



Engineering and Manufacturing
Premium Oil Free Compressors

Reed Valve maintenance procedure



This text and accompanying photographs are for a third stage valve and head assembly from a SA high pressure air compressor. This procedure applies to:

- SA-3, stages 2 & 3
- SA-6B, stage 2 & 3
- 4VX4, stages 3 & 4 (Tube fitting instead of center plug)
- 4V4, stages 2, 3 & 4
- And others

This level of maintenance is normal and is considered routine for a compressor that is in constant use. Reasons for repair include:

- Fouled valves
- O-ring leakage

Some considerations before getting started

This text is directed to those using this assembly and the compressor in a breathing air environment. A person attending to this maintenance must possess a thorough understanding of the requirements for cleanliness of a breathing air system.

Prior to starting, have on-hand all the necessary parts to complete this activity. At minimum, new o-rings should be available.

Great care must be taken to protect the critical surfaces in the o-ring seal area.

During the cleaning phase of this operation:

- Use a mild detergent, "Joy" soap or the equivalent, and generous amounts of hot water (grade C, which is usually, tap water, or better).
- Rinse immediately, using generous amounts of hot water (grade C, which is usually tap water, or better).
- Dry all, cleaned parts thoroughly. Usually, clean, oil-free compressed air is sufficient. Alternately the parts can be "baked" at 250 (deg. F) for 30 minutes.
- Care must be taken to ensure that the area where the work is to be done does not contribute to further contamination.
- A clean part will be free of visibly detectable surface oils and particles. White light inspection is normally sufficient.

These are the things you will need prior to starting.

1. Wrench for plug
2. Pin punch, 5/16 or smaller
3. Hammer
4. Cleaning supplies (not shown)
5. Oxygen compatible grease
6. Seal tool/pick, P/N 88-5812
7. Tweezers or needle nose pliers



This is a view of the head assembly from the bottom. Notice the deformation of the visible o-ring.



This is the top view and the side that we will start from.

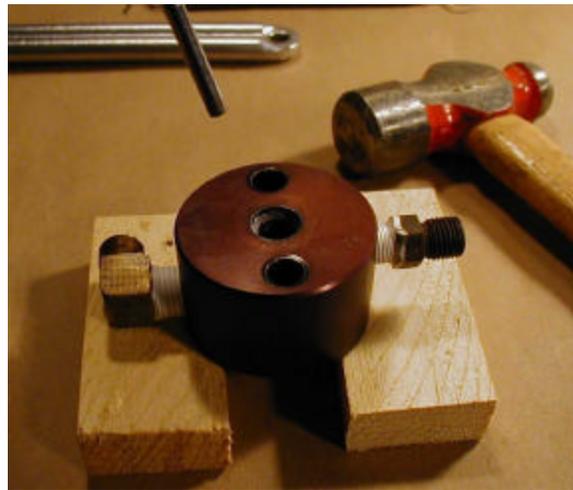


Disassembly

1. Remove this plug to gain access to the backside of the valve assembly.



2. Support the head on wooden blocks or equivalent. Using a pin punch, 5/16" diameter or smaller. Take care to center the punch and avoid damaging the internal threads of the head.



3. Continue to drive the valve assembly until it is free of the head. Take care to ensure that all removed parts are recovered. Gently remove the valve assembly by tapping pin punch with a hammer. Excessive force is usually not required.



4. The valve assembly will come out as a complete unit.



5. This is what it looks like once removed. Notice the "roll pin" at the bottom of the photograph.



6. And here is how it looks once it has been laid out. This is the order, in which it has been disassembled, reverse the order to reassemble.



Cleaning

7. All parts, which come in contact with the gas/air steam, must be cleaned prior to assembly.
 - Use a mild dishwashing detergent "Joy" soap or the equivalent and soft bristle brushes. Clean parts shall be free of all particles and surface oils.
 - Rinse thoroughly with liberal amounts of hot water.
 - Dry all parts thoroughly until all visible moisture has been removed.



Inspection

8. After cleaning, carefully inspect all parts. Identify the sealing surfaces and inspect for signs of deterioration. These areas are:
 - Valve seat – Sealing edges around the suction and discharge ports O-ring seal surfaces
 - Suction and discharge reed valves
 - Internal bore of the head.
 - Sealing surfaces must be free of scratches or deformations, which could provide a leak path.



9. Here is another view. All o-rings pictured here must be replaced. The metal parts are in good condition and will be reused.



Reassembly

10. Reassemble, starting with the first pin.



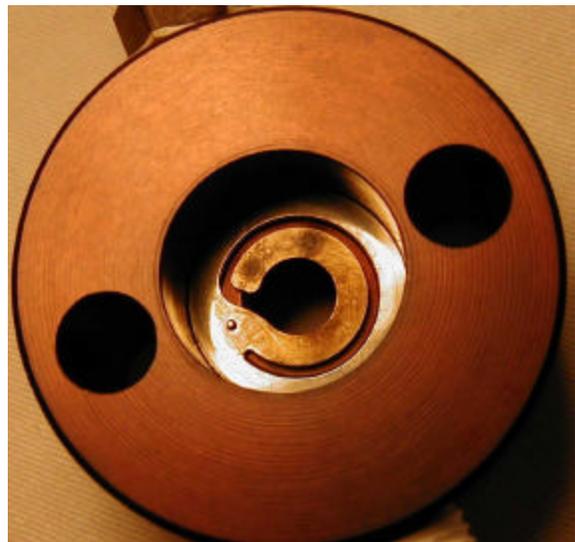
11. Here is a view of the installed pin.



