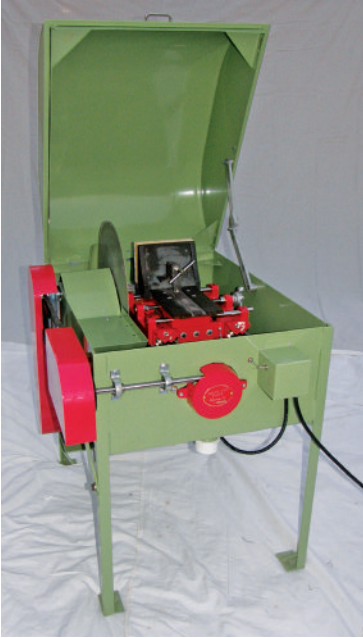


General Operating and Maintenance Instructions for Highland Park Slab Saws



INTRODUCTION

Highland Park Lapidary Slab Saws are used to make accurate cross section cuts through large and heavy pieces of semi-precious material, geological specimens, core samples, and other non-metallic material. They have been engineered and built to grip a hard mass securely and to move it into a rotating diamond saw blade in a straight line parallel with the plane of the blade.

To operate your slab saw, simply adjust the slab saw as described in this manual and you are ready to begin cutting.

HOW HIGHLAND PARK LAPIDARY BUILDS A SLAB SAW

HOODS – All Highland Park Lapidary saws feature full steel hoods with no plastic windows to crack and leak. Because each saw is equipped with automatic cut off, watching the blade is unnecessary and with some experience you can hear when the blade is about to cut through.

BLADE COOLANT DEFLECTOR is adjustable.

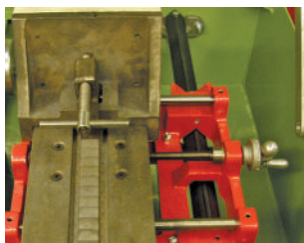
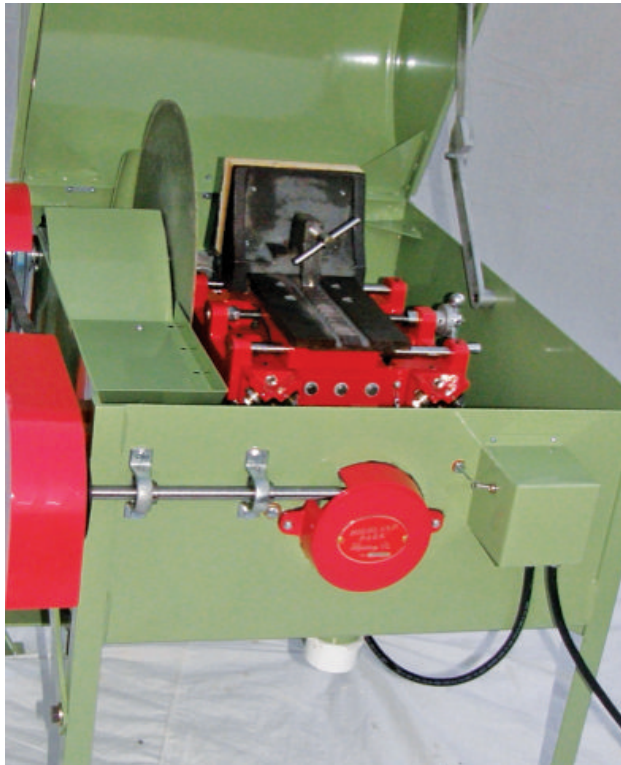
ARBOR SHAFTS are engineered for strength and rigidity, machine-turned for proper fit of bearings and blade.

BLADE FLANGES are machined from aluminum billet for safety and durability. They are designed with the necessary relief to provide proper contact with and support of the saw blade.

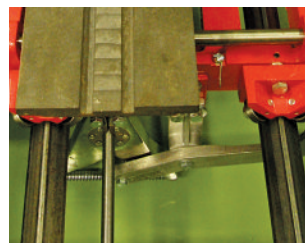
MOTORS are equipped with overload protection.

POWERFEED – designed for three speeds (except for Model 10) to adjust the carriage in-feed for various rock hardnesses. Adjustment is easy – change V-belt to another pulley groove.

ARBOR BALL BEARINGS are factory lubricated and sealed to protect them from abrasive contaminants. They can be lubricated for long-life



CROSS-FEED HAS CALIBRATED DIAL.



SPLIT-NUT CARRIAGE DRIVE IS QUICKLY AND EASILY RELEASED FOR CARRIAGE RETURN OR POSITIONING.

performance.

WISE – made of close-grained iron castings for strength and rigidity, faced with replaceable wood jaws. Opening designed for maximum capacity of saw. Ratchet in 1” increments for coarse setting; screw for tightening.

