



Installation Instructions

AD-9® AIR DRYER PURGE VALVE MAINTENANCE KITS - HARD SEAT AND SOFT SEAT STYLES

AD-9® Air Dryer

Purge Valve Assembly

Gasket

Extended Exhaust Cover (optional)

Silencer and Adapter (optional)

Purge Valve Assembly

Purge Valve Assembly

Purge Valve Housing

Kit Contents		
Item	Description	Qty
1	O-ring - small	1
2	O-ring - medium (not needed for DLU style purge valve)	1
3	O-ring - large	1
4	Quad Ring	1
5	Piston Assembly	1
6	Return Spring	1
7	Purge Valve	1
8	Exhaust Guide	1
9	Shoulder Bolt	1
10	Washer	3
11	Screw	3
12	Assembly Tool (see Figure 4)	1
13	Lubricant (not shown)	1

IMPORTANT: Prior to assembly of any kit, coat all o-rings, o-ring grooves and bores with the supplied lubricant(13).

CLEANING AND INSPECTION

1. Using mineral spirits or an equivalent solvent, clean and thoroughly dry all metal parts.
2. Inspect the interior and exterior of all metal parts that will be reused for severe corrosion, pitting and cracks. Superficial corrosion and/or pitting on the exterior is acceptable.
3. Inspect the bores of both the end cover and the purge valve housing and seats for deep scuffing or gouges.
4. Inspect the purge valve piston seat for excessive wear.
5. All o-rings removed should be discarded and replaced with new o-rings provided in this kit. Any component exhibiting a condition described in steps 1 through 4 should be replaced.

Purge Valve Assembly Removal

(Refer to Figure 1)

1. Disconnect the vehicle wiring harness connector that mates with the connector on the purge valve assembly. Make sure the connector seal is present on the wire harness. Refer to Figure 7.
2. If a silencer is installed, pull the silencer down away from the end cover to remove it.
3. Remove and discard the three 1/4" self-tapping screws(11) that secure the purge valve assembly to the end cover and the 3 flat washers (10), if present. Note: Bendix® AD-9® air dryers with extended covers do not have flat washers(10).
4. *NOTE: In some cases a flat (non-extended) exhaust cover is used. This cover should be left intact while servicing the purge valve assembly. However, if an extended type exhaust cover is in use to accommodate the attachment of an exhaust hose or silencer, the exhaust cover must be carefully peeled off the purge valve housing. USE A THIN FLAT BLADE TO PRY THE EXHAUST COVER OFF. TAKE CARE NOT TO DAMAGE THE POTTING MATERIAL (RTV SEALANT) OR GASKET UNDER THE COVER.* If the seal is damaged during removal, repair with silicone sealant (Dow Corning 736 or 732 RTV) or replace the extended cover assembly.
5. Pull the purge valve assembly out of the end cover. Discard o-rings 1, 2 and 3. Note: O-rings 1 and/or 2 may be lodged in the end cover bores, be sure to remove these. Note: DLU style purge valves do not have an o-ring(2) or an o-ring groove in the purge valve housing. Refer to Figure 2.

PURGE VALVE DISASSEMBLY

When servicing an AD-9® air dryer purge valve, it is possible that one of the older style assemblies could be found. If the purge valve assembly is an older style, as shown in Figure 3, disassemble the entire assembly and retain the purge valve housing. All of the other components must be discarded. Do not attempt to reuse any of these components along with the new kit.

1. While depressing the piston assembly(5) with the assembly tool(12), loosen and remove the shoulder bolt(9) using a 3/8" socket. See Figure 4.
2. Remove and discard all components (items 4 through 9) except the purge valve housing. Before discarding the piston assembly(5), determine if the piston assembly being removed is a hard seat or soft seat style. Refer to Figure 5.
3. Clean the purge valve housing using a commercial solvent. Thoroughly wipe the inner diameter to remove any residue. Thoroughly dry the purge valve housing before reuse. Inspect for corrosion, pitting and damage to the purge valve housing. Inspect the purge valve seating and turbo cutoff valve seating area in the purge valve housing for deep scratches and gouging. Replace the entire purge valve assembly if these conditions are noted and would prevent sealing. Note: Light exterior pitting is acceptable.

