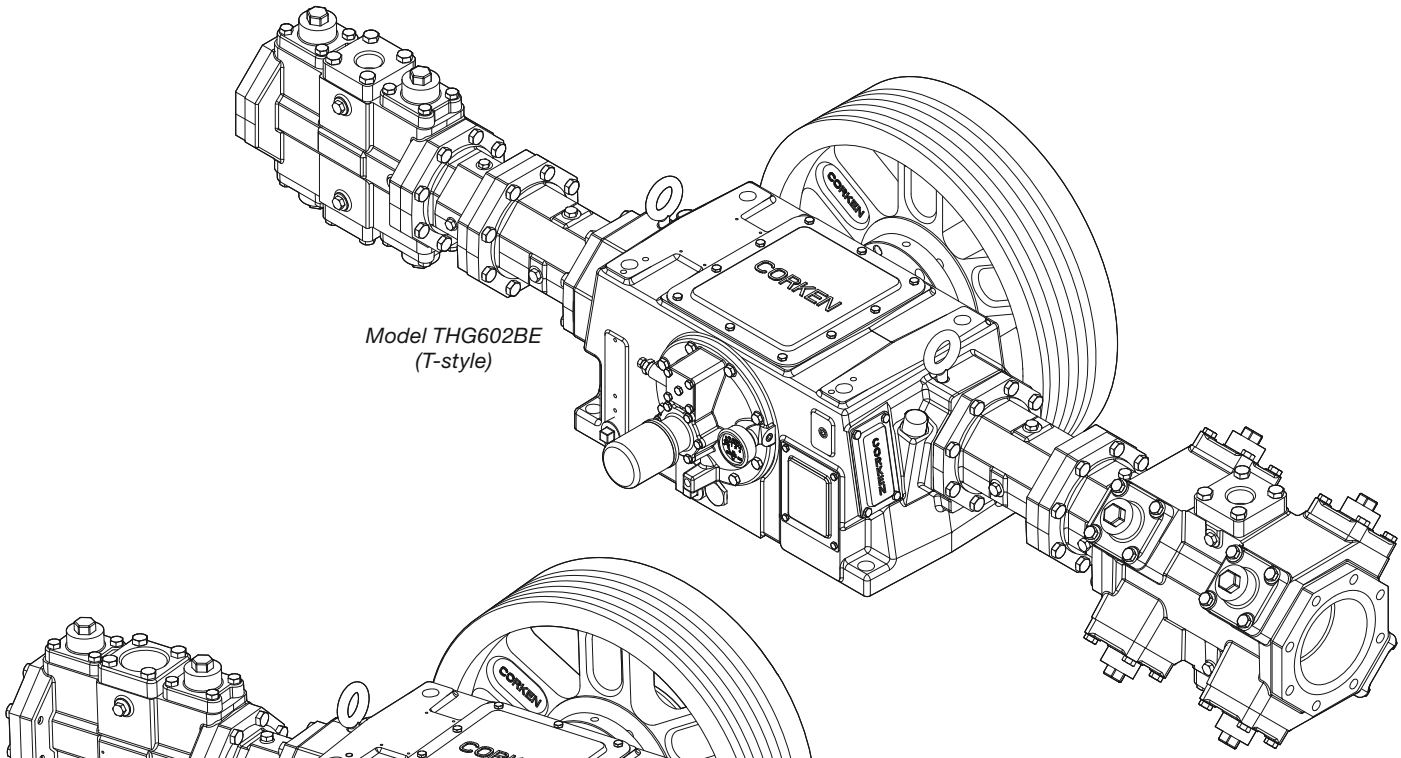
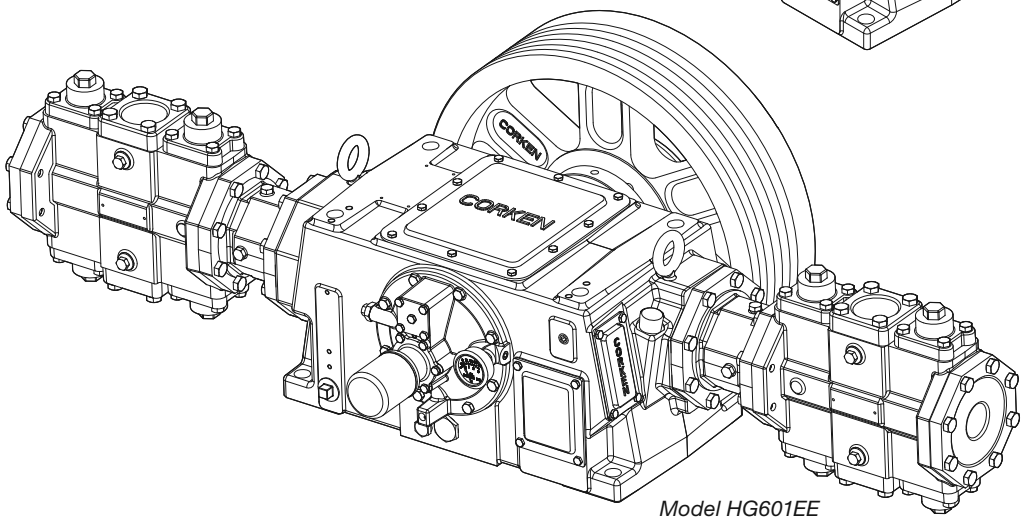
Installation, Operation & Maintenance Manual

Plain & T-Style Double-Acting Gas Compressors
Models HG601, HG602, THG601 & THG602 Series



Model THG602BE
(T-style)



Model HG601EE
(Plain style)

Warning: (1) Periodic inspection and maintenance of Corken products is essential. (2) Inspection, maintenance and installation of Corken products must be made only by experienced, trained and qualified personnel. (3) Maintenance, use and installation of Corken products must comply with Corken instructions, applicable laws and safety standards (such as NFPA Pamphlet 58 for LP-Gas and ANSI K61.1-1972 for Anhydrous Ammonia). (4) Transfer of toxic, dangerous, flammable or explosive substances using Corken products is at user's risk and equipment should be operated only by qualified personnel according to applicable laws and safety standards.

Solutions beyond products...

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IDEX

Warning

Install, use and maintain this equipment according to Corken, Inc. instructions and all applicable federal, state, local laws and codes, and NFPA Pamphlet 58 for LP-Gas or ANSI K61.1-1989 for Anhydrous Ammonia. Periodic inspection and maintenance is essential.