SAW TANK is engineered using steel plate welded and fabricated to provide a rigid, stable base for the saw mechanism.

CARRIAGE – cast aluminum frame, roller bearing mounted, travels along square structural steel ways. Wide lateral crossfeed movement, crank operated, with graduated dial for cutting multiple slabs. Split-nut carriage drive, released by flip of a handle for quick carriage return.

AUTOMATIC CUT-OFF SWITCH – is adjustable for length of cut.

DRAIN PLUG is located at front of saw for easy access...large diameter nipple for fast draining, easy cleaning.

SETUP AND ADJUSTMENTS

A. Uncrate the Saw

All Highland Park Lapidary Slab Saws are packed in heavy-duty shipping crates. Crates can be easily opened using a large screw driver to remove the spring clips and a socket driver to remove the bolts holding the crate sides to the crate bottom.

B. Install Casters and Vise

Casters ship with all 14/16, 18, 20, 24 and 36 inch saws. The casters should be installed with the two locking casters placed to the front two legs of the saw so they can be locked and unlocked easily. Casters and bolts are located in the cardboard box inside the shipping crate. The 10 inch saw ships with leveling feet already installed.

C. Install Vise (24 and 36 inch only)

24 inch and 36 inch slab saws ship with the vise bolted to the crate bottom to avoid damage to carriage components during shipment. The moving vise jaw and vise bolts are located in the cardboard box inside the shipping crate along with the casters and bolts. Install all of the bolts in the fixed vise jaw before tightening them. Do not over-tighten.

D. Fill the Drive Gear Box

CRITICAL: YOU MUST FILL THE FRONT GEAR BOX 1/3-1/2 FULL WITH 80 WEIGHT GEAR OIL BEFORE OPERATION. 80w gear oil is used in automotive rear axles and can be readily purchased from a local auto parts store.



FILL GEAR BOX 1/3- 1/2 FULL WITH 80W GEAR OIL

E. Install the Blade

1. Remove arbor hex nut (turn counterclockwise looking at the end of the arbor shaft).
2. Remove outside flange.
3. Place blade on arbor shaft. Make sure that the correct bushing is used so the blade fits the shaft without excess play. NOTE: Flanges must be kept clean and free of all foreign particles.

4. Replace outside flange.
5. Replace hex nut and tighten (firmly). NOTE: To prevent arbor shaft from turning, hold pulley or shaft – never blade.

F. Install Drain Cap

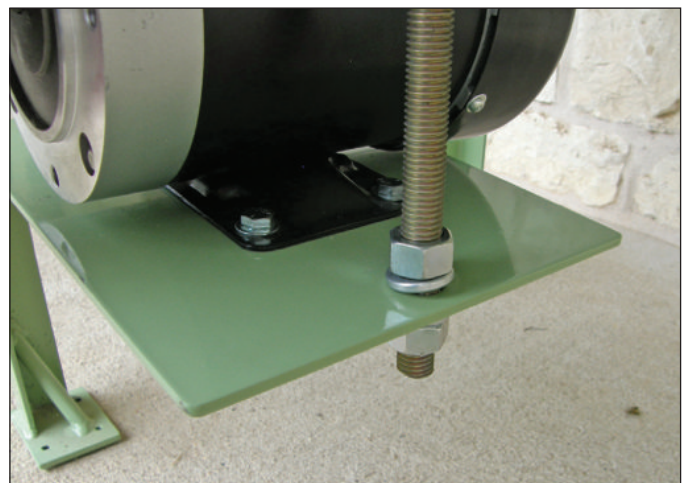
Use Teflon tape or pipe sealant to prepare the threads. Thread the cap onto the drain port making sure to not cross thread the fitting and then tighten with channel locks or a pipe wrench. It is not necessary to tighten excessively because the fitting may be tightened more if the cap has a small leak. NOTE: some people prefer to install a ball valve on the drain port to make oil changes easier. 2 inch ball valves are available at your local hardware or plumbing store.

G. Fill with Coolant

A lapidary diamond saw blade cannot cut properly without a lubricant which also acts as a coolant. An ample supply must be directed into the saw cut, enough to lubricate the rim and the work piece and to flush out all debris. Commercial light cutting oils comparable to as Texaco's "Almag", Shell's "Diala AX", or high-grade mineral oils will work. Be sure to check product material safety data sheet (MSDS) for health and safety data. We do not recommend the use of a water soluble oil or plain water; using either of these will void warranty and can cause premature component failure. Dirty coolant/lubricant should be replaced. Fresh coolant should be added until the blade is immersed approximately 3/8" for smaller saws and up to 3/4-1" for 24 and 36 inch saws. The Highland Park Lapidary EverClean oil cleaning system is an excellent solution for keeping your oil clean and saw sludge free while reducing component wear.