PURGE VALVE ASSEMBLY

The components in this kit may be different from those removed or may have been assembled in a different order. This kit brings the purge valve up to new design standards. For the assembly process, refer to Figure 1 unless otherwise noted.

1. Verify the piston assembly type (hard or soft seat) included in this kit is the same as the one removed.
WARNING: Damage to the air dryer may result if a hard seat piston assembly is used to replace the soft seat type. Refer to Figure 5.
2. Place the return spring(6) in the bore of the purge valve housing.
3. Using the lubricant(13) provided, lubricate the quad-ring(4) and the quad-ring groove of the piston assembly(5). Install the quad-ring(4) on the piston assembly(5). Warning: Take care not to twist the quad-ring(4). Refer to Figure 6.
4. Insert the piston assembly(5) with the quad-ring (4) into the I.D. of the spring inside the purge valve housing.
5. Place the larger diameter of the purge valve(7) on the smooth "cupped-side" of the exhaust guide(8). Lightly press these two pieces together then place them over the shoulder bolt(9). Insert these components into the bottom of the purge valve housing. For appropriate orientation refer to Figure 4.

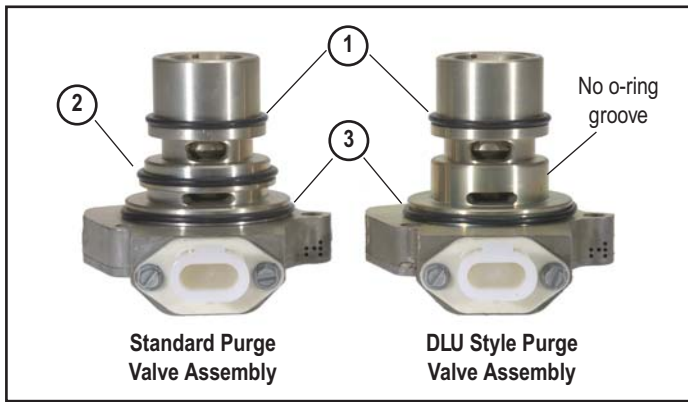


Figure 2 Standard and DLU Style Purge Valve Assembly Identification

6. Place the assembly tool(12) in the piston assembly's tool slot and press the piston down until it bottoms out in the purge valve housing. See Figures 4 and 5. (The assembly tool may be held in a vise, if needed.) While depressing the purge piston with the assembly tool, torque the shoulder bolt to between 60-80 in. lbs with a 3/8" socket wrench.
7. Lubricate the o-rings(1, 2 and 3) and the o-ring grooves of the purge valve housing using the lubricant(13) provided. Note that there are three sizes of o-rings. The smallest is o-ring(1), the middle size is o-ring(2) and the largest is o-ring(3). Install all three o-rings in their respective o-ring grooves on the purge valve housing. Use care to not twist the o-rings. Note that DLU style purge valves do not use o-ring(2). Refer to Figure 2.

