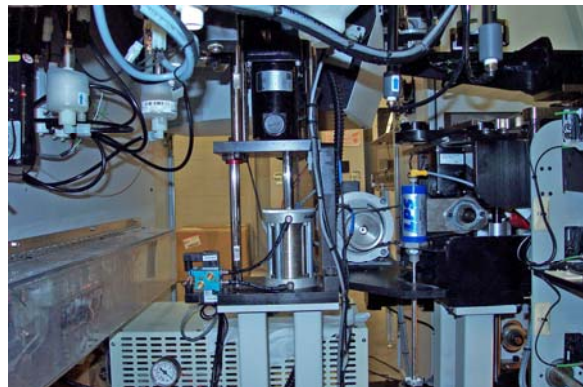


Spindles Assembly contains 5 Spindle Assemblies

As the gripper is bringing lenses to the vacuum cups on the front Spindle Assembly, the Spindle Assembly will home itself. Internally on the assembly are two lugs 180 degrees apart, which are read by a proximity sensor. These devices are used to align the block holding the lens so it can properly be put back into the tray. The lugs and proximity sensor also gives the speed of rotation during cleaning, coating and curing. This allows the machine to automatically correct for any motor drift and maintain the correct speed for the process. There is a valve and vacuum sensor for each cup on the Spindle assembly. The valve turns on the vacuum and the sensor monitors the lens held on the cup. On the front of each Spindle assembly is a reflector. The reflector is read by a photo-eye mounted on the front to know where to stop the Spindles Assembly during rotation. A proximity sensor and lug mounted below deck on the drive shaft, tells the machine where Spindle 1 is located.



Spindles Stop Position Photo-Eye



Spindles Assembly Drive and Lift

Cleaning Station

The first working station is cleaning the lens. This is accomplished by high pressure water directed at the lens. The water stream moves from the center to the edge of the lens, while the spindle rotates the lens. This is followed by air drying the lens, moving from center to edge, while the lens is rotated.



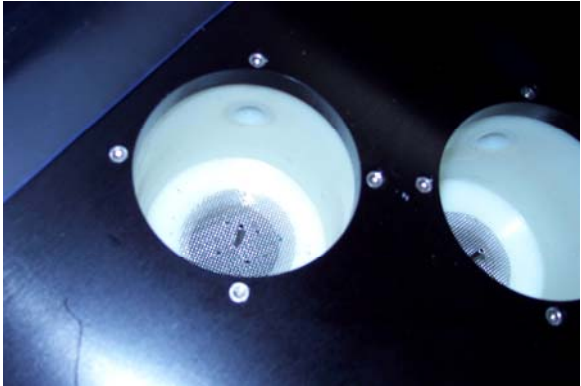
Inside of cleaning tank. The silver nozzles are the high pressure water outlets. The orange nozzles are the air dry outlets.



Back side of the wash tank. The wash pumps are visible, and the stainless water lines connected to the nozzle bars. The motor driving the cam to rotate the nozzles bars can also be seen.

Coating Station

After cleaning the lenses, the next station applies the coating. Coating is pumped up through a stainless tube. This creates a fountain effect of coating. When the lens is in the tank, the coating pumps will start while the lens is slowly rotated. A flow meter in line with the coating fluid is monitored to check if coating is flowing. A fault will occur if coating is not moving. Next the pump shuts off and the lens is rotated at a higher speed to spread the coating to the proper thickness over the lens.



Coating bowl top view.



Coating bowl reservoir. Messer filters are located below the tanks. The Orange sensors are used to warn if coating is getting low.



Coating pump height control and manual on off switches. The Spindles assembly must be raised before these switches will work. Its best to jog the cups away from the fountain path in case you over drive the pumps and contaminate the vacuum cups.

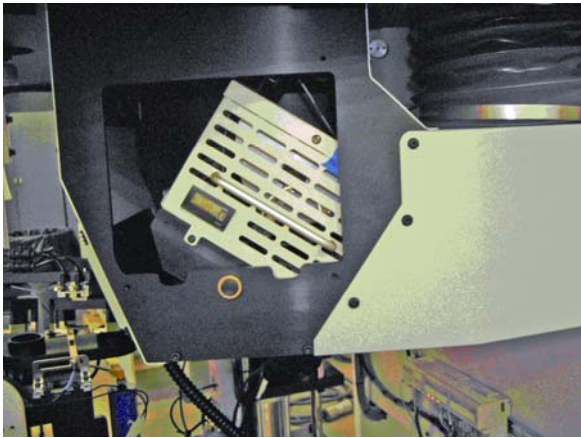


Flow meters with photo-eyes verify the coating pumps are working. Past the flow meters are the pumps. They are mounted on the back wall of the under deck area.

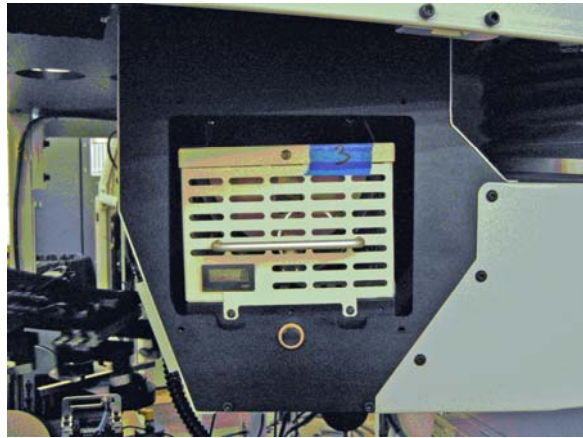
There is one blank station after the coating station. It is reserved for a second coating application.

UV Curing

The UV curing station has a one step operation. The UV light goes from low power to high power and begins moving across the lens openings from its home position. The Spindle holding the lens rotates at a slow speed at the same time. A motor driven cam is used to make the UV light rotate from its home position, which is tilted away from the lens openings, to tilted past the lens openings, then returning to home again. A proximity switch reading the cam tells the machine when it is at this home position. A UV sensor reads the intensity of the light at its highest point. Both UV intensity and exposure time to the light are required to get a proper cure. The time of exposure can be checked on the Curing screen of the operator interface. If the intensity gets too low, a fault will be triggered but the fault will not disable the machine. Except during UV light igniting time, cooling fans on the front of the UV lighting enclosure run at all times.



UV light at home position. (note- there is normally a cover on the opening. Cover was removed for photographic reasons only. Do not operate without cover in place. UV light is harmful to your eyes.)



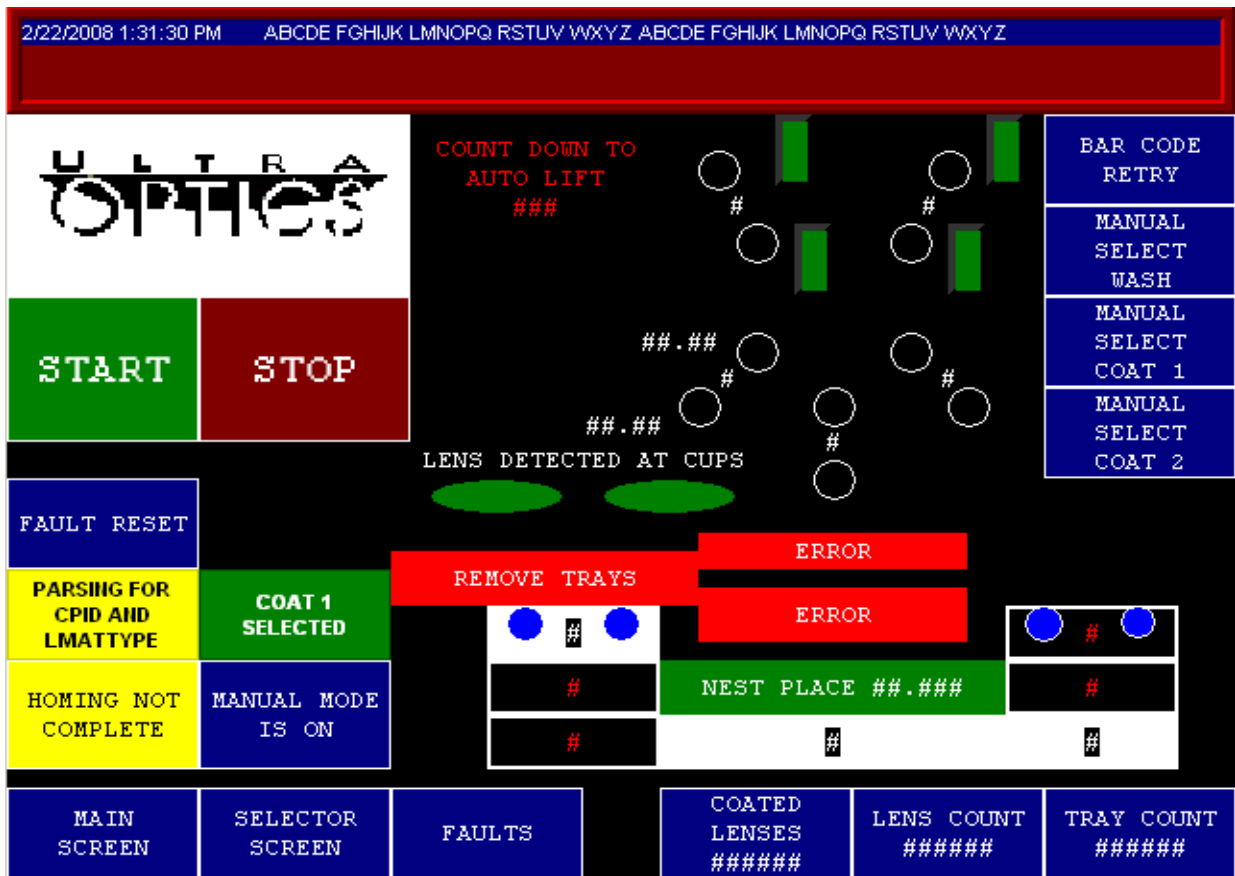
UV light at removal position. Commanded from operator interface for maintenance or replacement of the UV light.

The UV Curing light stays on at all times that the power switch on the front of the machine is in the ON position.

When power has been turned off to the UV curing lights, it must stay off for 5 minutes. This is referred to as the Minimum UV Power Down time. The UV Curing screen has a count down in seconds when this is active. If you return the power switch to the ON position before this time is up, the machine will keep UV power off until the minimum off time is complete.

The UV light takes 3 minutes to power up. During this time you can't run the machine. A count down timer in seconds is located on the UV Curing screen.

MAIN SCREEN



The Main Operator Interface Screen gives the general status and control of normal machine functions. Any active faults are listed on the banner at the top. Starting and Stopping is controlled by the Start Stop Buttons on this screen.

The status of the lenses can be seen by the 5 round dot pairs in the rotational pattern. This represents each spindle arm and any lenses it holds. The spindle arm number is noted between the lens pair on each arm. Any lens moving through the system has a tray shown in the accumulator with the matching spindle arm number moving with it. White areas show where trays are presently detected. Black areas in the accumulators are empty locations. The color of each lens indicator changes with the process.

Lens Indicator

- Black is no lens
- White is lens present but no work started
- Yellow is lens being worked on
- Green is work complete on lens
- Red is a fault on the lens (usually a vacuum loss from a dropped lens)
- Blue is a lens in the tray in the accumulator

The green ovals, with “Lens Detected at Cups” are relative to the infeed gripper function. Photo-eyes detect the lenses as they near the cups during the loading operation. Green is a detected lens, and red means no lens detected.

The numbers listed at the cleaning station, represents the pump rate of the high pressure wash. If it is too high or too low a fault will show up in the fault display banner. If a problem is detected it will be displayed in the fault display banner. The square rectangles next to the coating station, represent the coating level in each tank. If the indicator turns red, the coating level in the tank is lower than recommended.

The green rectangles give the status of the different motions on the robotic arm. They are the Vertical Rotate on top, the Horizontal Rotate in the middle, and the Vertical Position on the bottom. For all three displays, green is at position, yellow is moving, and red is unknown position or faulted.

There are three counters on the main screen for use in keeping track of production on the machine. They can be reset to zero by pressing the display counter.

Coated Lens - Counts how many lenses have been coated. Counts right after coating.

Lens Count - Counts how many lenses that have ran thru the machine. Counts on unload of lenses.

Tray Count - Counts the trays that have entered the machine.

On the bottom left of the main screen are the buttons to navigate the screens. The

Selector Screen is the main jumping spot to the other screens.

The Fault Button is quick access if you wish to see the fault history.

The indicator on the left saying “Parsing for CPID and LMATTYPE” and “Coat 1 Selected” are status indicators if your machine is equipped with the bar code option. In the upper right are bar code recovery buttons. If the bar code reading or host inquiry should fail, you can manually select an option to run on the tray, or retry reading the bar code and ask the host again. They are not visible if there is not a bar code reading or host communication error.