Corken One Year Limited Warranty

Corken, Inc. warrants that its products will be free from defects in material and workmanship for a period of one year from date of installation, provided that the warranty shall not extend beyond twenty-four (24) months from the date of shipment from Corken. Corken products which fail within the warranty period due to defects in material or workmanship will be repaired or replaced at Corken's option, when returned freight prepaid to: Corken, Inc., 3805 N.W. 36th Street, Oklahoma City, Oklahoma 73112.

Parts subject to wear or abuse, such as mechanical seals, blades, piston rings, valves, and packing, and other parts showing signs of abuse are not covered by this limited warranty. Also, equipment, parts and accessories not manufactured by Corken but furnished with Corken products are not covered by this limited warranty and purchaser must look to the original manufacturer's warranty, if any. This limited warranty is void if the Corken product has been altered or repaired without the consent of Corken.

ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY NEGATED TO THE EXTENT PERMITTED BY LAW AND SHALL IN NO EVENT EXTEND BEYOND THE EXPRESSED WARRANTY PERIOD.

Corken disclaims any liability for consequential damages due to breach of any written or implied warranty on Corken products. Transfer of toxic, dangerous, flammable or explosive substances using Corken products is at the user's risk. Such substances should be handled by **experienced, trained personnel in compliance with governmental and industrial safety standards.**

Contacting The Factory

For your convenience, the model number and serial number are given on the compressor nameplate. Space is provided below for you to keep a written record of this information.

Always include the model number and serial number when ordering parts.

Model No. _____

Serial No. _____

Date Purchased _____

Date Installed _____

Purchased From _____

Installed By _____

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Features and Benefits

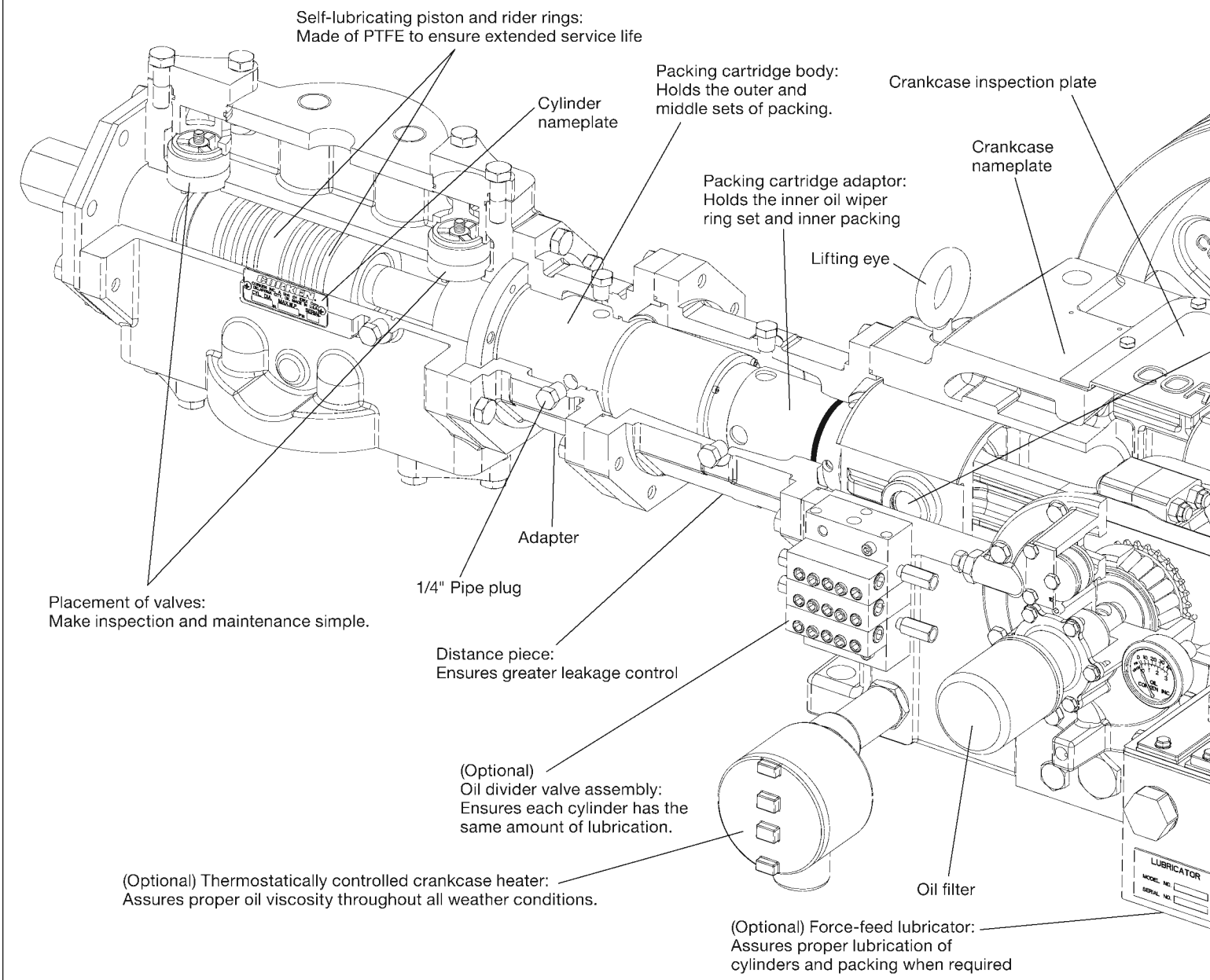
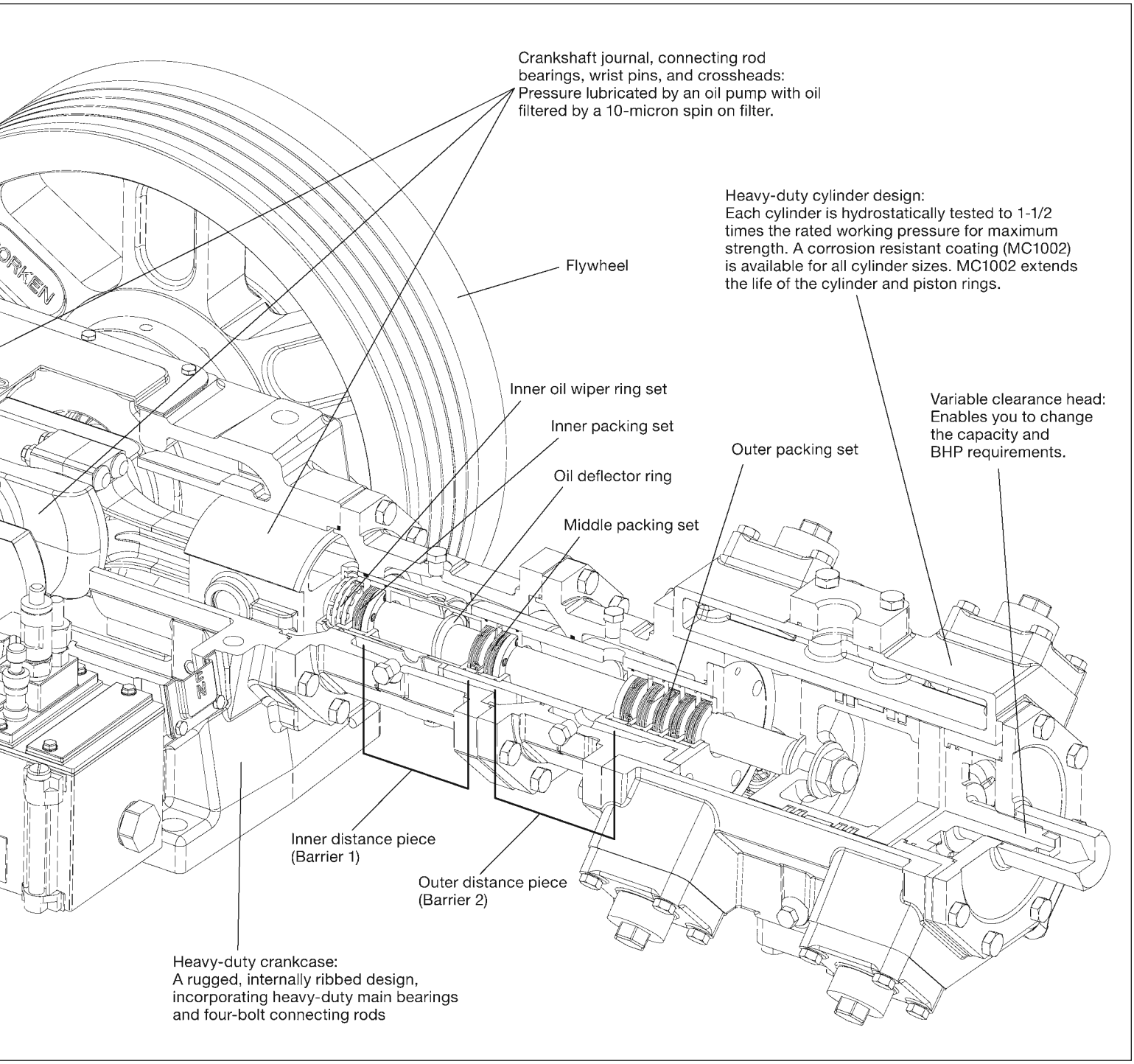