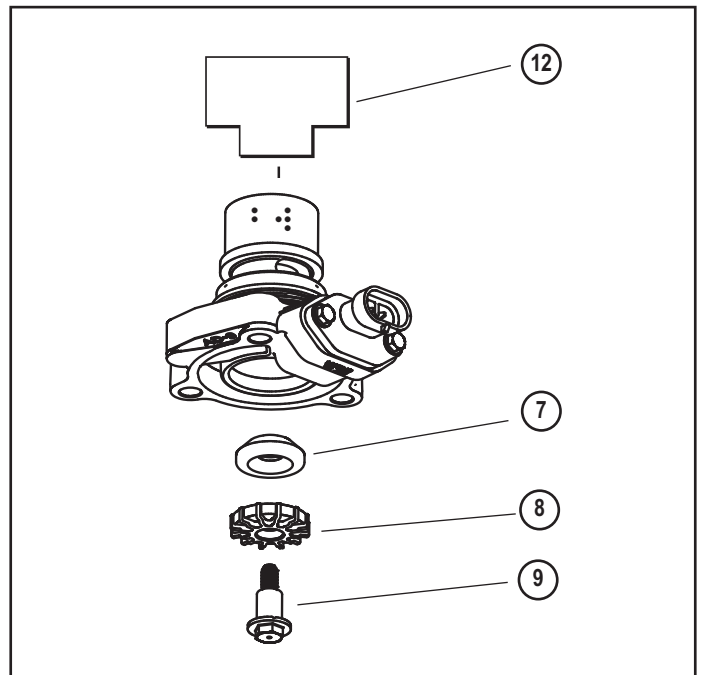
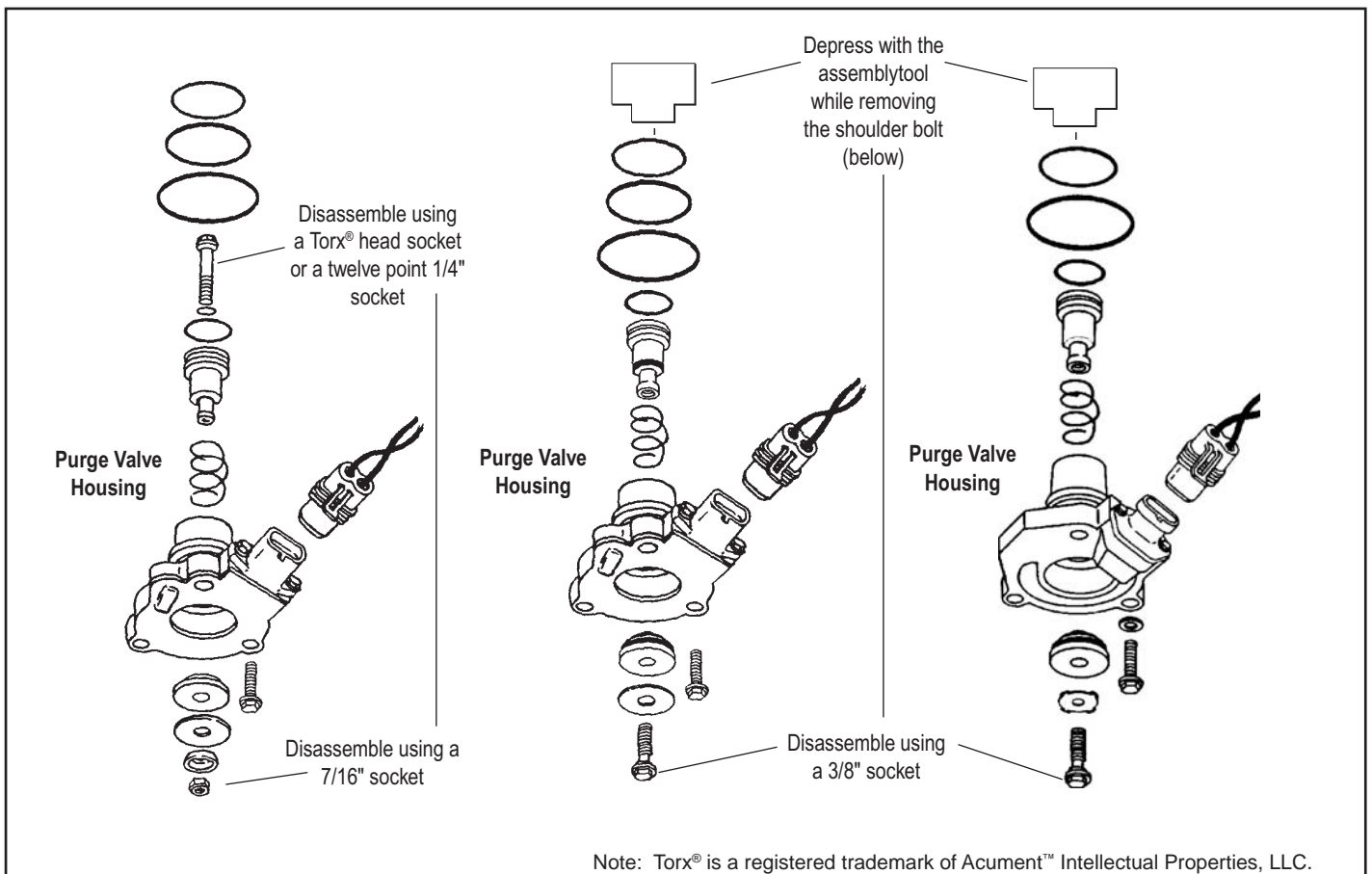


Figure 4 Purge Valve Disassembly



Note: Torx® is a registered trademark of Acument™ Intellectual Properties, LLC.

