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Chapter 1
User Precautions

Do not attempt to operate the SRP Glass Restoration equipment without first reading and understanding both this Operations Manual and the training video. Be aware of the following user precautions before operating the equipment:

- Before using this equipment on customer work, practice on scrap glass until you are comfortable with the system. Experience is the best teacher.
- Never hold either the Polisher or the Finer on the glass. Allow the vacuum created at the bucket to hold the Polisher/Finer on the glass. If the vacuum fails to hold the machine on the glass, there will be no slurry flowing to the pad. **Lack of slurry can cause the glass to break.**
- Never fine any glass without first using the polisher. The finer will operate on tighter curves than will the polisher due to the pressure that is on the polishing pad. The technician needs to be sure the polisher will work in the same area.
- Never operate either the Polisher/Finer or buckets without the GFI system.
- Never operate the polisher without slurry flow to and from the bucket.
- Do not operate the Polisher/Finer with the retraction handle held part way in. The handle should always be either completely in (pad retracted), or completely out (pad fully extended).
- Never attempt to remove sand pits or welding splatte they are much deeper than normal scratches.
- Do not operate the Glass Restoration systems in the rain, standing water or with frayed wires/ cords.
- As a general rule, light scratches (less than .001") can be removed using the Polisher only with very acceptable results.
- Use eye and hearing protection.
- **Do not overheat the slurry.** Doing so will cause inefficient polishing and could damage the equipment. Use multiple buckets if necessary.

Chapter 2
Equipment Set-Up

To get the Finer and Polisher systems operational, several pre-assembled components have to be connected to each other. These components are:

- Polisher/Finer slurry bucket, and tri tube assembly
- Aspirator and pump assembly
- Water lubrication tank and tri-tube assembly
- Install the shroud seals into the polisher and finer shrouds

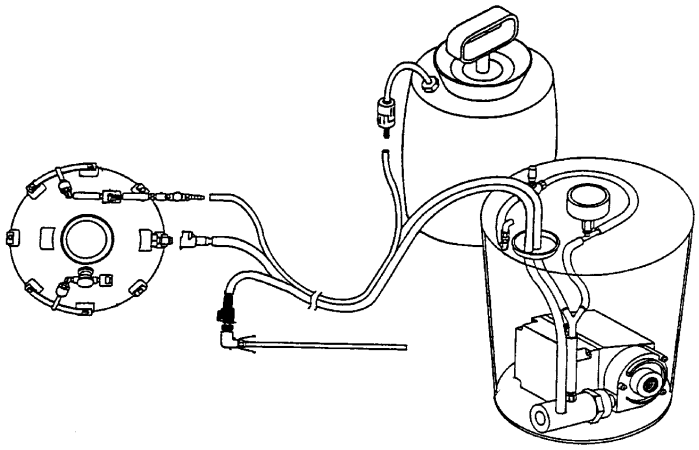
Polisher/Finer Slurry Bucket, And Hose Assembly

Polisher System (See Figure 1)

A. Polisher Assembly
B. Tri Tube Assembly
C. Slurry Container Assembly
D. Water Lubrication Assembly

Finer System (Not Pictured)

E. Finer Assembly
F. Tri Tube Assembly
G. Slurry Container Assembly



Polisher System

Aspirator and Pump Assembly Connections

- Locate Aspirator wrapped in packing material inside the Slurry Container.
- Thread Aspirator onto pump discharge using a 1" open-end or adjustable wrench. **Caution:** To avoid breakage, do not use aspirator fitting to gain leverage when hand tightening.
- Tighten aspirator so that approx. 5/16" of discharge threads are visible. (See Figure 2). Do not overtighten!
- Position the aspirator so the vacuum pick-up tube is pointing up **(see Fig. 2)**

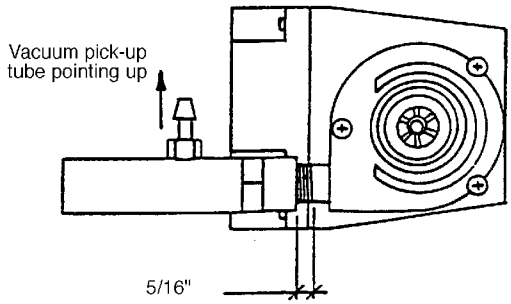


Figure 2
Correct Aspirator Positioning

2. Connection of tri tube to slurry container. After connecting the aspirator to the pump and placing it into the slurry container, the tri tuber, have to be hooked up.

3. Notice that one end of each hose has a section of the hose cut away (refer to Figure 3). Insert this end through the cover and into the slurry container, the smaller diameter hose of the tri tube is not inserted into the slurry container. Insert the "Y" fitting into this section then attach the end of that hose to the aspirator. The other hose draws slurry from the container, and does not attach to the other parts.

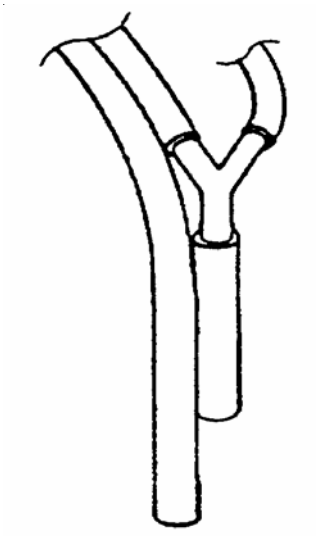


Figure 3
"Y" Fitting Inserted

Water Lubrication Tank and Tri-Tube Assembly

1. Locate the small diameter tube on the triple hose assembly.

2. Connect the small hose from the water lubrication tank.

3. Connect the other end to the valve assembly to one of the lubricator jets located on the shroud. The quick disconnect coupling needs to be pushed together and twisted to lock and unlock them. Before attaching the hoses to the shroud connections use some of the water based lubricant. Failure to use the lubricant will result in excessive wear on the black O-rings located on the shroud fittings.

4. One of the two remaining hoses has a white fitting which is connected to the white fitting on the shroud. This is the slurry return line. This tube connects to the white quick connect fitting on the shroud.

5. The remaining hose has a black quick disconnect fitting (male) which is attached to the top of the extended input tube. This is the slurry supply line. NOTE: This fitting on the Finer bucket is connected to the silver disconnect fitting (male) located on the shroud.

Connect Tri-Tube to Finer

The dual hose has one white quick disconnect coupling and one black one. Connect these couplings to the mating parts on the finer shroud on the same color. Before attaching the hoses to the shroud connections use some of the water based lubricant. Failure to use the lubricant will result in excessive wear on the black O-rings located on the shroud fittings.

Installing Shroud Seals into the Polisher and Finer Shrouds

The Glass Restoration systems are shipped **without** the shroud seal(s) installed due to the seal developing a “set”, which would reduce their operating life.

Before attempting to operate the Glass Restoration system it will be necessary to install the shroud seals into the recessed channel located at the bottom of the shroud on both the Finer and Polisher.
(See Figure 4).

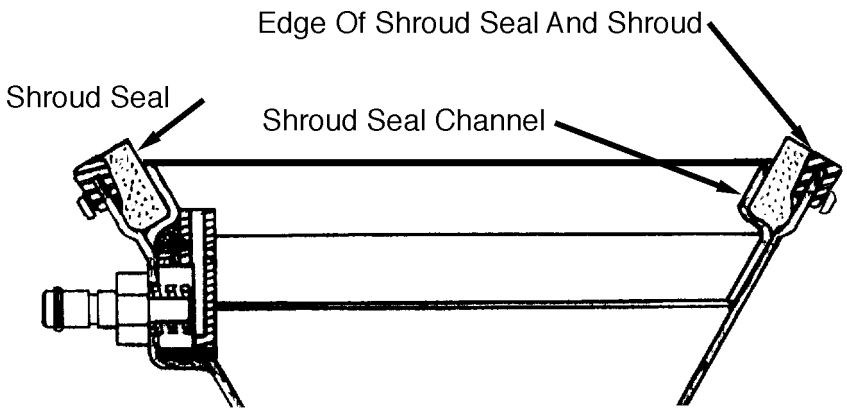


Figure 4
Location Of Shroud Seal Channel

The steps to install a shroud seal on the polisher are as follows:

1. Turn Polisher/Finer upside down.

2. Hold the shroud seal between the thumb and forefinger of each hand. Gently pull the seal so the seal's thickness becomes slightly less.

3. Position the seal in the channel in the shroud, using a tucking motion. Place the seal so the outside edge of the seal is even with the shroud edge. Do not push the seal down into the channel, let it remain even with, or slightly higher than, the shroud. The seal will seat itself when it is applied to the glass.

4. Continue to pull the seal gently and tuck it into the channel.

Chapter 3
Basics of How the System Works

The SRP Glass Restoration system has two different assemblies: the fining assembly, and the polishing assembly. Each assembly consists of a bucket or slurry container with either the finer or polisher machine.

Figure 5 is a schematic drawing of the polisher, showing the flow of the slurry from the bucket to the polisher and back.

The following basic explanation describes the Polisher and the Finer. Both systems use a slurry container with an electric pump that creates a vacuum. The pump is connected to the Polisher/Finer by two hoses. The suction hose draws the slurry up to the Polisher/Finer and circulates the slurry through the machine. The vacuum hose pulls the slurry from the machine back into the bucket. When the polisher is placed on the glass and a vacuum is established, a continuous flow of slurry circulates from the bucket to the shroud and back to the bucket.

Once the slurry circulation is established, the electric motor of the Polisher/Finer is turned on. The retraction handle allows the polishing pad (or fining disc) to be pulled from or extended onto the glass. The pad or disc is what actually holds the slurry momentarily and forces it against the glass. The Polisher/Finer is manually moved across the scratch. When the polishing or fining action has been completed, the machine motor is turned off, the slurry is drained from the shroud back into the container, and the machine is removed from the glass.

Basics of How the System Works

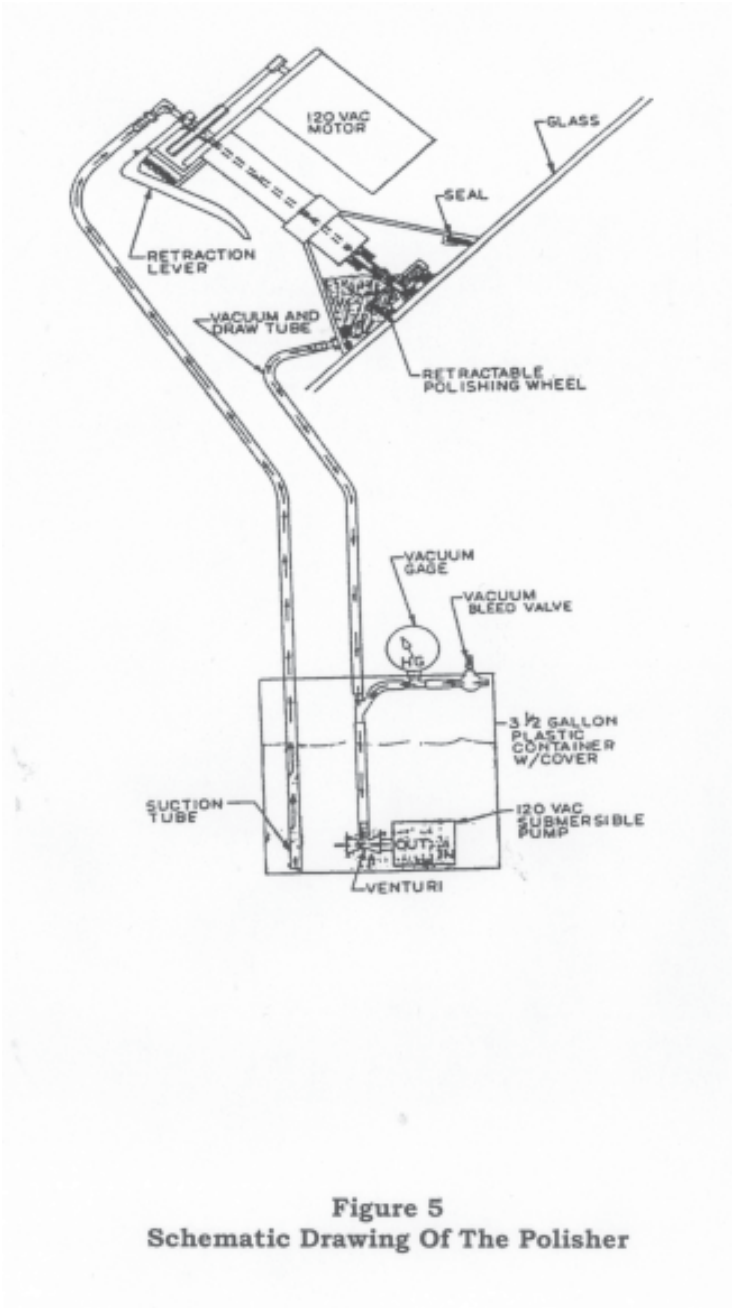


Figure 5
Schematic Drawing Of The Polisher

Chapter 4
Optical Distortion

What is optical distortion? Very simply, it is when the shape of an object does not look the same when viewed through glass (as an example) as it does when looked at directly. Irregularities in the glass surface make the object appear to be distorted or twisted out of shape. The amount of distortion that is acceptable to a customer varies. Some concerns include: how the glass is to be used, replacement price, cosmetics, and the value that the customer might place on the glass.

Curved glass is one example of optical distortion. The location of the curve in the glass will create a thicker or thinner section of the glass. It is at that location that the glass may be distorted. Distortion is a matter of degree. It can range from slight to obvious.

What is “acceptable” distortion? All glass is manufactured to tolerances or limits of distortion. Since no two objects can be made “exactly” identical, this is where the tolerances or limits of distortion come into play.

When a scratch is removed, the difference between what is an acceptable or unacceptable amount of distortion is very subjective and personal. It depends on the scratch location, type of glass, and the replacement cost of the glass.