SELECTOR SCREEN

SCREEN SELECTOR			RLC REV 2.2		BARCODE MENU
MANUAL MODE ON	MANUAL OFF		NO WORK IN PROCESS OK TO CHANGE TO MANUAL		NETWORK COMS & I/O STATUS
MANUAL GRIPS AND TRAYS CONTROL	MANUAL CLEANING		WORK STATIONS SPEED AND TIME SETUP	SPINDLE 1 SPEEDS	
MANUAL SPINDLES CONTROL & SPEEDS	MANUAL COATING 1		GRIPPER HEIGHTS POSITION SET UP	SPINDLE 2 SPEEDS	
VACUUM MANUAL	MANUAL COATING 2		GRIPPER MOTOR SPEED SET UP	SPINDLE 3 SPEEDS	
	MANUAL UV CURING		MANUAL GRIPPER MOTOR JOGS	SPINDLE 4 SPEEDS	
PROGRAM SEQUENCERS STATS AND RESETS	LENS AND TRAY STATUS MODIFIER		LOG IN	SPINDLE 5 SPEEDS	
MAIN SCREEN	SELECTOR SCREEN	FAULTS	LOG OUT	FACTORY ONLY	

The selector screen is used to navigate to the other screens in the system. Certain buttons for other screens may or may not be available to you based on your Log In rights. Use the Log In button to log in as a higher user.

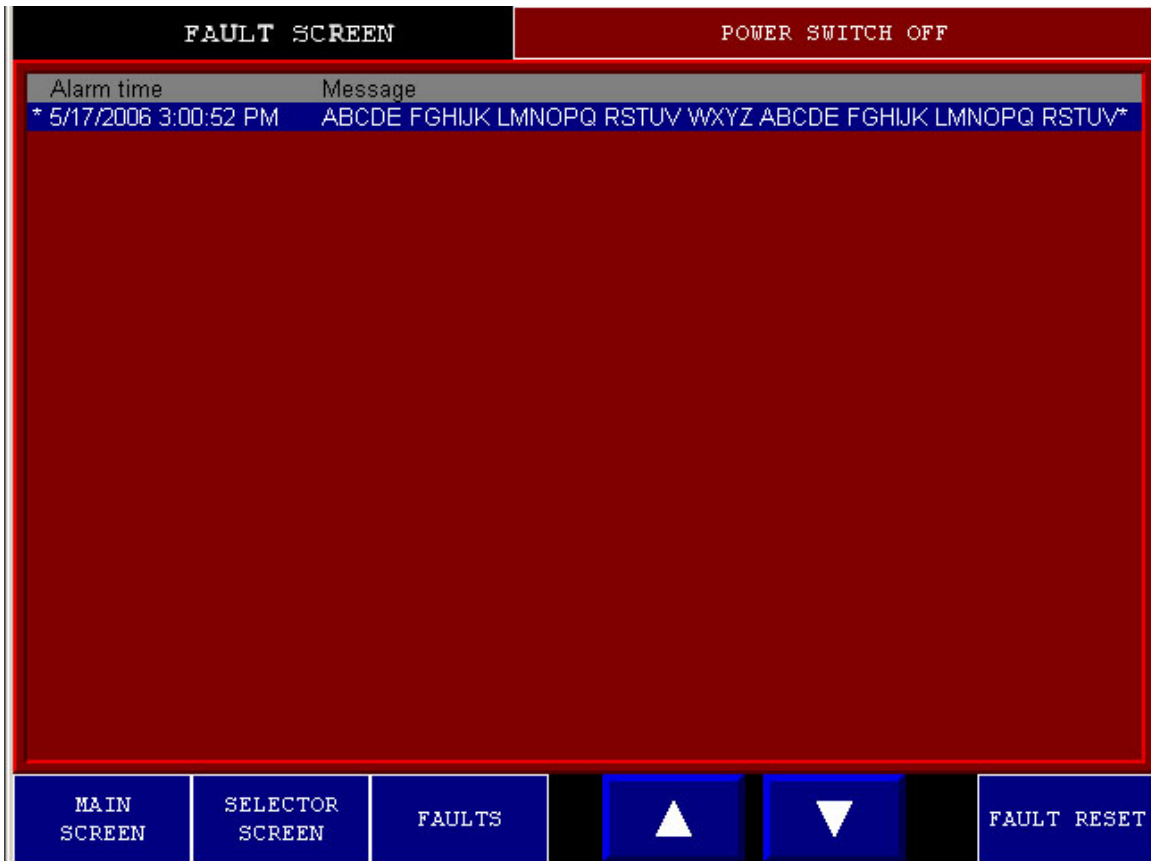
The green indicator will be yellow with red text when there is any coating process occurring with a lens. Its best not going into manual mode while this is on, because this process will be aborted. Cleaning, coating, or curing of the lens are the monitored functions.

Normally the log in user is an Operator who has limited rights.

The Maintenance user has higher rights but he must log in to get them.

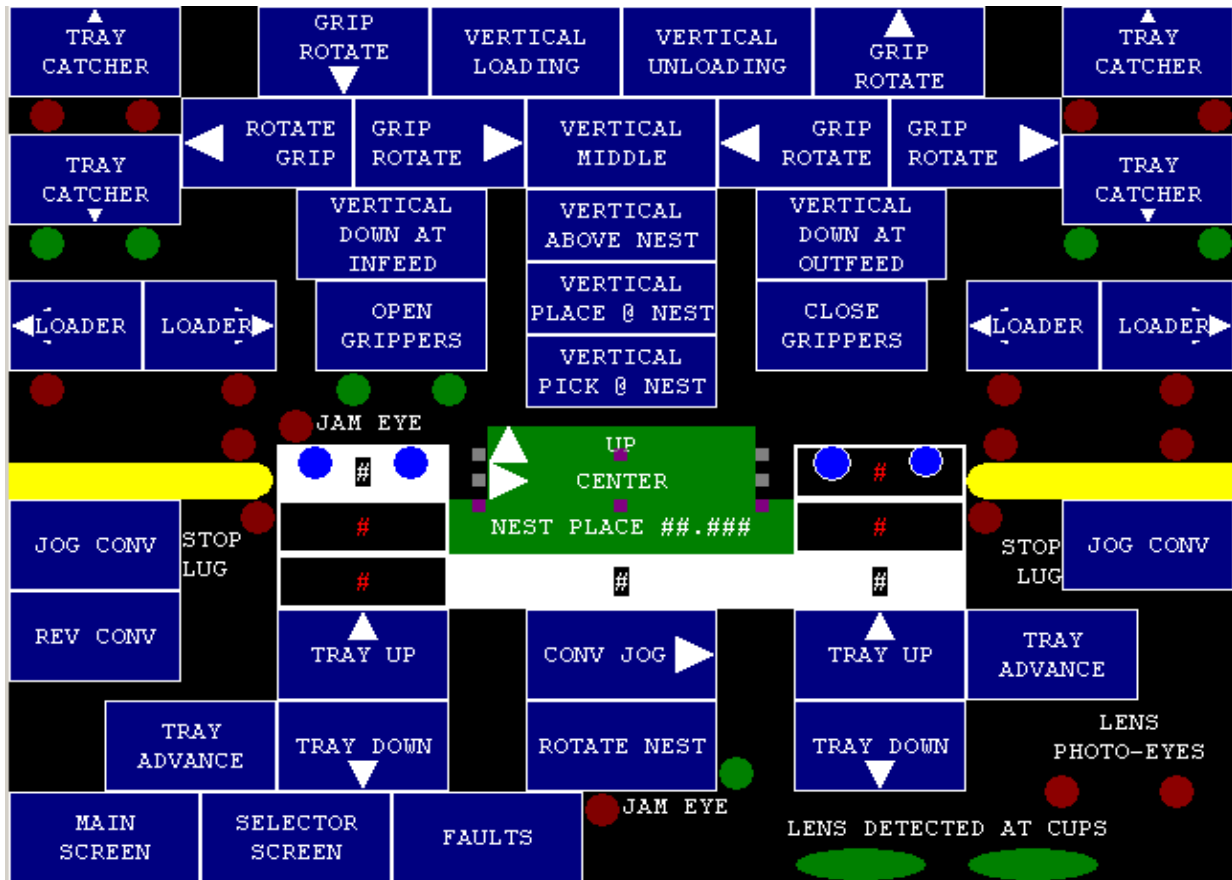
The Factory User level is required to get to deeper screens which are normally only used by an Ultra-Optics factory representative.

FAULT HISTORY



The Fault Screen gives a history of faults detected by the machine. All faults are date and time stamped.

MANUAL GRIPPERS AND TRAY HANDLING

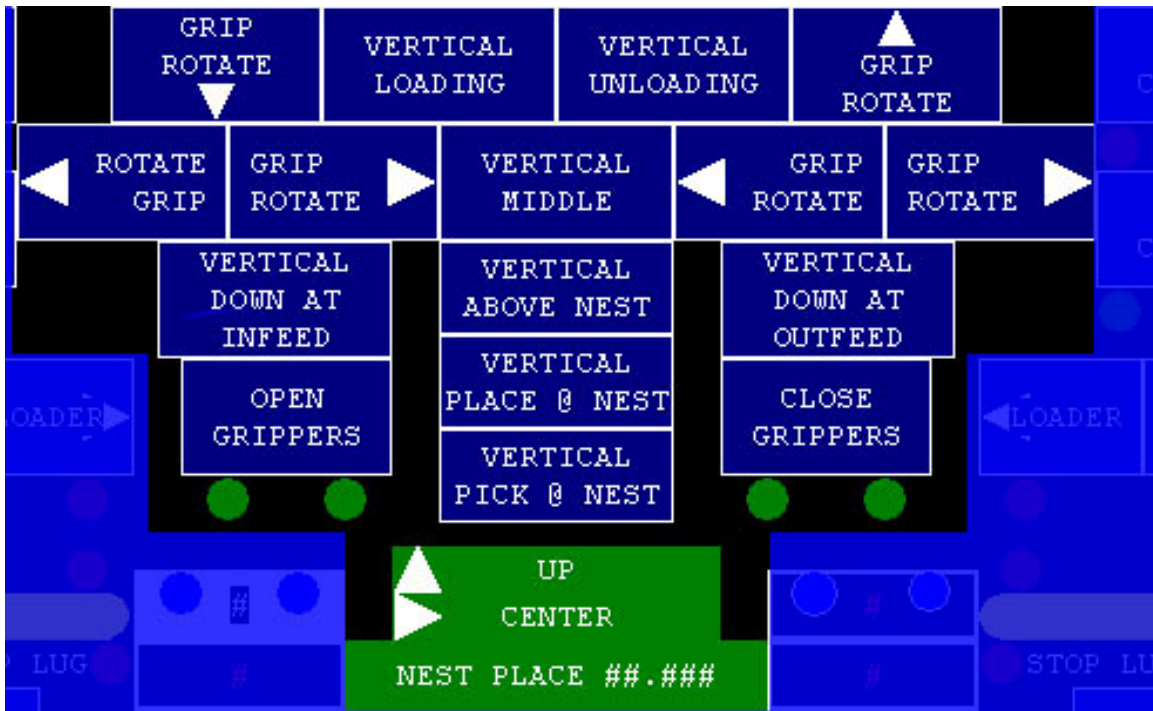


The Manual Grippers and Tray Handling screen is a very busy screen. It pretty much gives 100 percent control over the robotic arm and all tray handling functions. It also shows most of the sensors involved in those processes.

The top through the middle of the screen is the robotic arm control. You can command any position the program will normally use in the process with the command buttons here. The lower center of the screen has the status of both the robotic arm position and the tray sensors in the accumulators. The bottom of the screen and sides are used to control the trays through the accumulators and the infeed and outfeed conveyors.

Lens Photo-eyes are what detect the lenses as they're going to the cups during the infeed gripper sequence. They are red when the light is reflecting back, and green when blocked.

Lens Detected At Cups indicators change to green when a lens breaks the photo-eye during the infeed gripper loading sequence. A properly gripped lens is above the beam path when in the vacuum cup.



There are three basic motions the robotic gripper arm can make. Rotating up and down, rotating horizontally, and moving vertically up and down. There are also gripper control buttons to open and close the gripper. The dots below the Open/Close Grippers buttons are the sensors on the grippers themselves. Green means they are turned on, red indicates they are off. They tell the machine when the grippers are open. And upon closing that the gripper has a lens. The sensors are set so a proper grip on the lens does not turn on the closed gripper button. A gripper closing enough to read the closed sensor is assumed to have no lens.

Rotate Buttons Require the Linear Position set at Vertical Middle.

The Grip Rotate buttons showing the up and down arrows do exactly that. They tell the machine to manually rotate to the up position or the down position. The up and down rotate indicator will show the status,

Grip Rotate Buttons with arrows pointing in the horizontal direction control their associated rotation direct. They are all in a line with the vertical middle button on the center. They are in order of left to right Rotate to Infeed Tray, Rotate to Center from Infeed Tray, Rotate to Center from Outfeed Tray, and Rotate to Outfeed Tray.

