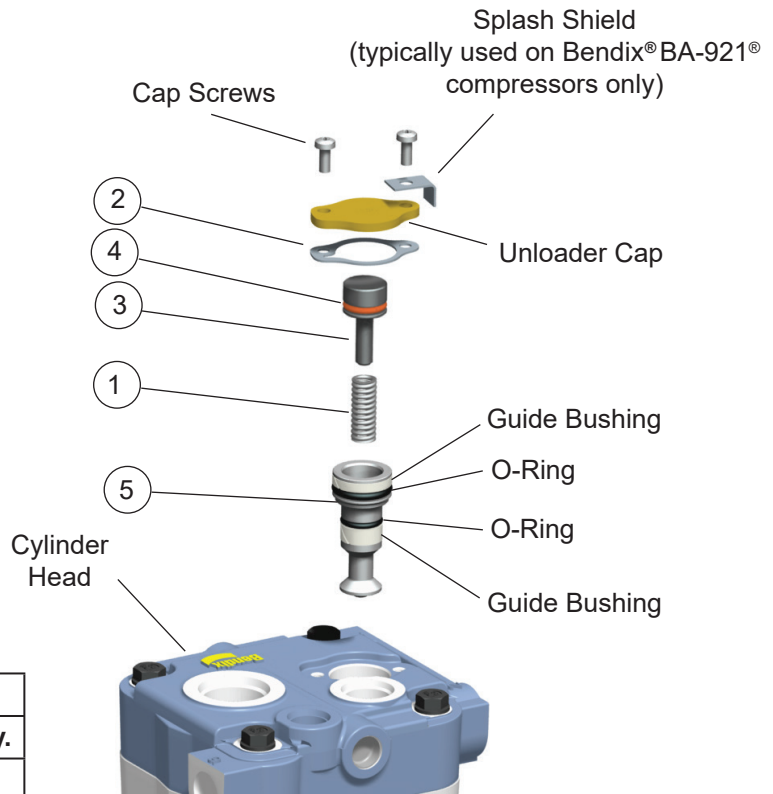


Installation Instructions



ESS UNLOADER KIT



Kit Contents		
Item No.	Description	Qty.
1	Return Spring	1
2	Unloader Cover Gasket	1
3	Balance Piston	1
4	Balance Piston O-Ring	1
5	Unloader Piston Assembly	1
6	Lubricant (not shown)	1

Figure 1 – Unloader Kit Installation Exploded View (Bendix® BA-921® Compressor Shown)



The service kit may include an unloader cap. This should be discarded from the service kit. The unloader cap(s) installed on the compressor must be reused.



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 guidelines should be observed **AT ALL TIMES**:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the 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.
- ▲ 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.
- ▲ 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, a Bendix® DRM™ dryer reservoir module, a Bendix® AD-9si®, AD-HF®, or AD-HFⁱ air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ 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.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ 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.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

VEHICLE PREPARATION



CAUTION

These instructions are general and are intended to be a guide. In some cases additional preparations and precautions are necessary. In all cases follow the instructions contained in the vehicle maintenance manual in lieu of the instructions, precautions, and procedures presented in this document.

1. Block the wheels of the vehicle and drain the air pressure from all the reservoirs in the system.
2. Remove as much road dirt and grease from the exterior of the compressor as possible.

INSTALLING UNLOADER KIT (NOTE: TWO KITS ARE REQUIRED TO SERVICE THE TWO CYLINDER BENDIX® BA-922® COMPRESSOR.)

Refer to Figure 1 throughout the removal and installation.