H. V-Belt Adjustment – Motor and Arbor Drive

1. Remove belt guard cover.
2. With V-belt on motor and arbor pulleys, loosen hex nut above and below motor mount plate until the weight of the motor is being supported by V-belt.



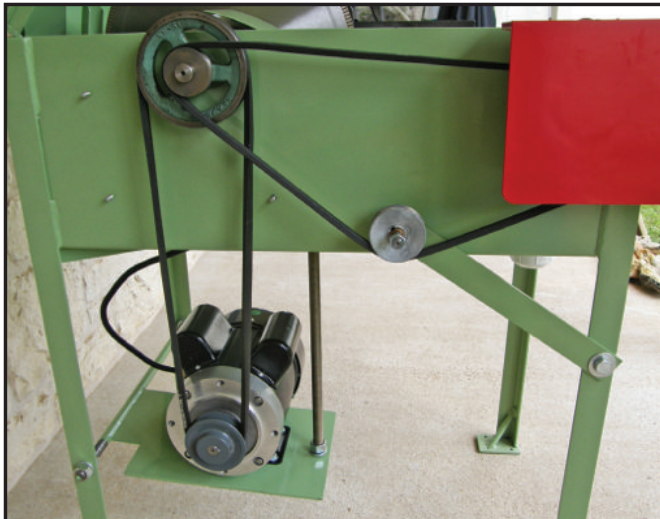
THE TWO HEX NUTS ON MOTOR MOUNT ROD ARE ADJUSTED TO TENSION ARBOR V-BELT.

3. Tighten the hex nut (above plate) until the motor mount assembly is secure.
4. Check V-belt tension at the mid-point between pulleys by pushing V-belt. Deflection of V-belt should be ½”-3/4”. If tension is not correct, adjust motor mount up or down accordingly. CAUTION: Excessive V-belt tension will cause blade vibration resulting in equipment damage.
5. Install belt guard cover before turning on power.

I. Power Feed – V-belt Adjustment.

Highland Park Lapidary 14/16, 18, 20 , 24 and 36 inch Slab Saw power feed systems are equipped with a three step pulley to provide three in feed speeds to accommodate various rock hardness's. Use the table below for selection of in feed speed.

Pulley Selection	Rock Hardness (MOHS)	Materials
Largest	7 or harder	Agate, Quartz, Topaz, Jasper
Middle	6	Orthoclase, Feldspar, Onyx
Smallest	5 or less	Apatite, Fluorite, Calcite



THE PULLEYS WITH FEED V BELTS

To set in feed speed and tension on the Feed V-belt, proceed with the following steps.

1. Loosen bolt that secures idler arm.
2. Swing idler arm up until the pulley no longer contacts V-belt.
3. Select in feed speed in accordance with rock hardness (see table).
4. Place V-belt on selected pulley.

5. Lower idler arm to tension V-belt (at mid-point between arbor and power-feed pulleys deflection of V-belt should be ¾” to 1”).
6. Secure idler arm by tightening bolt.



THE IDLER ARM IS ADJUSTED TO TENSION POWER FEED V-BELT.

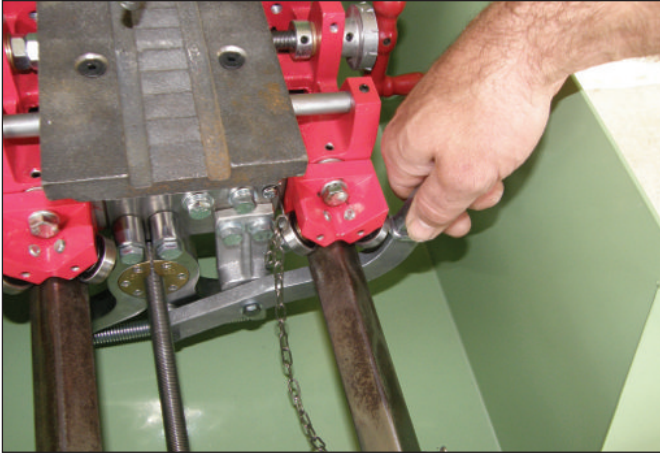
J. Electrical Power

Make sure you place your slab saw on a sturdy dry level floor near a grounded power outlet. It is critical to use a grounded circuit for safe operation.

K. Operation of Carriage Release Lever

The release lever engages or disengages the split nuts from the lead screw which operates the power feed system.