Figure 1.1 (THG600 shown)

Why Corken Compressors are Special

Corken industrial gas compressors are unique among compressors their size. Unlike ordinary lubricated gas compressors, Corken compressors completely isolate the pressurized gas in the compression chamber from the crankcase. While piston rings seal the piston tightly enough for it to do compression work, they do not provide enough sealing to isolate the compression chamber from the crankcase. To further seal the compression chamber, a crosshead/piston rod design with seals around the piston rod is required.

By utilizing specialized piston-rod sealing systems, Corken compressors can compress pressurized, flammable and toxic gases. They can also be used to compress harmless gases where oil-free compression or elevated suction pressures are required. With a large selection of design options available, Corken offers the most versatile line of small gas compressors in the world.



Corken Horizontal Gas Compressors

Your new Corken horizontal compressor is a double-acting reciprocating compressor; however, when an optional blank valve is used, the compressor is single acting. Corken horizontal compressors have a large number of configurations to fit your individual requirements. They are manufactured as single stage- or two-stage units. For more information on the various configurations, refer to Appendix A.

Chapter 1—Installation Of Your Compressor

1.1 Location

NOTE: Corken compressors are designed to handle toxic or flammable gases and should be located outdoors in a well ventilated area.

Proper installation of your compressor is essential for peak performance and reliable service. The installation area should be clean, well ventilated and have ample space to install and maintain your compressor. A double-acting compressor generates more heat than a typical single-acting compressor. As a result your compressor should be located in an area where good air flow and ventilation can be provided. In extreme cases, external cooling fans can be used to provide additional air flow across the cylinders. A minimum of 18 inches clearance between the unit and the nearest wall is advisable. This space will allow access from all sides and provide unrestricted air flow for adequate cooling of the motor and compressor. The unit should be firmly bolted to a solid, level base.

Corken compressors are designed and manufactured for outdoor duty. For applications where the compressor will be subjected to extreme conditions such as corrosive environments or arctic conditions for extended periods of time, consult Corken.

Check local safety regulations and building codes to assure installation will meet local safety standards.

Noise:

Corken horizontal compressors should not exceed an 85 DBA noise level when properly installed.

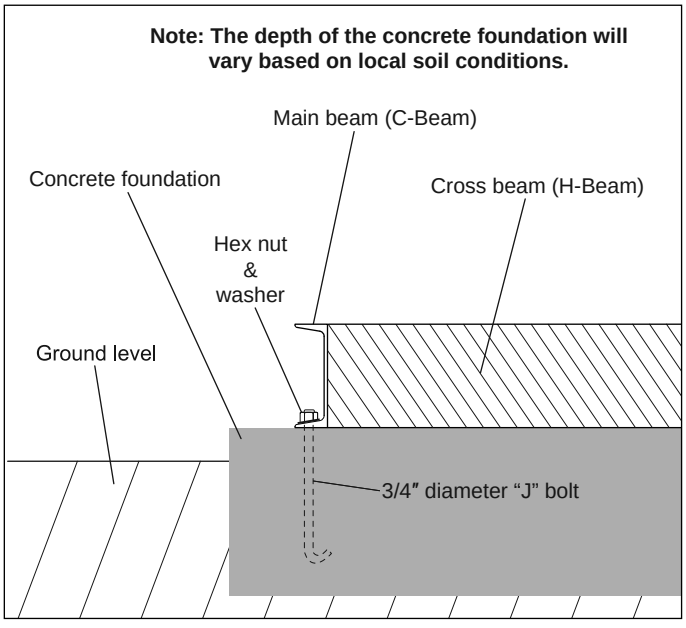


Figure 1.2

1.2 Foundation

Proper foundations are essential for a smooth running compression system. The compressor should be attached to a concrete slab a minimum of 8 inches thick with a 2 inch skirt around the circumference of the steel structural skid. The steel structural skid should be securely anchored into the foundation by 3/4 inch diameter “J” bolts that are 8 inches long. The total mass of the concrete foundation should be approximately twice the weight of the compressor system (i.e. steel structural skid, compressor, motor, etc.). See figure 1.2 for details.