1. Read the **CAUTION** statement under the VEHICLE PREPARATION heading.
 2. Locate the two screws that secure the unloader cap to the cylinder head and remove any remaining contamination in the area to prevent it from entering the unloader bore.
 3. To restrain the spring force exerted by the return spring (1), hold the unloader cap in place while removing the two screws. Carefully release the hold on the unloader cap until the spring force is relaxed, then remove the unloader cap (and splash shield for the single cylinder Bendix® BA-921® compressor).
- Note: Retain the original unloader cap(s) and splash shield (single cylinder BA-921 compressor only). These parts will be reused.
4. Remove and discard the unloader cover gasket (2).
 5. Remove and discard the balance piston (3), the balance piston o-ring (4), and the return spring (1) from the cylinder head. Then remove and discard the unloader piston assembly (5) along with its two o-rings.
 6. Clean the unloader piston bore in the cylinder head. Inspect the bore. If any damage in the form of scratches, galling, or significant wear is present, then the entire cylinder head must be replaced. Call 1-800-AIR-BRAKE (1-800-247-2725), option 2, for information on availability.
 7. Using the lubricant (6) provided, thoroughly lubricate the balance piston o-ring (4) and the exterior of the balance piston (3). The balance piston o-ring (4) is brown whereas the o-rings that install on the outside of the unloader piston assembly (5) are black.

When installing the balance piston o-ring (4), take special care to thoroughly lubricate and install without twisting or pinching it during installation. If the o-ring appears to be twisted, manipulate it to remove any twists. Set the balance piston (3) and balance piston o-ring (4) aside.

8. The service kit contains a pre-assembled unloader piston assembly (5) which includes the unloader piston, o-rings, and guide bushings. Remove the unloader piston assembly (5) from the package and remove the plastic cap from around the top of the piston. Using the lubricant (6) provided, be sure the entire exterior of the piston is thoroughly lubricated. Additional lubricant should be applied between the upper and lower outside o-rings. Note: If an o-ring appears to be twisted, manipulate it to remove any twists.

Using the lubricant (6) provided, lubricate the unloader piston bore. Insert the unloader piston assembly (5) into the cylinder head. Take care to avoid catching or snagging the edge of the guide bushings between the unloader piston and the unloader piston bore. If there is significant resistance when pressing the unloader piston assembly (5) into the bore, then remove it, adjust the position of the bushings, and retry. It is helpful to press on the upper guide bushing with your fingers while inserting the piston into the bore.

Note: Lubrication of the balance piston (3), unloader piston assembly (5), and bore should consume the entire packet of lubricant (6).

9. Insert the return spring (1) into the unloader piston assembly (5).
10. Using the balance piston (3) with balance piston o-ring (4) from step 7, insert the small diameter of the balance piston (3) into the return spring (1).
11. Note: For both single cylinder Bendix® BA-921® and twin cylinder Bendix® BA-922® compressors, the original unloader caps should be reused to service the compressors. Discard the unloader caps supplied with the service kit (if present). For the single cylinder BA-921 compressor, also reuse the splash shield.

Clean any of the gasket material from the unloader caps. For unloader caps used on the single cylinder compressor, a thin narrow machined slot is present. Remove any debris, if present, in the slot. (See Figure 2).

12. Position the unloader cover gasket (2) on the cylinder head. Position the unloader cap (and splash shield for the single cylinder compressor) on top of the balance piston (3) making certain the cap is oriented correctly. (The machine slot on the BA-921 compressor cap should be toward the compressor cylinder head.) Using

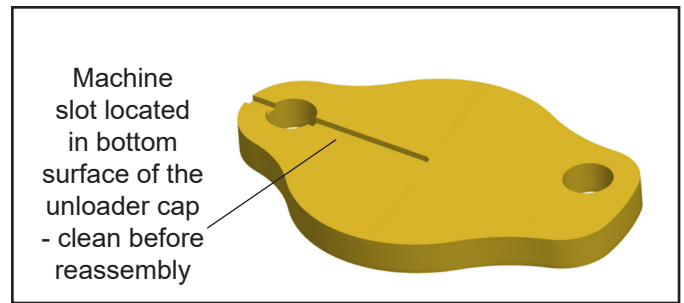


Figure 2 – BA-921 Compressor Unloader Cap

manual pressure, gently push the balance piston into the unloader piston until the unloader cap rests against the cylinder head. Secure the unloader cap using the two cap screws. Torque to 62 to 71 in-lbs.