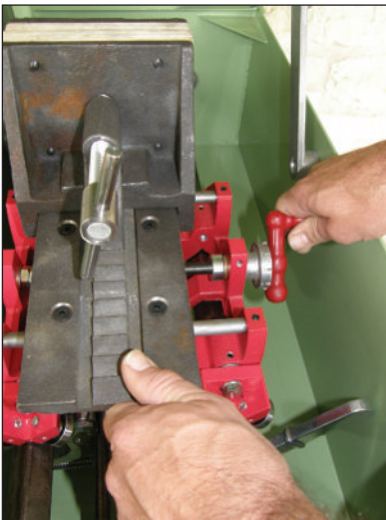
1. For manual positioning of carriage (for preparation of cut or return after cut), push release lever down and move carriage to desired position.
2. To engage power feed system (automatic feed), pull release lever to up position
 - A. NOTE: as a standard practice, when moving the stone up to the blade to begin a cut, you should turn the blade by hand to insure that the blade is turning freely before starting the saw. If the blade is rubbing the stone, then release the feed and back the carriage up a little, then engage the power feed lever and recheck the blade to insure it moves freely.



SPLIT-NUT CARRIAGE DRIVE IS QUICKLY AND EASILY RELEASED FOR CARRIAGE RETURN OR POSITIONING.

L. Operation of Carriage Cross Feed Crank System

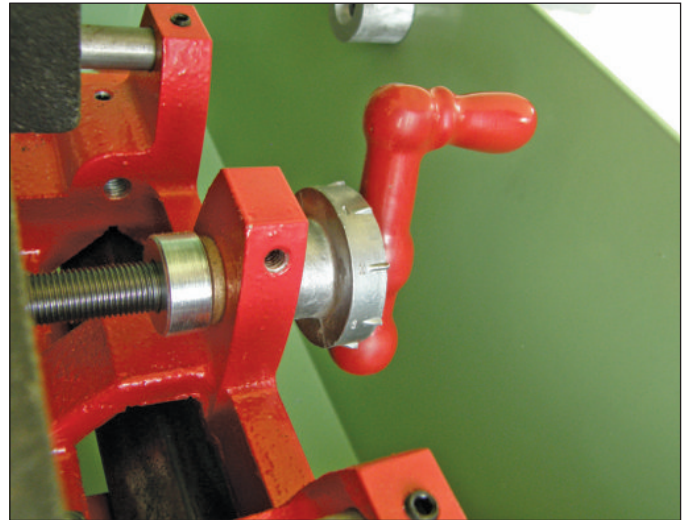
The carriage assembly includes a cross feed crank which moves the vise into or away from blade.



CRANK-ACTUATED CROSS-FEED VISE HAS VERY ACCURATE ADJUSTMENT FOR CUTTING SUCCESSIVE SLABS TO DESIRED THICKNESS.

1. Turn crank counterclockwise to move vise into blade; clockwise to back vise away from blade.
2. Threads per inch:
 - a. For the 24 and 36 inch saws, the cross-feed screw is 5/8-18 (18 threads per inch)
 - b. For the 14/16, 18 and 20" saws, the cross-feed screw is 1/2-20 (20 thread per inch)
 - c. For the 10" saw, the cross-feed is 3/8-24 (24 threads per inch)

M. Cross Feed Crank System – Parallel Slabs



CROSS FEED HAS CALIBRATED DIAL.

For cutting multiple parallel slabs to precise thicknesses, the cross feed system is equipped with a calibrated dial. To cut slab to desired thickness:

1. Be certain work piece is sufficiently extended (to left of vise) for several cuts to be made without moving work piece in vise.
2. Make first cut and return carriage.
3. Note position of the calibrated dial.
4. Turn crank counterclockwise until desired thickness is set.
5. Make cut.

Common Slab Thicknesses

Slab Thickness	10" Saw	14/16, 18 & 20" Saws	24 & 36" Saws
1/2 inch	12 turns	10 turns	9 turns
3/8 inch	9 turns	7 1/2 turns	6 3/4 turns
1/4 inch	6 turns	5 turns	4 1/2 turns
3/16 inch	4 1/2 turns	3 3/4 turns	3.4 turns
1/8 inch	3 turns	2 1/2 turns	2 1/4 turns

NOTE: To achieve precise thicknesses, the material removed by the blade must be compensated for by adding the *rim* thickness to the slab thickness desired. Therefore (using the table on the next page) you must turn the crank (counterclockwise) an additional amount to compensate for the thickness of the rim of the blade being used.

Rim Thickness	10 inch saw	14/15, 18 and 20 inch saws	24 and 36 inch saws
.032	¾ additional turn		
.040	1 additional turn		
.050	1¼ additional turns		
.060	1½ additional turns		
.065	1⅝ additional turns	1.3 additional turns	
.070	1¾ additional turns	1.4 additional turns	1¼ additional turns
.075		1 ½ additional turns	1.4 additional turns
.085		1.7 additional turns	1½ additional turns
.090		1.8 additional turns	1.6 additional turns
.100		2.0 additional turns	1.8 additional turns
.105		2.1 additional turns	1.9 additional turns
.110		2.2 additional turns	2.0 additional turns
.125		2.5 additional turns	2¼ additional turns
.145		2.9 additional turns	2.6 additional turns
.200		4 additional turns	3.6 additional turns

N. Automatic Cut Off

The trip chain, if properly adjusted will shut off the power upon completion of cut. To adjust chain for automatic cut off, proceed with the following steps.



