Installation Instructions

SEAL REPLACEMENT KIT FOR SINGLE – AND TWIN – CYLINDER COMPRESSOR FOR INTERNATIONAL® MAXXFORCE™ 11 AND 13 BIG BORE ENGINES

Single Cylinder

Twin Cylinder

Kit Contents		
Item No.	**Description**	**Qty.**
1	End Cover O-ring	1
2	Cover	1

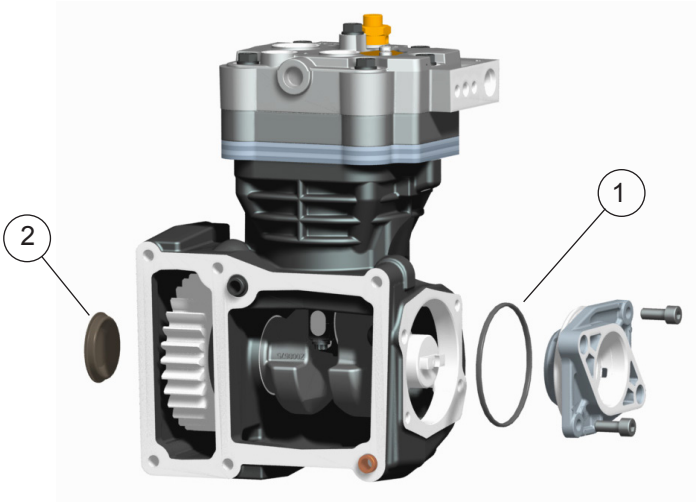


Figure 1 – Seal Replacement Kit Contents

MAXXFORCE™ is a registered trademark of International Engine Intellectual Property Company, LLC.

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, or a Bendix® AD-9si® 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.**

Follow all General Safety Guidelines including, but not limited to, those found on page two of this document. In many instances it may not be necessary to remove the compressor from the vehicle when installing the various maintenance kits and service parts. The Technician must assess the installation and determine the correct course of action.

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.

The compressor seal kit services the single cylinder and the twin cylinder compressor models shown in *Figure 1*.

VEHICLE PREPARATION

1. Block the wheels of the vehicle and drain the air pressure from all the reservoirs in the system.
2. Drain the engine cooling system and the cylinder head of the compressor. Identify and disconnect all air, water, and oil lines leading to the compressor.
3. Remove as much road dirt and grease from the exterior of the compressor as possible.
4. Remove the discharge fitting, if applicable, and note the position on the compressor to aid in reassembly.
5. Remove any supporting brackets attached to the compressor and note their positions on the compressor to aid in reassembly.
6. **Note the position of the six mounting bolts. Two of the six bolts are shorter and must be installed in the same locations during re-assembly. Mark the bolts and locations to ensure they are returned to their original locations.** Remove the six mounting bolts that retain the compressor to the side of the engine block. Remove the compressor from the vehicle.
7. Inspect the drive gear and associated drive parts for visible wear or damage. If the compressor drive gear is worn or damaged, the compressor must be replaced. Refer to the Engine Manufacturer's service manual to address the associated engine drive parts.

PREPARATION FOR DISASSEMBLY

Place a clean shop rag over the openings of the crankcase that expose the gear and crankshaft/connecting rod assembly (*see Figure 3*). No contamination is permitted in these areas. The serviceable items are identified by their "Item" numbers in the kit contents table and are also noted by the numbers in parenthesis in the following procedures.

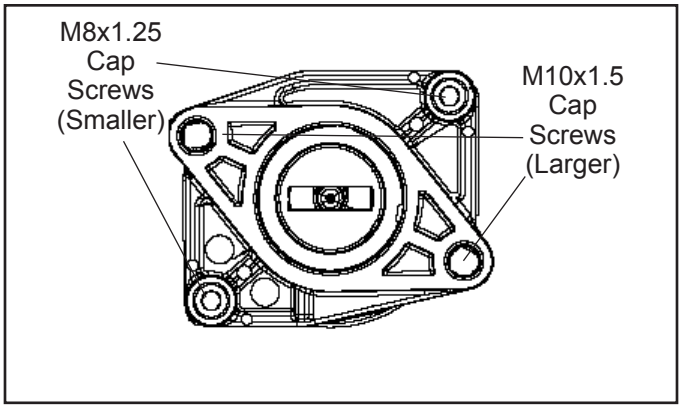


Figure 2 – Rear End Cover Attachment Bolts

Remove the balance of road dirt and grease from the exterior of the compressor with a cleaning solvent. If the rear end cover o-ring (1) is being replaced, mark the rear end cover and the two cap screws in relation to the crankcase. A convenient method to indicate the above relationships is to use a metal scribe to mark the parts with numbers or lines. Do not use marking methods, such as chalk,that can be wiped off or obliterated during rebuilding.