Figure 3 Three Older Style Purge Valve Assemblies

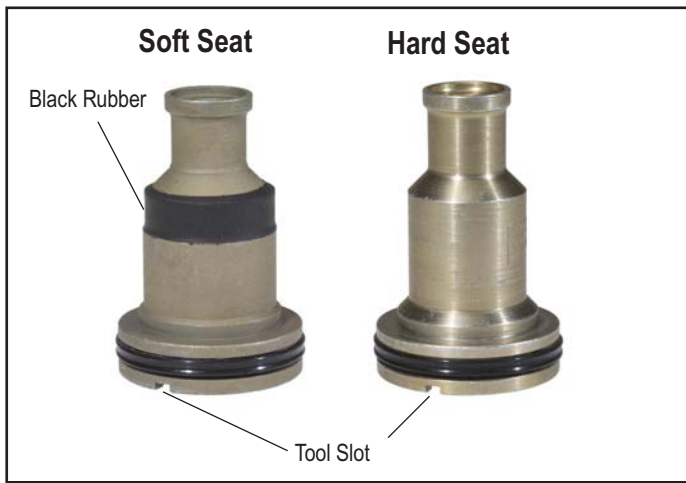


Figure 5 Piston Assembly Identification

8. Lubricate the air dryer bore for the purge valve assembly. Important: Use only the lubricant(13) packaged with this kit.
9. Install the purge valve assembly in the end cover. Make certain to orient both parts so that the connector is approximately 10 degrees clockwise from the supply port. Making certain the purge valve assembly is fully seated against the end cover. CAUTION: Carefully ease the purge valve assembly into position (using a gentle twisting motion if necessary). Do not force the purge piston as serious damage may be caused to the quad-ring(4).
10. If replacing an extended exhaust cover, verify the gasket was not damaged during removal. If necessary, repair with silicone sealant (Dow Corning 736 or 732 RTV) or replace the extended cover assembly. Install the extended cover on the purge valve assembly aligning the cover with the contour of the purge valve housing.
11. Secure the purge valve assembly and/or extended exhaust cover to the end cover using the three 1/4" self-tapping screws(11) and 1/4" washers(10), if applicable. The 1/4" washers(10) should not be used with the extended exhaust cover. Start all three screws by hand then torque to 85 - 125 in. lbs.