1.3 Piping

Proper piping design and installation is as important as a proper foundation is to a smooth operating compressor. Improper piping installation will result in undesirable transmission of compressor vibration to the piping. The compressor piping should be designed for the rate of flow anticipated and for minimum pressure drop; in no case should the piping be smaller than the compressor nozzle to which it connects. If the length of the line must exceed 100 ft., the next larger size pipe should be used. Install a strainer at the compressor inlet. Never install a shut-off valve in the discharge piping unless a safety relief valve is placed in the line between the shut-off valve and the compressor. Remember to consider future expansion in your pipe sizing and layout.

DO NOT SUPPORT PIPING WITH THE COMPRESSOR. Unsupported piping is the most frequent cause of vibration of the pipe. The best method to minimize transmission of vibration from the compressor to the piping is to use flexible connectors (see figure 1.3 for details).

Pipe must be adequately sized to prevent excessive pressure drop between the suction source and the compressor as well as between the compressor and the final discharge point. In most cases, piping should be at least the same diameter as the suction nozzle on the compressor.

If a restrictive device such as a valve, pressure regulator, or back-check valve is to be installed in the compressor’s suction line, care must be taken. The suction line volume between the restrictive device and the compressor suction nozzle must be at least ten times the swept cylinder volume.

On liquefied gas applications such as LPG, it is of extreme importance to prevent the entry of liquid into the compressor. Installing a liquid trap on the inlet side will prevent liquid from entering the compressor (see section 1.4).

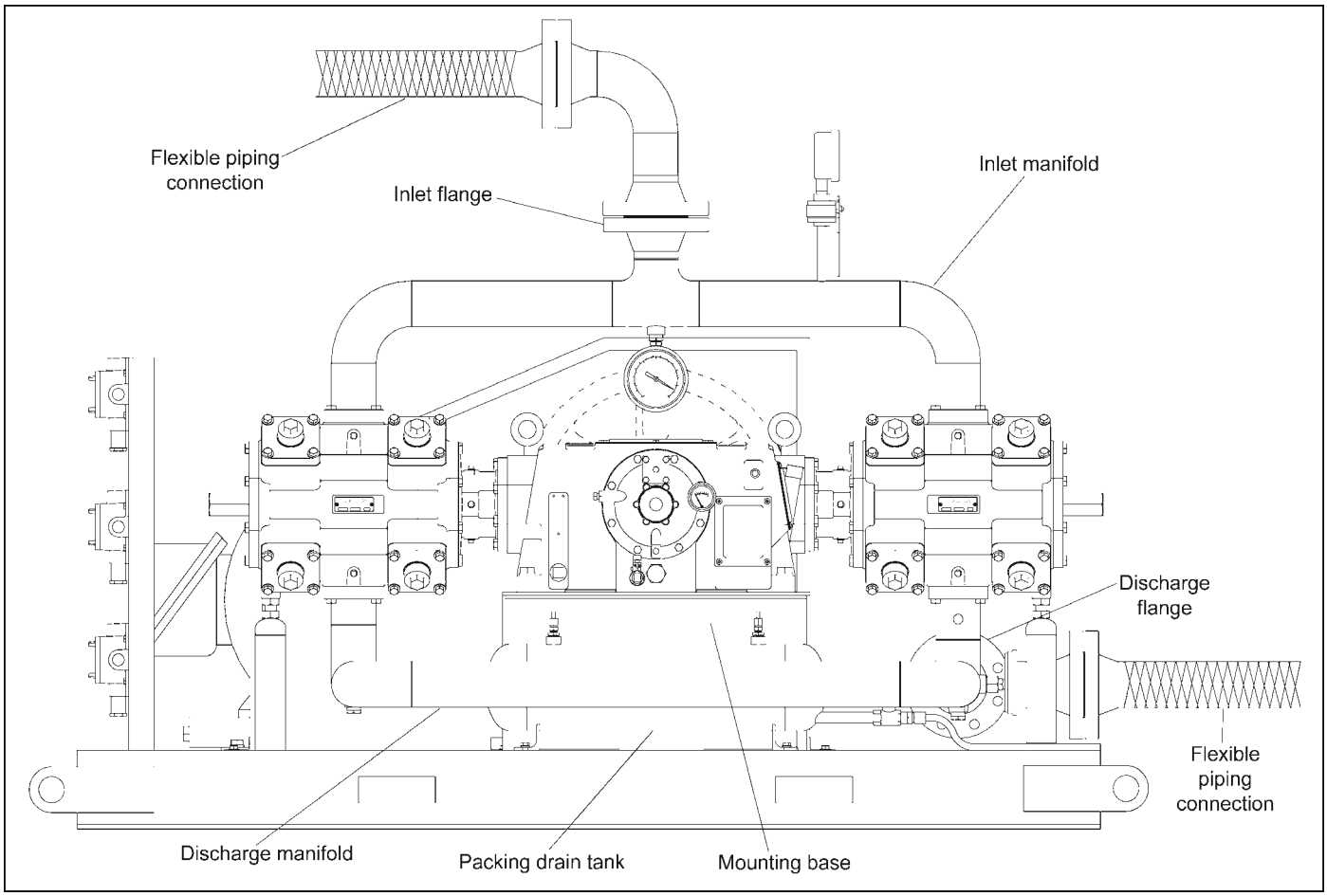


Figure 1.3

It is of equal importance to protect the discharge side of the compressor from liquid entry. This may be done by installing a check valve on the discharge side of the compressor and using a piping design that does not allow liquid to gravity drain into the compressor.

For vapor recovery applications, be certain to install a check valve on vapor lines discharging to the liquid space of the tank.