Feathering

When a scratch is removed, we are, in fact, removing the scratch as well as the area surrounding the scratch. By a technique called “feathering” the edge where the glass is removed, the distortion can be minimized. Feathering refers to a very carefully controlled, gradual removal of glass that blends the original surface of the un-scratched glass with the area where the scratch was located. The transition is very gradual and not noticeable.

Depth of Scratches and Distortion

There is a direct relationship between the depth of the scratch and the distortion that might appear. The deeper the scratch, the more the glass must be removed surrounding the scratched area. The more glass that is removed, the more distortion will be created.

Feathering can minimize and possibly eliminate unacceptable distortion by spreading out the amount of glass removed over a large area. The amount of feathering that can be used is limited, and if the scratch is too deep, the distortion will be noticeable. There is a point where you must decide if it is better to remove the deeper sections of a scratch and create distortion, or whether to prevent distortion by leaving a small amount of the scratch showing.

The amount of distortion is a matter of degree. No matter how slight the scratch, there will be some distortion. However, in most cases, the distortion will not be noticeable to the eye even after a moderately deep scratch is fined and polished, providing the operator has used the correct tools, materials and techniques. See Chapter 7 for proper techniques for using the Glass Restoration system.

Chapter 5
Inspecting the Damage

There are no practical measuring instruments available that will accurately measure the depth of scratches in glass. Generally, scratches that are over 0.001 (one thousandth) of an inch are going to present some slight problems with distortion. A typical medium wiper scratch is often less than 0.0004 (four ten-thousandths) of an inch. Instead of trying to measure these small dimensions, learn to gauge the depth of the scratch with your fingernail. Personal experience will give you the opportunity to inspect many scratches, use the Glass Restoration equipment on them, and observe the results.

There are three main considerations when inspecting the scratch:

1. Depth of the scratch and what may have caused it.

Knowing the cause of the scratch, combined with your sense of touch, gives a more accurate idea of how deep the scratch is. If the scratches were made with a diamond or carbide-tipped tool, the resulting scratch will be very deep. Extensive fining and polishing will be required to remove the scratch and some distortion will be evident. Vandalism also can produce scratches that are similar to the above
Do not confuse the depth of the scratch and its width.

2. How long is the scratch?

A scratch that is thirty inches long obviously will require more time and effort to remove than a six-inch scratch.

3. Location of the scratch?

A scratch on a windshield that is directly in front of a driver, or a scratch on a plate glass window looking out over a parking lot are two examples of where the amount of distortion may be a factor
Curved glass or glass in a large frame adds other challenges to Glass Restoration.

Other considerations include the accessibility of the Glass Restoration equipment to the location of the scratch. These will be discussed in detail later.

The Glass Restoration equipment is not limited to certain types of glass. The following paragraphs cover different types of glass and their properties regarding Glass Restoration.

TEMPERED GLASS

Used in side and rear windows, also some T-tops and sun roofs.

Entry doors and windows of commercial buildings. Surface is up to four times harder than plate glass, thus removing a scratch might be more difficult.

Manufactured with more distortion, so distortion is not as critical.

PLATE GLASS

Used in commercial store fronts, and many other applications. Softer than tempered glass.

Distortion might not be as critical, especially if replacement involves buying new advertisements or burglar alarms.

MIRRORED GLASS

Distortion is often less noticeable due to the small distance that the image travels in the glass.

Mirrored glass is more expensive and the distortion factor may not be as critical.

PLASTIC

Scratch removal on plastic should not be attempted, due to the heat and abrasive characteristics of the scratch removal process.

CURVED GLASS

The Polisher and Finer are designed to operate on moderate curves.

Special techniques that will enable the operator to extend the range of work on curved glass will be discussed in a later section.

DAMAGE OTHER THAN SCRATCHES

Mineral deposits also can be removed from glass with the Glass Restoration system.This type of damage can occur in areas with high mineral content in the water.

Lime deposits that leach out of brick mortar and stain adjacent glass is another example.

Power washing deposits can be removed easily with the Glass Restoration system.

Damage Other Than Scratches (cont)

Aluminum deposits on glass are easily removed. This kind of deposit occurs when one uses an aluminum soda can to scrape off frost, ice, snow, etc. The remaining marks are not scratches, but aluminum deposits on the glass.

Sand Pitting. People often ask about removing the sand pits that occur on windshields from tiny rocks and gravel. **This type of damage is NOT a good prospect for Glass Restoration.** Sand pits vary in depth, often 0.003" to 0.005" deep. An operator would need to remove an exact amount of glass

Acid Etching. Is a process using Hydrofluoric Acid that engravers and art students used to decorate glass. Now becoming so popular with vandals that legislation has been enacted to limit accessibility to the chemical. An acid tagged piece of glass looks like soap scum or raw egg that has dried. The damage usually is easily removed with the polisher depending on the depth of the damage. Fining may be required to remove deeper damaged acid tagged glass.

Welding Splatter. Caused by sparks from the welding process. This type of damage is very deep, needing considerable fining to remove. Considerable distortion is unavoidable when removing this damage.

Chapter 6
Basics of the Glass Restoration Process

Overview of Glass Restoration Process

This chapter will present a general overview of the entire process. Please refer to each of the corresponding chapters for detailed instructions.

Equipment Set-Up

The first step in Glass Restoration is setting up the equipment in a logical and detailed process. If the restoration is being done on a mobile basis, then set-up and tear-down may require more time than actually removing the scratch. The steps to follow are:

1. Plug in electrical cord and the bucket systems.

2. Pre-mix the slurry in the buckets by hand.

3. Turn on the buckets.

4. Protect the surrounding work areas with covers or absorbent materials.

5. Mark the location of the damage on the back side of glass where possible, using a dry erase marker.

6. Prepare the polisher for operation by following these steps:

    - Install the correct pad for the damage or the application to be used.
    - De-glaze the pad, using the wood rasp, if necessary.
    - Check the shroud positioning and adjust if necessary.
    - Remove the Input tube, wipe clean with a towel, inspect tube for damage, if tube is ingood condition, regrease with super lube and reinstall.
    - Connect vacuum, supply, and water lubrication quick connects.
    - Moisten shroud seal and pad.
    - Pressurize the water lubrication tank.

7. Vacuum the polisher onto glass by following these steps:

    - Pull in the retraction handle
    - Close the vacuum release valve. Press the machine lightly to the glass and hold it in place until a vacuum is started

Trial Polishing Test

With each scratch, determine if it requires fining first, or just polishing. To do this, complete a trial polishing test. This test has two purposes:

- Determines if the scratch requires fining.
- Assures the operator that the polisher is working and will remain on the glass, especially if the glass is curved (such as a windshield).

At first, it may be difficult to decide which scratches will polish out and which will require fining. With experience, the operator will become a better judge of fining and polishing needs. As a general guide, scratches caused by vandalism will require both fining and polishing.

Refer to Chapter 7 for specific instructions on completing the trial polishing test and general polisher operating instructions.

Fining the Damage

1. Install new fining disks.
2. Vacuum the finer onto the glass.
3. Pull in the retraction handle, then turn on the finer.
4. Begin moving the finer along the guide lines while slowly releasing retraction handle.
5. Test the finer operation by making one test path on the scratch:
   - Inspect the fining marks after one pass.
   - Look for light, wispy edges.
   - Adjust the finer as necessary for desired path characteristic.
6. When the scratch is “just gone,” stop fining and completely clean off the fining slurry residue.

Polishing Fining Marks

1. Install a flat pad on the polisher.
2. Vacuum the polisher onto glass.
3. Remove the fining marks using correct machine movements. Continue polishing until fining marks and original scratch are removed.

4. Remove the polisher from glass.

Chapter 7
Details of Operating The Polisher

ELECTRICAL CONSIDERATIONS

The electrical components of the Glass Restoration system consist of:

- Ground fault interrupter (GFI)
- Power cord (one each) for the polisher and finer machines
- Electric motor for each machine
- Electric pump in each of the two-bucket systems
- On/off switch on the polisher and finer

Both machines are protected by a switch that will "trip" if excessive amounts of amperage are being used by the machines. It is important to remember the SRP recommendations for polishing amperages (see page 23). If a switch does "trip," there is a 10–15 minute wait or cool down period to re-set the switch.

One advantage of the SRP Glass Restoration System is that it is totally mobile. The equipment will operate with a portable generator that can generate 2400 watts at 120 volts. The pump and the polisher together draw approximately 15 amps.

The bucket systems always **MUST** be plugged into the GFI. The GFI can detect a ground fault in the electrical system and shut off the power before the operator is in danger of being injured.

Before plugging the GFI into an outlet, first test the outlet to see if it is wired correctly. An improperly wired outlet may affect the GFI's ability to function correctly. Purchase a plug-in outlet tester at a local hardware store.

Plug the GFI into the tested outlet, and then plug all equipment into the GFI. The GFI is equipped with a test switch. The switch determines if the unit is operating correctly. Test the GFI each day before using it. The switch is not intended to be used as an on/off switch, and will wear out prematurely if used as such. Use the switch on the outlet box to turn power on and off. When the test button is pressed, the GFI should shut off to indicate that it is working correctly. When the reset button is pressed, the GFI should resume operation.

MIXING THE POLISHING SLURRY

To mix the polishing slurry, follow these steps:

1. Place 2-1/2 gallons of plain tap water into the polishing bucket. The water should be even with the bottom handle reinforcements on the side of the bucket with the pump in the bucket.

   Note: Make sure the bucket has been rinsed thoroughly. Use only water, do not use any detergents.

2. Plug the pump into the GFI. Make sure the pump is properly positioned in the bucket as shown earlier in this manual.

MIXING THE POLISHING SLURRY (CONT)

3. Turn on the pump using the switch on the GFI box. Do not use the reset switch on the plug as an on-off switch for the system.

4. Slowly sift the entire contents of one bag of polishing compound into the bucket.
   - The sifting process should require at least ONE minute to complete.
   - Avoid inhaling the polishing powder dust.

5. Mix the slurry by hand, making sure that all polishing compound is mixed and no lumps remain. Improper or uneven mixing will result in poor polishing efficiency, low pump vacuum, and other operating problems.

6. Turn on the pump using the switch on the GFI box and allow the bucket to continue mixing.

7. The polishing slurry is ready to be used.

Note: If the bucket remains on, the slurry will not require additional hand mixing. If the bucket is turned off for more than 15 minutes, additional hand mixing will be required.

8. **Important note**: The polishing slurry works well under 90 degrees, beyond that temperature the polishing rate decreases drastically. **DO NOT overheat the slurry, doing so will cause inefficient polishing and could damage the equipment.** SRP will not warranty equipment/ parts damaged by overheating.

We recommend using at least two buckets when polishing. When the slurry in one bucket gets hot to the touch, remove the pump and the lid and place them in a pre-mixed, cool bucket. Do not add ice to the slurry as it will dilute the mixture.

Selecting a Polishing Pad

Before using the polisher on the glass, install the correct pad for the application. As a rule:

- **FLAT PAD (DONUT PAD)** Not included in kit. Used for wide area damage because the pad spreads out the polishing action. The flat pad works best for removing fining marks and for general clean-up polishing including deposit removal.
- **DOMED PAD** concentrates the polishing action into a narrower path and is used for removing light to medium, single-line scratches.
- **SOLID FLAT PAD,** much like the donut pad, is used for wide area damage and suggested for inexperienced users. Distortion is less likely using this pad due to its larger surface area.

Note: These are general pad recommendations. There are other conditions when using a specific pad may be recommended.

INSTALLING THE SHROUD SEAL

The steps to install a shroud seal on the polisher are as follows:

1. Turn polisher upside down.

2. Hold the shroud seal between the thumb and forefinger of each hand. Gently pull the seal so that the seal's thickness becomes slightly less.

3. Position the seal in the channel in the shroud, using a tucking motion. Place the seal so that the outside edge of the seal is even with the shroud edge. Do not push the seal down into the channel, let it remain even with, or slightly higher than, the shroud. The seal will seat itself when it is applied to the glass.

4. Continue to pull the seal gently and tuck it into the channel. (See Figure 6).

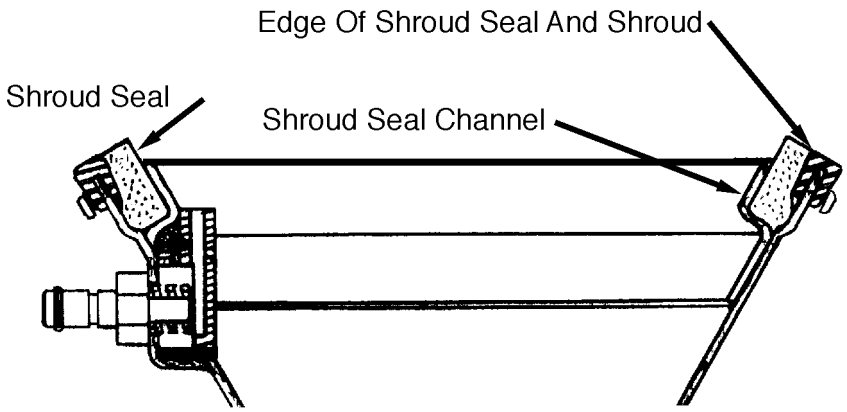


Figure 6
Properly Installed Shroud Seal

5. The finer and polisher seals are made of blended foam and neoprene respectively. Using the blended foam seal when fining and the neoprene seal when polishing will make the polishing and fining process less strenous for the user.