THE AUTOMATIC CUT OFF TRIP CHAIN IS ADJUSTED FOR LENGTH OF CUT.

1. Position work piece in vise and secure.
2. Position vise so that work piece will clear blade.
3. Move carriage to position on way bars so that all of work piece has cleared the cutting edge of blade.
4. Lock carriage by raising release handle.
5. Remove slack from chain and hook chain on switch wire.
6. Release and position carriage for start of cut.

SLAB SAW OPERATION

1. Check condition of blade – Use straight edge to check blade straightness. A bent, dished, or warped blade will wear out rapidly and may also bind in the cutting process.
2. Check blade flanges – When contact surfaces are put together, they must lie flat and no light should be visible. Improper condition of flanges will cause blade damage.
3. Install blade – Tighten arbor nut firmly, but not so much that the flanges collapse.

NOTE: If a new blade is being used, it is recommended to be broken in by cutting through a 220 grit silicon carbide grinding wheel stub two or three times to expose diamonds.

Selection of Work Piece

Model	Blade Used	Maximum Size of Work piece
10	10	4 x 4" cross section
14/16	16	5¾ x 6" cross section
	14	4¾ x 6" cross section
	12	3¾ x 6" cross section
18	18	6¾ x 7¼" cross section

Model	Blade Used	Maximum Size of Work piece
	16	5 ³ / ₄ x 7 ¹ / ₄ " cross section
20	20	7 ¹ / ₄ x 7 ³ / ₄ " cross section
24	24	8 ³ / ₄ x 17 ³ / ₄ " cross section
36	36	13 ¹ / ₂ x 28" cross section

4. Select work piece in accordance with model and blade capacities. (See table)
5. Position work piece in vise using the following considerations.
 - a. The surface of work piece must not deflect blade from cutting plane. At all costs, avoid side pressure on blade to prevent damage to blade.
 - b. Be certain that work piece does not protrude below vise.
 - c. If multiple parallel slabs are desired, position work piece to protrude sufficiently from vise so that of work piece can be cut multiple times without having to be removed and repositioned in the vise.
6. Lock work piece in vise – it must be secured. (Pull on the work piece to see if it is clamped securely. If the piece moves, reposition it, re-tighten vise and recheck)



WORKPIECE MUST BE HELD FIRMLY IN VISE.

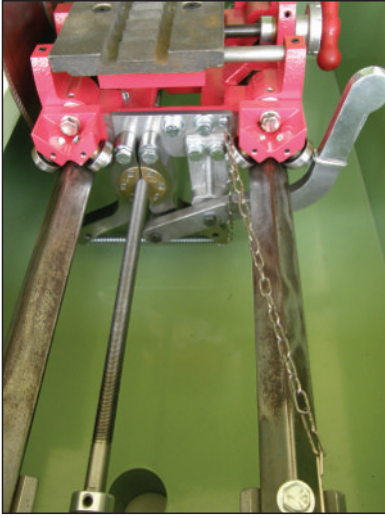
7. Adjust automatic cut-off chain.
8. Set power feed rate in accordance with rock hardness and size.
9. Tension powerfeed V-belt.
10. Wipe sludge from way bars and roller bearings.

11. Position carriage and vise so that work piece is 1/4" from cutting edge of blade.
12. Move blade manually to make sure it can turn freely.
13. Check coolant.
 - a. If splash system is used, be certain rim of blade is immersed to a depth of 3/8-1/2" for 14-20" saws, and 3/4" to 1" for 24 and 36" saws.
 - b. If pump system is used, be certain coolant is directed at cutting edge of blade directly above work piece.
 - c. If pump system is used, but is not wired into machine power switch, start pump.
14. Close Hood.
15. Flip on Toggle Switch.
16. Listen for smooth operation of saw. If any unusual sounds occur, turn off saw and recheck.