12. Carefully observe the orientation of the discharge valve. The discharge side of the valve seat has only one set of (four) holes.



13. Ensure that the correct orientation is maintained as the discharge valve is installed in the head.



14. Install the first o-ring.



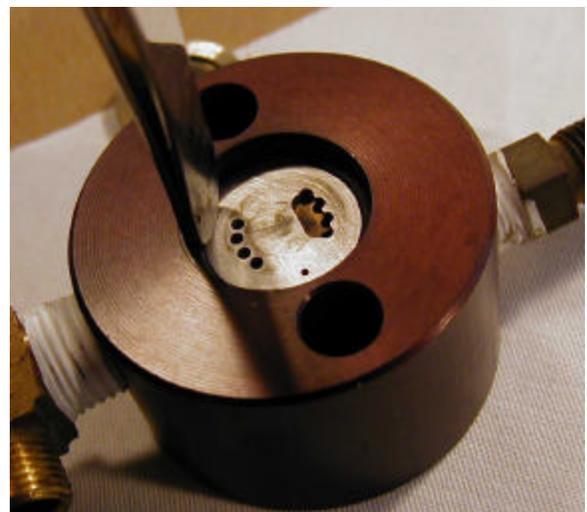
15. Install the valve seat. Observe that the side with two sets of ports will be facing out. **Very important!** Ensure correct roll-pin alignment between head and valve seat.



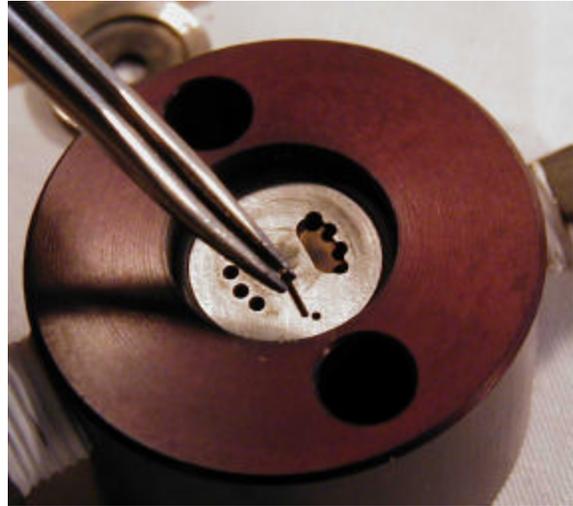
16. Install the second o-ring. The o-ring should already have a light coating of lubricant. Gently place the o-ring inside the head. Using the valve stop as an insertion tool, carefully press the o-ring fully into place.



17. Ensure that it is fully seated, using a blunt tool. Care must be taken to ensure that the internal bore of the head is not scratched.



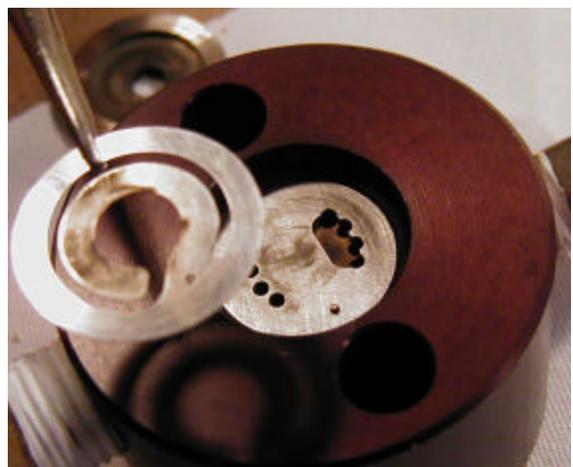
18. Install the second pin.



19. Ensure that it is fully seated.



20. Install the inlet valve. Note that the end of the inside “circular reed” aligns with the suction ports.



21. Verify that the inlet reed is fully seated and that no gaps exist between the reed and the seat.

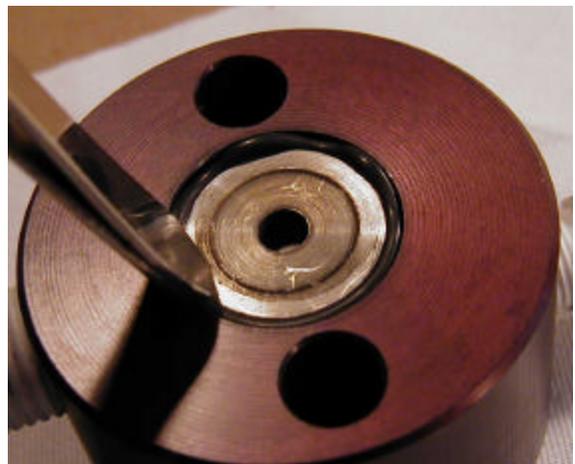


22. Install the valve stop.

- Note: The valve stops on some models, have a which must align with the second roll pin.



23. Install the third o-ring.



24. The completed assembly will look like this. Re-install the plug, which was removed in step #1. Verify valve function by applying low pressure air (less than 5 psi) to the inlet side of the head. Air should flow freely. Next, apply the low pressure air source to the discharge side. No air should flow. If the head is not to be reinstalled on the compressor immediately, take care to prevent contamination while in storage.

