



Service Manual – 10,000 hours
2-15 Hp “Oil-Less” Scroll Compressor

Any information, service or spare parts requests should include the machine serial number and be directed to:

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Safety Precautions

Pressurized air from the compressor system may cause personnel injury or property damage. Isolate the compressor to be serviced from the rest of the system. Release all pressure from the compressor before removing it from the medical air system.

The service technician should have carefully read and become familiar with the contents of this manual before adjusting and repairing the compressor. The service technician is expected to use common sense safety precautions, good workmanship practices and follow any related local safety precautions.

Safety Precautions For The Medical Air System:

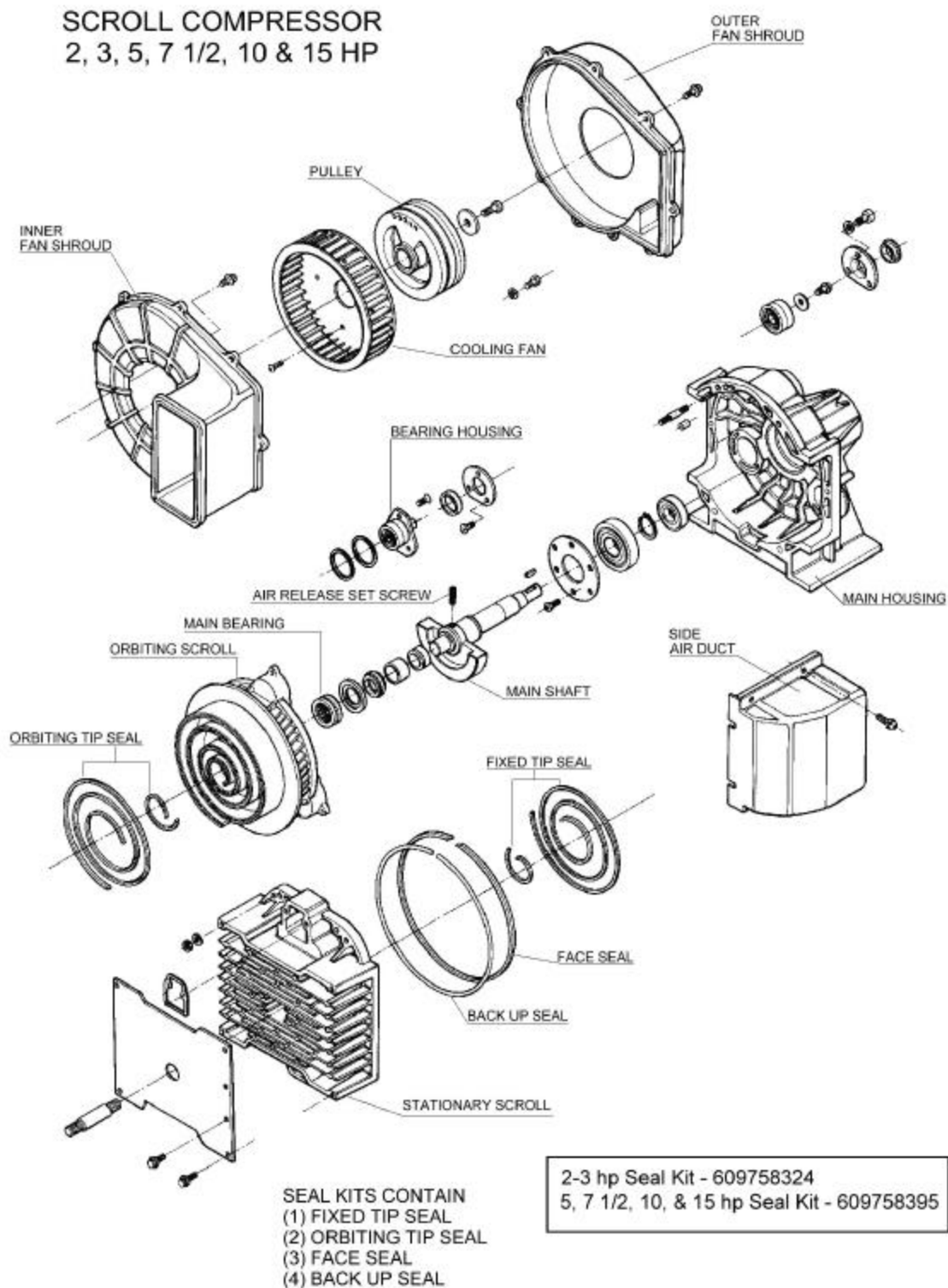
- **Before starting any installation or maintenance procedures, disconnect all power to the package.**
- Release all pressure from the package before removing, loosening, or servicing any covers, guards, fittings, connections, or other devices.
- Notify appropriate hospital personnel if repairs or maintenance will affect available compressed air levels.
- Do not attempt to service any part while machine is in operation.
- To prevent automatic starting, disconnect all electrical power before performing any maintenance.
- Do not operate unit without belt guards, shields or screens in place.
- Make sure that all loose articles, packing material, and tools are clear of the package.
- Never operate a compressor with its isolation (shutoff) valve closed or without its relief valve in place. Damage to the compressor may occur.
- **Do not add lubricating oil of any kind to the compressor.** Absolutely no oil is required for proper operation.