As to the Vertical Linear Positioner, there are 8 different positions that can be commanded. All require the rotation status to be correct before allowing the motion. The exception to this is the Vertical Middle position. This is the location the machine is safe to make any rotation. Other locations risk crashing so they are disallowed unless the right state is entered first.

Vertical Loading and Vertical Unloading – These are the positions to Load or Unload lenses in the suction cups at the loading station. You must be rotationally centered and up.

Vertical Down at Infeed – This is the position used to pick up the lenses from an incoming tray. You must be rotationally at infeed and down.

Vertical Down at Outfeed – This is the position used to place up the lenses in an outgoing tray. You must be rotationally at outfeed and down.

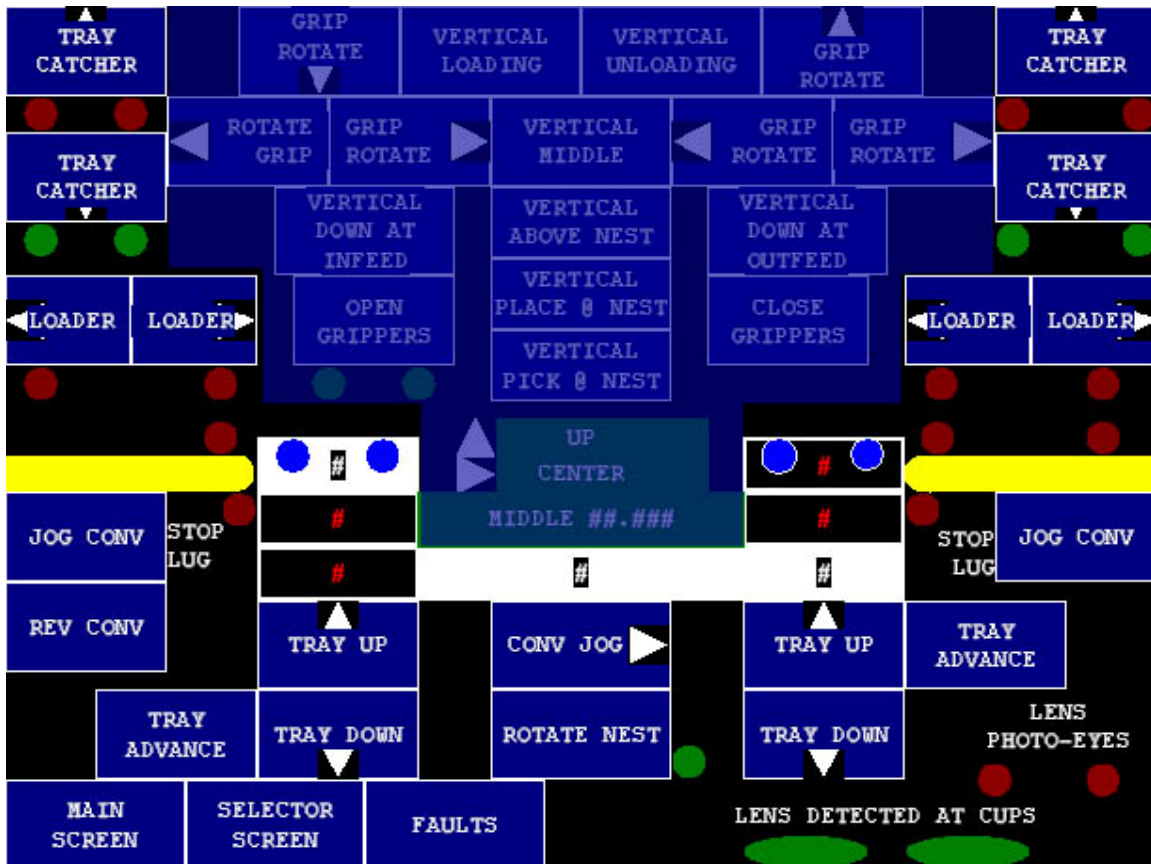
Vertical Nest positions all require you to be rotationally at center and down.

Vertical Above Nest - This is the position the gripper raises above from the lenses so they may be rotated.

Vertical Place @ Nest - This is the position the gripper places lenses in the rotation nest so they can be rotated between inside and outside grippers.

Vertical Pick @ Nest - This is the position the gripper grabs lenses in the rotation nest after rotating.

The Rotate Nest button is shown in the next graphic on the lower center. This will make the nest rotate 180 degrees when all is functioning correctly. This rotation is required in the process or the left and right lens would end up getting swapped in the tray.



The tray handling buttons are show on the previous graphic.

Tray Catcher Buttons are Up and Down and show the associated sensors. These are plates that swing in on each elevator to hold the tray at a constant fixed known position. Pressing the up button makes them go up, and the down button makes them go down.

MAKE SURE YOU PUT TRAY CATCHERS DOWN BEFORE JOGGING THE TRAYS UP OR DOWN.

MAKE SURE YOU PUT TRAY CATCHERS UP BEFORE MOVING TRAYS IN OR OUT.

Failure to put the tray catchers in the correct position can cause damage to the machine, trays or possibly lenses.

Loader Buttons on both the infeed and outfeed conveyors move the tray into the machine or pull it out. The associated sensor indicators are also shown.

Infeed and Outfeed Conveyor jog buttons. The infeed conveyor can also be reversed. The indicators above the conveyors show if a tray is in place. On the infeed manual remove a tray if this sensor is blocked before reversing. You can not pull a tray backwards once it has past the infeed loader. The outfeed conveyor sensors show trays at the end of the

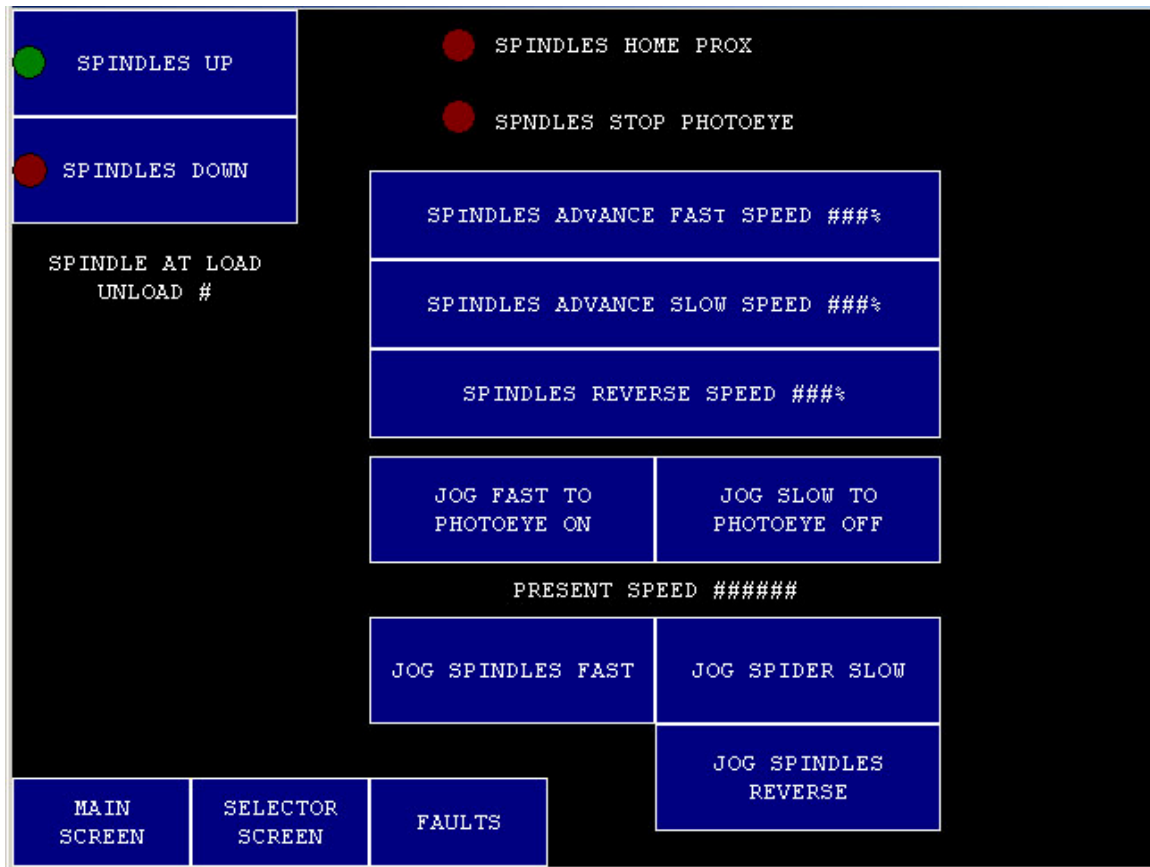
conveyor and if the unload area onto the conveyor is open. If either sensor is blocked, the machine will stop loading trays in automatic mode.

Tray Up and Down buttons are available for both the infeed and outfeed Accumulator towers. The sensors noted as Stop Lug, shows where the conveyor must be stopped if manually jogging. If you don't manually jog to the stop lug, you must reset the homing sequence for the accumulators.

Tray Advance buttons, move the accumulator to the next position. You must be logged in with at least maintenance rights to see these buttons. They will not work if the tray catchers are up. This manual function will not advance the tray number. Use with care and make sure you go the Lens and Tray Status and Modifier screen if there are trays present. Failure to do so will cause faults when normal operation is resumed.

There is also a cross over conveyor jog button. This moves one direction only and moves the tray from the infeed to outfeed accumulator tower.

SPINDLES CONTROL



The Spindles Control screen enables jogging of the entire five arm spindles assembly.

Spindles Up and Down activate the cylinder to lift the assembly. Associated status sensors are shown.

The Home Prox sensor should be on somewhere between Spindle 5 and 1. This tells the machine the number 1 Spindle Reflector is the next one to be expected. Homing consists of running at high speed until the home prox is seen first. Second it looks for the next reflector the photo eye sees and ramps to the slow speed setting. When the end of the reflector is seen, the spindles assembly stops. Normal running between spindle arms doesn't wait for the home prox, but advances to the next reflector.

Spindles Stop Photo Eye tells the machine when a spindle arm is at the front of the machine.

All speed settings are entered as percent of maximum speed.

There are 5 jog mode functions. Two represent simulated auto functions.

Jog Fast to photo eye, simulates the motion between reflector to reflector moves.

Jog Slow to Photo Eye Off moves at slow speed as long as a reflector is seen. The Spindles stop rotating when the reflector moves out of the sensor's view.

Jog Fast runs at fast speed and ignores reflectors.

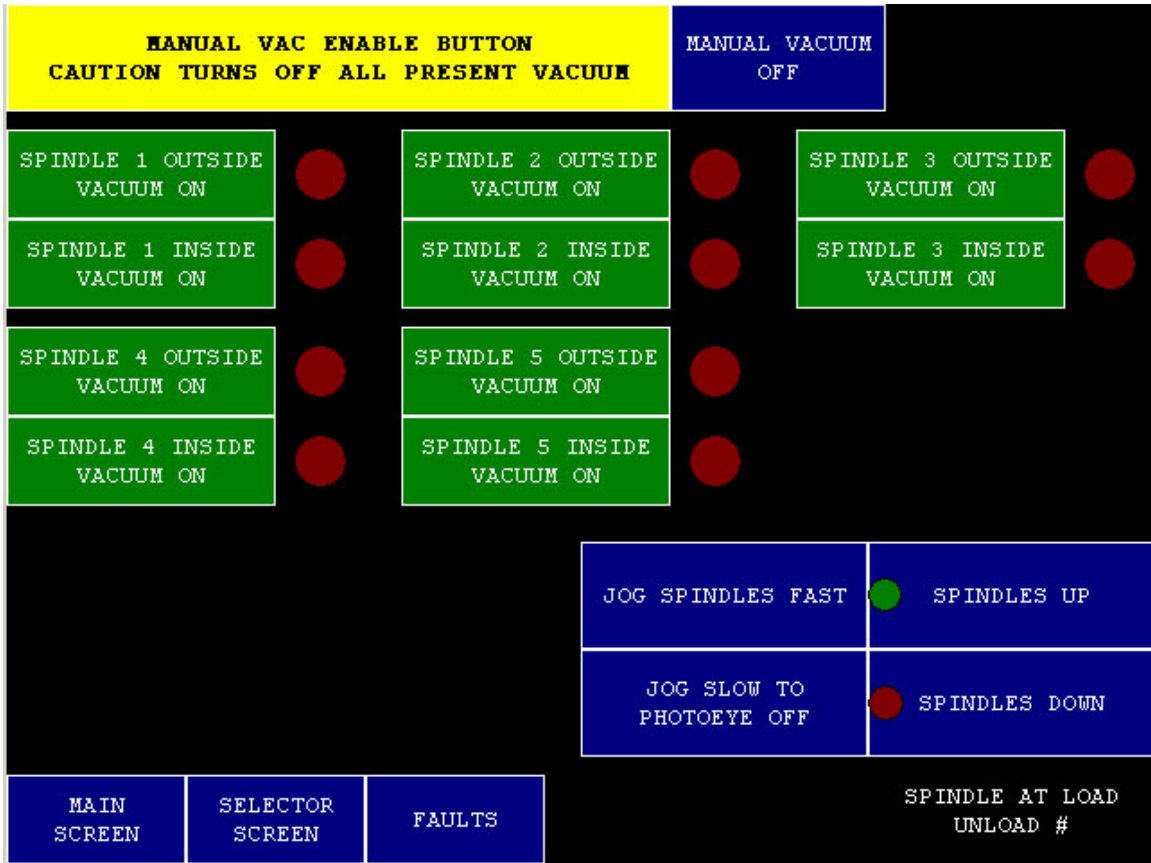
Jog Slow runs at slow speed and ignores reflectors.