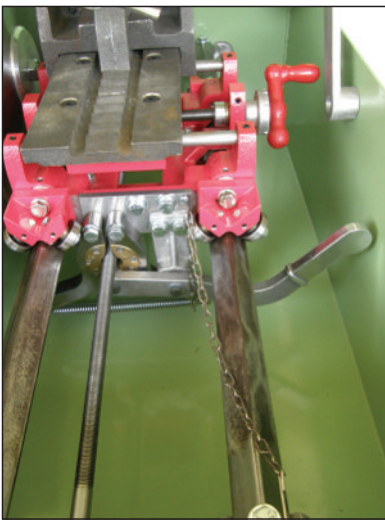
MAINTENANCE

A. Saw

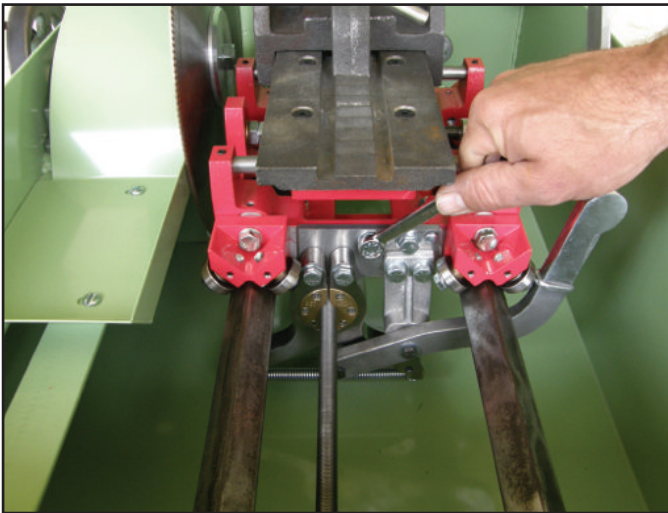
1. Wipe way bars and roller bearings of all grit and sludge before every cut.
2. Keep V-belts tensioned properly.
3. Change coolant when dirty.
4. Check oil level in power feed gear box. The gear box should be 1/3 to 1/2 full of 80 weight gear oil.
5. Keep end play out of feed screw by adjusting locking collar.
6. Inspect vise blocks. (Replace if necessary.)
To replace:
 - a. Remove hex head screws.
 - b. Remove the blocks.
 - c. Replace with appropriate blocks.
7. Keep split nut assembly properly adjusted
 - a. With release handle in the up position, the feed screw must be fully engaged by the split nuts (see picture). If split nuts need to be adjusted, proceed with the following steps.
 - (1) With release handle in the up position, loosen the bolts which hold the split nut plate to the carriage body. The split nut assembly will automatically adjust to the lead screw.
 - (2) Tighten bolts.



LEAD SCREW FULLY ENGAGED BY SPLIT NUTS. (RELEASE HANDLE IN RAISED POSITION)



LEAD SCREW DISENGAGED FROM SPLIT-NUTS. (RELEASE HANDLE IN DOWN POSITION)



THE SPLIT-NUTS ARE ADJUSTED TO THE LEAD SCREW.

8. Keep carriage roller bearings in contact with way bars. If, upon movement of carriage, any of the roller bearings do not roll, adjustment is necessary.

- a. Tighten the bolts that secure the carriage retain-er straps (under side of carriage) to way bars. Do not over-tighten, just enough for the bearings to make good contact with the way bars.
 - b. If a bearing gets dirt inside and will not roll freely, check all carriage bearings and replace the bad bearings.
9. Check frequently for blade and carriage alignment and bearing wear — see Trouble Shooting and Re-pairs section.
 10. Inspect flanges — see Trouble Shooting and Repairs section.
 11. Grease bearings — see Trouble Shooting and Repairs section.

B. Blade

1. Inspect blade condition with straight edge.
2. To insure even wear, long life, and efficient cutting, occasionally reverse blade.
3. To increase diamond protrusion and improve cutting action, occasionally sharpen the blade by cutting two or three times in a 220 grit silicon carbide grinding wheel stub.



A STRAIGHT EDGE IS USED TO CHECK BLADE STRAIGHTNESS.

TROUBLE SHOOTING AND REPAIRS

A. No Power

1. Check all connections, especially the motor cord for breaks in the insulation. Be sure the circuit is grounded for safe operation and that the power plug ground prong is not damaged.
2. If motor still does not run, turn machine off, wait five minutes and turn back on power. (This is in the case of thermal overload. The motor has an internal sensor that turns off the motor if it gets too hot which can happen if cutting too large of a work piece on one of the faster settings, if the blade gets dull, or if the saw is being run in very hot weather.)

B. No Power Feed (Carriage Travel)

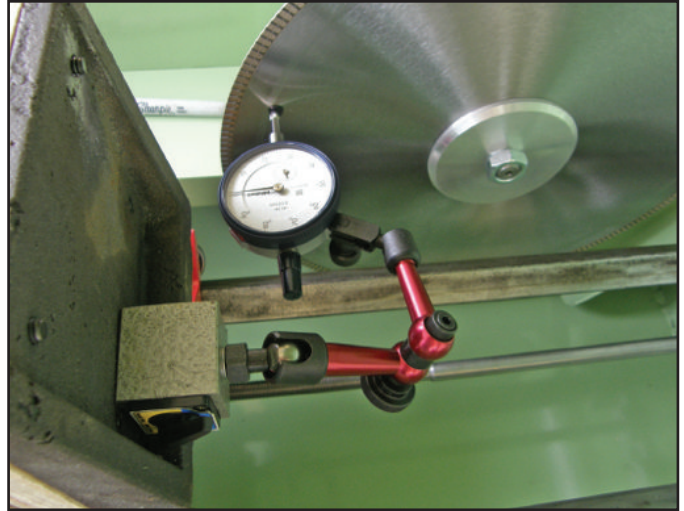
1. Check V-belt tension.
2. Check split nut assembly.
3. Collar loose on lead screw.
4. Bushing on lead screw (front of tank) may need to be replaced.
5. Power feed bearings may need to be replaced.
6. Power feed shaft may be bent.
7. Worm gear and bronze drive gear may need to be replaced.