Safety Precautions For The Repair Of The Scroll Compressor:

- Perform service on the scroll compressor **ONLY INDOORS IN A CLEAN ENVIRONMENT.** Dust and dirt will cause damage to the compressor.
- **CLEAN THE COMPRESSOR CONNECTIONS AND SURROUNDING AREAS** before disconnecting piping or removing compressor from its base. Do not allow dirt to enter into the piping or inlets of the compressor.
- **COVER OPEN INLETS WITH TAPE BEFORE SERVICING COMPRESSOR**, so that dust or dirt is not allowed to enter the compressor.
- **DO NOT** blow directly on bearing with compressed air.
- **DO NOT** wear cloth gloves when performing this service, to prevent cloth fibers and lint from contaminating bearings and grease. Latex gloves are permitted.
- **DO NOT STRIKE or use excessive force on** any part of the compressor, when removing the stationary scroll from the compressor.
- **REPLACE ONLY THE TIP AND FACE SEALS.** There are no other replaceable parts.
- **NO PARTS ARE INTERCHANGEABLE WITH ANY OTHER COMPRESSOR.**
- **HEXANE** and equivalent solvents are volatile and can be hazardous. Please use caution and proper safety measures when using any solvent.

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1.0 Exploded View



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2.0 Tools and Materials Required

Special Tools

(Fits all size Scroll compressors)

<u>Description</u>	<u>Tool Number</u>
Compressor Stand	3K-5562
Grease Filler for SRL-2.2C (2-3 hp)	7K-2488
Grease Filler for SRL-5.5C (5-15 hp)	7K-1105
Air-release Wrench	7K-1106
Shaft Stopper	7K-5560
Torque Wrench, 3/8" drive, 250 in/lbs. Max.	5XW12
Spring Balance, 10 lbs. Max.	T-10

Standard Tools

(Fits all size Scroll compressors)

Description

Philips Screwdriver
13 mm Socket, 3/8" drive
17 mm Socket, 3/8" drive
8 mm hex drive, 3/8" drive

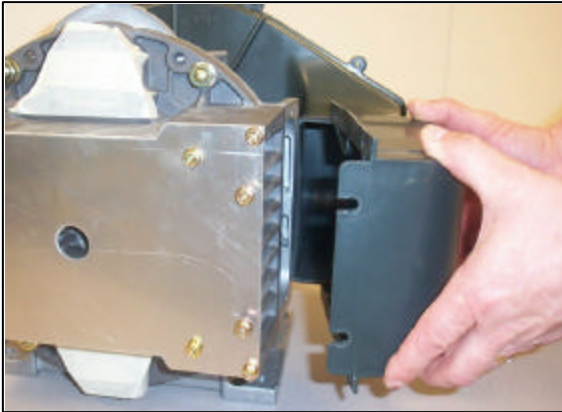
Materials

(For all size Scroll compressors)

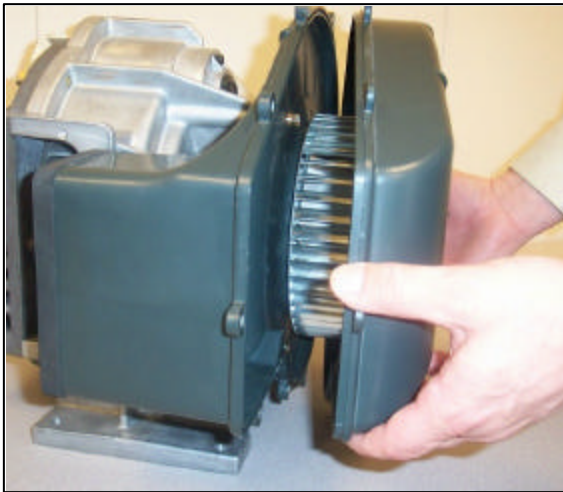
<u>Item</u>	<u>Description</u>
Bearing Grease	GRS01-007
Hexane Solvent Equivalent	Kwik-Solv
Two feet of String	Nylon
Masking Tape	
Compressed Air	
Tip Seal Kit 2-3hp	609758324
Tip Seal Kit 5-15 hp	609758395