Jog Reverse runs in reverse at the reverse speed.

If you press any Spindles assembly jog button, the machine detects it and notes the current position of the spindle assemblies. The next time it is started in automatic mode the machine will re-home then go to its last know position.

Use care lowering the spindles assembly. Failure to have the spindles assembly in an exact position over the work stations can cause damage to the machine.

VACUUM CONTROL

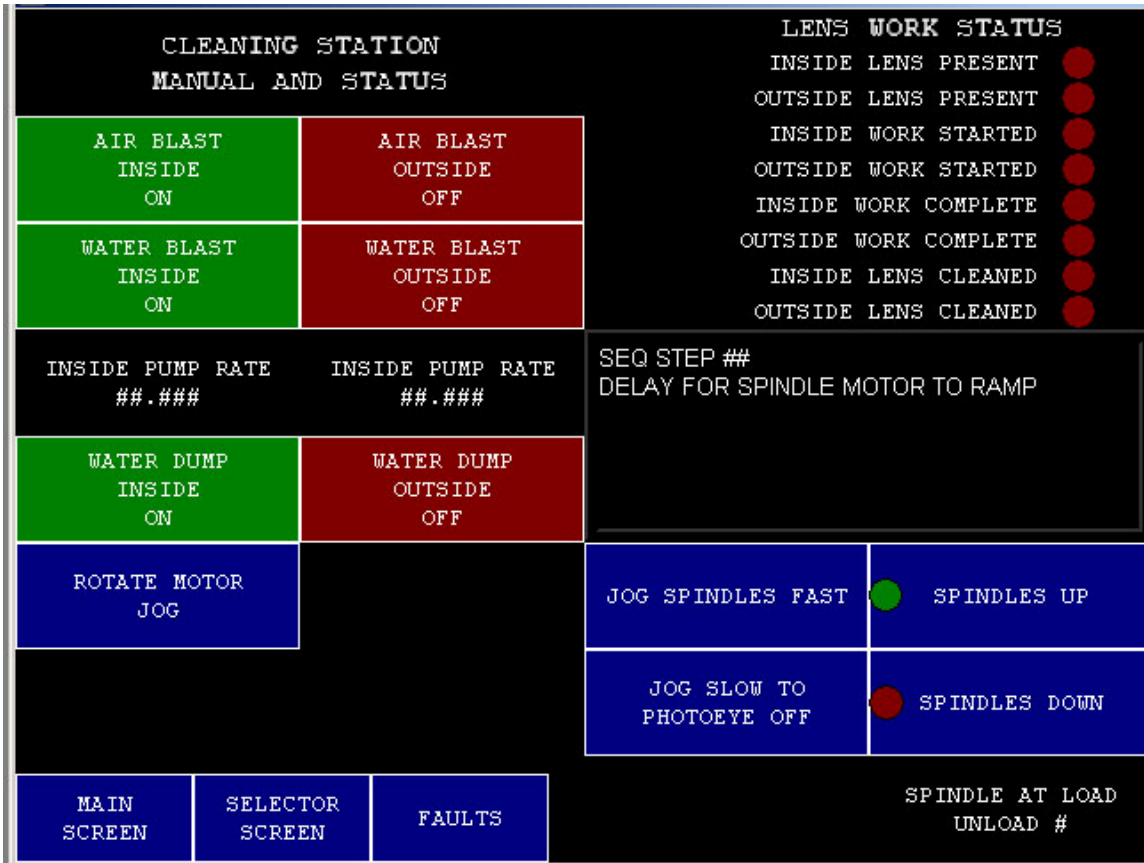


Each Vacuum cup on the machine is equipped with a valve and vacuum sensor. You can enable manual control of these valves to test the sensors. If you have lenses on some cups they will be dropped when you switch to manual control unless the manual valve control is turned on for that sensor before the enable is given.

The valve controls are labeled as inside or outside cup and Spindle number. To their right is their associated vacuum switch. Physically on the machine the left vacuum switch display is the inside cup switch. The right vacuum switch display is the outside cup switch.

Some spindles assembly control is also available on this screen.

CLEANING STATION



Cleaning Station Screen provides manual control over the individual functions and shows the status of lenses presently at the station. Lens Status indicators shown for both the inside and outside lens. They turn from red to green if the function is true.

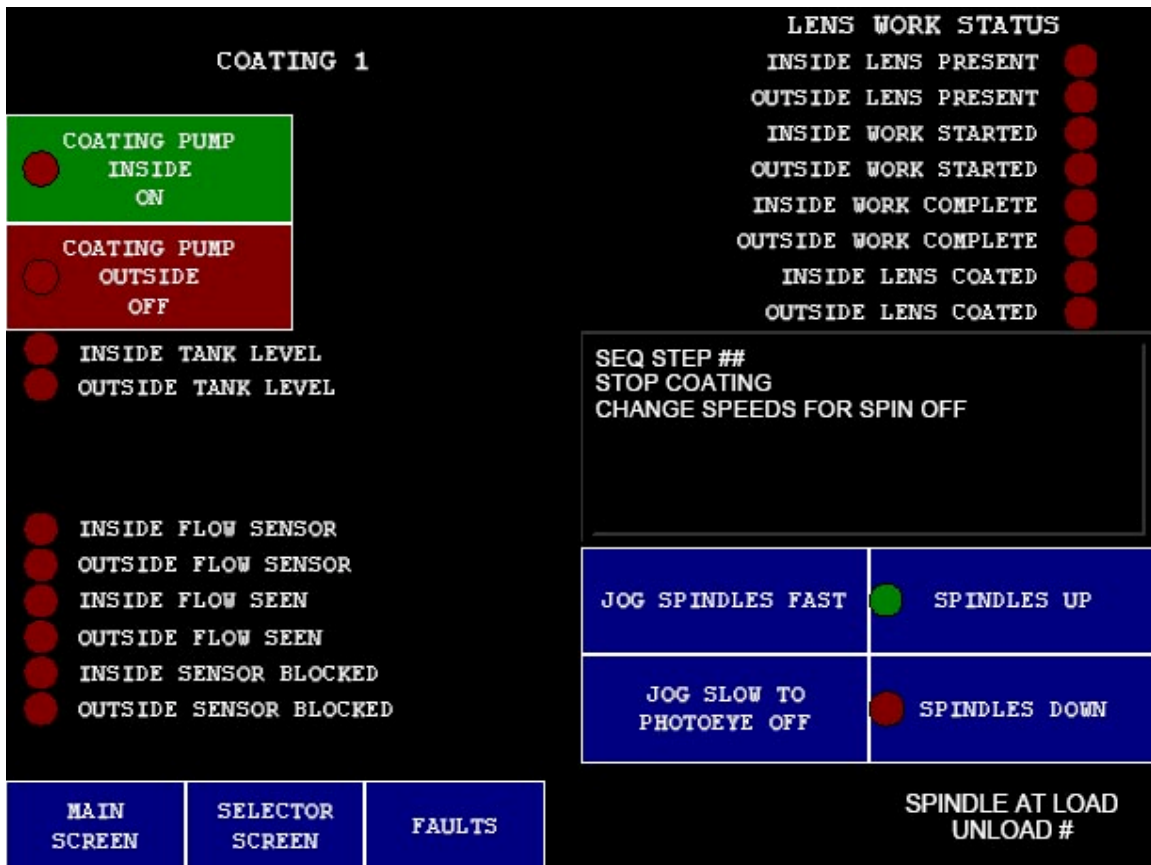
Air Blast buttons turn on the air for associated cup. The rotate motor will also run when they are on. These are toggle on and toggle off maintained buttons and not momentary. Turn off before leaving the screen. If you fail to turn these off and leave the screen, you will be returned to the screen.

Water buttons turn on the water for associated cup. The rotate motor will also run when they are on. These are toggle on and toggle off maintained buttons and not momentary. Turn off before leaving the screen. If you fail to turn these off and leave the screen, you will be returned to the screen.

Water dump buttons relieve water pressure on the associated cup. These are toggle on and toggle off maintained buttons and not momentary. Turn off before leaving the screen. If you fail to turn these off and leave the screen, you will be returned to the screen.

Rotate Motor Jog runs the rotate motor. This is a momentary button.

COATING SCREEN



Coating Station Screen provides manual control over the individual functions and shows the status of lenses presently at the station. Lens Status indicators shown for both the inside and outside lens. They turn from red to green if the function is true.

Coating Pump Buttons turn on the coating pumps. The inside circle is green when the coating pumps are turned on. You must have the spindle up to turn on the coating pumps. These are toggle on and toggle off maintained buttons and not momentary. Turn off before leaving the screen. If you fail to turn these off and leave the screen, you will be returned to the screen.

Sensor indicators used at coating station turn green when turned on.

Inside and Outside Tank levels indicate if enough coating fluid is present.

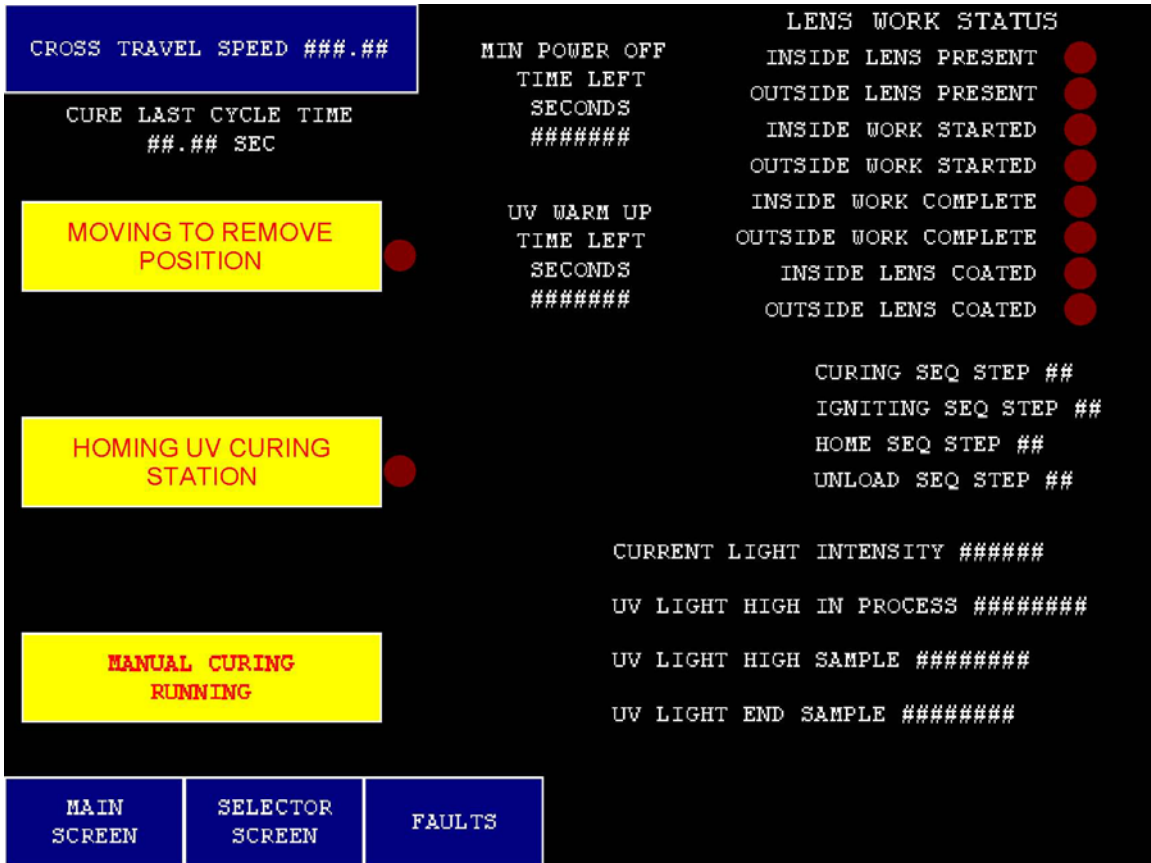
Inside and Outside Flow sensors detect if the coating pumps are moving coating.