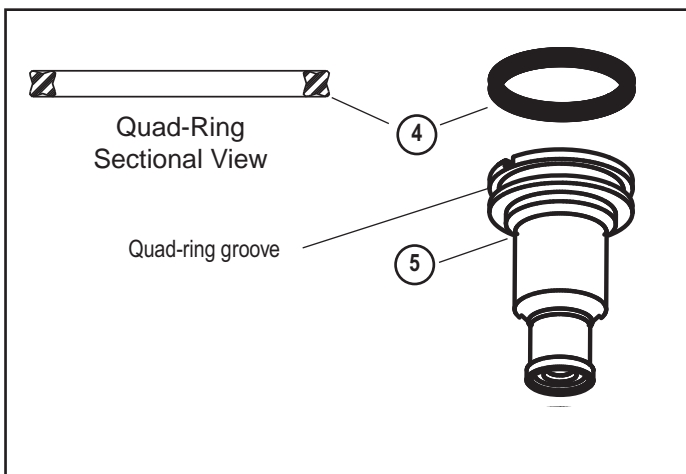


Figure 6 Quad-Ring and Piston Assembly

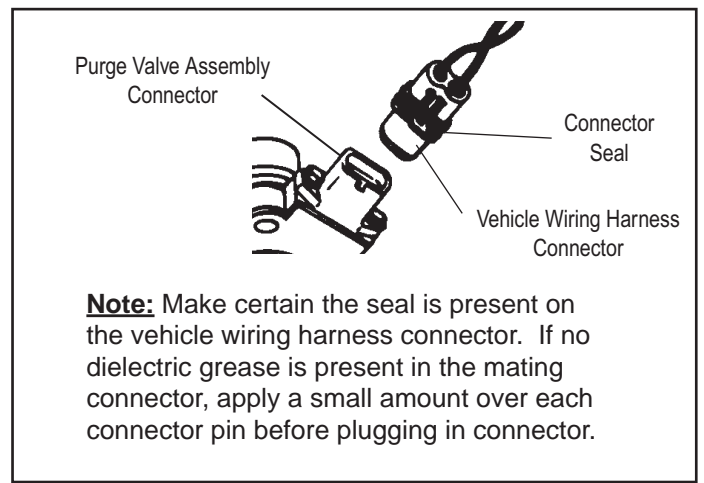


Figure 7 Purge Valve Assembly & Wiring Harness Connectors

Note: Make certain the seal is present on the vehicle wiring harness connector. If no dielectric grease is present in the mating connector, apply a small amount over each connector pin before plugging in connector.

12. Test for vehicle power at the two pins of the vehicle wiring harness connector. The vehicle battery voltage should be detected with the ignition ON. If voltage is not detected, check for broken or pinched wiring.
13. Re-connect the vehicle wiring harness connector to the purge valve assembly. (Refer to Figure 7 and read all notes.)
14. Complete the Operation and Leakage Tests to verify the air dryer is functioning properly.

OPERATION AND LEAKAGE TESTS

1. Close all reservoir drain cocks. Build up system pressure to governor cut-out and note that Bendix® AD-9® air dryer purges with an audible escape of air. "Fan" the service brakes to reduce system air pressure to governor cut-in. Note that the system once again builds to full pressure and is followed by an AD-9 air dryer purge.

OPTIONAL OPERATION AND LEAKAGE TESTS

1. Test the delivery port check valve by building the air system to governor cut-out and observing a test air gauge installed in the #1 reservoir. Check all lines and fittings leading to and from the air dryer for leakage and integrity. A rapid loss of pressure could indicate a failed delivery check valve. To confirm this, bleed the system down and remove the supply and delivery lines from the air dryer. Apply 100 psi of air pressure at the air dryer delivery port while apply a soap solution to the air dryer supply port. Leakage should not exceed a 1" bubble in one second.

2. Check for excessive leakage of the purge valve. With the compressor loaded (compressing air), apply a soap solution to the purge valve housing assembly exhaust port and observe that leakage does not exceed a 1" bubble in one second. If the leakage exceeds the maximum specified, service the purge valve housing assembly.

3. Check the operation of the end cover heater and thermostat assembly during cold weather operation as follows:

A. Electric Power to the Dryer

With the ignition or engine kill switch in the ON position, check for voltage to the heater and thermostat assembly using a voltmeter or test light. Unplug the electrical connector at the air dryer and place the test leads on each of the pins of the male connector. If there is no voltage, look for a blown fuse, broken wires, or corrosion in the vehicle wiring

harness. Check to see if a good ground path exists. Refer to Figure 7.

B. Thermostat and Heater Operation

Turn off the ignition switch and cool the end cover assembly to below 40° Fahrenheit. Using an ohmmeter, check the resistance between the electrical pins in the female connector. The resistance should be between 1.0 and 3.0 ohms for the 12 volt heater assembly and 4.8 to 9.0 ohms for the 24 volt heater assembly. If the resistance is higher than the maximum stated, replace the purge valve assembly, which includes the heater and thermostat (old versions style A & B) or replace the heater and thermostat assembly in the new version purge valve assemblies (standard and DLU style). Warm the end cover assembly to over 90° Fahrenheit and again check the resistance. The resistance should exceed 1000 ohms. If the resistance values obtained are within the stated limits, the thermostat and heater is operating properly. If the resistance values obtained are outside the stated limits, replace the heater or purge valve assembly.

GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR

DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.
2. Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.
3. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
4. If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work

on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.

5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
11. For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.