3.0 Scroll Compressor Disassembly

1. Clean the compressor piping connection areas, so that dirt will not enter into the piping or compressor during removal and installation.
2. Remove the compressor from the package.
3. Cover the open inlets of the compressor with tape, so that dirt will not enter into compressor.
4. Remove the side air duct by removing six M6 Philips head screws. Note: this duct can be used to hold screws and bolts removed from the compressor during disassembly.



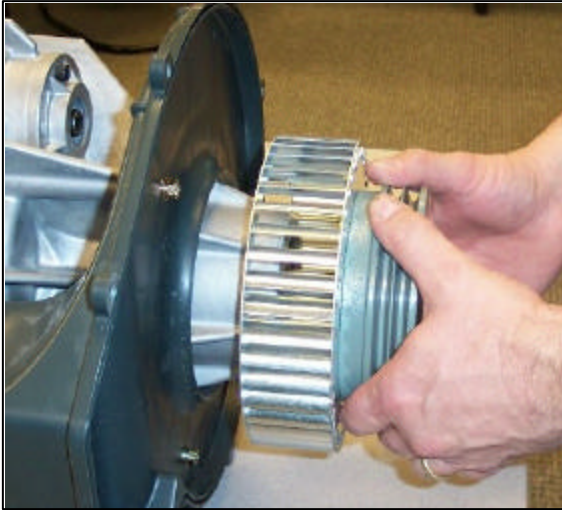
5. Remove the outer fan shroud by removing eight M6 self-tapping screws.



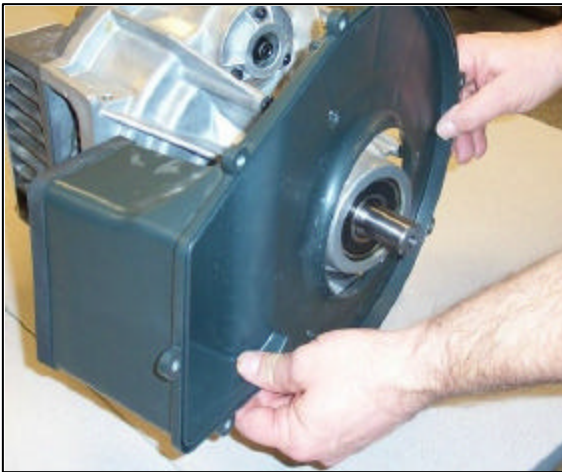
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6. Remove the compressor pulley/cooling fan assembly by removing the M10 bolt and sliding the assembly off of shaft. If the pulley will not come off by hand, the use of a puller may be required. Remove shaft key and place with other nuts and bolts.

NEVER TAKE THE PULLEY OFF BY HITTING THE SHAFT WITH HAMMER.



7. Remove the inner fan shroud by removing three M6 hex head cap bolts.

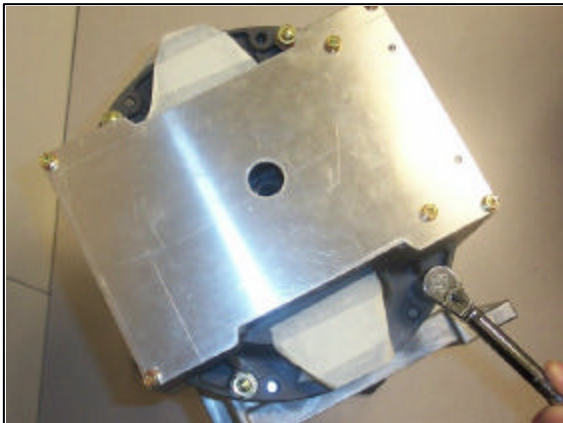


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8. Mount the scroll compressor on the stand (part # 3K-5562) and fasten it in place (bolts are part of stand). The stand is designed to fit both size scrolls by repositioning the leg supports onto the opposing bolt pattern.