INSTALLING THE POLISHING PAD

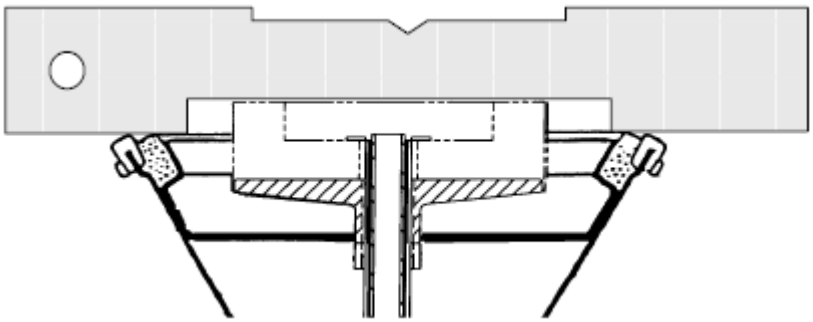
The steps to install a polishing pad on the polisher are as follows:

1. Unplug the polisher from the power source.
2. Remove handle pad.
3. Turn polisher upside down.
4. Loosen the shroud collar clamp with a 3/16" T-handle wrench.
5. Slide the shroud and collar clamp down the quill shaft using a twisting motion (toward the motor).
6. Use your fingers to hold the polishing chuck stationary while turning the polishing pad counter-clockwise with the palm of your hand.
7. Continue turning the pad counter-clockwise until it is finger tight.
   Caution: Do not over-tighten the pad on the chuck.
8. To remove a pad, reverse the installation instructions

Adjusting the Polishing Shroud Height

For the polisher to operate with maximum effectiveness, the pad must be adjusted so it exerts the correct amount of pressure on the abrasive particles in the polishing slurry. Problems will occur if the pressure is either too light or too heavy. Follow theses steps to properly complete the necessary adjustments:

1. Install the polishing pad according to the previous section.
2. Turn out (counter-clockwise) the fine adjustment screw until the flat washer on top of the spring makes contact with the dowel pin that acts as a pivot for the retraction handle.
3. Turn the fine adjustment screw back in (clockwise) three (3) complete turns. This is called “pre-loading” the fine adjustment screw, and will remove all slack from the spring.
4. Loosen the shroud collar clamp and slide the shroud down the quill shaft, toward the motor.
5. Place the height gauge (See Figure 7) on top of two opposite shroud feet; do not rest the height gauge on the shroud seal.



Proper shroud setting using height gauge

- The top of the domed and donut polishing pad should just touch the height gauge. Leave approximately 1/8-1/16" between the top of the solid flat pad and the height gauge if you are drawing excesive amperage (over 12 amps)
- Raise or lower the shroud by twisting the shroud while lifting up or pushing down.
- The vacuum release valve should remain positioned next to the motor housing.

5. Tighten the shroud collar with the 3/16" hex driver. Check the shroud again for proper height and location.

6. **Polishing pad Tips:** It's helpful to deglaze the polishing pads whenever you remove the polisher from the glass. A roughed-up pad will better catch the abrasive in the slurry, making polishing more efficient. Use the wood rasp to deglaze the pads, being careful not to hit the white shroud feet. Remember to keep the slots in the pad open as the pad wears to allow the slurry to circulate through the system. Not doing so can damage the glass and the polishing pad. Make sure when you are opening the slots in the pad that they are cut symetrically and of a uniform depth. Do not wait until the slots are completely gone to cut new ones. Do not cut the slots very deep as you will starve the pad of slurry.

Marking the Scratch

The Glass Restoration process begins by first marking the scratch on the glass. The marking is placed on the opposite side of the glass so the shroud feet and polishing/fining action will not wear off the lines. The lines help the operator guide the finer and polisher along the scratch.

Follow these steps to mark the scratch. Figure 8 shows a properly marked scratch.

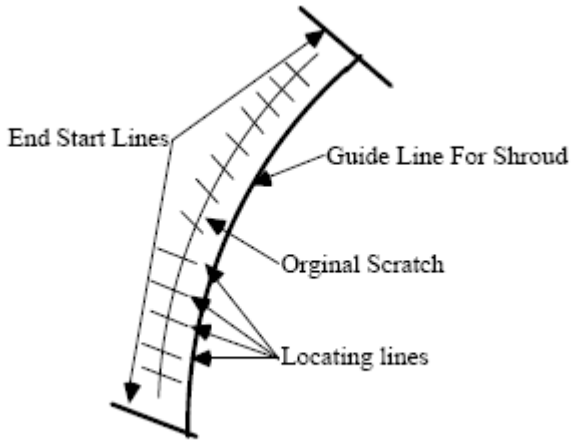


Figure 8
Marked Scratch

1. Locate scratch in the notch of the height gauge.

2. Draw a guide line by moving the height gauge along the path of scratch, keeping the scratch within the locator slot.

3. Draw a straight line across each end of the scratch.

4. Draw short locating lines directly across the scratch at 2-3 inch intervals.

Connect The Slurry Lines

For safety reasons, the slurry lines should be connected before any electrical connections are made. Follow these procedures:

1. Apply a light film of water based lubricant to the O-Rings on the quick-connects on the shroud, input tube, and the two water lubrication assemblies on the shroud. The lubricant will extend the life of the O-Rings

2. With the GFI connected to a properly wired outlet, plug in the polisher bucket and allow the slurry to mix. (SRP recommends that only one bucket at a time be plugged into the GFI. This lowers the power draw through the extension cord to the GFI.) Plug the extension power cord first into the machine pig tail, then into the GFI.

ADJUST THE VACUUM

Proper vacuum adjustment allows the polisher to have the most efficient “force” on the glass. With a stronger vacuum, the polisher will be more difficult to move across the glass. Having a weaker vacuum will allow for easier machine movement, but the machine will tend to break the vacuum more easily and “pop” off. The vacuum that the bucket system is developing can be adjusted at any time. However, the vacuum gauge will only read the available vacuum when the Polisher/Finer is vacuumed on to the glass.

To vacuum the machine onto the glass and make the proper adjustments, follow these steps:

1. Moisten a dry shroud seal with tap water (a spray bottle works well).

2. Pressurize the water lubrication tank, turn on the water valve at the polisher shroud and adjust for proper water flow.

3. Pull in on the retraction handle.

4. Lightly place the shroud on the glass, and rock the polisher very slightly to help the vacuum start.

5. Listen for and watch the slurry flow up from the bucket into the machine and back out through the vacuum line.

6. Push in the white vacuum release valve to close the vacuum.

7. Once the vacuum starts and the shroud fills with slurry, turn on the polisher by pushing down on the on/off switch.

ADJUST THE VACUUM (cont)

8. To adjust the vacuum, turn the vacuum adjustment valve on the bucket top. Turning the valve clockwise will increase the amount of vacuum. Turning it counter-clockwise will lower the vacuum. Recommended vacuum settings are as follows:

In-line polishing with the domed pad	7–8 inches
Deposit removal with the flat pad	6–7 inches
Polishing fining marks with flat pad	9–11 inches

Note: The settings listed above are recommended starting vacuum settings. There are some special operating conditions that may require higher or lower vacuum settings

Adjust the Amperage (Polisher Only)

The proper amperage setting is critical for the polisher to be as efficient as possible. With a too-low amperage setting, the polisher will require much more time to do the required work. A too-high setting will cause harm to the polisher's motor and will distort the glass faster.

The amp meter will **read correctly only** when the polisher is vacuumed to the glass, the retraction handle is released and the machine is moving on the glass. The amperage **can be adjusted** with the retraction handle pulled in or released.

Recommended amperage settings for the various pads and polishing applications are as follows:

Domed pad general use	9 Amps
Solid Flat deposit removal	10 Amps
Solid Flat fining marks removal	11-12 Amps

Note: The settings listed above are recommended starting amperage settings. There are some special operating conditions that may require higher or lower amperage settings.

TRIAL POLISHING TEST/POLISHER OPERATIONS

The trial polishing test is completed to determine whether or not the scratch needs fining, to assure the operator that the polisher is working, and to assure that the polisher will remain on the glass, especially if it is curved glass. **Complete a polishing test on every scratch before proceeding with any further Glass Restoration procedures. Details of the trial polishing test can be found on the next page.**

Trial Polishing Test

To operate the polisher and complete the trial polishing test follow these steps:

1. Install the domed pad on the polisher.
2. Vacuum the polisher onto glass.
3. Start the water lubrication flow.
4. Pull in the retraction handle, then turn on the polisher.
5. Begin moving the polisher along the guide lines while slowly releasing the retraction handle.

Important note: Be sure the machine is moving before the retraction handle is released to prevent the formation of "donut" rings in the glass.

6. Check the amp meter on top the polisher for correct amp draw.
7. Continue moving the machine along the length of the marked guide path.
8. At the end of the damage, and while machine is still moving, slowly pull in the retraction handle. Once the handle is fully retracted, stop moving the machine.
9. Follow steps 5–8 to polish the damage on the return trip back to the original starting point.
10. Repeat steps 5–9 a second time. For a total of four one-way trips or two round trips across the glass.
11. Inspect for damage removal progress:

    - If the damage has significantly improved, continue to use the polisher in the manner described above to remove the damage.
    - If the damage has not significantly improved, stop using the polisher and prepare the finer for operation.

POLISHER MACHINE MOVEMENTS

The polisher is moved in four standard patterns across the glass. The pattern(s) and type of polishing pad used depends on the application.

Keep in mind that the suggested polishing paths, pads, amperage and vacuum settings suggested in the following paragraphs are initial settings. Each job has many different variables to be considered. Factors that can affect these recommendations are: location of the scratch, depth of the scratch and type of glass surface.

In-Line Pattern (See Figure 9). The polisher is moved directly over and in the same direction as the scratch. This pattern is used for the polishing test and for general light scratch removal. Continuous direct passes over a scratch can cause distortion however.

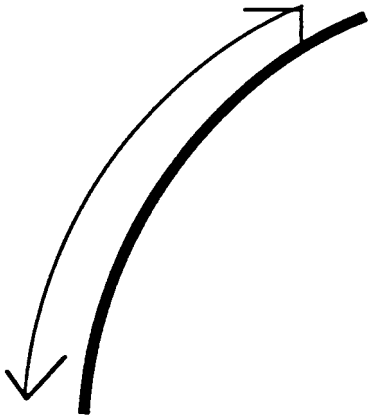


Figure 9
In-Line Pattern

POLISHER MACHINE MOVEMENTS

Oval Pattern (See Figure 10). The polisher is moved in continuous overlapping circles or ovals along the scratch length. The oval pattern is used most often to remove fining marks and is an alternative to the zig-zag pattern. Typically, use a flat pad with an initial setting of 11-12 amps and a vacuum reading of 9-11 inches. Note the size of the overlapping ovals. Note that the shroud is moved off the fined path on each side of the scratch or fining marks. This ensures an even polishing of the fined path.

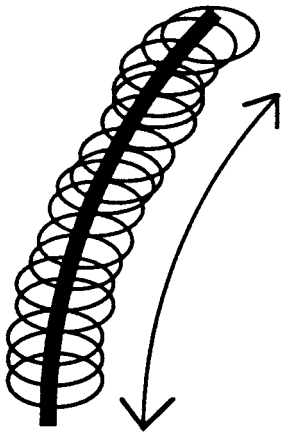


Figure 10
Oval Pattern

Zig-Zag Pattern (See Figure 11). The polisher is moved across the scratch with sharp alternating turns. This pattern is used most often to remove fining marks and is an alternative to the oval pattern. Some operators feel that this pattern is easier to use than the oval polishing pattern on some applications, 11–12 amps and vacuum reading of 9–11 inches.

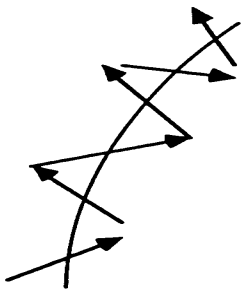


Figure 11
Zig-Zag Pattern

POLISHER MACHINE MOVEMENTS

Cross-Hatch Pattern ((See Figure 12). The polisher is moved in intersecting parallel lines, both horizontally and vertically. It is used most often to remove very wide and shallow types of damage such as aluminum deposits, or doing a “super cleaning” of glass surfaces. The advantage of this pattern is that the polishing effect is spread out, and done correctly, the polishing is even over the entire surface of the glass. Typically, use a flat pad with an initial amperage setting of 8–9 amps, and a vacuum reading of 6–7 inches.

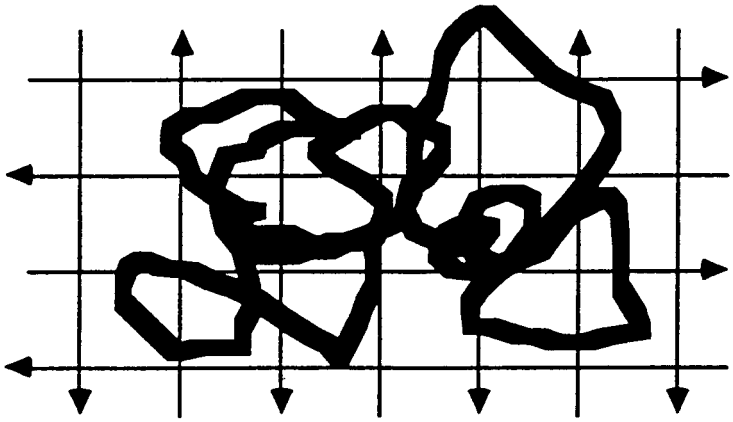


Figure 12
Cross-Hatch Pattern

INSPECT THE POLISHING PROGRESS

Inspection is the single most important aspect of scratch removal. An accurate first inspection assists in determining the correct pad, polishing path, amperage and vacuum setting. Once the polish process is started, inspection becomes even more critical. Glass Restoration works by removing glass. If too much glass is removed in one area, there is no way to repair the damage. It is as simple as that.

As a rule, **never** polish more than 10 passes or 5 round trips before moving the polisher off the scratch and looking at the progress made. **Always dry the glass** completely before inspecting.