C. Improper Cutting

1. Check blade condition.
 - a. Reverse.
 - b. Sharpen.
 - c. Repair or replace if needed.
2. Check V-belt tension.
3. Check to see if pulleys are slipping on shafts.
4. Check coolant.
5. Check arbor assembly.
 - a. Check condition of arbor shaft surface. If blade does not fit snugly, shaft may be worn and will need to be replaced.
 - b. Check flange condition. If flanges when placed together do not lie perfectly flat, they need to be replaced. Be certain flanges are clean and free of debris.
 - c. Arbor shaft play (any movement other than rotation).
 - (1) Radial Play – Grasp blade end of shaft and try to move it back and forth.
 - (2) Axial Play – Try to move shaft in and out.

NOTE: Any arbor shaft play indicates worn bearings or a bent shaft. Do not operate saw until this condition is remedied.

6. Check blade alignment. Use the Highland Park Lapidary Blade Alignment Kit for best results. Machine must be sitting on level floor for this check.
 - a. Put the magnetic base of blade alignment kit on the back side of the vise. Using a sharpie, put a small "X" on the blade where the dial indicator will touch on the side of the front of the blade.



BLADE AND CARRIAGE ALIGNMENT SHOULD BE CHECKED REGULARLY.

- b. Move the dial indicator into position right on the "X" mark. Use the crossfeed until the indicator touches the blade then give it 2 more turns so the indicator has plenty of "in/out" travel while contacting the blade....then adjust the indicator to the zero mark.
- c. Touching only the lower part of the carriage, slowly move the carriage towards the back of the saw. Rotate the blade until the indicator is now over the "X" mark which is now towards the back of the saw. Observe how much the indicator moves as you move it from front to back.



MEASURE FROM SAME POINT OF BLADE

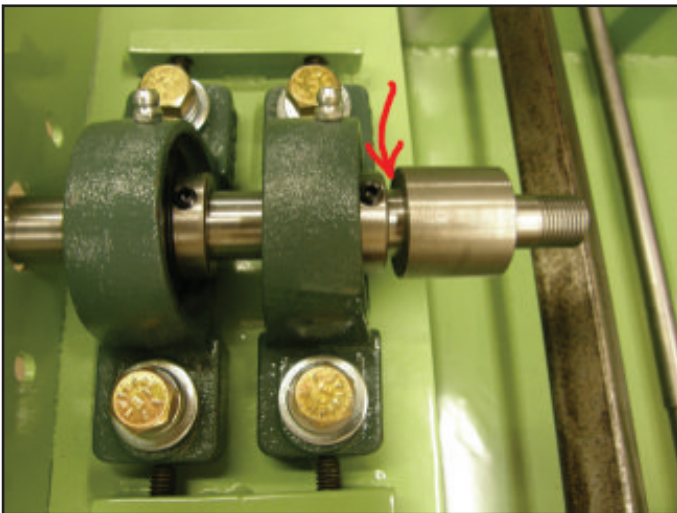
If indicator does not show equal measurements at both front and rear positions, the bearings need to be aligned with the carriage. Following the steps below:

- a. Remove the motor belt guard by removing the three (3) 1/4" nuts and flat washers.
- b. Remove the blade by removing the main nut (Right hand thread).

- c. Remove the blade flanges.
- d. Remove the four (4) ¼" screws that hold the arbor cover to the arbor plate.
- e. Remove the two (2) ¼" screws that hold the arbor cover to the side of the tank behind the arbor pulley.
- f. Slide the arbor cover to the right and then lift the left side of the arbor cover up about 1 inch allowing it to slide the rest of the way off of the arbor shaft.

NOTE: Check the bearing set screws to insure that they are tight and that the arbor shaft is seated against the right hand bearing.

- g. If it is not seated against the bearing you can see a gap between the arbor shaft and the right hand bearing.