9. Clean the cooling fan/pulley assembly, stationary and orbiting scroll and overall compressor, so as not to allow dirt to enter into the scroll compressor. Compressed air can be used to blow loose dirt and dust off of compressor. **MAKE SURE THE COMPRESSOR INLETS ARE COVERED WITH TAPE.**
10. Remove the stationary scroll
11. Remove the four M10 nuts and washers.



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12. Lift the stationary scroll vertically off compressor. If the part is not lifted straight up, the dowel pins will bind and the part will not come off. If this happens, push the stationary scroll back down into place and lift again. You may have to place the fixture/scroll on the floor to get proper leverage. Be careful not to damage scrolls by forcing the stationary scroll misalignment. **DO NOT HIT ANY PART OF COMPRESSOR.**



13. Remove the face seal and tip seals on both the stationary and orbiting scrolls.
MAKE SURE YOUR HANDS ARE CLEAN.
14. Use a pointed tool like a mechanical pencil or a metal scale.
BE CAREFUL NOT TO SCRATCH SCROLL LAPS.

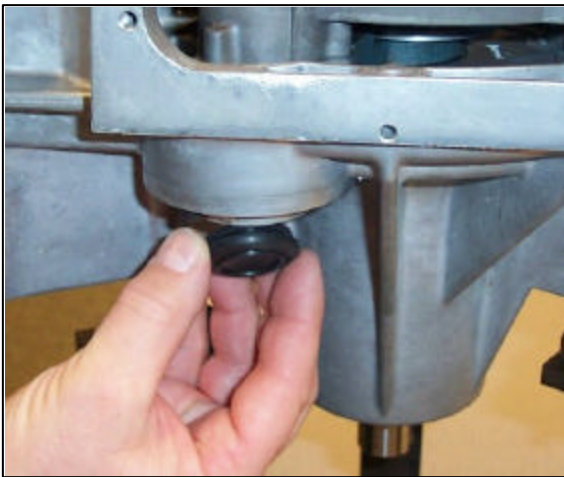


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15. Remove the air release set screw located opposite the balance weight on a main crankshaft by using special tool #7K1106.



16. Remove three rubber dust covers located at support cranks of the casing.



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17. Loosen and remove three M10 socket head bolts and washers from support cranks. Be sure not to lose washers. Use the shaft stopper to hold the main shaft from turning.

NOTE: DO NOT REPLACE WASHERS WITH STANDARD WASHERS.



18. Remove the orbiting scroll by lifting it vertically. If the scroll cannot be removed smoothly, turn the main shaft by hand. Place the orbiting scroll face down on a soft, smooth surface (cardboard, towel, etc). Do not allow the scroll laps to be scratched.

NEVER REMOVE PARTS THAT ARE NOT INSTRUCTED TO BE REMOVED IN THIS MANUAL.

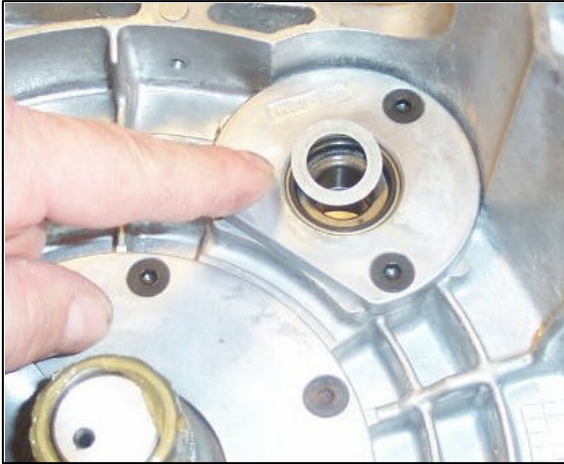


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19. Check to see if any support crank shims have stayed on the support cranks. If so, remove them and place them back on the bearings.

*****BE VERY SURE TO REPLACE THEM EXACTLY WHERE THEY CAME FROM***.**

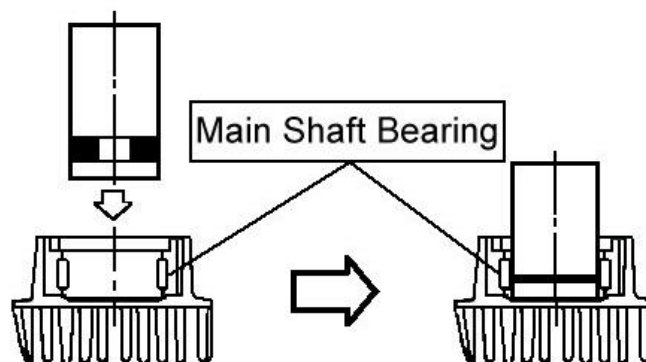
There may not be the same quantity/thickness of shims at all three support bearing locations and they are not interchangeable.