REMOVE THE POLISHER FROM THE GLASS

To remove the polisher from the glass for inspection or when the Glass Restoration is done, follow these steps:

1. Pull in the retraction handle.

2. Turn off the polisher.

3. Continue to hold in the retraction handle in to keep the polisher vacuumed onto the glass while rotating the polisher so that the white quick connect is in a down position. This helps the slurry drain more completely from the shroud.

4. Lift up on the white vacuum release valve on the shroud.

5. Continue to hold the polisher on the glass until the majority of the slurry has been pulled from the shroud back to the bucket.

6. Tilt the top of the machine away from the glass while keeping the bottom edge of the shroud against the glass.

7. Lift the polisher off the glass and release the retraction handle.

8. Wipe the glass dry for inspection.

Techniques To Help Move The Polisher Across The Glass

Water Lubrication System:

Use the water lubrication system and monitor the amount and area where the water is actually contacting. After vacuuming the polisher onto the glass and before turning the motor on, slide the polisher across the area you'll be working on to drip water on the whole area. This helps the machine glide across the glass. An on-demand water lubrication system is an available option. (P/N 9050) Glass Glide, a water additive, helps reduce seal drag making polishing easier (P/N 9063)

Leverage:

While working it is best to be slightly higher than the machine to take advantage of leverage. Pushing is usually easier than pulling.

Polish In One Direction:

If desired; polish only while pushing the machine away from you, and retract the pad while pulling that machine toward you.

Gravity:

When working on vertically mounted glass, use gravity to your benefit. It is easier to pull in the retraction handle and pull the machine up than to polish going up.

Techniques To Help Move The Polisher Across The Glass (cont)

Speed and Shape:

Move the machine at a comfortable, relaxed pace. Moving too fast requires extra effort, and can create “chatter” and vibration. A smooth constant pattern and speed of machine movement will help.

Center of Gravity:

Holding the machine as low as possible lowers the machine’s center of gravity, and minimizes tipping the machine and breaking the vacuum seal.

Helpful Techniques For Curved Glass

- **Decrease the amp setting.** By reducing the amperage one to two amps, the polisher will not be pushing with as much force against the glass. Note: As you decrease the amperage, the system is less efficient. A one to two amp reduction drastically reduces polishing effectiveness.

- **Increase the vacuum setting.** The vacuum can be increased as much as you wish; however, the polisher will be harder to move across the glass. Increasing the water lubrication flow may help make the machine easier to move.

- **Use a new shroud seal.** You may want to try using a new shroud seal, or place an O-Ring under the seal in the seal channel to extend the seal slightly. Extending the seal using a piece of 12 guage wire under the shroud may help the machine hold vacuum over sharper curves.

- **“Ride the clutch.”** This is the ONLY time! By very slightly pulling in on the retraction handle, the pressure on the glass will be reduced. This allows the operator to go over sharper curves. Use this technique only on curved glass!

- **Flexible Shroud.** Is not included with the Glass restoration kit but is available for purchase through SRP. This Shroud is specially designed to negotiate extremely curved glass. Following the directions above, simply squeeze or “flex” the wide part of the shroud when you reach a curve.

Chapter 8
Polisher Edge Shroud

The Edge Shroud was specifically designed to allow operation of the polisher closer to the edge of the glass, generally within 3/8" of the edge. The edge shroud is NOT part of the basic Glass Restoration system; it is an optional shroud. While this shroud was designed to allow you to work closer to the frame, it will work in other applications as well. You may want to use this shroud only when it is important to get to the edge, or you may want to use it all the time. When positioning the edge shroud on the polisher, it is recommended that the vacuum release valve be located next to the motor casing.

INSTALLATION:

Follow standard methods for removing the shroud from the polisher. Remove the polishing chuck, reverse the procedure to install this shroud. (Exercise care to not damage the o-ring located under the shroud of the quill shaft when removing and installing the edge shroud). Lubricate the quill shaft o-ring with a very small amount of water based lubricant. The Edge Shroud uses the same shroud seals as the standard shrouds. Refer to the previous chapter for shroud seal installation procedures.

MACHINE MOVEMENTS:

For optimum results in getting close to an edge, use the solid flat pad. When using the solid flat pad, it is recommended that a circular or oval polishing pattern be used.

You will notice some differences in movements between the edge shroud and the standard one. Movements in-line (parallel) with the “cut” edge are easier to perform than when the shroud is moved across (perpendicular) the “cut” edge. You may want to experiment with moving the polisher in different directions to discover which works best for you. Take care when pushing the shroud with the “cut” edge first. The shroud seal may “roll over” and become entangled in the polishing pad or chuck. Many operators will polish in one direction only by retracting the pad with the handle and sliding the polisher back to the origin without polishing. (See Figure 13).

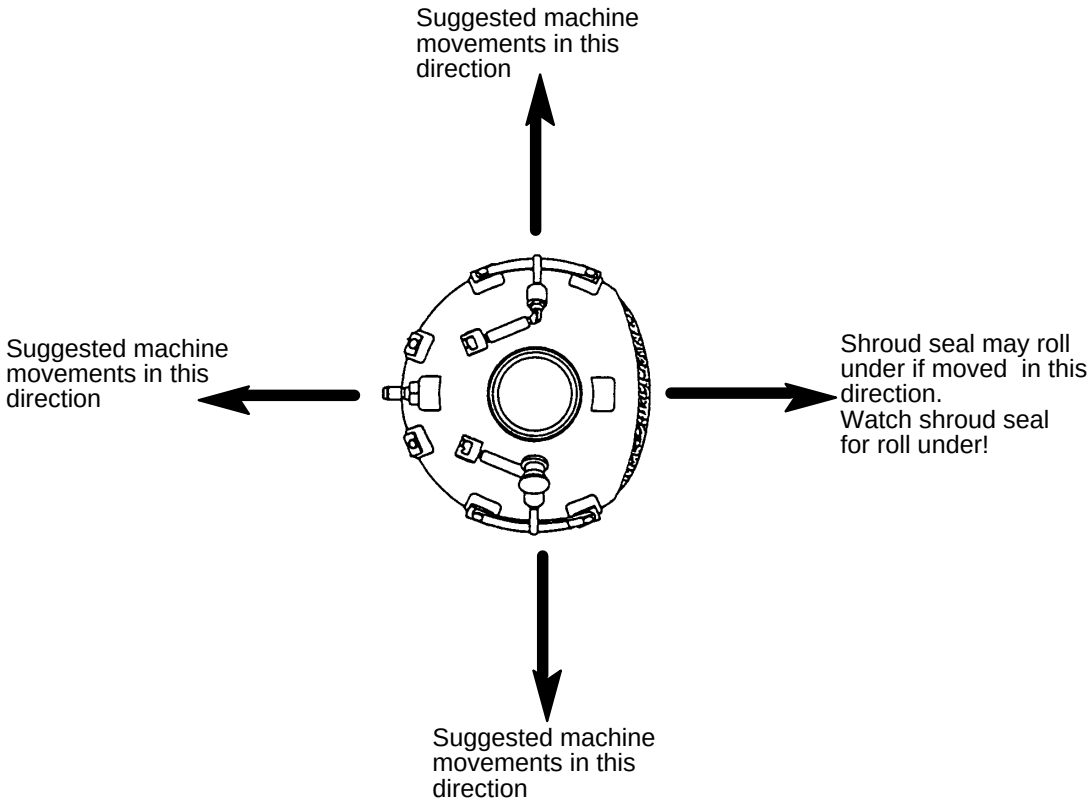


Figure 13
Suggested Polisher Movements
When Using Edge Shroud

Wearguard:

There is a white wearguard located inside the shroud. The purpose of this wearguard is to protect the shroud from the polishing chuck. The wearguard is attached to the shroud by two white plastic rivets. Check the condition of the wearguard each time the polisher is removed from the glass. When it gets very thin, it must be replaced. Failure to replace a worn guard will allow the polishing chuck to “wear” away the shroud. When replacing the wearguard, follow these steps:

Polisher Edge Shroud (cont)

1. Lift the shroud seal to expose the two white plastic rivets.

2. Using your fingernail or thin steel blade, pry the rivet head up and out of the rivet body. Remove just the rivet head and NOT the rivet body.

3. Push the rivet body up and out of the shroud.

4. Repeat the procedure for the other rivet then remove the worn wearguard. Discard the used plastic rivets; use the new rivets that are included with the new wearguard.

5. To reinstall the plastic rivets, place the body in the hole. Place the rivet head into the body and push the head down until it is seated on top of the body. Repeat this procedure on both rivets.

6. Replace the shroud seal.

7. Test the polisher's vacuum. If a vacuum problem exists, check the wearguard mounting and shroud seal.

8. See Chapter 10 for information on the SRP Surface Wizard.

Chapter 9
Details of Operating the Finer

ELECTRICAL CONSIDERATIONS

Same as with the polisher. Refer to Chapter 7

MIXING THE FINING SLURRY

Same as with the polisher. Refer to Chapter 7.

HOW THE FINER WORKS

The Finer works by moving an abrasive compound (slurry) over the glass by means of consumable metal alloy disks that work in a totally random orbital pattern. This random pattern creates a frosted appearance on the glass. It produces a feathering effect with a deeper cut in the center of the pattern, and a lighter cut on the edges. This feathering allows deeper scratches to be removed with minimal distortion.

The fining disks remove a wider section of the glass surface at a faster rate than the polishing pads. If only the polisher is used to remove deeper scratches, there may be unacceptable distortion. Because the finer spreads out the glass removal, it reduces the amount of unacceptable distortion. **It is important to understand, however, that using the finer will not necessarily eliminate unacceptable distortion.**

The Fining Process-

For the most aggressive scratches only, such as graffiti caused by a hardened metal scribe, using three separate slurry buckets consisting of Pre-fining compound (P/N 8899) Ultra Fine compound (P/N 9065) and then Polishing compound (P/N 9040) can reduce glass restoration time significantly.

Step 1: Using the Finer with the Pre-fining compound, the most aggressive compound, in one slurry bucket, fine the damage until it is just gone. This will leave the glass with a heavy frosted appearance. Inspect the damage after several passes. Make sure the glass is dry when inspecting a fined area. The damage must be removed at this stage, as the Ultra Fine Compound is not aggressive enough to remove heavy damage. A third bucket and Pre-fining compound are sold separately and are available for purchase through SRP.

Step 2: After the damage has been removed with the Pre-fining compound, thoroughly clean the area. Next, using the Ultra Fine fining compound and a separate slurry bucket, continue to work the pre-fined area with slightly overlapping passes with the Finer. The Ultra Fine compound is slightly less aggressive than the Pre-fining compound and will restore some luster to the glass. The glass will remain slightly frosted when finished fining with Ultra Fine, however. Using this intermediate step between the Pre-fining and polishing step has shown a significant reduction in overall glass restoration time.

Step 3: Final Polish. Once the glass has a light frosted appearance from the Ultra Fine Fining process, clean the glass thoroughly and begin polishing out the haze using the polisher and a third slurry bucket containing polishing compound. Polish the fined area until the glass is restored to its full sheen. Depending on the depth of the original damage, the glass will most likely have slight distortion after the Fining and Polishing processes. Dedicate one bucket for Pre-fining, one for Ultra Fine and another for polishing only. **Do not contaminate slurry containers.**

INSTALLING THE FINING DISKS

It is recommended that the fining disks be replaced with each fining job. As the disks wear away, their cutting action is reduced significantly. New disks on each job will assure the operator of even, consistant machine operation.

To replace the fining disks, follow these steps:

1. Lift up on an edge of the worn disks and gently peel it from the orbiter pads.
2. Clean the Mylar face of the orbiter pads with isopropyl alcohol.
3. Peel off the white paper backing from a new disk. The disks have a self-adhesive backing.
4. Position the new disks on the orbiter pads making sure that the disks are centered on the pad. Press the disks on securely.

REPLACING THE ORBITER PADS

The orbiter pads connect the fining disks to the finer. The orbiter pads do not require replacement as often as the fining disks. The pads must be replaced when their Mylar face begins to deteriorate, or when the pads lose their ability to return to their original shape.

To replace the orbiter pads, follow these steps:

1. Peel the old padsfrom the orbiter.
2. Wipe off the face of the cup with isopropyl alcohol.
3. Peel off the white paper backing from a new pad. The pad has a self-adhesive backing.
4. Position the new pads on the orbiter, making sure the outer edge of the pad lines up with the outer edge of the orbiter. Press the pads on securely.

INSTALLING THE SHROUD SEAL

The steps to install a shroud seal on the finer are as follows:

1. Turn finer upside down.

2. Hold the shroud seal between the thumb and forefinger of each hand. Gently pull the seal so that the seal's thickness becomes slightly less.

3. Position the seal in the channel in the shroud, using a tucking motion. Place the seal so that the outside edge of the seal is even with the shroud edge. Do not push the seal down into the channel, let it remain even with, or slightly higher than, the shroud. The seal will seat itself when it is applied to the glass.

4. Continue to pull the seal gently and tuck it into the channel. (See Figure 14).

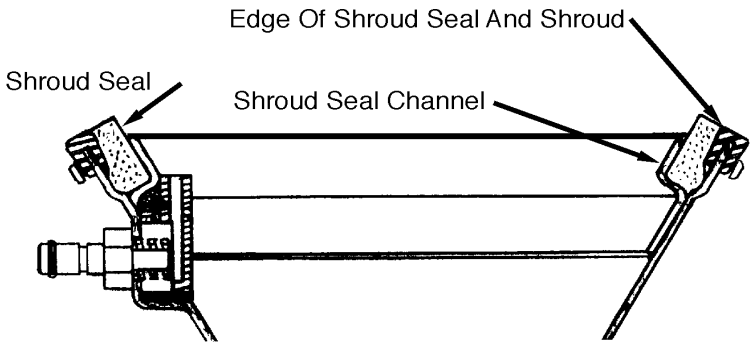


Figure 14
Properly Installed Shroud Seal

CONNECTING THE SLURRY AND ELECTRICAL LINES

For safety reasons, the slurry lines should be connected before any electrical connections are made. Follow these procedures:

1. Apply a light film of Super Lube to the O-Rings on the quick-connects on the shroud. The lubricant will extend the life of the O-Rings.