13. Follow steps under the RETURNING THE VEHICLE TO SERVICE section below.

RETURNING THE VEHICLE TO SERVICE

1. Install any fittings, etc., if applicable, in the same position on the compressor noted and marked during disassembly. Make certain the threads are clean and the fittings are free of corrosion. Replace as necessary. See the Torque Specifications for various fitting sizes and types of thread.
2. Before returning the vehicle to service, perform the Operation and Leakage Tests specified below. Pay particular attention to all lines and check for air, oil, and coolant leaks at compressor connections. Also, check for noisy operation and repair or replace components as needed.

OPERATION & LEAKAGE TESTS

1. Start the engine and note that the air system steadily builds pressure.
2. With system air pressure increasing, check for cylinder head gasket air leakage. Apply a soap solution around the cylinder head. Check the gaskets between the cylinder head, cooling plate, and valve plate assembly for air leakage. No leakage is permitted. If leakage is detected try retorquing the head bolts after draining all air pressure. Replace the compressor if replacing the head gasket has not resolved the leakage problem.
3. Allow air system pressure to build and note that the compressor unloads properly at the specified governor cut-out pressure. Repeat this test 3 times noting that the compressor unloads at approximately the same pressure each time. If the compressor fails to unload by at least 150 psi system pressure, check all air lines to and from the governor. Make certain each line is clear (unobstructed) and not kinked, or leaking. Repair or replace the governor as needed.

4. More complete compressor performance tests are provided in the Bendix Service Data Sheet. This publication is available online at bendix.com or by calling 1-800-AIR-BRAKE (1-800-247-2725).

TORQUE SPECIFICATIONS

Bolt, Nut, or Screw Assembly Torques

M8x1.25-6g Cylinder Head30-33 Nm (265-292 in-lbs)

M5x0.75-6g Unloader Cap7-8 Nm (62-71 in-lbs)

1-3/16"-12 UN-2B Inlet Port Fittings

straight fitting.....95-104 Nm (841-925 in-lbs)

adjustable (w/jam nut).....67-74 Nm (597-655 in-lbs)

7/8"-14 UNF-2B Discharge Port Fittings

straight fitting.....57-62 Nm (509-553 in-lbs)

adjustable (w/jam nut).....40-44 Nm (354-389 in-lbs)

3/4"-16 UNF-2B Water Port Fittings

straight fitting.....30-33 Nm (265-292 in-lbs)

adjustable (w/jam nut).....28-31 Nm (248-274 in-lbs)

Unloader Port Fittings

1/8"-27 NPT2-3 TFFT¹

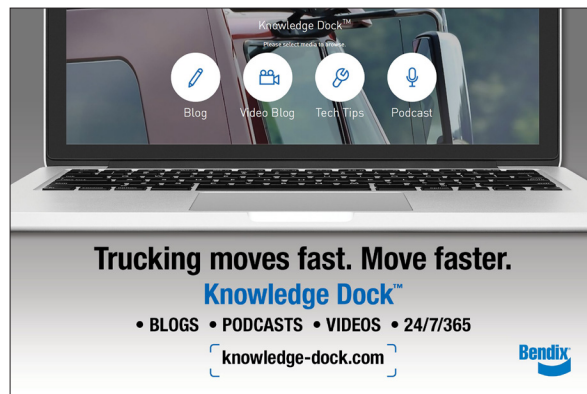
Safety Valve

7/8"-16 UNF26-29 Nm (230-257 in-lbs)

Oil Port

7/16"-16 UNF17-19 Nm (150-170 in-lbs)

¹Note: TFFT = Turns From Finger Tight



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 On-line training that's available when you are –24/7/365.
 Visit brake-school.com.