20. Inspect the compressor for damage.
21. Check rotation of bearings. Make sure they feel smooth with no rough spots.
22. Check the condition of the scrolls. Any shiny spots (aluminum color) on the scroll face or side is evidence that there has been contact or rubbing of the scrolls. If there is any damage or evidence of contact – the compressor cannot be repaired and must be replaced.

4.0 Grease the Main Bearing

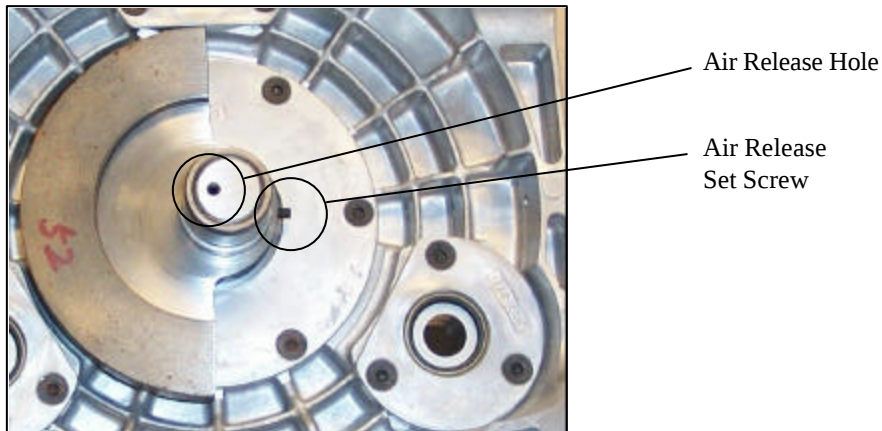
1. Fill the main shaft bearing with hexane or equivalent solvent to dissolve the grease.
CAUTION: BE SURE TO REMOVE ALL OF THE GREASE – INCLUDING THE GREASE INSIDE THE LIP SEAL.
2. Leave the solvent in the bearing for 5 to 10 minutes, turning rollers and stirring occasionally.
Drain the solvent.
3. Repeat the previous step if there is any grease left in the bearing.
4. Dry the bearing with compressed air.
CAUTION:
 - a. **DO NOT USE A TOWEL OR RAG INSIDE THE BEARING.**
 - b. **USE AIR AT A LOW PRESSURE**
 - c. **DO NOT BLOW AIR DIRECTLY AT THE BEARING ROLLERS** (to keep dust and lint particles out of bearing).
5. Grease the main shaft bearing with approved grease only (GRS01-007)
6. Open the grease filler completely and fill the gap with grease.
7. Insert the filler into the main shaft bearing and push down with your hand to completely dispense all of the grease.
8. Repeat this grease process.
9. If there is any grease that pulls out with grease filler, put back into the bearing with your finger.
CAUTION: MAKE SURE THAT ALL OF THE GREASE IS APPLIED TO THE BEARING.



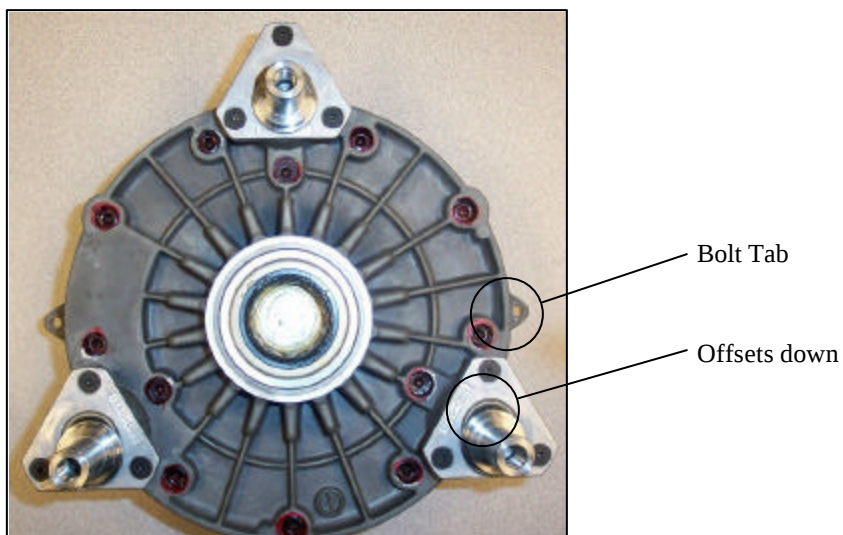
5.0 Tip Seal Replacement and Re-Assembly