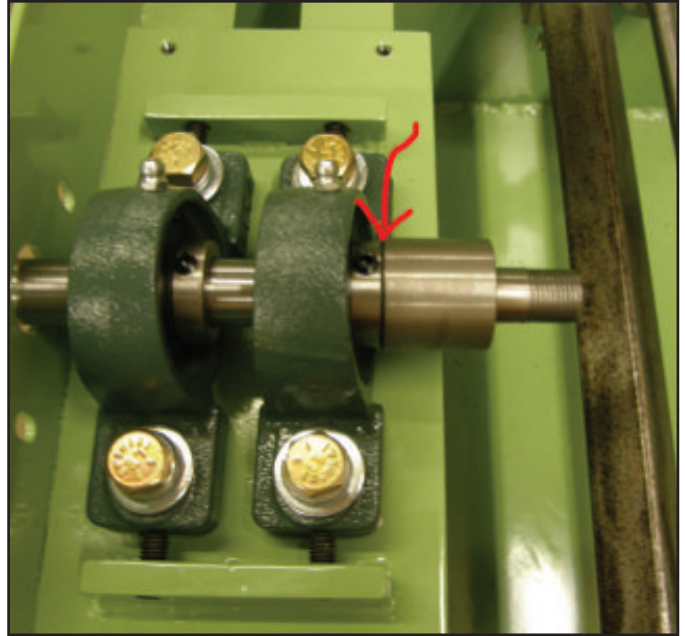


GAP BETWEEN ARBOR AND BEARING

- h. Loosen the two (2) set screws on each bearing and use a rubber mallet to hammer it back into place. Do not use a hard hammer as this can damage the threads on the arbor shaft.



USE A RUBBER Mallet, NOT A HARD HAMMER



ARBOR SHAFT PROPERLY SEATED

- i. When the shaft is seated against the bearing again, you can then re-tighten the 4 set screws.
- j. Using the two adjusting bolts on the left hand bearing, center the arbor shaft where it comes out of the hole on the side of the saw. When the shaft is centered, tighten the bolts on the left hand bearing.
- k. Use the two adjusting bolts on the right hand bearing to center this bearing. (This is the bearing that is closest to the blade).
- l. Turn the adjusting screws to move the indicator for half of the deflection. (Keep in mind it is half, because as you move the right arbor bearing the blade will "tilt" around the axis of the arbor shaft.
- m. Keep repeating this exercise until you get close to zero with indicator on both the front and back positions for the indicator as you move the carriage forward and back.
 - Note: using an "X" on the blade eliminates error that is likely to be found in the case that the blade isn't perfectly straight, or in the case of a bent flange or arbor shaft. You can use the indicator to see how much error there is in the blade by simply rotating the blade and watching the runout of the blade.
- n. Do a preliminary tightening of the right hand bearing bolts, do not fully tighten the bolts. You will see the alignment change and then can still do some adjustment with the adjusting bolts. Ideally you want both bolts pressing into the bearing housing so it cannot move.

- o. After re-establishing a good alignment from front to back, you can finish tightening the arbor bolts on the right arbor bearing. Re-check the alignment...and make adjustment if necessary.

NOTE: You will see that it is difficult to get exactly “zero” to “zero” when moving from front to back, but you can get very close and this will insure you the best results in getting great cuts.

Grease Bearings. With the arbor cover removed, use a grease gun to with a high performance lithium grease (a NLGI2 No. 2 rated or equivalent) to grease each bearing. Pump the grease slowly into the bearing allowing it to push the old grease out.

- On 18” machines, the grease fittings will not be installed, but are placed under the arbor cover between the bearings. (This is because the arbor cover clearance is limited and there is no room to leave the grease fittings in with the arbor cover installed.)
- (1) (18” only) Remove the Allen screws from the top of the bearings and put the grease fitting into each bearing. Do not over-tighten as the grease fittings as this can damage the threads in the bearing housing.
 - (2) (18” only) After greasing the 18” machine, remove the grease fitting and replace it with the Allen screw. The Allen screw should not be tightened, just insert finger tight, it keeps dirt and debris out.
- p. Wipe off the excess grease with a paper towel or rag.
 - q. Carefully place a bead of silicon seal on both sides of the felt gasket between the tank side and arbor cover circling the openings where the arbor shaft and two (2) screws pass through it.
 - r. Reinstall the arbor cover and replace all six screws before tightening. Next tighten the two (2) screws on the side before tightening the four (4) screws on the top.
 - s. Re-install the inner blade flange, the blade and then the outer blade flange and tighten the blade nut.
 - t. Re-install the belt guard using the three (3) ¼” nuts and flat washers. Put a wrench on the screw head inside the tank when tightening so the bolt does not unscrew as you tighten it.

PARTS AND SUPPORT

As fellow cutters, we want you to be successful with your Highland Park Lapidary slab saw. If you have any questions, feel free to contact us directly at Support@HPLapidary.com or at 512-348-8528.

We stock most replacement parts for immediate shipment. Order from www.HPLapidary.com, the Highland Park Lapidary Catalog or call us at 512-348-8528 to order parts.