All piping must be in accordance with the laws and codes governing the service. In the United States, the following codes apply:

For LP Gas—The National Fire Protection Association Pamphlet No. 58, Standard for the Storage and Handling of Liquefied Petroleum Gases.

For Ammonia—The American National Standards Institute, Inc., K61.1-1989, Storage and Handling of Anhydrous Ammonia.

Copies of these are available from NFPA, 60 Baterymarch Street, Boston, Mass, 02110 and ANSI, 1430 Broadway, New York, N.Y., 10018. Install, use and maintain this equipment according to Corken instructions and all applicable federal, state, and local laws and previously mentioned codes. Other laws may apply in different industries and applications.

1.4 Liquid Trap

Compressors are designed to pressurize gas and not pump liquids. The entry of even a small amount of liquid into the compressor will result in serious damage to the compressor. A liquid trap (scrubber) must be installed in the suction piping - and discharge line if condensate can drain back to the compressor - when handling any but the driest of gases.

If your compressor is equipped with a liquid trap not manufactured by Corken, make sure it is adequately sized; otherwise, it may not be able to remove the liquid entrained in the suction stream.

Corken's liquid trap provides the most thorough liquid separation (see figure 1.4) and is American Society of Mechanical Engineers (ASME) code stamped. It contains two level switches: one for alarm and one for shutdown. In some cases the alarm switch is used to activate a dump valve (not included with trap) or sound an alarm so the operator can drain the trap using the manual drain valve at the bottom of the trap. The manual drain valve is supplied with this trap. NOTE: The liquid level switches MUST be removed from the trap before grounding any welding devices to the trap or associated piping. **Failure to do so will damage the switch contacts!** This trap also contains a mist pad. A mist pad is a mesh of interwoven wire designed to remove fine liquid mists.

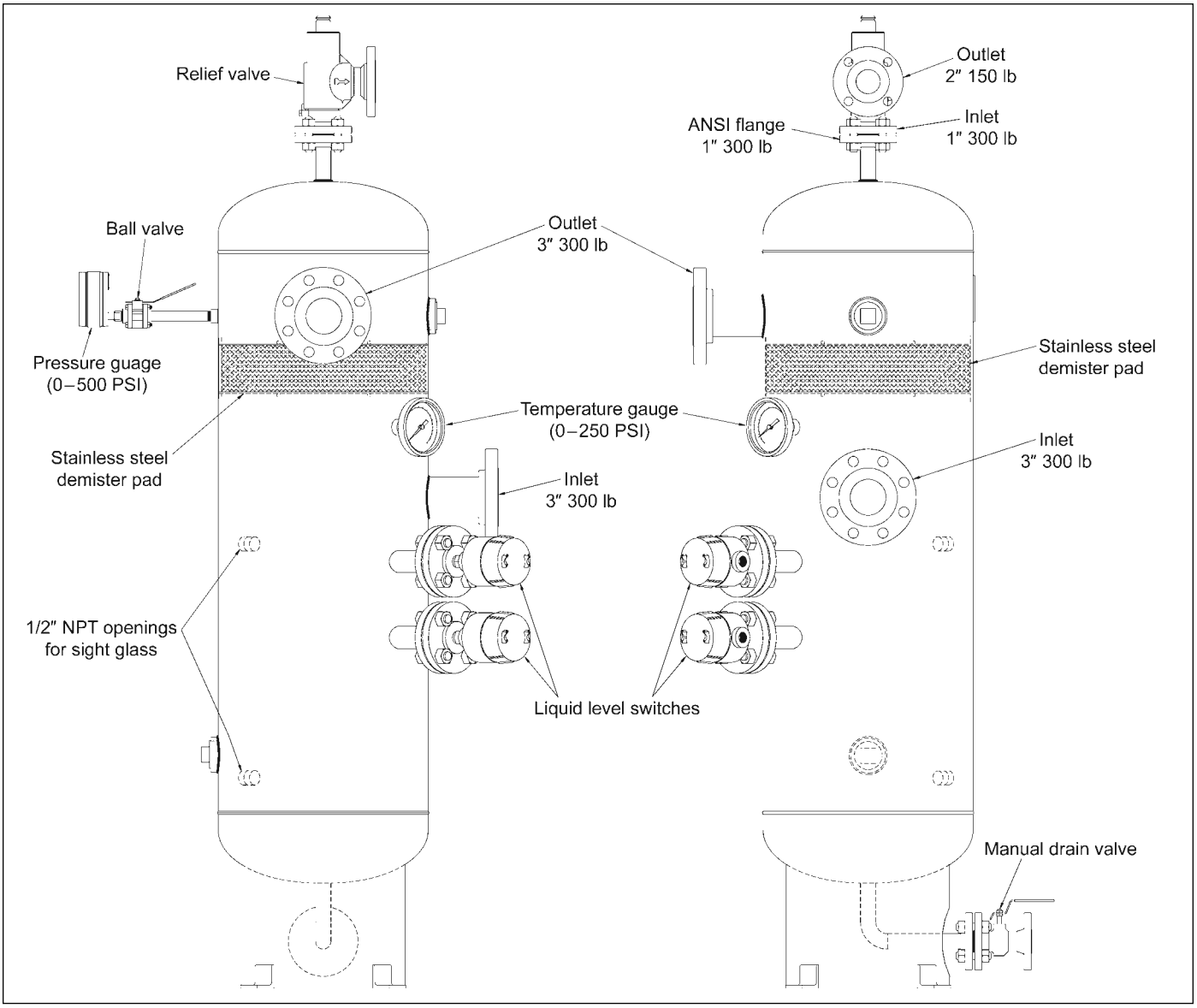


Figure 1.4

1.5 Driver Installation and Flywheels

Corken compressors may be driven by either electric motors or internal combustion engines (e.g. gasoline, diesel, natural gas, etc.). The wiring of an electric motor is extremely important and must be done by a competent electrician. Low voltage or improper wiring of the motor will result in expensive consequences. If you suspect that you have a low voltage problem, call your power company.

Humid climates can cause problems with explosion proof motors. The normal breathing of the motor and alternating between being warm when running and cool when stopped can cause moist air to accumulate in the motor. The moist air inside the motor will condense and if enough water accumulates, the motor will fail. To prevent this, make a practice of running the motor at least once a week on a bright, dry day for an hour or so without the V-belts. During this period of time, the motor will heat up and vaporize the condensed moisture.

NOTE: No motor manufacturer will guarantee their explosion proof or totally enclosed (TEFC) motor against damage from moisture.