5.1 Installing the orbiting scroll.

1. Blow air through the air release hole of the main shaft to remove any grease that may block the hole.
CAUTION: MAKE SURE THE AIR RELEASE HOLE IS NOT PLUGGED.
2. Start the air release setscrew in its threaded hole by about 2 threads. (This will allow the air to escape during orbiting scroll assembly and have the setscrew in place when it is time to tighten.)

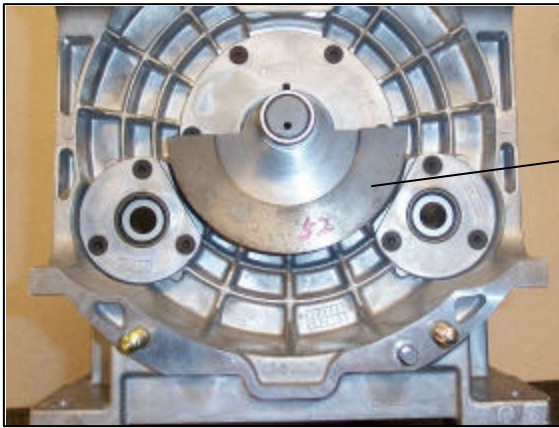


3. Set the three support cranks with the offset pointing down as shown. The two bolt tabs should be on either side, with the single support crank located at the top.



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4. Set the position of the main crank balance weight to the bottom.



Crank Balance
Weight

5. Install the orbiting scroll, carefully lowering it onto the case. If the scroll does not drop completely in place, turn the main shaft by hand while pushing gently down on the scroll. Scroll is fully in place when it is flush with casing face.



6. Clean the three support crank socket head bolts and washers of any loctite using soft wire brush.
7. Install the three support crank washers and socket head bolts and tighten by hand.
8. Snug lightly with wrench, the three support crank socket head bolts.

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9. Tighten the three support crank socket head bolts in a clockwise repeating order, using this torque process:
 - 9.1. Torque all three bolts (one at a time in a clockwise rotation) to 108 in/lbs (12.5 Newton Meters).
 - 9.2. Torque all three bolts (one at a time in a clockwise rotation, starting with the same bolt as previous step) to 156 in/lbs (17.5 Newton Meters).
 - 9.3. Torque all three bolts (one at a time in a clockwise rotation, starting with the same bolt as previous step) to 216 in/lbs (25.0 Newton Meters).



10. Rotate the main shaft so that the air release set screw lines up with the access hole.
11. Tighten set screw using special tool 7K-1106.



12. Install three rubber covers to protect the support crank bearings.

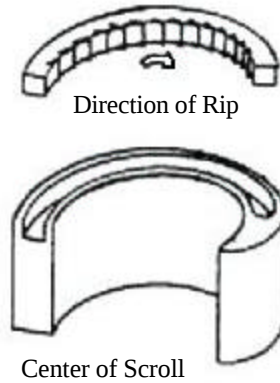


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5.2 Installing the tip seals.

CAUTION: MAKE SURE YOUR HANDS ARE CLEAN – NO GREASE ALLOWED!

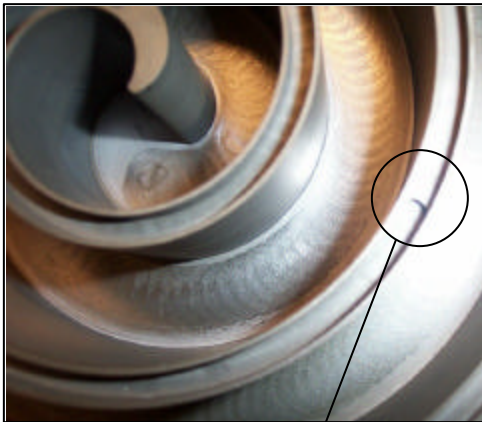
Note: Orbiting scroll tip seals and a stationary scroll tip seals are different. Make sure they are installed in the correct direction (smooth side up).