2. With the GFI connected to a properly wired outlet, plug in the finer bucket and allow the slurry to mix. (SRP recommends that only one bucket at a time be plugged into the GFI. This lowers the power draw through the extension cord to the GFI.) Plug the power cord first into the machine pig tail, then into the GFI.

ADJUSTING THE VACUUM

Proper vacuum adjustment allows the finer to have the most efficient “force” on the glass. With a stronger vacuum, the finer will be more difficult to move across the glass. Having a weaker vacuum will allow for easier machine movement, but the machine will tend to break the vacuum more easily and “pop” off the glass.

To vacuum the machine onto the glass and make the proper adjustments, follow these steps:

1. Moisten a dry shroud seal with tap water (a spray bottle works well).
2. Push in the white vacuum release valve to close the vacuum.
3. Pull in on the retraction handle.
4. Lightly place the shroud on the glass, and rock the finer very slightly to help the vacuum start.
5. Depress the vacuum release valve to start the flow of slurry.
6. Listen for and watch the slurry flow up from the bucket into the machine and back out through the vacuum line..
7. Once the vacuum starts and the shroud fills with slurry, turn on the finer by pushing down on the on/off switch. Keep the handle retracted.
8. To adjust the vacuum, turn the vacuum adjustment valve on the bucket top. Turning the valve clockwise will increase the amount of vacuum. Turning it counter-clockwise will lower the vacuum. The recommended vacuum setting for the finer is 5–7 inches.

Note: The setting listed above is the recommended starting vacuum setting. There are some special operating conditions that may require a higher or lower vacuum setting.

ADJUSTING THE FINER SHROUD

In general, the finer requires more precise adjustments than does the polisher. The finer adjustments will require more time, but are not required as often as with the polisher. Finer adjustments are required only after the tear-down maintenance procedures. Minor compression spring adjustments will be required on every different fining job.

For the finer to operate with maximum efficiency, the disks must be adjusted so they exert the correct amount of pressure on the abrasive particles in the fining slurry. Problems will occur if the pressure is either too light or too heavy. Follow these steps to properly complete the necessary adjustments:

1. Install the fining disks according to the previous section.
2. Turn out (counter-clockwise) the fine adjustment screw until the flat washer on top of the compression spring makes contact with the dowel pin that acts as a pivot for the retraction handle.
3. Turn the fine adjustment screw back in (clockwise) three (3) complete turns. This pre-loading step removes all slack from the spring.

ADJUSTING THE FINER SHROUD

4. Remove the handle pad and loosen the shroud collar clamp and slide the shroud down the quill shaft, toward the handle.

5. Place the height gauge (See Figure 15) on top of two opposite shroud feet; do not rest the height gauge on the shroud seal.

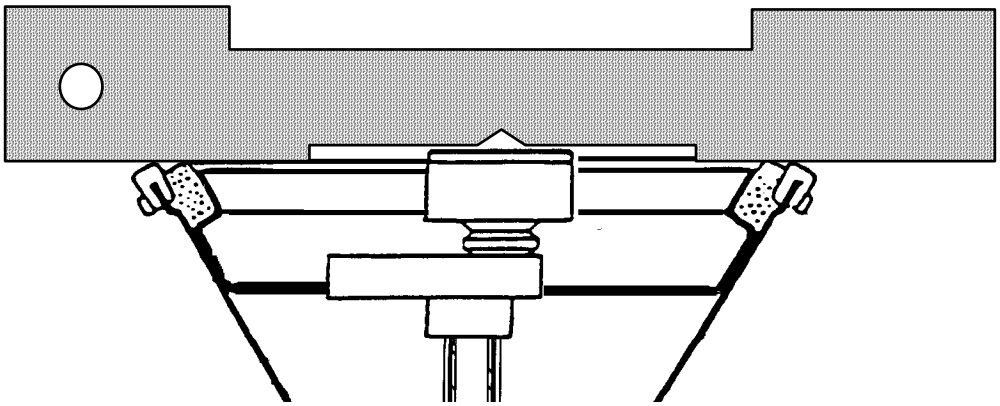


Figure 15
Height Adjustment Gauge

Note:

- The middle of one of the orbiter pads should align with the height gauge.
- Position the orbiter pads by raising or lowering the shroud by twisting the shroud while lifting up or pushing down.
- The vacuum release valve should remain positioned next to the motor housing.

6. Tighten the shroud collar with the 3/16” hex driver. Check the orbitor pads again for proper alignment.

ADJUSTING THE "LOAD" AND COMPLETING THE FINER TEST

"Load" refers to the amount of pressure on the compression spring that determines how much work the fining disks and slurry accomplish. To adjust the load, a test pass must be made on the damage, inspected, and adjustments made as needed. The test ensures that the finer is producing the correct fining path on the glass. **Complete a fining test on every scratch before proceeding with any further Glass Restoration procedures.**

To adjust the load and complete the fining test follow these steps:

1. Install new fining disks (and orbiter pads, if necessary).

2. Vacuum the finer onto glass.

3. Pull in the retraction handle, then turn on the finer.

4. Begin moving the finer along the guide lines while slowly releasing the retraction handle. Be sure the machine is moving before the retraction handle is released to prevent too much fining in one spot.

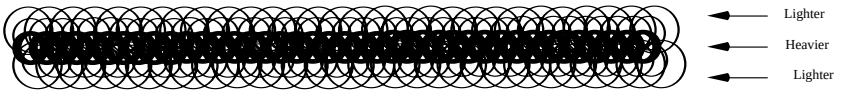
    - Be sure the finer is moved in-line with the scratch and that the edge of the shroud is kept on the guide line.

    - Move the finer in a slow even pace across the glass.

5. At the end of the damage, and while machine is still moving, slowly pull in the retraction handle. Once the handle is fully retracted, stop moving the machine. Be sure the machine is still moving as the retraction handle is pulled in to prevent too much fining in one spot.

6. Wipe the fining path dry. Any moisture will hide the fining marks.

7. Inspect the fining test results. The fining path should have a fairly solid, opaque-frosted center with lighter, wispy edges. (See Figure 16).



Example Of A Properly Fined Single Line Scratch First Pass
Note: Heavier Fined Area In Center of Path And Lighter Fining Marks Towards The Outer Edges Center Path is Nearly Solid Outer Edges Are "Light & Whispy"

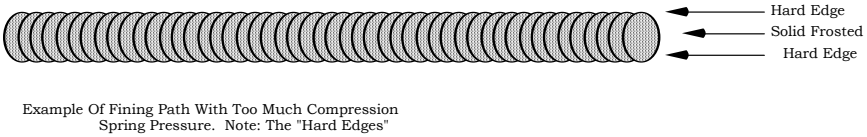
See Figure 16
Properly Adjusted Fining Path

ADJUSTING THE "LOAD" AND COMPLETING THE FINER TEST

- Figure 16 is an example of a properly fined single line scratch after the first pass. Note the heavier fined area in the center of the path and the lighter fining marks toward the outer edges. The center path is nearly solid and outer edges are light and wispy.

- If the fined path lacks a fairly opaque center, the fining is too light. Turn the fine adjustment screw in (clockwise) 1/2 turn. (Screw adjustments are made in increments of 1/2 turns.)

- If the fined path has a solid opaque center and/or lacks the wispy edges the fining is too heavy. Turn the fine adjustment screw out (counter-clockwise) 1/2 turn. (Screw adjustments are made in increments of 1/2 turns.) (See Figure 17).



Example Of Fining Path With Too Much Compression Spring Pressure. Note: The "Hard Edges"

Figure 17
Improperly Adjusted Fining Path

- Figure 11 is an example of a improperly fined single line scratch after the first pass. Note the "hard edges."

FINER MACHINE MOVEMENTS

For most scratches, the finer is moved in-line with the damage. If the damage is very wide (wider than 2 inches) or has a very irregular shape, move the finer in an oval pattern.

Inspecting the Fining Progress

Continue fining and inspecting the damaged area until it is barely visible. Not all areas of a damage will be the same depth. As a rule, fine until 90% of the damage is barely visible. If the remaining 10% is still very visible, continue to fine those selected areas. If the damage is not fined enough, additional polishing time is needed and may create unacceptable distortion. **The customer must understand the potential for distortion when removing deeper scratches.**

Watch for these points at each inspection:

- Wipe the fining path dry before each inspection.
- A scratch should remain in the middle of the fining path.
- The fining path should extend only slightly beyond the end of a scratch.
- The fining path for a scratch should be no wider than the fining disk (slightly less than 2 inches). If the path is wider, the finer is not following the guide lines close enough.
- The fining path should maintain light, wispy edges. If there is a solid transition line from the fining path to clear glass, there is too heavy a load on the fining disk, back off the fine adjustment screw located on the retraction handle.

Removing the Finer from Glass

To remove the finer from the glass for inspection or when the fining is complete, follow these steps:

1. Pull in the retraction handle.
2. Turn off the finer.
3. Continue to hold the retraction handle in to keep the finer vacuumed onto the glass. Rotate the finer so that the white quick connect on the shroud is in a down position. This helps the slurry drain more completely from the shroud.
4. Lift up gently on the white vacuum release valve on the shroud.
5. Continue to hold the finer on the glass until the majority of the slurry has been pulled from the shroud back to the bucket.
6. Tilt the top of the machine away from the glass while keeping the bottom edge of the shroud against the glass.
7. Lift the finer off the glass and release the retraction handle.
8. Wipe the glass dry for inspection.

Polishing Out Fining Marks

Once you are confident you have the scratch or other damage out with the finer then you are ready to restore the original glass luster, by using the polisher. However, make sure that the scratch or other damage has been completely removed before using the polisher. Inspect the fined area dry, and from several different angles to make sure the damage has been removed. If portions of the damage are left, excessive amount of polishing will be needed to then completely remove the damage. This excessive polishing will create additional distortion. **It is advisable to fine a little more than not enough.** Polish the fined area(s) using the solid flat pad with an oval or zig-zag motion. Refer to Chapter 7 for detailed instructions on use of the polisher.

Chapter 10
Surface Wizard

This chapter will introduce the Surface Wizard System. This system has been designed to supplement the standard polisher and finer and is **NOT** to be used in place of the polisher and/or finer.

PURPOSE:

The primary purpose of the Surface Wizard is to assist in polishing scratches where the standard polisher will not reach. The Edge Shroud reduces the amount of the scratch that cannot be polished with the standard shroud, by allowing you to work to within 1/2" of the edge of the glass. With the Surface Wizard, you can reach the very edge of the scratch, regardless of the frame that is holding the glass. Other uses of the Surface Wizard Include polishing sections of glass which are highly curved, on which the polisher will not hold a vacuum and if the scratch is located very close to the edge of the glass.

This system **is not** intended for use as a Glass Restoration system in place of the polisher and the finer. It does not have the required capabilities of the standard polisher or finer. Therefore, it is not practical for removing the entire length of scratches. It is intended to remove the last inch or so of a scratch.

SYSTEM COMPONENTS:

See Surface Wizard Operations Manual for Operating Instructions and Component list.

Chapter 11
Equipment Maintenance

Maintenance Schedules

This chapter covers the routine maintenance of the SRP Glass Restoration System, including the polisher, finer, buckets and water-lubrication system. The timetables for the maintenance procedures will vary with the amount of equipment use. There are two types of maintenance procedures:

- Daily inspection, cleaning and maintenance
- Tear-down maintenance for the finer and polisher

If the polisher is used daily, a complete tear-down and inspection should be done every seven to ten days. If the machines are used one to three times a week, a four-to-six week maintenance schedule should be adequate. It is not necessary to inspect both the polisher and finer at each maintenance session. The finer machine should be maintained every other time the polisher is maintained, due to the lower use of the finer.

Tear-down maintenance procedures are performed as routine, preventive maintenance. Such maintenance locates a potential problem **before** it has a chance to cause a serious breakdown of the system on the job site.

The polisher and the finer share many of the same parts. Therefore, the maintenance procedures are very similar. The differences are noted in the following paragraphs.

DAILY INSPECTION, CLEANING AND MAINTENANCE

Polisher and Finer:

After the last Glass Restoration job of the day, wipe off the machines and inspect the following areas for any obvious wear:

- Quick-connect O-rings.
- Polishing pad and fining orbiter pad condition.
- Finer: check the bearing free play on the orbiter assembly.
- Vacuum Release Grommet (PN 8156): It will wear from normal use which may result in a vacuum leak. Inspect for wear or weak spots. If in doubt, replace the grommet. Lubricating the grommet with Superlube periodically can increase its lifespan.

Shroud:

Shroud Feet: These 8 white feet contact and slide across the glass. Under normal use they wear out.

- Inspect them for wear to prevent the shroud from contacting the glass. Always replace the 8 feet as a complete set. The shroud is constructed from ABS plastic that will scratch glass.
- Do not allow the shroud feet to touch the ground. They may pick up sand or other debris that will scratch the glass.
- Check for tiny hairline cracks where the white feet fit into the shroud, and for other cracks. With extended use, the shroud may break at the hairline cracks causing a loss of vacuum.

Shroud Seal: Check for wear, nicks and tears.

Shroud Distortion: The shroud can soften and distort when excessively hot (over 170° F) slurry is used. **In actual use, slurry should never reach such temperatures!** Monitor the slurry temperature. If it is too hot to keep a hand in, allow it to cool. To cool the bucket, keep open the lid to help the heat to dissipate. On large jobs, use two slurry buckets and alternate between them to avoid too hot slurry temperatures.

