

4, 6 & 8 PASS OVER-THE-SHAFT HIGH TEMPERATURE PNEUMATIC ROTARY UNION SEAL REPLACEMENT FOR GEMCO DRYERS

Gemco high temperature dryer pneumatic rotary unions are typically made in four, six and eight pass configurations. **Not all passes are always utilized.** For instance a four pass may only have three lines connected or a six pass may only use five lines, etc.

Basic construction of the rotary union consists of:

- a. an inner adapter sleeve against the vessel shaft (item #1);
- b. a main air sleeve over the inner adapter sleeve with NPT tapped connections for the air line connections to the rotating vessel (item #2);
- c. a stack of repeated parts is assembled outside the main air sleeve and held together on the sleeve by four threaded rods with double jam nuts (item #3) running end to end of the rotary union parallel to the vessel shaft; the stack consists of:
 1. two anti rotation pins (item #4), one each end of the stack, to prevent the stack from rotating with the sleeve during vessel operation
 2. two snap rings (item #5), one each end, notched into the main air sleeve positioned to retain the carbon bearings (item #6) and keep the entire stack aligned in place on the sleeve;
 3. two end caps (item #7), one each end, to house the carbon bearings and serve as the end stops for the entire stack;
 4. eight (for a four-pass rotary union), 12 (for a six-pass rotary union) or 16 (for an eight-pass rotary union) flanged seals (item #8) are interspersed in the stack to provide one on each side of each air passage ring;
 5. four, six or eight (corresponding to the number of passes in the rotary union) air passage rings (item #9);
 6. and three, five or seven (again according to the number of passes in the rotary union) bleed caps (item #10) which are between any two passes and provide weep holes so that a leak in one passage does not affect a neighboring passage.

The following procedure for seal replacement applies to all three sizes, four six and eight pass. The accompanying illustration depicts a four pass rotary union but both the illustration and the text below apply equally to the six and eight pass unions as well. All the construction and operations are the same except that the journal is longer with more segments to remove and more seals to replace.

Depending on the actual layout of the machine, **the union may be able to be repaired in place after partial disassembly** or may have to be completely removed for repair. The following descriptions refer to complete removal but the mechanic may find removal of the journal is not required and thus save time by not removing inner journal and the air lines connecting to the rotating vessel.

Refer to the attached illustrations for identification of the components mentioned below.

1. Lock out the electrical control panel for the unit.
2. Secure the vessel and then remove the air supply from the blender and bleed down all air pressure on the machine.
3. Disconnect the air line connections (item #1) to the outer sleeve (item #2) of the rotary union. Note the port numbers to ensure they are replaced in exactly the same locations.
4. Remove any positioning cams or other components mounted outboard of the rotary union that would prevent the rotary union from being removed. Note and mark the position of each component before doing so to ensure proper re-assembly later.
5. Drain the heating media from vessel (heat transfer fluid).
6. Disconnect and remove the two-pass end-of-the-shaft heating media rotary union from the end of the vessel shaft.
7. Remove the rotary union from the vessel shaft. In some designs, the adapter sleeve (item #1) and main air sleeve (item #2) are keyed together with a pair of axial set screws (item #11) and use common set screws (item #12) to attach to the vessel shaft. In this design, remove both the adapter sleeve and the main air sleeve at once (after loosening the set screws—item #12). In units without the axial set screws (item #11), the main air sleeve (item #2) can be removed from the vessel leaving the adapter sleeve (item #1) in place.
8. Place the rotary union in an upright position with the outboard end of union on the bench and the air line fittings facing up.
9. Remove the exposed jam nuts (item #3) from threaded rod ends pointing up.
10. Remove top snap ring (item #5). Be careful in the process not to damage the fragile carbon bearing next to it.
11. Before proceeding with disassembly, put a scribe mark on the entire length of the union. This will locate each part during re-assembly. Also put a direction arrow on each part to get them back in the same location and orientation. It can also be very helpful to number all the components in order from one end to the other to assist with re-assembly.
12. Removal of the carbon bearing (item 6) must be done with extreme care since it is quite brittle. Sometimes it comes out easiest alone, other times, remove it by gently removing the end cap (item #7) with the bearing still in place. Note that the carbon bearing may or may not be of a split bearing.
13. Remove end cap (item #7) if it was not removed above with the carbon bearing.
14. Remove the first flanged seal (item #8).
15. Remove first air passage ring (item #9).
16. Remove another flanged seal (item #8).
17. Remove the first bleed cap (item #10).
18. Repeat the above steps 14 through 17 until you reach the second end cap (item #7). Keep the parts in order to ensure they go back in the same relative positions without being turned over, interchanged, etc.
19. Remove the threaded rods (item #3) without loosening the nuts.
20. Turn the entire rotary union end for end on the bench.
21. Remove the second snap ring (item #5).
22. Remove the second carbon bearing (item #6).
23. Remove the second end cap (item #7).
24. Inspect each component very carefully for signs of wear or damage. Pay special attention to the flanged seals (item #8), carbon bearings (item #6) and main air sleeve (item #2). Replace all components that show any signs of wear. Do not put back a marginal component and have to go through this entire procedure and downtime for possibly one more month of life in a questionable part!
25. Re-assemble in reverse order taking great care not to damage any component and getting them all back in the exact same orientation. A light film of oil on the outside of the main air sleeve (item #2) can ease assembly, if the process allows.