1. Install the **inside** tip seals for both the orbiting and stationary scrolls.

Note: start with the trailing end of the inside tip seal (farthest from center), install tip of seal in groove and slide towards the step in the seal groove. Work the rest of the seal into place with your finger.

MAKE SURE YOUR FINGERS ARE CLEAN – NO GREASE!



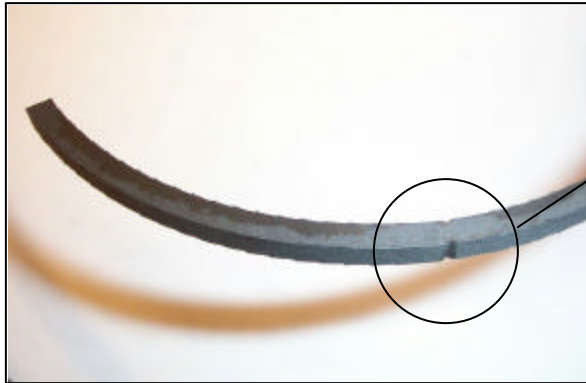
Step

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2. Install the outside tip seals for both the orbiting and stationary scrolls.

Note: Align the notch in the outer tip seal with the corresponding notch in the seal groove. Work the rest of the seal into place with your finger.

CAUTION: DO NOT LEAVE A GAP BETWEEN THE INSIDE AND OUTSIDE TIP SEALS.



Notch located in outer tip seal



Notch locators in outer tip seal



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5.3 Installing the face seal.

1. Insert the back up tubing in face seal groove.
2. Insert the face seal

CAUTION: MAKE SURE THE SPLITS IN THE FACE SEAL AND BACK UP TUBING ARE STAGGERED AT 180°.

Note: The face seal may fall out during stationary scroll assembly (when you turn it over), It may be necessary to straighten the face seal so that once installed, it will remain in place.



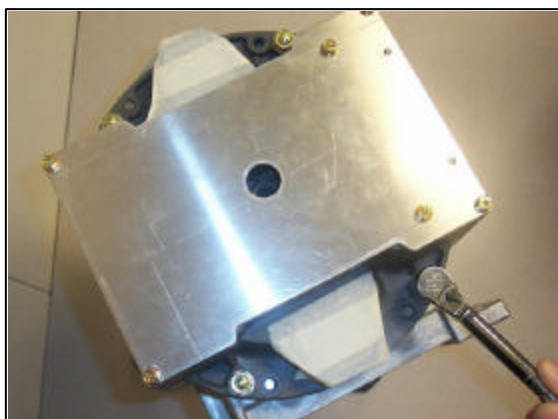
5.4 Assembling the stationary scroll onto the casing.

1. An arrow near the upper inlet opening will show which way is up. Carefully lower the stationary scroll onto the compressor. Align with the two guide pins. It is necessary to slide the stationary scroll down straight or it will bind on the guide pins.

CAUTION: ONCE INSTALLED, THERE SHOULD BE LESS THAN .020" GAP BETWEEN THE STATIONARY SCROLL AND THE CASING. If the gap is more than .020" or is not parallel, there is a possibility that the tip seals are not properly installed or face seal has fallen out during this step. **IN THIS CASE, NEVER TIGHTEN BOLTS** - remove the stationary scroll and find out the cause for the gap.



2. Install the four washers and four M10 nuts. Tighten nuts by hand and then tighten with a torque wrench using the same 3 step method as in step 5.1.9. First at 108 inch pounds, then 156 inch lbs, then 216 inch lbs.



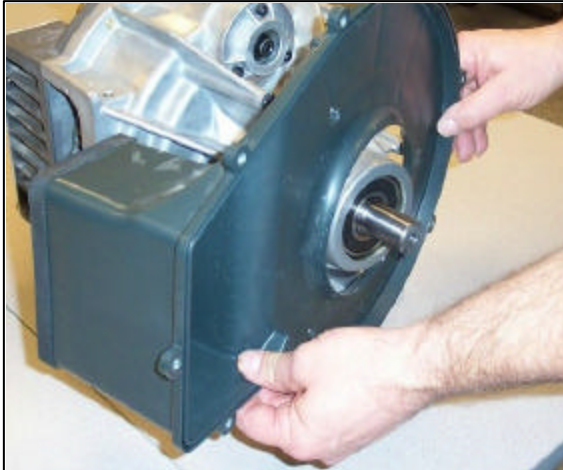
3. Turn the shaft by hand to confirm smooth rotation. If a rub or hard spot is felt, the orbiting scroll must be re-torqued as follows:
 - 3.1. Loosen the four M10 nuts fastening the stationary scroll – do not remove.
 - 3.2. Loosen three support crank socket head bolts.
 - 3.3. Rotate the main shaft at least 2 revolutions.
 - 3.4. Hand tighten and then torque the three support crank socket head bolts as instructed in step 4.1.9.
 - 3.5. Hand tighten, then torque the four stationary scroll nuts as instructed in step 4.5.2.
 - 3.6. Rotate the shaft by hand again to check for smooth rotation.