There are two possible areas where shroud distortion might occur:

- The “neck” between where the shroud clamp is located and where the shroud expands into its cone shape. Distortion appears as a wrinkled and almost cracked-looking ridge instead of a smooth transition.

  To check the shroud for distortion: (1) remove the pad from the chuck; (2) adjust the shroud slightly downward so the chuck extends past the shroud edge; (3) lay a straight edge across the chuck; (4) compare the levelness of the chuck to the levelness of the shroud. Even a slight amount of variation can result in an improper polishing path and excessive machine vibration. Replace the shroud as necessary.

- The inside lip of the “channel” into which the shroud seal fits. Visually inspect this “channel” for distortion.

Slurry Buckets:

Look inside each bucket to insure the water level is up to the bottom of the handle reinforcements, (approx. 2 gallons) and that the slurry concentration has not become too thick. Some water and/or slurry loss occurs when removing the polisher or finer from the glass and through heat evaporation. Some water can be added to the buckets, but adding water will reduce the concentration of the polishing or fining compound in the mixture. This results in extended polishing or fining time. If in doubt about how much water to add, mix a new batch of slurry. Visually inspect the hoses and connections to catch potential problems. If the bucket(s) have given any problems during the day, correct the problem before they are used again.

Water Lubrication System:

On daily basis, release the air pressure to help extend the lifespan of the seals and valves.

A water tank repair kit (P/N 8773) is available for the water lubrication system. This kit contains all the necessary seals and valves to maintain this system. All the seals should be replaced when the water tank first shows signs of not building pressure fast enough, or when the water tank leaks around the seals.

TEAR-DOWN MAINTENANCE GENERAL INFORMATION

Tear-down maintenance involves in-depth procedures to inspect critical wear points on the machines, and remove and replace those components that appear to be worn. These procedures also help the operator become more familiar with the working components of the equipment, and catch little problems before they become larger problems.
Before any maintenance work is performed, have a clear and clean space available to work. In addition, all of the following tools and replacement parts/supplies are necessary :

Tools	Parts/Supplies
Straight Slotted Screwdriver	630 AA Lubriplate Grease (Super Lube)
3/8" Open-End Wrench	Cotton Swabs Water Based Lubricant (PN 1720)
1/2" Open-End Wrench	*Drive Shaft Seal (PN 8872)
5/32" T-Handle Hex Wrench	*Quill Housing O-Ring, (PN 8464)
3/16" T-Handle Hex Wrench	*Shaft Seal (PN 8018) *Drive Belt (PN 8005)

* *Required only if replacing the part. Keep extra on hand to prevent down time.*

LOWER-END TEAR-DOWN PROCEDURES

The lower-end procedures focus on cleaning, inspecting and lubricating the seals on the lower-end of the polisher and finer.

Polisher Pad/Chuck or Finer Orbiter Removal:

1. Unplug the polisher/finer from the power source.
2. Polisher only: squeeze the retainer clip together and remove the extended input shaft.
3. Place the polisher/finer on table with the pad or orbiter pointing up.
4. Remove the handle pad.
5. Loosen the shroud collar clamp using a 3/16" T-handle wrench.
6. Slide shroud all the way up toward the polishing chuck, until the black O-ring is visible.
7. Lubricate black O-ring using Super Lube Lubricant to allow for easier removal of the shroud.
8. Move the shroud down the quill shaft by gently twisting the shroud back and forth until it contacts the motor canister.

LOWER-END TEAR-DOWN PROCEDURES

Polisher Only:

9. Remove the polishing pad, if present.

10. Remove the polishing chuck by placing a 1/2" open-end wrench on the jam nut. Turn the polishing chuck off by hand (remember: left-handed threads turn clockwise).

11. Remove the jam nut by placing a 3/8" open-end wrench on the ground flats located just below the jam nut. Place the 1/2" open-end wrench on the jam nut, hold the wrench on the drive shaft, and turn (clockwise) to remove the jam nut from the shaft.

Finer Only:

12. Remove the orbiter by placing a 1/2" open-end wrench on the back of the orbiter and a 3/8" open-end wrench on the ground flats located just below the orbiter assembly. Hold the drive shaft stationary and turn the orbiter assembly clockwise off the shaft.

13. Inspect the fining orbiter by rotating the fining disk. If the disk does not easily rotate, or if there is excessive side play, then the orbiter assembly should be replaced. Some side play is desirable and necessary for the fining disk to operate properly.

Polisher and Finer:

14. Remove the shroud by using a slight twisting motion and pulling up. Use the super lube on the black O-ring located under shroud collar to allow for easier shroud removal.

Shaft Seal Removal:

1. Open the spring clamp on the drive shaft seal using pliers. Remove the seal and the clamp together.

2. Inspect the drive shaft seal for any nicks, cuts, or wear patterns.

3. Using a small straight slot screwdriver remove the circular spring located on the shaft seal.

4. Using the small straight slot screwdriver remove the drive shaft seal by prying up around the perimeter of the outer edge of the seal.

5. Remove the drive shaft seal and clean the drive shaft seal by wiping it with a paper towel. Inspect the drive shaft seal surfaces for any cuts or nicks. Replace if necessary.

6. Wipe the recess between the quill shaft and drive shaft with a paper towel. It is not necessary to completely remove all traces of old grease.

Lubrication and Assembly (Polisher and Finer):

1. Place the shaft seal washer over the drive shaft and push the washer down.

2. Apply additional 630 AA (Super Lube) grease if needed.

Quill Shaft and Drive Shaft Maintenance:

Note: Refer to the Figure 21, for the following maintenance items.

1. Remove the shroud by lifting it up with a slight twisting motion. The collar clamp should come with the shroud.

2. Remove the small jam nut. Use a 3/8-inch open-ended wrench and a 1/2-inch open-ended wrench. Place the 3/8" wrench on the milled slots and the 1/2" wrench on the jam nut. Once loosened, remove the nut by hand.

3. Inspect the jam nut. Notice the threads are ground off on half of the nut. This portion goes on the shaft first.

4. Now remove the drive shaft seal. Using a pair of pliers, grab the snap clamp and lift up. The clamp may separate from the seal. As soon as the seal is cleared, release the pliers.

5. Remove the seal from the shaft.

6. Inspect and lubricate the drive shaft seal.

7. Remove the small metal spring that encircles the drive shaft. Place a screwdriver in the margin and lift up on the small round spring and move it out of the way. It will be removed and reinstalled later.

8. Remove the inner seal. Place a screwdriver against the edge of the seal and gently work it around the seal to remove it. Inspect the seal

9. Remove most of the old grease with a cotton swab.

10. Place new grease in the area between the two seals. A small fillet of grease between the two seals, next to the drive seal, is all that is required.

11. Re-install the seal with the recessed end positioned on top (the other end is flat). Place it on the drive shaft and push it down all the way down so it is completely seated on the bottom.

12. Clean the recess in the drive shaft seal between the two molded O-rings. Then apply a small bead of new grease between the O-rings.

13. Re-install with the molded O-ring side on the top. Push it down all the way down.

Quill Shaft and Drive Shaft Maintenance (cont):

14. Position the snap clamp on the drive shaft. Grab the clamp with a pliers and slide the clamp all the way down to the bottom of the drive shaft seal. Leave 1/16-inch of space between the bottom of the clamp and the bottom of the drive shaft.

15. Place the jam nut on the drive shaft with the ground-off threads going on first (left hand threads). Tighten the jam nut only finger-tight.

16. Slide the shroud down over the quill shaft.

17. Inspect the polishing chuck for any dried slurry on the threads. Clean the threads with a toothbrush.

18. Replace the polishing chuck on the drive shaft by turning it into place.

19. Tighten the jam nut up to the polishing chuck with a 1/2" wrench.

20. Re-install the polishing pad (left handed threads). Tighten it finger-tight.

21. Slide the shroud up into position. Position the vacuum release valve next to the canister.

22. Place the height gauge on top of the pad. Slide the shroud up until the gauge rests on the feet and on the pad top.

23. Turn the shroud clamp so it is up tight against the shroud and the groove is in the center. Tighten the clamp with an Allen wrench. Recheck the pad position with the height gauge.

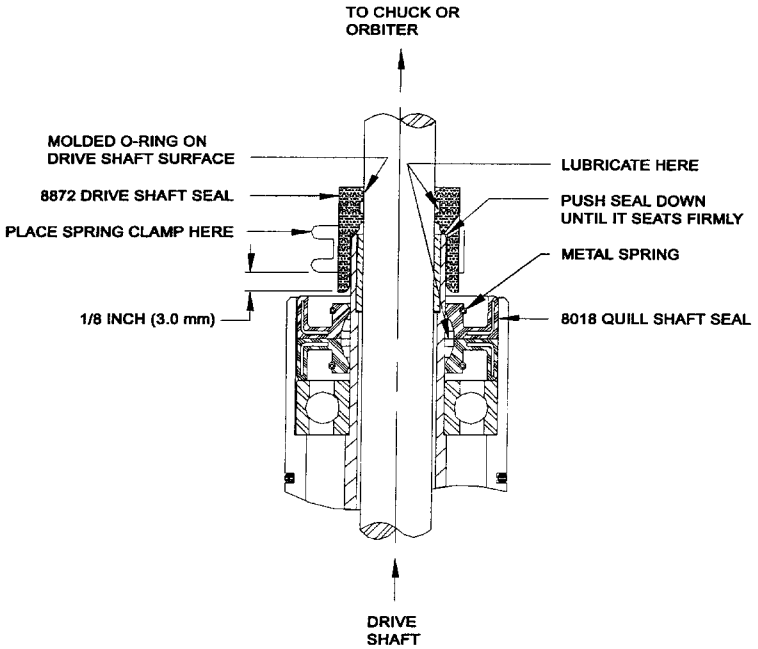


Figure 21
Lower End Assembly

Lower End Bushing Lubrication And Maintenance:

Both the lower end, and upper end of the drive shaft have bushings that need to be cleaned, and maintained on a regular basis. The following procedure is for the lower end bushings.

1. Clean the input fitting with a paper towel. Wipe off all the old grease.

2. Inspect the ends of the input fitting. Check the lower and upper ends for wear. Inspect one inch from each end with a fingernail to feel for any wear marks or patterns.

3. Lubricate the entire length of the Input tube with the Super lube grease.

4. Test the amount of wear on the input fitting or the drive shaft. Place the input tube into the drive shaft. When released, the shaft should drop slowly into the machine. If it drops quickly, the shaft should be replaced.

UPPER END TEAR-DOWN PROCEDURES

The upper end procedures center on the drive belt tension, drive belt replacement, and lubrication of the upper end oilite bushing of the drive shaft.

Drive Belt Adjustment:

1. Loosen, but do not remove, the 4 slotted hex-head screws that hold the drive plate cover in place.

2. Gently lift the drive cover up approximately 1" above the drive plate.

3. Then, with the handle assembly away from the operator (switch to the right), and the quill shaft assembly away from the operator. Place the left hand on the squared end of the cover. Using that end as a hinge, rotate the drive plate cover off the machine.

4. Remove the 2 slotted hex-head screws that hold the switch bracket in place.

5. Loosen the 4 hex-head cap screws that hold the motor assembly on the bottom of the drive plate. Use a 3/16" T-handle wrench to loosen the screws by one (1) turn only. Do not remove them.

6. Adjust the drive belt tension:

    - Hold the motor housing in left hand with square end facing the operator.
    - Place the left hand on the square end of the drive plate next to the electrical cord. Place the fingers around back side of motor canister.
    - Squeeze the thumb and fingers together tightly.
    - Tighten the hex head cap screw that is on the right side of the drive plate closest to the drive pulley.

7. Tighten the remaining 3 hex-head cap screws in a “X” pattern.

Drive Belt Replacement:

1. Loosen, but do not remove, the 4 slotted hex-head screws that hold the drive plate cover in place.

2. Gently lift the drive cover up approximately 1" above the drive plate.

3. With the front of the machine (switch to the right) facing the operator, place the left hand on the square end of the cover. Using that end as a hinge, rotate the drive plate cover off the machine.

4. Lift up the drive belt and rotate it off the drive pulley and the motor pulley.

5. Loosen and remove the 2 hex-head cap screws that hold the handle assembly to the drive plate. Use a 5/32" T-handle wrench.

6. Rotate the handle assembly toward the side to gain clearance for the belt to slip between the drive plate and handle mounting assembly.

7. To install new drive belt, reverse the above procedure.

8. Adjust drive belt tension using the procedures outlined in the drive belt Adjustment section.

Upper End Bushing Lubrication and Maintenance:

1. Clean the bushing located in the upper end of the drive shaft of the polisher. Use clean, dry, cotton swabs to clean inside the drive shaft. Continue swabbing the drive shaft until the cotton swabs no longer show any dirt.

2. When the drive shaft is clean, use a clean cotton swab with Super Lube grease to lubricate the inside of the shaft.

BUCKET MAINTENANCE:

Bucket maintenance is done each time the polishing slurry and fining slurry is changed. Clean the buckets according to the following procedure to keep them operating at peak efficiency:

1. Empty the bucket contents into a trash can. The fining/polishing agents can settle to the bottom and the water can be removed from the top. Dispose of the settled material.

2. Place the empty bucket in a sink. Rinse off any remaining slurry on the pump and other bucket components. Note: **Do not use any detergents when cleaning buckets or bucket components.**

3. Fill the bucket with clean water.

4. Turn on the pump and leave it running for 5–10 minutes.

5. Turn off the bucket. Empty the water.

6. Inspect the hoses and connections for any signs of wear. Check hose for kinks or blocks, hot water works well for clearing out blocks inside the hoses. Check the threaded connections and barbed connections for tightness and blockages. Blockages in threaded connections most likely are caused by felt from the polishing pad. It is easily removed with hot water and a toothpick.