Drivers should be selected so the compressor operates between 400 and 1200 RPM. The unit must not be operated without the flywheel or severe torsional imbalances will result that could cause vibration and a high horsepower requirement. The flywheel should never be replaced by another pulley unless it has a higher wk2 value than the flywheel.

NOTE: Never operate a reciprocating compressor without a flywheel.

For installation with engine drivers, thoroughly review instructions from the engine manufacturer to assure the unit is properly installed.

1.6 Crankcase Lubrication

The crankcase of your compressor was drained before shipment. Before starting the machine, be sure to fill the crankcase to the full mark on the oil bayonet and not above. To ensure proper lubrication of the crankcase parts, the crankcase should be filled through the crankcase inspection plate (see Fig. 1.6A for the proper oil filling location).

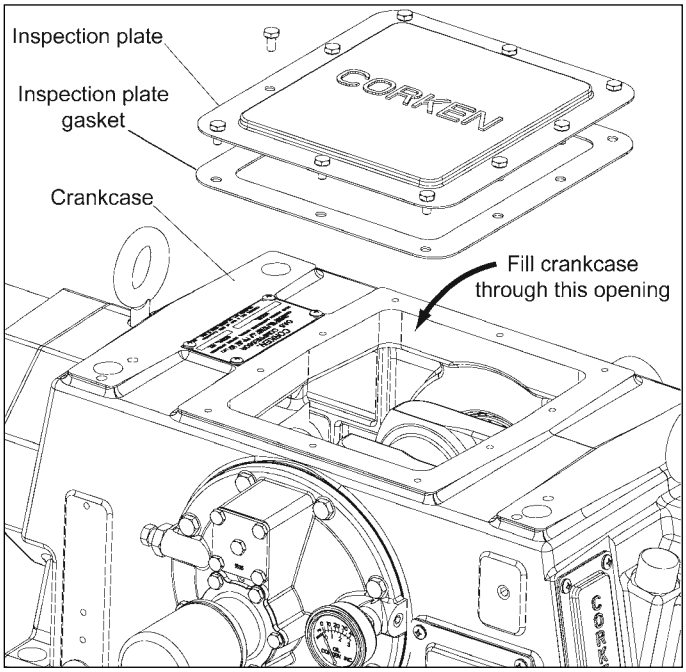


Figure 1.6A

Use heavy-duty, non-detergent motor oil with rust and oxidation inhibitors. For viscosity requirements, see figure 1.6B.

Acceptable Crankcase Oil Products for Corken Compressors

Constant Weight - Non-Detergent - R&O Inhibited				
Oil product	**ISO**	**VI**	**SAE**	**Ambient Temp.**
Exxon®				
TERESSTIC	100	95	30	65° - 100° F
	68	95	20+	45° - 70° F
	46	95	20	35° - 50° F
Mobil®				
RARUS 427 Reciprocating Compressor Oil	100	95	30	65° - 100° F
DTE Oil Heavy Medium	64	95	20+	45° - 100° F
Dectol R&O Oil	44	95	20	35° - 50° F
Conoco®				
Dectol R&O Oil	100	98	30	65° - 100° F
	68	97	20+	45° - 70° F
	46	99	20	35° - 50° F
Texaco®				
Regal R&O Oil	100	92	30	65° - 100° F
	68	97	20+	45° - 70° F
	46	102	20	35° - 50° F
Sun®				
SunVis 900 Oil	100	100	30	65° - 100° F
	68	100	20+	45° - 70° F
	46	100	20	35° - 50° F

Figure 1.6B: Oil Selection Chart

Non-detergent oil is recommended for Corken horizontal compressors. Detergent oils tend to keep wear particles and debris suspended in the oil, whereas non-detergent oils let them settle in the bottom of the crankcase. When non-detergent oils are not available, detergent oils may usually be successfully substituted, although compressors handling ammonia, amine, or imine gases are notable exceptions. These gases react with the detergent and cause the crankcase oil to become corrosive and contaminated. Figure 1.6C shows the recommended oil capacity for the crankcase. ***Ensure oil is compatible with the product being compressed.***

Synthetic lubricants are generally not necessary. Please consult your lubricant supplier if you are considering the use of synthetic oil.

Compressor Model	Approximate Capacity	
	Quarts	Liters
HG/THG600	7	6.6

Figure 1.6C

1.7 Crankcase Oil Pressure Adjustment

Your Corken compressor is equipped with an automatically reversible gear type oil pump. It is essential to ensure the pumping system is primed and the oil pressure is properly adjusted in order to assure smooth operation.

Before starting your compressor, check and fill the crankcase with the proper amount of lubricating oil (see figure 1.6A for details).

When the compressor is first started, observe the crankcase oil pressure gauge. If the gauge fails to indicate pressure within 30 seconds, stop the machine. Loosen the oil filter and remove the pressure gauge. Restart the compressor and run it until oil comes out of the pressure gauge opening or around the filter. Tighten the filter and reinstall the gauge.

The oil pressure should be about 20 psi (1.4 bars) minimum for normal service. If the discharge pressure of the compressor is above 200 psi (14.8 bars), the oil pressure must be maintained at 25–30 psi (1.7–2.1 bars). A spring-loaded relief valve mounted on the bearing carrier opposite the flywheel regulates the oil pressure. As shown in figure 1.7, turn the adjusting screw clockwise to increase the oil pressure and counterclockwise to lower it. Be sure to loosen the adjusting screw locknut before trying to turn the screw and re-tighten it after making any adjustment (see figure 1.7 for details).