Prior to disassembly make certain that the appropriate kits are available. *See Figure 1 during the entire disassembly and assembly procedure.*

CRANKCASE FRONT COVER

Carefully remove the cover (2) from the front of the crankcase, using a flat head screw driver or a scraper. Place the tool edge under the lip along the outside diameter of the cover. Gradually pry the cover from the cast surface until the whole cover can be removed.

REAR END COVER

Note: There are two M8x1.25 cap screws used to retain the end cover to the crankcase. There are also two larger M10x1.5 cap screws (not shown) that are used to retain the auxiliary drive unit (e.g. hydraulic pump) via the end cover and torqued into the crankcase. If the auxiliary drive unit has already been removed, these two cap screws are no longer present on the end cover. *See Figure 2 to see location of the cap screws in the end cover.*

1. Remove the two end cover cap screws that secure the rear end cover to the crankcase.
2. Remove the rear end cover from the crankcase. Remove and discard the o-ring (1) from the end cover.

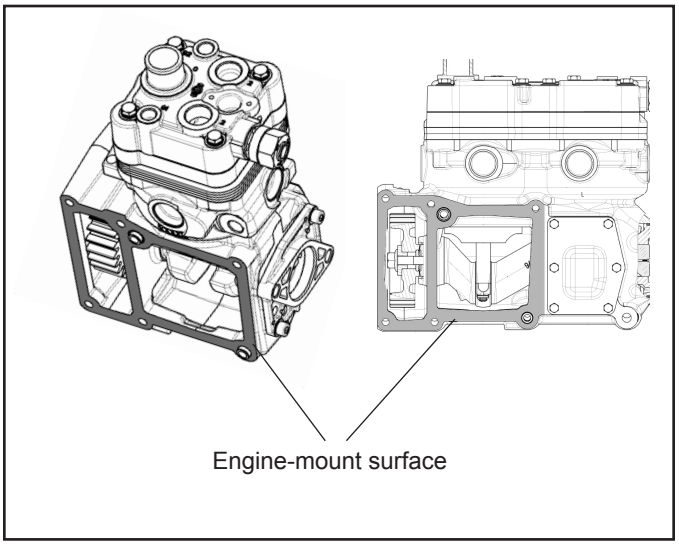


Figure 3 – Compressor – to – Engine Mounting Surface

CLEANING OF PARTS

GENERAL

All parts should be cleaned in a good commercial grade of solvent and dried prior to inspection.

CRANKCASE

1. Carefully remove all sealant gasket material adhering to the machined mounting face of the crankcase. *See Figure 3*. Make certain not to scratch or mar the mounting surface. Note: Keep the crankcase opening covered to prevent any of the sealant material from entering. Repeat this process on the engine mounting face as well. Follow the instructions contained in the vehicle maintenance manual in lieu of the instructions and procedures presented in this manual.

INSPECTION OF PARTS

REAR END COVER

Visually inspect for cracks and external damage. Check the crankshaft rear bearing diameter in the rear end cover for excessive wear, flat spots, or galling. Check the hydraulic pump attachment pilot and threaded holes for damage. Minor thread chasing is permitted, but do not re-cut the threads. If any of these conditions are found, replace the compressor.

ASSEMBLY

GENERAL

Note: All torques specified in this manual are assembly torques and typically can be expected to fall off after assembly is accomplished. Do not re-torque after initial assembly torques fall unless instructed otherwise. A compiled listing of torque specifications is presented in this manual.

CRANKCASE FRONT COVER

Position the new cover (2) over the hole in the front of the crankcase. Using a rubber mallet, drive the cover into the hole in the front of the crankcase until the outside diameter of the cover is flush with cast surface.

REAR END COVER

1. Install the o-ring (1) on the rear end cover.
2. Orient the rear end cover to the crankcase using the reference marks made during disassembly. Carefully install the rear end cover in the crankcase making certain not to damage the crankshaft bearing surface.
3. Install the two end cover cap screws. *See Figure 3* to ensure that the two cap screws are installed in the proper crankcase bolt holes. “Snug” the screws, then tighten to 195 to 212 in-lbs (22-24 Nm).
4. Refer to vehicle maintenance manual to re-install hydraulic pump to compressor end cover.