SUBMERSIBLE PUMP

The submersible pump requires very little maintenance. The housing provides a case for the motor. An oil is used for heat transfer and as a lifetime lubricant for the motor bearing. Under no circumstances should the case be opened to expose the motor or drain the oil.

Do not allow the pump to freeze in cold weather; the case may crack open. Also, running the pump in overheated slurry for prolong periods of time could cause premature failure of the pump. Use a second bucket of premixed, cool slurry if necessary.

The pump manufacturer recommends that the submersible pump be flushed out each time the slurry is changed. This is accomplished by following the Bucket Maintenance procedures in the preceding paragraph. **Do not pick up the pump by the power cord. Doing so could cause an electrical short to the pump**.

If you are having trouble with slurry foaming while operating the system, there could be an oil leak coming from the pump. If so, discontinue use and replace the pump.

Troubleshooting

The most common operator problems with the Glass Restoration system are with amperage, vacuum, and vibration. Most of these problems can be traced back to improper or infrequent maintenance procedures and simple operator oversights with the equipment. If in doubt about the condition of any parts, replace it with a new part.

Troubleshooting Amperage Problems

Check the following items for problems with low amperage or if unable to increase amperage:

- **Has the pad been de-glazed recently?** If it has not been, the pad will not grab the glass as well a “roughed up” pad.
- **Is the shroud height adjusted properly?** If you have it set too high you will not pull enough amperage to polish efficiently. If you have it set too low you will most likely bounce off the glass because there is too much pad pressure. Use the height adjustment gauge provided to insure you start each removal at the appropriate height.
- **Is the spring tension adjusted properly?** Relieve tension on the spring each night so the spring does not become permanently compressed. If the spring becomes compressed you will not be able to increase amperage (pressure) on the pad.
- **Are the grooves in the polishing pad too small?** If they are not deep enough the machine will not be able to disperse the slurry out from the middle of the pad causing the machine to hydroplane.
- **Is the slurry weak or worn out?** Weak slurry or water only will not give you an accurate amp reading. When testing your amperage on the machine make sure you are using fresh slurry.
- **Are you polishing on fined glass?** The polishing pad will not “grab” as much on smooth, fined glass.
- **Are you using a 110 volt outlet?** If you are not you will not get the correct amperage on the machine and you will have vacuum problems.

Troubleshooting Vacuum Problems

Refer to the flow chart located on page 56 to assist in tracing most vacuum problems. The following text corresponds to the flow chart:

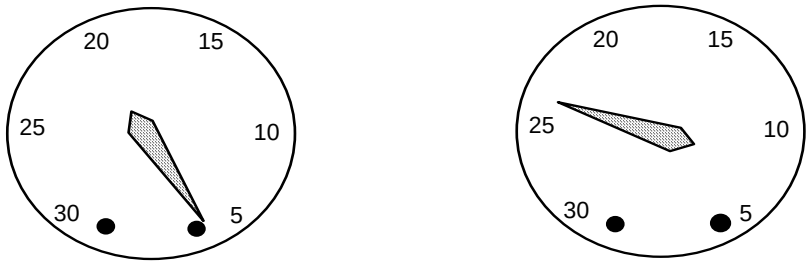
First, determine which part of the system is causing the vacuum problem:

1. Turn on the bucket to visually confirm that the bucket is running.

2. Close completely the brass vacuum bleed valve on top of the bucket.

3. Crimp the white quick connect hose at the end that connects to the shroud (away from the bucket)

4. Observe the result of crimping the hoses. The vacuum gauge needle should start to move, and should go to at least 24 inches within 15 seconds. (See Figure 22). It should remain at 24 inches for at least 1 minute. (The 24-inch reading is at an elevation of 840 feet, or 256 meters. At higher elevations, the vacuum reading will be lower.) Refer to steps 5 and 6 to determine the potential source of the problem.



Vacuum Gauge Reading 0 Inches Of Mercury

Vacuum Gauge Reading 24 Inches Of Mercury

Figure 12
Vacuum Gauges On Slurry Buckets

5. **If the needle reaches 24 inches within 15 seconds and is steady,** the problem is in the hoses or the polisher or finer machines. The next step is to test the vacuum in the hoses. It is possible for a tiny hole to occur in the hoses due to dragging them across the ground. To test the hoses, crimp the hose with the **white** quick-connect. Crimp near the quick-connect, but just before the extra clear hose reinforcement. (See Figure 23).

Troubleshooting Vacuum Problems (cont)

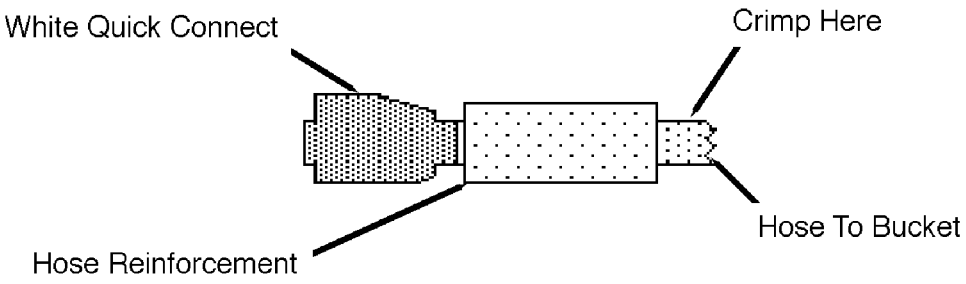


Figure 23
Quick Connect Crimp Position

If the needle does not go up to 24" or is unsteady, the problem is in the hose assembly. Remove and replace the hoses. *If the needle goes to 24" and is steady*, the bucket and the hose assemblies are good and the problem lies either at the work surface or in the polisher or finer.

6. **If the needle does not reach 24 inches within 15 seconds, or is unsteady**, the problem is most likely in the bucket or bucket system.

   It is possible that both the bucket and the machine have vacuum problems. *If the bucket reaches 24" and is steady*, the vacuum problem most likely is in the machine or in the hoses. If the bucket does not reach 24" or is unsteady, the problem is in the bucket. Check the following items:

   - All hoses and hose connections
   - Threaded connectors
   - Aspirator assembly, including the vacuum pick up tube (it must be straight and firm)
   - Slurry level and concentration in the bucket
   - Clogged intake screen
   - Bent or twisted hoses in the bucket.

Next, is the work surface curved? If so, the curve could be breaking the vacuum. If the surface is curved try the following techniques and adjustments:

- Reduce the polisher amperage.
- Increase the water lubrication flow.
- Pull in slightly on the retraction handle slightly to reduce the amperage draw (“ride the clutch”).
- Extend the shroud seal, (you can use a piece of 12 gauge wire placed under the shroud seal) or use a new shroud seal.
- Increase the vacuum.
- Combination of any or all of the above techniques.

Troubleshooting Vacuum Problems

Last, if vacuum problems continue, it is with the polisher or finer machine.
Inspect the parts listed below **IN THE ORDER GIVEN**: If in doubt about the condition of any part, replace it with a new part.

1. **Shroud seal – replace it or turn it around**. The neoprene shroud has two usuable edges, take the shroud seal out of the shroud and use the other edge.
2. **Vacuum release grommet**. This part is the most common issue regarding vacuum problems. The part number is 8156.
3. O-ring on the quill housing
4. Drive shaft seal (PN 8872)
5. **Extended input tube.** If the Input tube is bent you will lose vacuum, make sure the Input tube is in good condition.
6. White washer on top of the extended Input tube
7. **Shroud** – inspect for bent or broken glue seams, or heat distortion. 90% of vacuum problems occur in the shroud. If there is any doubt regarding the condition of the shroud replace it with part number 8499.

Other Vacuum Problem Issues-

Are you losing vacuum after you release the retraction lever?

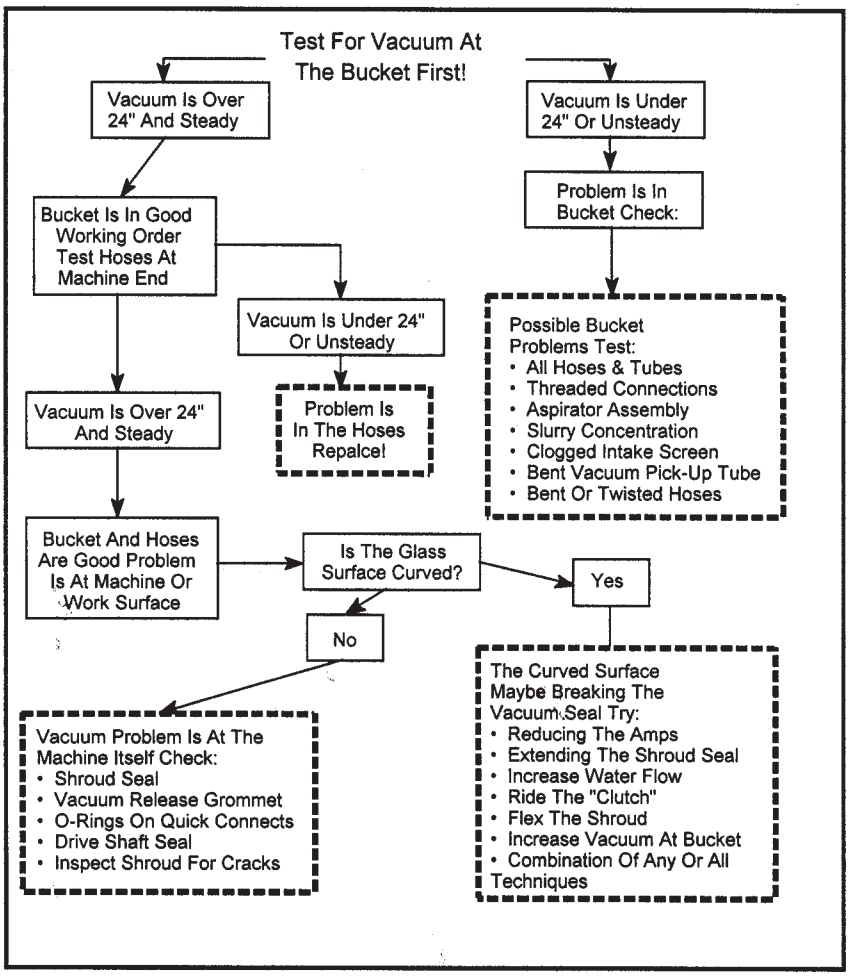
This is normally caused by a worn Drive Shaft Seal (PN 8872). An air leak occurs between the drive shaft and the quill shaft if this seal is worn and will result in a loss of vacuum when the retraction handle is released or the motor is switched on. A worn seal will appear “out of round” and will have traces of white slurry opposite of wear the clamp is placed. Grease and inspect after every 8 hours of running use.

Test the power source you are using. If you are not using an 110 outlet you or a inadequete generator you will definitely have vacuum problems when you turn the machine on. Use only an extension cord of less than 100 feet and of at least 12 gauge. Anything longer or of a lesser gauge can cause vacuum problems due to the power loss through the cord.

Check your Input tube. If you have a slightly bent tube you can lose vacuum when you turn the machine on.

PROBLEM SOLVING FLOW CHART FOR GLASS RESTORATION

The polisher/finer will not stay vacuumed onto the glass. The problem may be in the bucket, hoses, or the polisher/finer. This trouble shooting flow chart will walk you through a step-by-step procedure to determine what is not operating correctly in your system. **It is important to note that all components must be working at their capacity for the entire system to work correctly**. If you are in doubt as to the condition of any part of the system replace that part with a new part. Keep additional parts on hand to prevent downtime.



Troubleshooting Polisher Vibrations

If the polisher vibrates excessively and becomes hard to control, there are five possible sources for the problem:

1. **Drive belt is loose or badly worn.**

   Refer to the Upper End Tear-Down Procedures outlined earlier in this chapter for information on “Drive Belt Adjustment” and “Drive Belt Replacement.”

2. **Quill shaft bearings are worn out.**

   If the machine runs without vibrations at first, when it is cold, but vibrates once it warms up, then the quill shaft bearings may be bad. If the bearings need to be replaced, the machine must be returned to SRP. Call for details on returning equipment for repair.

3. **The shroud is distorted.**

   To check the shroud, remove the pad from the chuck. Adjust the shroud slightly downward so the chuck extends past (above) the shroud edge. Lay a straight edge across the chuck and compare the levelness of the chuck to the levelness of the shroud. Even a slight amount of imbalance can result in an improper polishing path and machine vibration. Replace the shroud as necessary.

4. **The polishing chuck is not perpendicular to the drive shaft, is loose, or is improperly mounted.**

   To check the polishing chuck, remove the polishing pad and slowly rotate the chuck by hand. Watch for a high spot and a low spot on opposite sides of the chuck. If so, the chuck may be “warped,” or not correctly installed on the drive shaft.

   The proper procedure for attaching the chuck to the shaft is: (1) Turn the chuck down onto the jam nut. (2) Back off the polishing chuck one full turn. (3) Hold the polishing chuck stationery while turning the jam nut up to the polishing chuck. (4) Tighten the jam nut finger-tight. (5) Tighten the jam nut one flat more with the 1/2" open-end wrench. Make sure this procedure is followed every time you install the polishing chuck.

5. **Polishing pad is distorted or worn.**

   To inspect the pad, remove it and visually inspect for levelness. Also inspect the size, and uniformity of the grooves in the pad face.

Other sources of machine vibrations may be:

- Worn motor or worn drive shaft bushings
- No slurry flow or very low flow (refer to the Troubleshooting for Vacuum Problems section above)

Other Common Troubleshooting Issues...

Bucket heating problems-

Keep the lid of the slurry container ajar to dissapate heat. The slurry container lid does not need to be sealed, the vacuum is created by the slurry flow.

Lift the cover and pump from the slurry container and place in a second container pre-mixed with slurry. Use the second container while the first cools down. You can use dry ice to rapidly cool the hot bucket. Make sure you use the second bucket until the first one has cooled down however. DO NOT PUT ICE DIRECTLY INTO A RUNNING BUCKET AS IT WILL CREATE A SLURRY FLOW PROBLEM!