Coating Sensor Function Indicators – When the machine is running a coating check is ran during the coating process.

Flow Seen turns green if the flow meter ball was seen by the flow sensor.

Sensor Blocked creates a fault if it appears the flow sensor is blocked when the pump is not turned on. Adjusting of sensor or cleaning of the sensor lenses may be required.

UV CURING



UV Curing Screen gives the status and test control of the UV light.

Cross Travel speed controls how fast the UV light housing moves past the lenses being cured.

Cure Last Cycle Time is how long the last cycle ran.

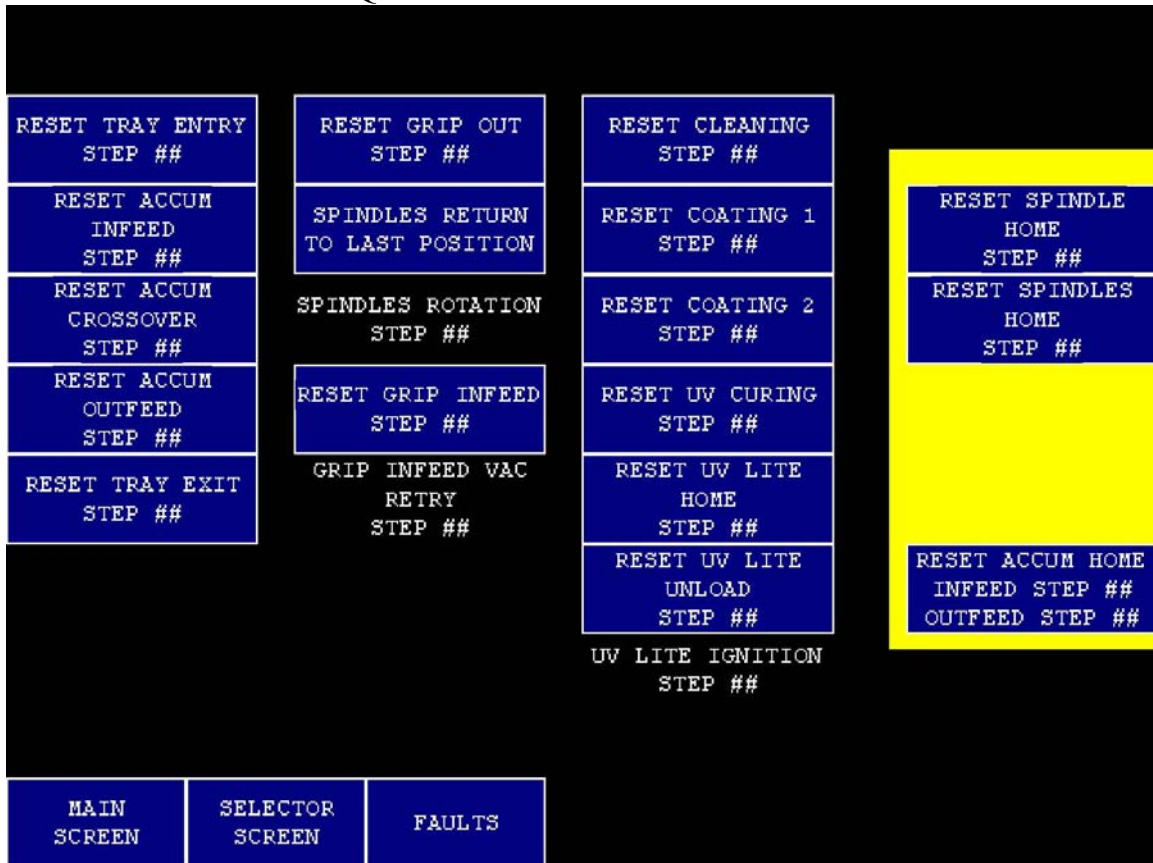
Move to Remove Position is used to move the light to a centered position so it may be removed from the light housing. Power is removed from the light and the motor runs until the remove position prox turns on. The button will turn yellow when running the cycle.

Homing UV Station button returns the UV light to its home resting position. The home position will turn on when the home position is reached.

Manual Curing runs a cycle on the light. Power is turned up to high, and the light is passed by the lenses, although the lenses do not rotate as in the automatic process.

The light intensity indicators are used for factory de-bugging purposes. The “UV Light High In Process” is used to determine if the light is getting too weak.

SEQUENCE STATUS SCREEN



The Sequence Status screen gives the present step number of one of the individual machine programming routines. Pressing the count indicator will reset or abort the reset of that routine. It may be required to reset a routine if the system faults and gets hung up. A time out fault will normally be displayed for the machine section that may be hung and require resetting. You must be in manual mode to reset the routine. The left two columns deal with lens and tray handling. The right column deals with work stations.

Column 1 Status indicators and Reset Buttons

Tray Entry is the sequence moving the tray from the infeed conveyor to the infeed accumulator.

Accum Infeed is in control of lowering and raising the tray catchers and advancing the belt in the infeed tower down.

Accum Crossover controls moving the tray between the infeed tower and the outfeed tower in the accumulator.

Accum Outfeed controls the outfeed tray catcher and advancing the belt in the outfeed accumulator up.

Tray Exit controls moving the tray from the outfeed accumulator to the outfeed conveyor.

Column 2 Status indicators and Reset Buttons

Grip Out controls the unloading of lenses from the vacuum cups. Basic process is

- rotate the grippers up, center the grippers and open the grips.
- move to vacuum cup, grab lenses, and turn off vacuum to the cups
- lower grippers and rotate down
- place lenses in the nest and move up
- rotate the lenses then go down to pick them back up
- move up then rotate to over the tray
- move down to tray and release lenses
- move up and return grippers to center position

Spindles Return to Last Position is an indicator that the Spindles arm assembly has been jogged and needs to find its last position.

Spindles Rotation is an indicator of the present step while rotating from arm reflector to arm reflector and can not be reset.

Grip Infeed is the process of getting the lenses from the tray to the cups.

- rotate the gripper down and move over the infeed tray
- move down to tray and grip lenses
- note by gripper closing fully or partly if each lens is present
- rotate back to center and rotate grippers up
- move to cups and turn on vacuum
- vacuum is turn on both cups even if only one lens was detected
- check that vacuum is on for any lens detect and looks for an undetected lens with vacuum
- release lenses and move down

*if a detected lens does not make the vacuum switch, the machine will move the lenses to the lens rotating nest to re-grip the lenses and then attempt to get vacuum in the cups again.

Column 3 Status indicators and Reset Buttons

Cleaning high pressure washes, then air dries the lenses.

Coating 1 coats and spins off the coating on the lenses.

Coating 2 is a presently unused station.

UV Curing runs high intensity UV light past the lenses.

UV Lite Home is the homing function to put the light in the start position

UV Lite Unload is the semi-manual function to turn power off and move the uv light to a position it can be removed from.

UV Lite Ignition runs the light at high power long enough for full UV intensity to be reached. It can not be reset except by turning off power the UV light with the Power ON/OFF switch on the front of the machine. There is a minimum power off time for the light or it will fail to reignite. The control system will prevent power coming back onto the UV light should power be turned off.

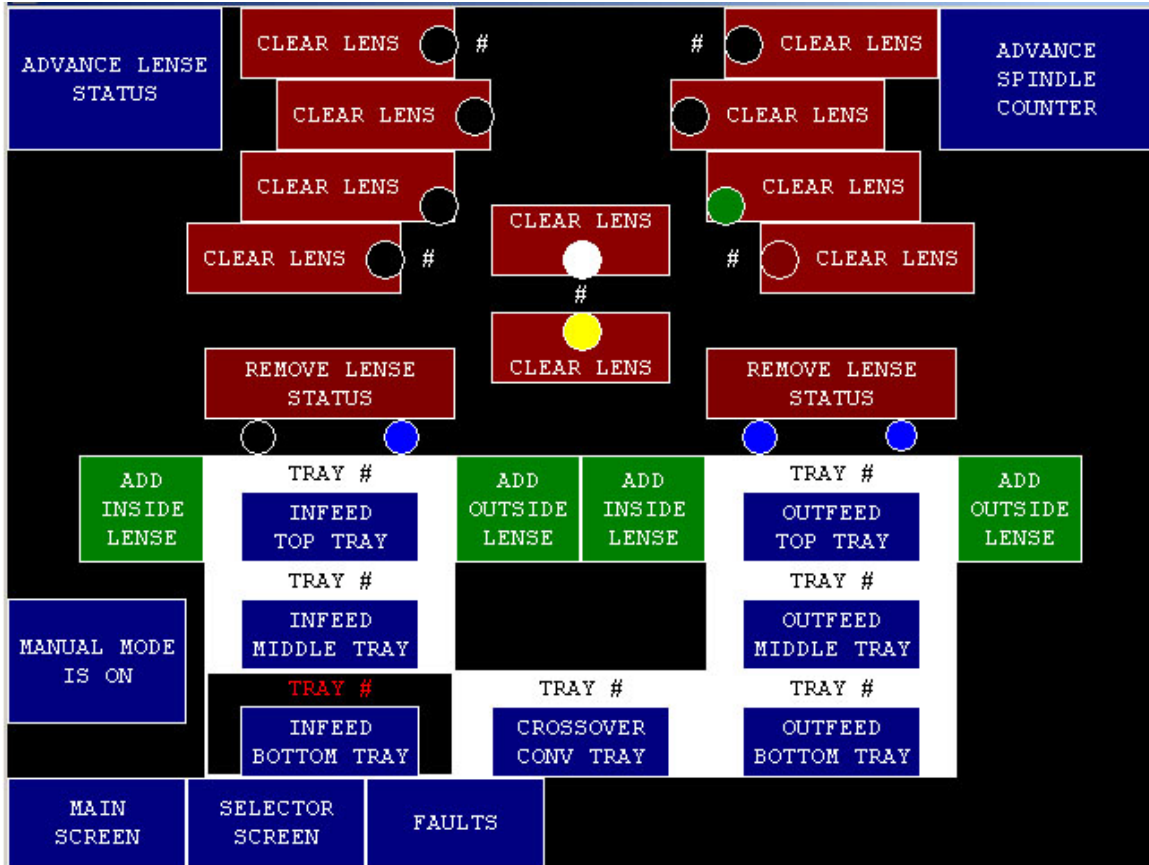
Column 4 Homing Status and Reset Buttons

Spindle Home rotates a pair of cups on single spindle to a known home position. Before loading lenses or unloading lenses to the cups the cups are homed.

Spindles Home is the process the machine goes through to find which spindle arm is number 1. If the spindle count is lost some how, the machine will have to be emptied and the homing sequence reset so number one can be found again.

Accum Home is normally at a number other than zero. These sequencers tell the machine to find the home belt lug on each tower. The Accumulators cannot accept trays or advance if they do not start on a home lug.

LENS AND TRAY STATUS MODIFIER



Lens and Tray Status allows you to clear a faulted lens on the spindles assembly, change a tray number, or add and subtract lenses to the infeed or outfeed tray.

Lenses on the spindle assembly are color coded.

Black is no lens

White is present but work not started

Yellow is work in process

Green is work complete

Red is faulted (usually a loss of vacuum)

Lenses in the trays the infeed and outfeed section are blue if present and black if empty.