Note: If you find a hard spot or rub, repeat the torque sequence of the orbiting scroll socket head bolts – but start the sequence with a different bolt.

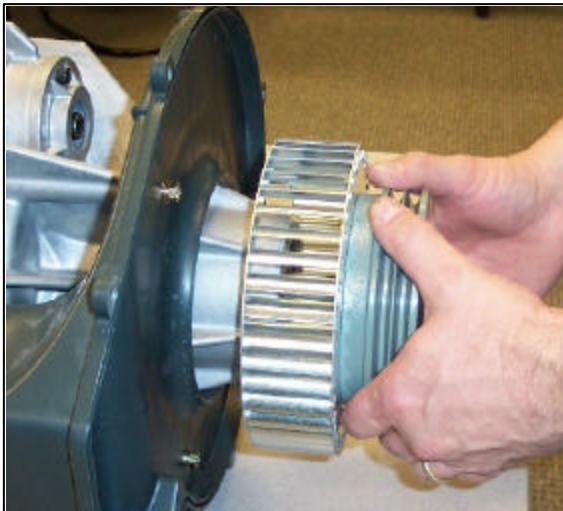
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5.5 Final Assembly

1. Remove the compressor from the stand.
2. Install the inner fan shroud.
3. Tighten three pieces of M6 cross-recessed head screws.



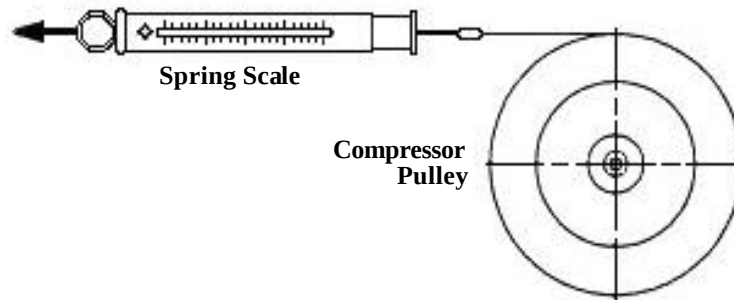
4. Install the pulley/cooling fan assembly and key onto shaft.
CAUTION: DO NOT STRIKE THE PULLEY TO INSTALL IT.



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5. Measure the shaft rotation torque.
6. Coil a piece of string around the pulley in a counterclockwise rotation and connect the spring scale to it.
7. Pull the spring scale slowly and monitor the reading. Turn the pulley more than one complete turn.
8. Record the average measurement of the spring scale.

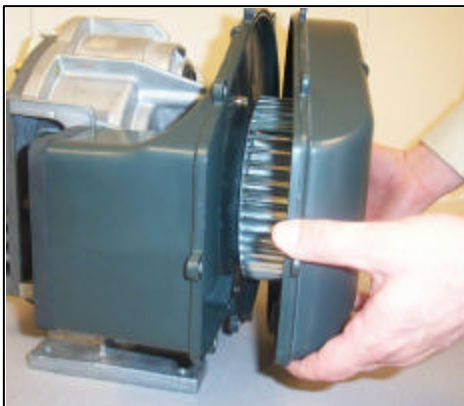
CAUTION: IF THE SCALE READING EXCEEDS THE MAXIMUM SHAFT TORQUE, THERE IS INTERNAL PUMP RUB. PLACE THE COMPRESSOR BACK ON THE STAND AND REPEAT STEP 5.4 step 3.



Take an average reading of one complete revolution

Model	Shaft Torque
SRL-2.2C/5.5C	Less than 5 pounds

9. Install the outer fan shroud.
10. Tighten self tapping screws.



11. Install the side air duct.
12. Tighten the six M6 screws.