Place your slurry container in a larger container of water or ice (like a cooler) to remove heat from the bucket.

Check the slurry level of the container, if you have spilled a lot of slurry, you have less slurry to absorb the heat. If the top of the pump is showing, the level is too low and you should mix a new batch of slurry.

Increased polishing time as you use the system for long periods of time-

As the polishing slurry gets hot, it is less efficient removing and softening the glass. We have found that 80% of the heat in the bucket is from the pump, not the polishing process. The pump gets very hot after extended use and should be shut off when not in use. The polishing compound **loses it's ability to remove a scratch at about 90 degrees**. **You will melt the shroud at approximately 170 degrees.** DO NOT let the slurry get that hot. **SRP will not warranty melted shrouds.**

DO NOT mistake the ineffectivity of the slurry when hot as being worn out! The polishing compound has been found to last for 15-20 hours of actual polishing. If you are changing the compound more than this you may be mistaking overheating for wear.

Rough up your polishing pads every time you remove the polisher from the glass. The pads are designed to catch the particles in the slurry and move them across the glass, a rough pad surface helps the process greatly. We recommend using the wood rasp to scuff up your pads. **Do not use a wire brush!**

Occasionally remove pad from shroud and use the rasp to scuff and reshape the pad. If deglazing is not done on a regular basis your pads will become hardened with slurry and will not be effective at removing a scratch. **Also, remember to keep the grooves in the pads open at all times.**

GFI Troubleshooting

If the GFI detects a ground fault in the electrical system, the system will shut off the power before the operator is in danger of being injured. The GFI is a safety feature of the system that must always be used. If the system trips when plugged into the GFI but not when plugged directly into a wall outlet, it is an indication that there is an electrical problem with the system**. Discontinue use of the system and NEVER USE THE SRP GLASS RESTORATION SYSTEM WITHOUT THE GFI! Doing so will could cause an electrical shock to the operator**

Training

If after reading this manual and viewing the video you find that you need further instruction, complementary quarterly training is available at our Minneapolis, MN office for machines purchased through SRP. Call for details. Customer is responsible for all other expenses associated with the training such as airfare, lodging and meals.

Warranty and Repair Information

The system warranty covers defects in manufacturing or workmanship for a period of **30 days from the date of purchase**. The warranty does not include defects caused by abuse or misuse of the equipment.

Abuse or misuse of the equipment includes but is not limited to:

- Dropping the machine
- Not following recommended maintenance schedules as found in operations and reference manuals.
- Overheating of the slurry or the Polishing/Fining machines.
- Handling equipment by the power cords.
- Neglecting to follow proper usage recommendations.

Pricing

Final repair billing includes labor, parts, shipping and rush charges if applicable. Call for current labor rates. Parts pricing is available on our parts/price list. All pricing is subject to change without notice.

Standard Repair Turnaround

2-3 business days. Standard business days are Monday-Friday.

Rush Repairs

If you require a rush repair, let us know when obtaining an RA #. Also let us know how you would like the item shipped. An additional rush charge will be applied to the final cost of the repair. Friday rushes will ship on Monday unless otherwise noted by the customer that they require Saturday Delivery.

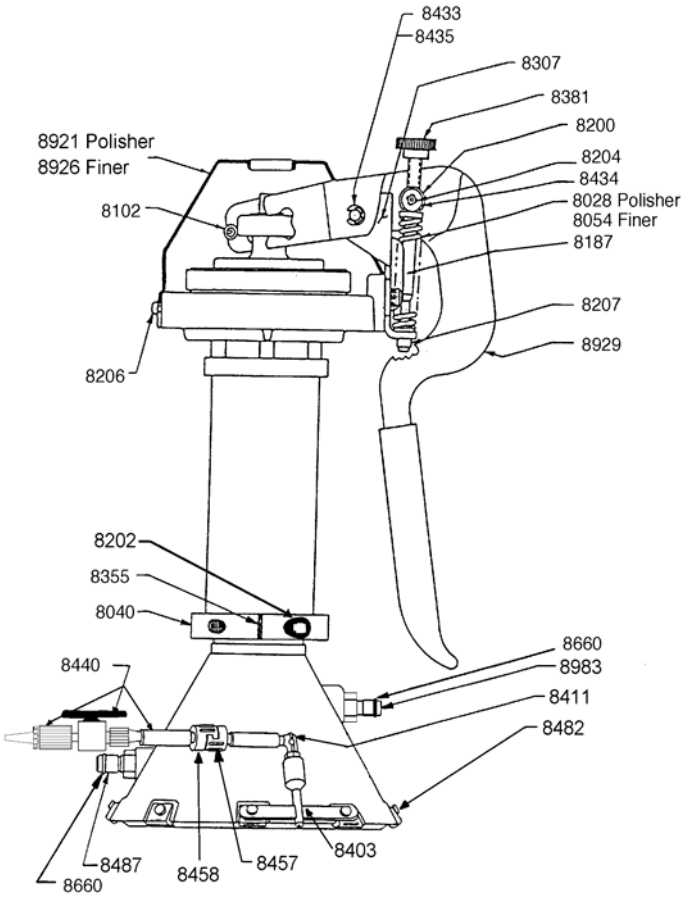
Warranty and Repair Information (cont)

Repair Warranty

SRP warranties replaced parts and workmanship for a period of **30** days from the date of shipment from SRP. For all repair warranty claims include a copy of the repair invoice. Test the machine when received to ensure the problem had been repaired. The warranty is void after 30 days of receipt no matter if the machine has been used or not.

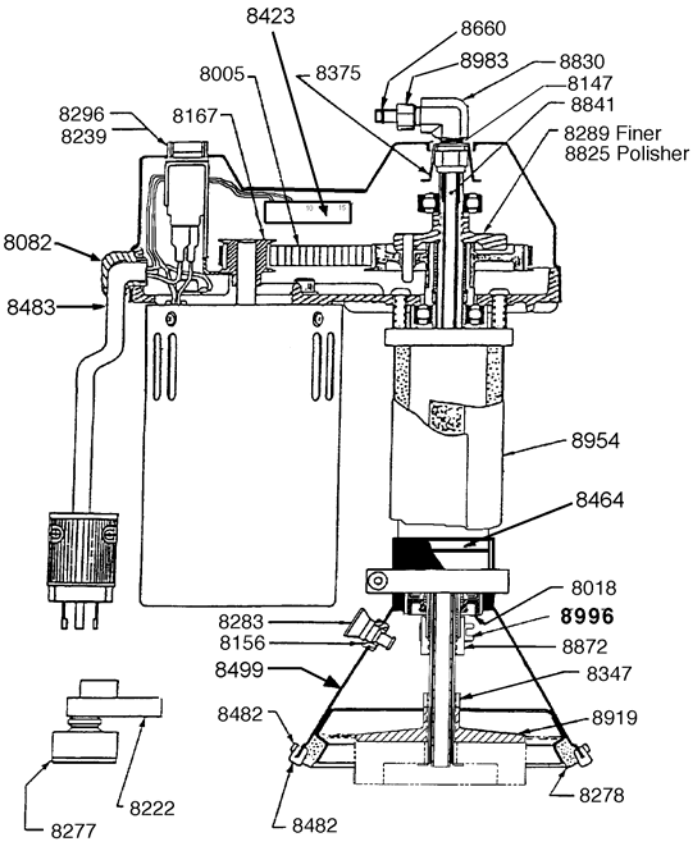
In the unlikely event that an item repaired by SRP should fail due to a warranty condition, simply send the item to us and we will perform an immediate evaluation. Tampering and failures due to an act of God, improper operation, mishandling or misapplication will void the SRP Glass Restoration repair and initial warranty.

Polisher Assembly Diagram
Exterior View, 120 Volt



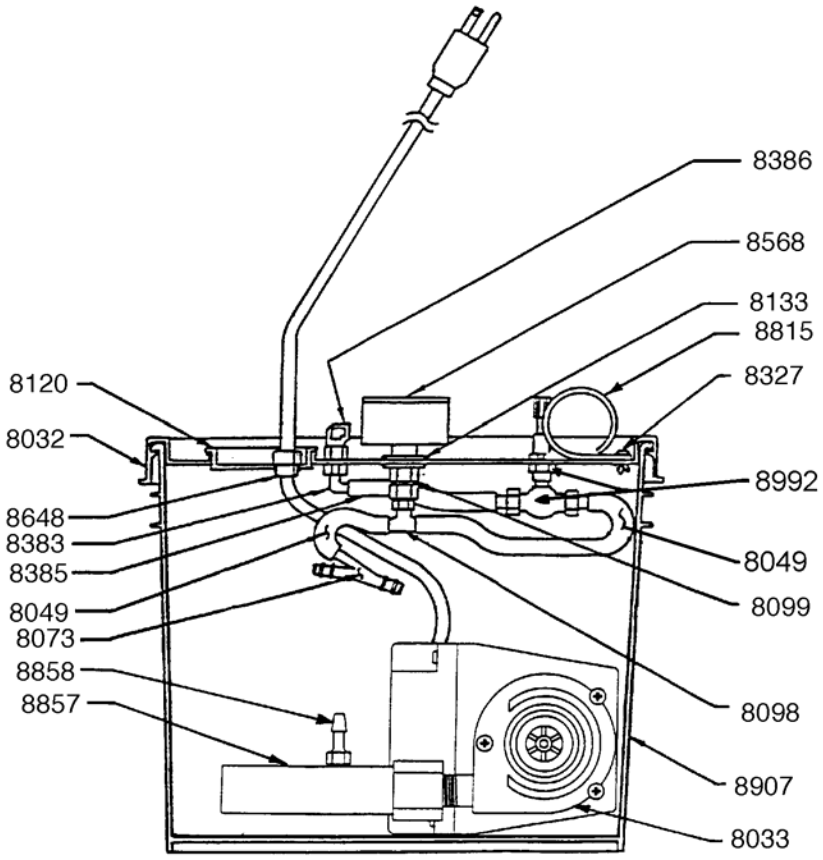
8028 Retraction Spring- Polisher
8040 Shroud Collar Clamp
8054 Retraction Spring- Finer
8102 Extension Spring
8187 Spring Pin for Retraction Handle
8200 Spring Pin For Retainer
8202 Screw for Shroud Clamp
8204 Spring Pin Set Screw
8206 Drive Cover Screw
8207 Spring Mandrel Bushing
8307 Pivot Bracket
8355 Shroud Clamp Spacer
8381 Adjustment Screw for Retraction Lever
8403 Lubricator Seal
8411 Elbow For Lubricator Assembly
8433 Pivot Pin
8434 Pin for Retraction Spring
8435 Pivot Pin Retainer
8440 Valve Assembly
8457 Coupling, Male
8458 Coupling, Female
8482 Shroud Foot Replacement Set
8487 Quick Coupling Insert
8660 O-Ring for Quick Coupling Insert
8921 Drive Cover Assembly-Polisher
8926 Drive Cover- Finer
8929 Retraction Lever
8983 Quick Coupling Insert, Brass

Polisher Assembly Diagram
Interior View, 120 Volt



8005 Drive Belt
8018 Quill Shaft Seal
8082 Strain Relief For Power Cord
8147 Input Tube Washer
8156 Rubber Grommet for Vacuum Valve
8167 Motor Pulley
8239 Switch Bracket
8278 Shroud Seal (6pk)
8283 Vacuum Relief Valve
8289 Drive Shaft Assembly-Finer
8296 Calibrated Switch-120 volt
8347 Jam Nut
8375 Input Tube Retainer Clip
8423 Ammeter, 0-15 amps, 120 volt
8464 Quill Shaft O-ring
8483 Power Cord, 120 volt
8499 Shroud, Finer/Polisher Replacement
8660 Quick Coupling O-ring
8825 Drive Shaft Assembly
8830 Input Tube and Fitting Assembly
8841 Input Tube Replacement, Tube Only
8872 Drive Shaft Seal
8919 Polishing Chuck
8954 Handle Grip Cover and Pad
8983 Quick Coupling Insert, Brass
8996 Drive Shaft Seal Spring Clamp

Slurry Container Assembly Diagram
120 Volt



8032 Slurry Container Cover
8033 Submersible Pump
8049 Slurry Container Tubing
8073 Y-Fitting
8098 T-Fitting
8099 Brass Coupling
8120 Slurry Cover Cap
8133 Vacuum Gauge Washer
8327 Clip Push Rivets
8383 Elbow, Black
8385 Tube, Vacuum Bleed Vent
8386 Vent Elbow
8568 Vacuum Gauge
8638 Pump Power Cord Strain Relief
8815 Supply Tube Clip
8857 Aspirator Assembly
8858 Aspirator Male Adapter
8905 Slurry Container Assembly
8907 Slurry Container (bucket only)
8992 Vacuum Adjustment Valve Assembly

MAINTENANCE

	SRP Scratch Removal Maintenance Schedule	Before Each Use	During Each Use	After Each Use	Every 15-20 Hrs.	Weekly
Polisher	Lubricate Input Tube	✓				
	Lube/Inspect Rubber Grommet	✓				
	Inspect Polishing Pad Height	✓	✓			
	Deglaze Polishing Pad		✓			
	Lubricate Drive Shaft Seal					✓
	Lubricate Inner Quill Seal					✓
	Inspect Drive Belt					✓
	Inspect Retraction Spring					✓
	Inspect Wiring/Power Cord(s)					✓
	Inspect Shroud For Cracks					✓
	Inspect Shroud Seal					✓
	Lube O-Rings/Clean Machine					✓
Slurry Bucket	Perform Vacuum Test	✓				
	Test GFI Plug					✓
	Cover Bucket			✓		
	Inspect Hoses For Holes					✓
	Change Slurry/Clean Bucket				✓	