An accumulator position with a tray is white, black is empty. Present and empty is determined by the photo-eye located at each tray stopping position. They also should always have a number associated with them. This tray number matches the spindle arm number the lenses from the tray were loaded in. The white tray indicator in the accumulator is controlled by the photo eye sensors in the accumulator while the number is controlled by the process. In the middle of a sequence the slot can show empty but have a number associated with it. Or may be white with no spindle arm assembly number. This will catch up when the advancing process is complete. Pressing on the tray number will allow you to change the spindle arm number associated with the tray. This is

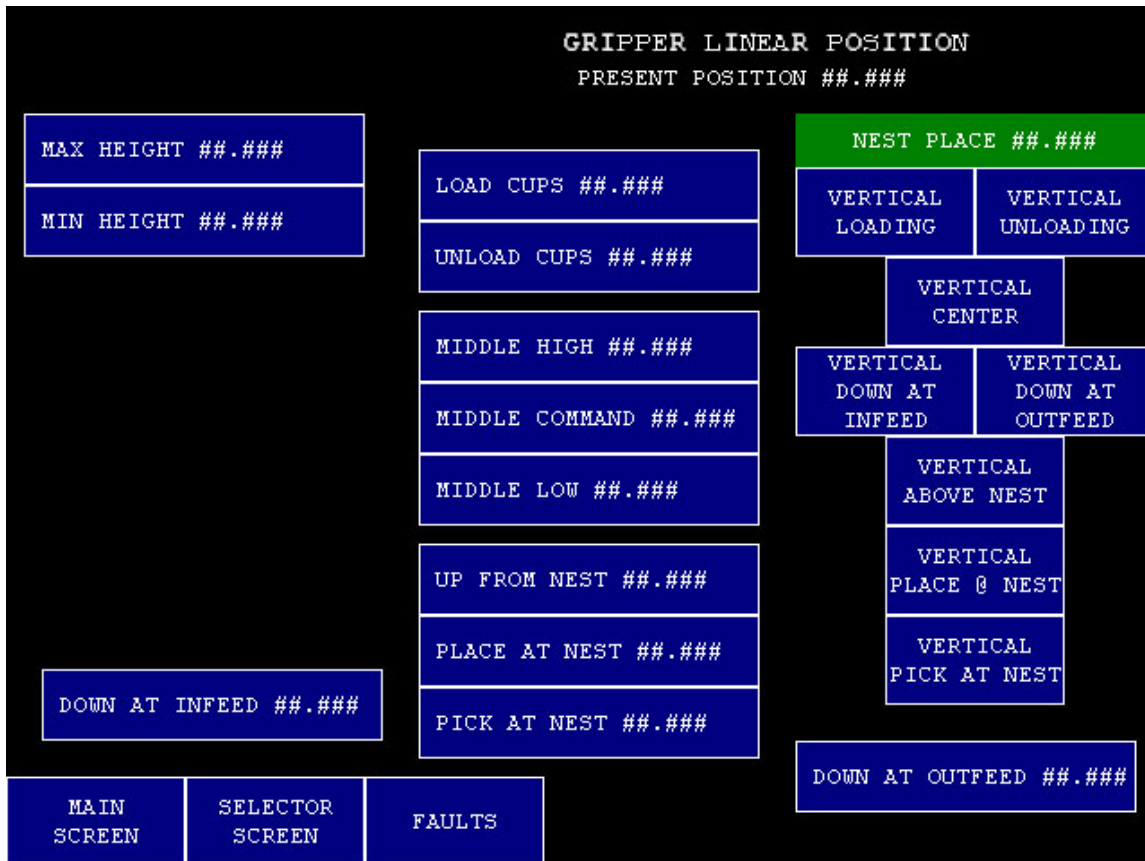
only recommended if the machine some how mixed the numbers up and you needed to correct the situation. Do not attempt this unless you're 100 percent sure you know this is the case.

WORK STATION SPEED AND TIME SET-UP

WORK STATION SPEED & TIMES			
LENS ROTATION SPEEDS IN RPM		CYCLE TIME IN SECONDS	
CLEANING WATER BLAST TIME ##.# SEC	COAT 1 COATING TIME ##.# SEC	CURE LAST CYCLE TIME ##.### SEC	
CLEANING WATER SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM	COAT 1 COATING SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM	UV CURE SPIN SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM	
CLEANING AIR BLAST TIME ##.# SEC	COAT 1 SPINOFF TIME ##.# SEC		
CLEANING AIR SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM	COAT 1 SPIN OFF COMMANDED ##### RPM LAST AVERAGE ##### RPM	COAT 2 COATING TIME ##.# SEC	
CLEANING SPIN OFF TIME TIME ##.# SEC		COAT 2 COATING SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM	
		COAT 2 SPINOFF TIME ##.# SEC	
MAIN SCREEN	SELECTOR SCREEN	FAULTS	COAT 2 SPIN OFF SPEED COMMANDED ##### RPM LAST AVERAGE ##### RPM

Work Station Speed and Time Set-up controls the speed lenses are spun at and for how long. These should not need changing and are a factory set up function. For speed settings the speed ran during the last spindle ran will be displayed. All spindles arms have a closed loop system to correct for speed drift on the spindle arms.

GRIPPER LINEAR HEIGHT POSITIONS



Gripper Linear Height Positions are the position in inches that gripper moves to during the automated process. Do not match the exact position on any setting. Part of the process requires they not be identical. If you want them to be the same, adjust the setting to be .001 of an inch different from another.

Load and Unload cups is the height setting when putting lenses into the cups or removing them. Unload cups is generally a higher or larger number.

Middle High, Middle Command and Middle Low are the clearance positions where it is safe for the gripper to rotate either vertically or horizontally. **DO NOT CHANGE THESE SETTINGS. YOU COULD CAUSE A MACHINE CRASH.**

Up From Nest, Place at Nest and Pick at nest are the heights used to put lenses into the nest then pick them out again. Place at nest should be higher than pick at nest. Up from nest is the height the grippers must go to allow the nest to rotate.

Down at Infeed is the height to grip lenses in the infeed side tray.

Down at Outfeed is the height to place lenses in the outfeed side tray.

GRIPPER MOTOR SPEED SET-UP

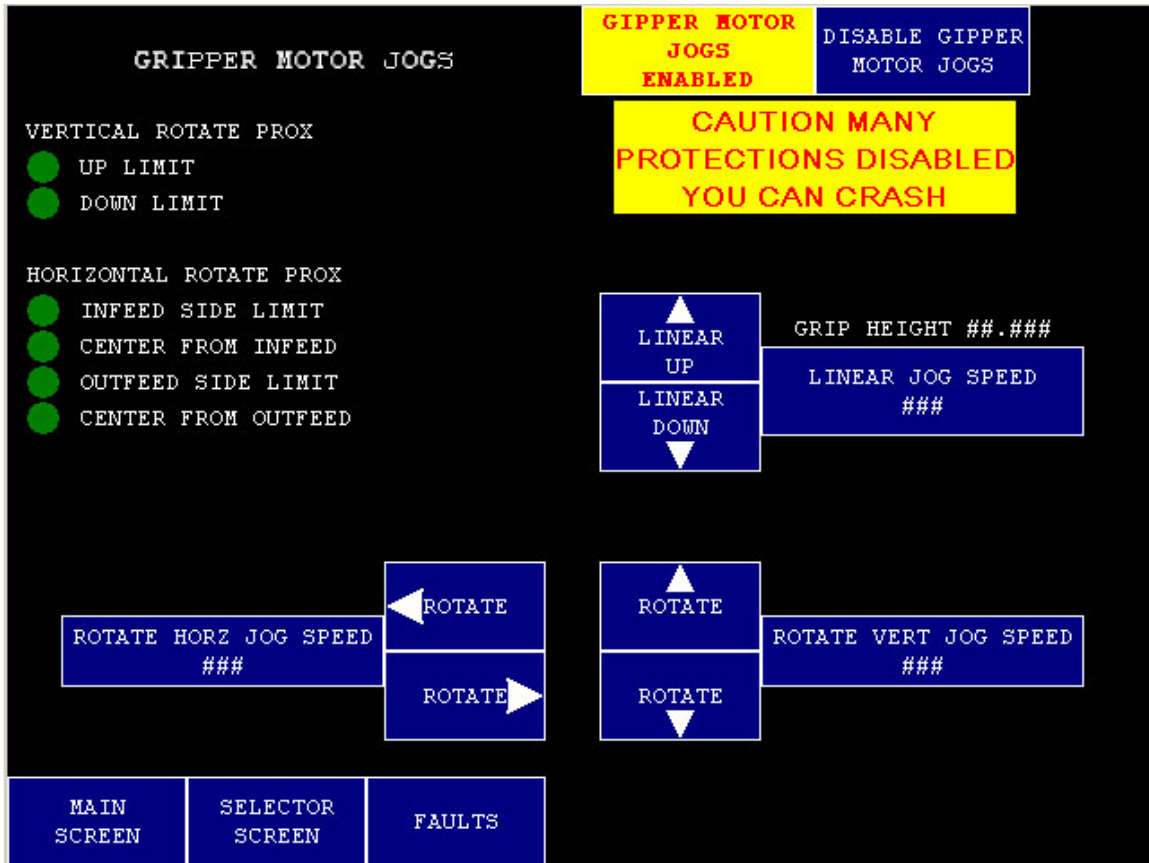
<p>VERTICAL LINEAR DRIVE SPEED ##### Bits</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">UP FAST ###%</td></tr> <tr><td style="text-align: center;">UP SLOW ###%</td></tr> <tr><td style="text-align: center;">DOWN FAST ###%</td></tr> <tr><td style="text-align: center;">DOWN SLOW ###%</td></tr> </table>	UP FAST ###%	UP SLOW ###%	DOWN FAST ###%	DOWN SLOW ###%	<p>GRIPPER DRIVES SETUP DIGITAL OUTPUT SPEED COMMAND 0 to 100% (this is not rpm)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">INFEEED ACCUMULATOR ###%</td></tr> <tr><td style="text-align: center;">OUTFEEED ACCUMULATOR ###%</td></tr> </table>	INFEEED ACCUMULATOR ###%	OUTFEEED ACCUMULATOR ###%										
UP FAST ###%																	
UP SLOW ###%																	
DOWN FAST ###%																	
DOWN SLOW ###%																	
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<p>VERTICAL ROTARY DRIVE SPEED ##### Bits</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">UP FAST ###%</td><td style="text-align: center;">● UP PROX</td></tr> <tr><td style="text-align: center;">UP SLOW ###%</td><td></td></tr> <tr><td style="text-align: center;">DOWN FAST ###%</td><td style="text-align: center;">● DOWN PROX</td></tr> <tr><td style="text-align: center;">DOWN SLOW ###%</td><td></td></tr> </table>	UP FAST ###%	● UP PROX	UP SLOW ###%		DOWN FAST ###%	● DOWN PROX	DOWN SLOW ###%		<p>HORIZONTAL ROTARY DRIVE SPEED ##### Bits</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">INFEEED FAST ###%</td><td style="text-align: center;">● INFEEED SIDE PROX</td></tr> <tr><td style="text-align: center;">INFEEED SLOW ###%</td><td style="text-align: center;">● CENTER INFEEED</td></tr> <tr><td style="text-align: center;">OUTFEEED FAST ###%</td><td style="text-align: center;">● CENTER OUTFEEED</td></tr> <tr><td style="text-align: center;">OUTFEEED SLOW ###%</td><td style="text-align: center;">● OUTFEEED SIDE PROX</td></tr> </table>	INFEEED FAST ###%	● INFEEED SIDE PROX	INFEEED SLOW ###%	● CENTER INFEEED	OUTFEEED FAST ###%	● CENTER OUTFEEED	OUTFEEED SLOW ###%	● OUTFEEED SIDE PROX
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OUTFEEED FAST ###%	● CENTER OUTFEEED																
OUTFEEED SLOW ###%	● OUTFEEED SIDE PROX																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">MAIN SCREEN</td> <td style="width: 33%; text-align: center;">SELECTOR SCREEN</td> <td style="width: 33%; text-align: center;">FAULTS</td> </tr> </table>		MAIN SCREEN	SELECTOR SCREEN	FAULTS													
MAIN SCREEN	SELECTOR SCREEN	FAULTS															

Gripper speeds are the speeds used to control the gripper rotation and linear positions. Changing them is not recommended and can have adverse affects on machine function. They are factory set and should not need adjustment.

Also shown are the proximity sensors that tell the machine which point is has reached in gripper rotation. These are expected to come on and off during the process but can be handy to monitor in the event of a sensor failure.

Again this screen is really provided as a diagnostic tool for trouble shooting and for factory calibration of the machine.

MANUAL GRIPPER MOTOR JOGS



Manual gripper jobs is trouble shooting screen. There are no protections or limits on how far you can move things here. Do Not use this screen unless you absolutely need to in order to trouble shoot the machine. And take great care you do not over rotate or machine damage will occur. This is a trouble shooting a factory set up screen only.

SPINDLE 1 THRU SPINDLE 5 SPEED

CLEANING SPEED 1 - WATER BLAST ###.##%	<p style="text-align: center;">SPINDLE 1 DIGITAL OUTPUT SPEED COMMANDS 0 to 100% (this is not rpm)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> ● HOME PROX ● RUN OUTPUT </div> <div style="border: 1px solid white; padding: 5px; text-align: center;"> JOG SPEED ###% </div> </div> <p style="text-align: center;">CURRENT COMMANDED SPEED #####</p> <p style="text-align: center;">PRESENT SPEED RPM ###</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid white; padding: 5px; text-align: center;"> REHOME SPINDLE </div> <div style="border: 1px solid white; padding: 5px; text-align: center;"> JOG SPINDLE </div> </div>
CLEANING SPEED 2 - AIR BLAST ###.##%	
1ST COAT SPEED 1 - COATING ###.##%	
1ST COAT SPEED 2 - SPIN OFF ###.##%	
2ND COAT SPEED 1 - COATING ###.##%	
2ND COAT SPEED 2 - SPIN OFF ###.##%	
CURING SPEED 1 - CURING ###.##%	
HOMING SPEED - FORWARD HOMING ###.##%	
HOMING SPEED - SLOW ###.##%	
<div style="display: flex; justify-content: space-between;"> MAIN SCREEN SELECTOR SCREEN FAULTS </div>	
<div style="border: 1px solid white; padding: 5px; display: inline-block;"> SPINDLE SPEED CALIBRATION #### </div>	

Spindle Screens are used to set up the homing of each spindle and check for proper operation of each spindle motor.