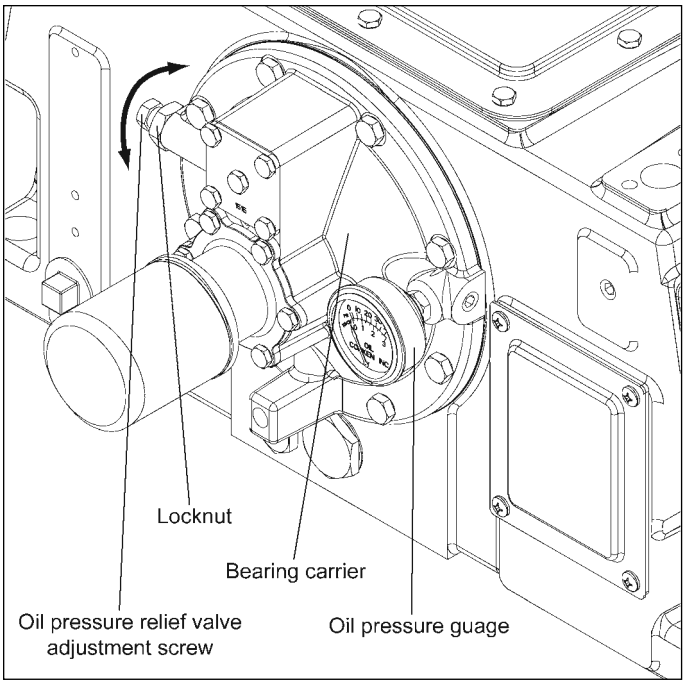


Figure 1.7

1.8 Relief Valves

An appropriate relief valve must be installed on the discharge side of the compressor. On Corken 107C-style mounted units, a relief valve should be fitted in the piping between the compressor discharge and the four-way valve. Relief valves should be made of a material compatible with the gas being compressed. Local codes and regulations should be checked for specific relief valve requirements. Also, relief valves may be required at other points in the compressor's system piping.

1.9 Shutdown/Alarm Devices

For many applications, shutdown/alarm switches will provide worthwhile protection that may prevent serious damage to your compressor system. All electronic devices should be selected to meet local code requirements. Shutdown/alarm devices typically used on Corken compressors are as follows:

1. **Low Oil Pressure Switch:** Shuts down the unit if crankcase oil pressure falls below 12 psi due to oil pump failure or low oil level in crankcase. The switch or the compressor controller must have a 30 second delay on startup which allows the compressor to build oil pressure in the crankcase.

2. **High Discharge Temperature Switch:** This switch is strongly recommended for all applications. Both the High Discharge Temperature switch (HDT) and compressor have an operating pressure range. It is preferable that the switch set point be 30°F (-1°C) above the normal discharge temperature, but below the maximum design temperature for the compressor of 350°F (176°C).

3. **Low Suction Pressure Switch:** Shuts down the unit if inlet pressure is not within the preset limit (set point). In some cases, it is important not to pull a vacuum because of the potential of pulling oil from the crankcase into the gas stream.

4. **High Discharge Pressure Switch:** Shuts down the unit if the outlet pressure reaches a preset limit (set point). Both the switch and the compressor have an operating range. The set point of the pressure switch should be as follows:

   Greater than the normal operating pressure for the compressor.

   Less than 90% of the relief valve set point pressure.

   Less than the maximum operating pressure of the compressor.

   Midpoint of the pressure switch range.

5. **Vibration Switch:** Shuts down the unit if vibration becomes excessive. Recommended for units mounted to a portable skid.

Chapter 2—Starting Up Your Corken Compressor

The initial operation of your compressor is the most critical time it will ever face. READ ALL OF CHAPTER TWO BEFORE YOU PROCEED WITH THE STARTUP CHECKLIST.

2.1 Inspection After Extended Storage

If your compressor has been out of service for a long period of time, you should verify that the cylinder bore and valve areas are free of rust and other debris. For valve and/or cylinder head removal instructions, refer to chapter 4 of this IOM manual.

Drain the oil from the crankcase and remove the crankcase inspection plate. Inspect the running gear for signs of rust and clean or replace parts as necessary. Fill crankcase with the appropriate lubricant through the crankcase inspection plate opening. Squirt oil on the crossheads and rotate the crankshaft by hand to ensure that all bearing surfaces are coated with oil.

Rotate unit manually to ensure running gear functions properly. Replace the crankcase inspection plate and proceed with startup.

2.2 Flywheel and V-belt Alignment

Before working on the drive assembly, make sure the electrical power is turned off. Always make sure the driver and compressor are close enough together to avoid forcing the belts over the flywheel and sheave. Tighten the belts so that they are taut, but not extremely tight. Consult your V Belt supplier for specific tension recommendations. Belts that are too loose will cause excessive vibration while those that are too tight may cause premature bearing failure (refer to figure 2.2C).

Improper belt tension and sheave alignment can cause vibration, excessive belt wear and premature bearing failures. Before operating your compressor, check alignment of the V-grooves of the compressor flywheel and driver sheave. Visual inspection often will indicate if the belts are properly aligned, but use of a straight edge tool or string is the best method.