TORQUE SPECIFICATIONS

Bolt, Nut, or Screw	**Assembly Torques**
Cylinder Head (M8x1.25-6g)	265 – 292 in-lbs. (30 – 33 Nm) Max
End Cover (M10x1.25-6g)	195 – 213 in-lbs. (22 – 24 Nm) Max
Discharge Port Fittings (M26x1.5)	66 ft-lbs. (90 Nm) Max
Water Port Fittings (M16x1.5)	33 ft-lbs. (45 Nm) Max
Safety Valve Port (M26x1.5)	59 – 66 ft-lbs. (80 – 90 Nm) Max

INSTALLING THE COMPRESSOR

1. Apply a liquid gasket sealant to the compressor / engine mounting interface *(Refer to Figure 3 for compressor mounting face).* Follow the Engine or Vehicle Manufacturer's guidelines for the proper liquid gasket sealant material and application procedure.
2. Align the locating pins on the compressor onto the mating holes on the engine mounting surface. Secure the compressor to the engine using the six mounting bolts.

   ⚠ CAUTION

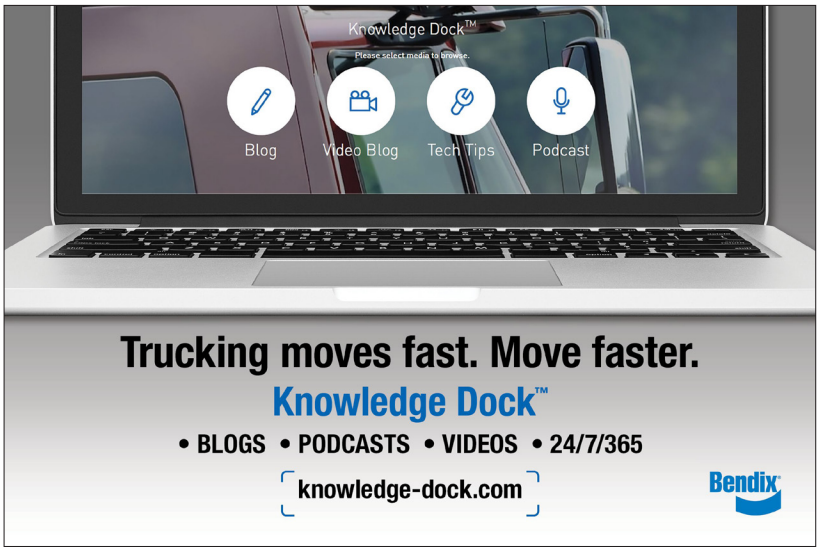
   There are two short bolts and four long bolts. Be sure to use the proper length bolts for the crankcase bolt holes. Run each of the bolts down finger tight, making sure not to smear the liquid gasket material on the sealing surface. Once the bolts are all finger tight then tighten per the Engine Manufacturer's recommended torquing sequence and torque requirements.
3. Install any supporting brackets on the compressor in the same position(s) noted and marked during removal.
4. Inspect all air and coolant lines and fittings before reconnecting them to the compressor. Make certain the o-ring seals are in good or new condition, the threads are clean and the fittings are free of corrosion. Replace as necessary.
5. Install the discharge and coolant fittings, if applicable, in the same position on the compressor noted and marked during disassembly. See the **Torque Specifications** for various fitting sizes and types of thread. Tighten all hose clamps.
6. Before returning the vehicle to service, perform the **Operation and Leakage Tests**. Pay particular attention to all lines and hoses disconnected during the maintenance and check for air, oil, and coolant leaks at compressor connections and the compressor engine interface. Also check for noisy operation.

OPERATION & LEAKAGE TESTS

Note: The Bendix® 360cc and 720cc DLU-style compressors do not contain components to unload the compressor. Therefore, the compressor pumps continuously. In most systems that utilize an air dryer, the governor and DLU-style air dryer are used to unload the system (i.e. air is not being delivered to the brake system reservoirs). When system unloading occurs, air from the compressor will typically flow out the exhaust port of the air dryer.

1. Start the engine and note that 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 draining all air pressure and then re-torquing the head bolts. 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 unloading system unloads properly at the specified governor cut-out pressure. Repeat this test three 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*.

   All Service Data sheets are available for free download from bendix.com. You may also order paper copies from the Literature Center at bendix.com or by calling 1-800-AIR-BRAKE (1-800-247-2725).



Bendix

Log-on and Learn from the Best
On-line training that's available when you are—24/7/365.
Visit brake-school.com.

S-1537 Rev. 001 © 2019 Bendix Commercial Vehicle Systems LLC, a member of the Knorr-Bremse Group • 09/19 • All Rights Reserved