Each work station will show the last output percentage sent to the motor to obtain the required speed. Although they can be changed here, doing so can have a detrimental affect on machine operation. They should never be at 100 percent speed or at 5 percent speed. This means the motor drive is improperly calibrated.

Jog speed is for setting the motor speed while pushing the job button. 100 percent speed should give 2500 RPM plus or minus 100 RPM.

Rehome Spindle causes the spindle to run a home position sequence. It is best to home the motor, place a mark on the cup, then rehome the motor a number of times to insure it is repeatable. Also home with and without lenses present.

Homing Speed Forward Homing – the speed to run the beginning of the homing process
Homing Speed Slow – in some case we want a slower second speed in the homing sequence. This is rare so this speed is usually set the same as the above setting.

Do not change these settings unless you're sure you're having an issue with proper alignment of the lenses when loading and unloading lenses.

FACTORY SET UP SCREENS

SPINDLES ADVANCE FAST SPEED ###%		MACHINE CYCLES #####		FACTORY ONLY SCREEN	
SPINDLES ADVANCE SLOW SPEED ###%		VERTICAL POSITION CHANGE TO SLOW DISTANCE MOVING UP ##.###"			
CLEANING PUMP HIGH TRIP ##.## CPS		VERTICAL POSITION CHANGE TO SLOW DISTANCE MOVING DOWN ##.###"			
CLEANING PUMP LOW TRIP ##.## CPS		VERTICAL POSITION POS TOLERANCE ##.###"			
VACUUM RELEASE DELAY ##### mSEC		COATING CROSS TRAVEL SPEED ###.##			
LOW UV LIGHT INTENSITY SETTING #####		JAM DETECTION (ON)	BARCODE SYSTEM (ON)		
LIGHT INTENSITY MULTIPLIER #.####		COATING FOUNTAIN FAULT PAUSE ON (ENABLE FAULT)	CLEANING STATION REQUIRES PROX TO STOP		
MAIN SCREEN	SELECTOR SCREEN	FAULTS	CALIBRATIONS	REV NOTES	goto configure exits program

The factory setup screen is mainly a source of data in one place, but also enables or disables some functions for testing. When an updated program is going to be downloaded to the machine, all data here should be recorded, as well as recording the data on the calibration screen and the gripper drive speeds screen.

FACTORY CALIBRATIONS

SPINDLE 1 SPEED CAL #### HOMING SPEED - FORWARD HOMING ###.##% HOMING SPEED - SLOW ###.##%	SPINDLE 4 SPEED CAL #### HOMING SPEED - FORWARD HOMING ###.##% HOMING SPEED - SLOW ###.##%	FACTORY CALIBRATIONS	
SPINDLE 2 SPEED CAL #### HOMING SPEED - FORWARD HOMING ###.##% HOMING SPEED - SLOW ###.##%	SPINDLE 5 SPEED CAL #### HOMING SPEED - FORWARD HOMING ###.##% HOMING SPEED - SLOW ###.##%	LOAD CUPS ##.### UNLOAD CUPS ##.###	MAX HEIGHT ##.### MIN HEIGHT ##.###
SPINDLE 3 SPEED CAL #### HOMING SPEED - FORWARD HOMING ###.##% HOMING SPEED - SLOW ###.##%	GET GRIPPER DRIVE SPEEDS ALSO		MIDDLE HIGH ##.### MIDDLE COMMAND ##.### MIDDLE LOW ##.###
		UP FROM NEST ##.### PLACE AT NEST ##.### PICK AT NEST ##.###	COATING STATION 1 NOT INSTALLED COATING STATION 2 NOT INSTALLED
		DOWN AT INFEEED ##.### DOWN AT OUTFEED ##.###	
MAIN SCREEN	SELECTOR SCREEN	FAULTS	FACTORY
			goto configure exits program

Machine calibration numbers.

FACTORY PROGRAMMING REVISION NOTES

REVISION NOTES

Rev 1.1 Jam detection added to gripper sequences at infeed tray and nest.

Rev 1.2 Jam Detection fix in manual mode. Jam detection enable on manual screen. Infeed lens loading vac fault, seq will now continue if left in middle during hand loading.

Rev 1.3 Remove lift of spider during UV Warm up. Was used to warm up coating, but this caused splashing on the deck.

Rev 2.0 Add Bar Code option. Auto lift in down with lens in UV light for 3 minutes

Rev 2.1 Add coated lens count, CPID per lens accept, LMATTYPE ? error.

Rev 2.2 Add coat 2. Untested but main routine dupped from coat 1

MAIN SCREEN	SELECTOR SCREEN	FAULTS	FACTORY	goto configure exits program
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Revision notes of the present version of the control program.

Bar Coding

Specifications - VCA compliant to Data Communication Standard Version 3.06

The RLC is optionally supplied with bar code reading, and serial communications to VCA compliant host software. The serial port is a standard 9 pin D-Sub DTE connection. The serial communications configuration

Baud Rate 192000

Data bits 8

Parity none

Stop bits 1

No handshaking

The RLC's preferred mode is running in Auto-format Initialization, although Preset Initialization is also supported. No-initialization mode is not supported.

DEV = COA

VEN = UOC

MODEL = RLC

The preferred selection method is using the CPID value. By default, the RLC follows the VCA Data Communication Standard to the letter. It is looking for a single integer of the value 0 for no wash only, 1 for coat with coat station 1, and 2 for coat with coat station 2 (if the machine is equipped with two coating stations). If the CPID is coming per lens with the ";" separator, the RLC will look for second CPID value if it finds a "?" returned in on of the locations. The RLC does not support a two different integer values.

Examples of supported host replies

CPID = 1

CPID = 0

CPID = ?;1

CPID = 0;?

Examples of unsupported host replies

CPID = 0;1

CPID = 1,0

- note the request to "wash only" with one lens and coat at station one with the other. The RLC treats incoming lens pairs as a group, which must either be coated or washed. It is not compatible requesting coating one, while washing only the other.

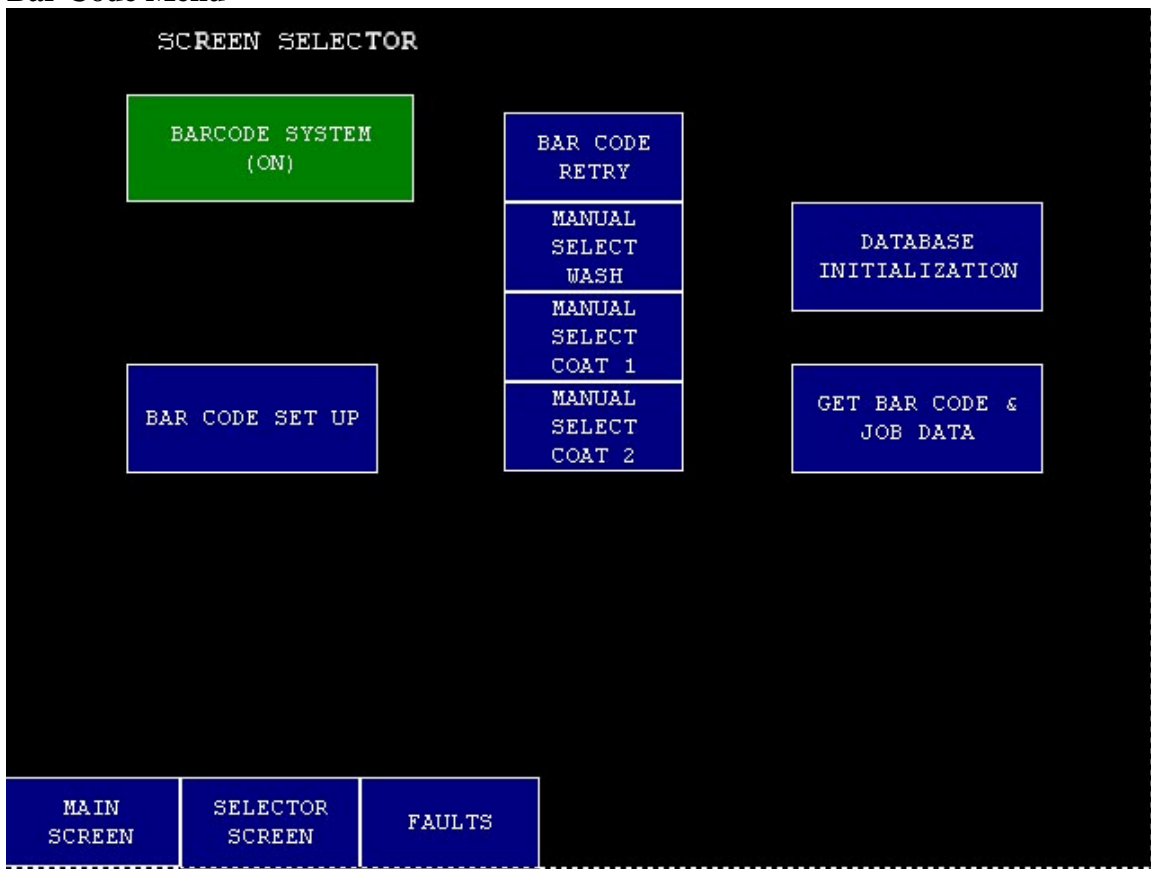
If the RLC gets a CPID of "?" or "?;?" it will assume the host software is not configured to send a CPID value. The RLC will then use the LMATTYPE value to determine if the lens, or lens pair should be coated or washed. To wash or coat based on the lens material type can be configured on the Bar Code Setup Screen of the operator interface.

Provisions are provided for the currently defined types 1 through 6, with types 7 through 14 available for custom programming or new lens material definitions by the VCA.

Aligning the bar code reader.

The Bar Code Reading head is located on the top of the infeed accumulator. There should be enough adjustment in the mounting bracket to pick up a bar code anywhere on the tray opposite the lens holding side. If there are multiple bar codes, insure the bar code is aligned to pick up only one. Do not align the bar code head to read a barcode with extra characters found at the end of the job number. Example 12345 is the job number, some job tickets will also have the code 12345.1 to designate which lens is being read. Unless you host software can interpret correct job number with the “.1 “ added, you may a job not found error. The RLC will send the read bar code on to the host software exactly as read on the bar code.

Bar Code Menu



Above is the Bar Code Menu screen. The green button turns the bar code reading function on and off.

The larger blue buttons send you to the three other screens related to bar coding.

Bar Code Set Up allows configuring if the machine will coat or wash only based on the the LMATTYPE id.

Data Base Initialization will take you to the screen to diagnose initialization problems.

Get Bar Code & Job Data assists in diagnosing errors in reading the bar code, or results returned from the host server.

The Center row of smaller blue buttons are the same buttons found on the main operator screen when there is an error reading the bar code or getting host information. It is a manual way to tell the machine what to do when a barcode can not be properly read, or the host returns invalid data.

Bar Code Retry – rereads the bar code and again asks the host what to do.

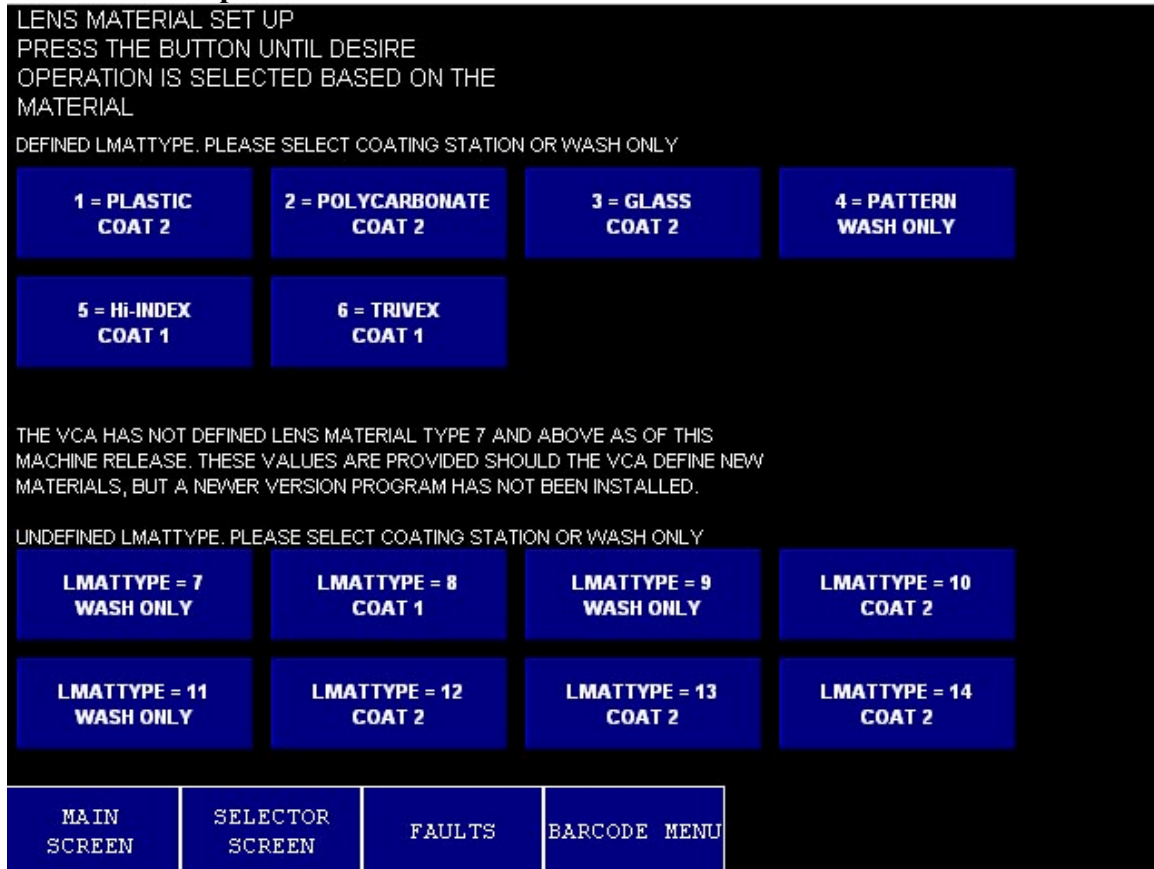
Manual Select Wash – tells the machine to only wash the lenses and apply no coating.

Manual Select Coat 1 – tells the machine to apply coating from station 1.

Manual Select Coat 2 – tells the machine to apply coating from station 2.

If the Coat 2 station is not installed, the Manual Select Coat 2 will not be visible.

Bar Code Set Up Screen



This is rather self explanatory. Press the button until the desired option is shown.

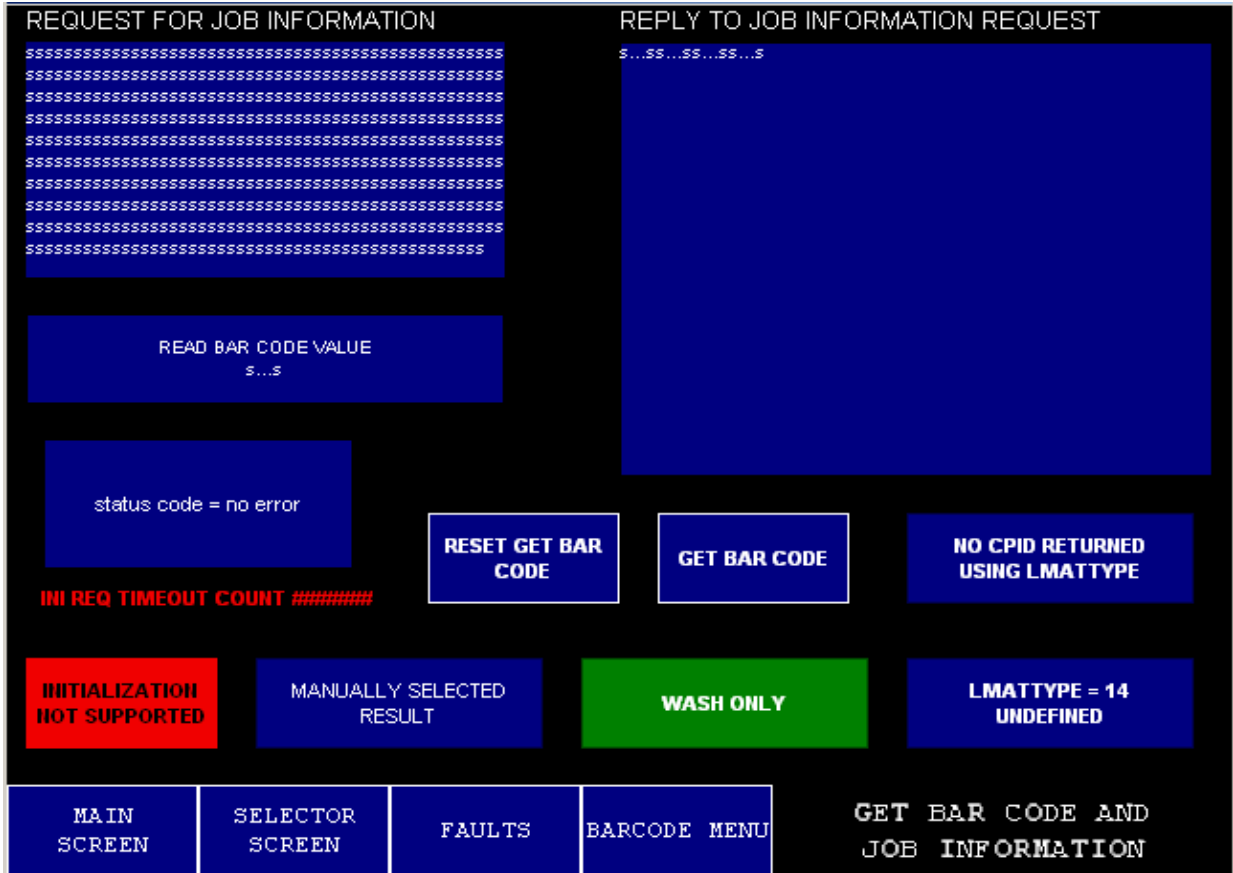
Bar Code Initialization Screen

The screenshot displays the Bar Code Initialization Screen with the following elements:

- REQUEST TO AUTO INITIALIZE SENT:** A blue window on the left showing status codes: "INI REQ TIMEOUT COUNT #######" and "INI SEND TIMEOUT COUNT #######". A text box below indicates: "status code = auto format ini not supported. can take preset format".
- REQUEST TO AUTO INITIALIZE HOST REPLY:** A blue window on the top right showing a response: "S...SS...SS...SS...S".
- INITIALIZE HOST REPLY:** A blue window on the middle right showing a response: "S...SS...SS...SS...S".
- INITIALIZE STRING SENT:** A large blue window on the bottom left containing a long string of "S" characters.
- AUTO ID RETURNED ##**: A text indicator in the center.
- RESET COMMS:** A button on the right side.
- Navigation Buttons:**
 - AUTO INITIALIZATION SET:** A green button.
 - PRESET INITIALIZATION SET:** A green button.
 - INITIALIZATION NOT SUPPORTED:** A red button.
 - REQUEST TO INI COMMS FAILED 4 TIMES:** A red button.
 - INITIALIZATION STRING COMMS FAILED 4 TIMES:** A red button.
- Bottom Menu:** A row of blue buttons: "MAIN SCREEN", "SELECTOR SCREEN", "FAULTS", "BARCODE MENU", and "SERIAL INI SCREEN".

This screen gives the status of the communications during initialization. The left hand side of the screen has two blue windows which show the messages sent to the host software. The two blue windows on the right show the responses from the host. Below are indicators giving the results of initialization.

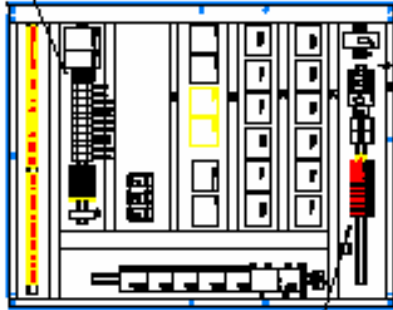
Bar Code Get Bar Code and Job Data Screen



This screen gives the status of getting the bar code and the communications with the host software. There are windows showing the communication strings from the RLC and the host, and the read bar code value. Results are shown for CPID, LMATTYPE if no valid CPID is returned, and the status code. The ability to reset the bar code get data sequence and resend to host are also provided.

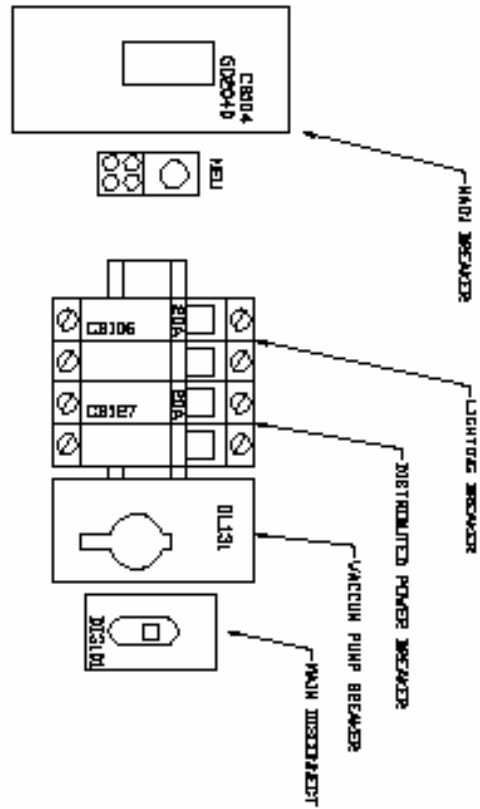
Fuse Locations

F1E200 10A	24VDC SUPPLY
F1E205 2A	24VDC SUPPLY
F1E204 5A	24VDC SUPPLY
F1E203 2A	24VDC SUPPLY



F1E206 5A
F1E208 2A
F1E210 2A
F1E213 5A
F1E216 2A
F1E217 5A
F1E219 5A
F1E222 5A
F1E225 5A
F1E227 5A
F1E229 5A
F1E231 5A
F1E234 5A
F1E235 5A
F1E236 5A
F1E237 5A
F1E238 5A
F1E239 5A
F1E240 5A
F1E241 5A
F1E242 5A
F1E243 5A
F1E244 5A
F1E245 5A
F1E246 5A
F1E247 5A

- F1E206 5A HEPA FILTER
- F1E208 2A CLEANING ROTATE MOTOR
- F1E210 2A VENTILATION & DODR FANS
- F1E213 5A PLC SUPPLY
- F1E216 2A WASH STATION JUMP VALVES
- F1E217 5A DUFFED CONVEYOR MOTOR
- F1E219 5A DUFFED CONVEYOR MOTOR
- F1E222 5A RECTIFIER FOR NETWORK SWITCH
- F1E225 5A 10 POWER SUPPLY SOURCE
- F1E227 5A SPINDLES MOTOR DRIVE
- F1E229 5A DUFFED ACUM DRIVE
- F1E231 5A DUFFED ACUM DRIVE
- F1E234 5A DUFFED ACUM DRIVE
- F1E235 5A DUFFED ACUM DRIVE
- F1E236 5A DUFFED ACUM DRIVE
- F1E237 5A UV CURS MOTOR DRIVE
- F1E238 5A GRIPS HOZE ROTATE
- F1E239 5A GRIPS HOZE ROTATE
- F1E240 5A SPRINDLE 1 L1
- F1E241 5A SPRINDLE 2 L1
- F1E242 5A SPRINDLE 3 L1
- F1E243 5A SPRINDLE 4 L1
- F1E244 5A SPRINDLE 5 L1
- F1E245 5A GRIPPER VERTICAL POSITION DRIVE
- F1E246 5A GRIPPER VERT ROTATE 48V SUPPLY
- F1E247 5A GRIPPER VERT ROTATE 48V SUPPLY



Lubricants acceptable for use with the Mac Valves

MAC Valves has compiled for reference a partial list of suitable oils, given upon request, for customer applications. If given a choice, this list should help avoid potential problems down the road. The information is provided as the result of recent lab testings and a great deal of field experience. The suitable oil should have an aniline point in the 180-210 range and viscosity of 150-200 seconds at 100 (S.A.E. #10). The following oils without additives are satisfactory:

MANUFACTURER OIL NUMBER	OIL NUMBER
NFO	NFO 10 H/NX
NFO	NFO 10 W/NR
CHEVRON	AW 10 MACHINE OIL
CHNRON	HANDY OIL - 15
EXXON	TERESSTIC 32
MOBIL	MOBIL DTE LIGHT
MOBIL	DEXRON 11 ATF
MOBIL	AFT 210 TYPE F
MOBIL	DTE 13M
MOBIL	ALMO 525
MOBIL	MIST LUBE 24
MOBIL	DTE 24
MOBIL	HYDRAULIC OIL 13
MOBIL	HYDRAULIC OIL AW 32
WOLVERINE	A-INDUSTRIAL I50 R&O
TITAW	TYPE F ATF
TITAL	DEXRON 11 ATF
AMERICAN	INDUSTRIAL OIL - 32

WARNING - The use of Kerosene, animal or vegetable fats should be avoided for additives *or* cleaning agents. Also, the use *of* any penetrants such as WD40 or 3-IN-ONE Oil, should NEVER be used on any rubber seals.