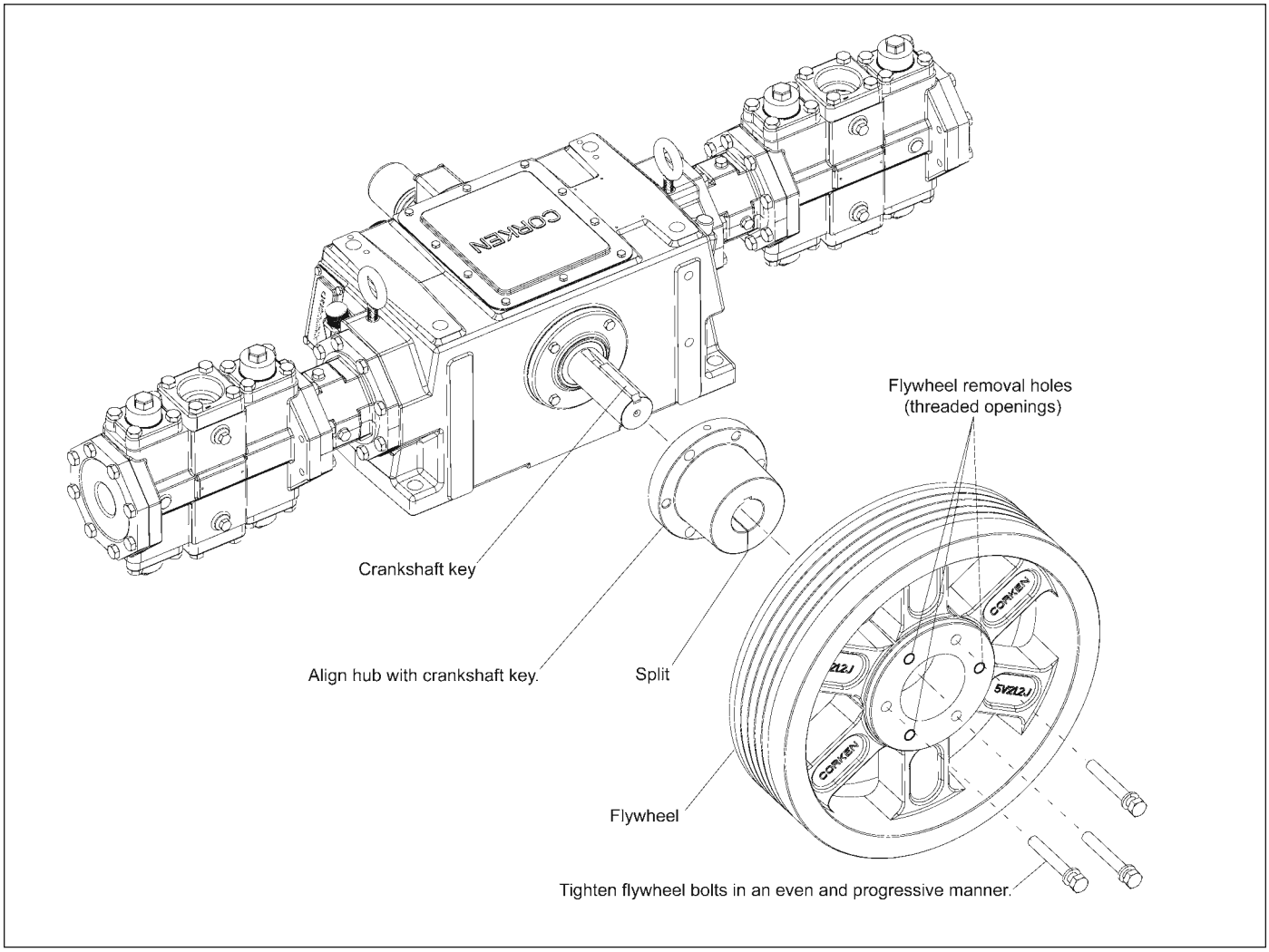


Figure 2.2A (model HG601EE (plain style) shown)

NOTE:

1) If you are using **five individual V-belts**, 1/4 to 3/8 inches (6.4 to 9.5 mm) of movement is normal.

2) If you are using **five banded V-belts**, movement will be much less due to the stiffness of the banded V-belt design.

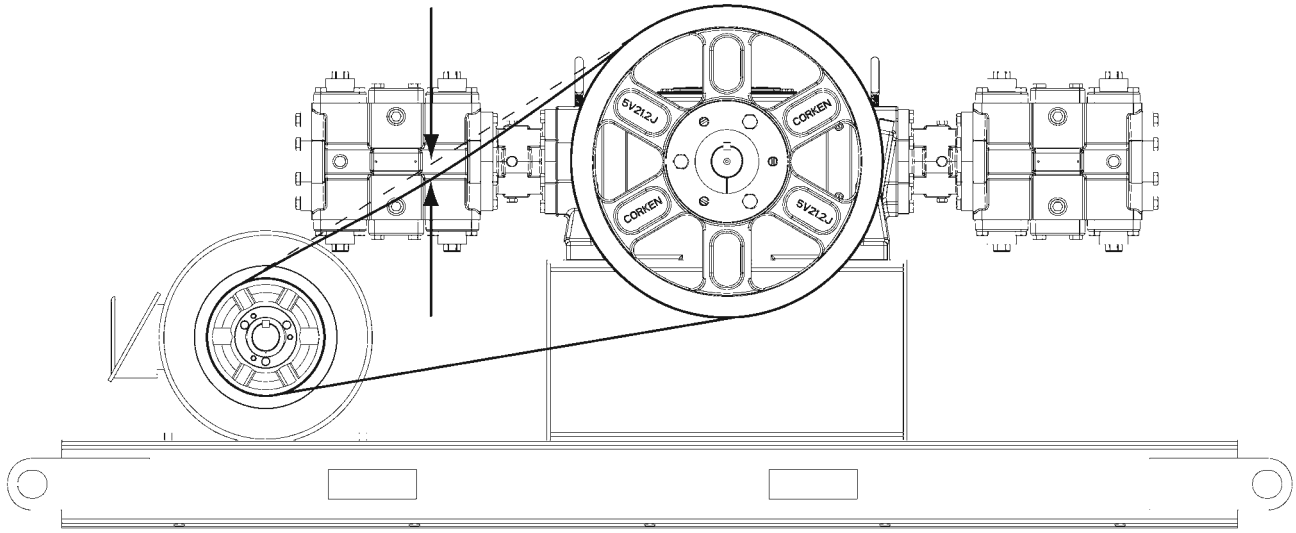


Figure 2.2C

The flywheel is mounted on the shaft via a split, tapered hub and three bolts (see figure 2.2A). These bolts should be tightened in an even and progressive manner to the specified torque values listed in figure 2.2B. There must be a gap between the hub and the flywheel when installation is complete. Failure to do so will cause the flywheel to be misaligned. Always check the flywheel run out before startup and readjust if it exceeds the value listed in Appendix B.

Bushing Size	Diameter In. (cm)	Bolt Torque Ft.-lb. (kg-meter)
SF	4.625 (11.7)	30 (4.1)
E	6.0 (15.2)	60 (8.3)
J	7.25 (18.4)	135 (18.7)

Figure 2.2B

2.3 Compressor Speed and Rotation Direction

The lubrication system of the Corken horizontal compressor is designed to operate at a minimum of 400 RPM. If lower speeds are necessary, consult the factory. The maximum speed is 1200 RPM. The crankshaft may be rotated in either direction.

2.4 Compressor Cooling

AIR COOLED: Double acting units generate a lot of heat around the valve area. It is very important that the compressor be located where good air flow and ventilation can be provided. In extreme cases external cooling fans can be used to provide additional air flow across the cylinders.

WATER COOLED: If your unit has water cooled cylinders (optional), be sure that the cooling system has been inspected for leaks and proper circulation. Purge air from the cooling jackets to eliminate air pockets in the cooling system. If chilled water systems are used be sure that water shut-off valves are installed to stop water flow when compressor stops. Monitor system for any signs of internal sweating. If internal moisture is detected, water temperatures and flow rates should be checked. Normal flow rate for cylinders is approximately 1 - 2 gpm.

2.5 Force Feed Cylinder Lubrication (Lubed models only)

An external lubricator is bolted directly to the crankcase and is driven by a chain inside the crankcase at 80% of crankshaft speed. To ensure each cylinder receives the same volume of lubrication, an oil divider valve assembly is also mounted to the opposite end of the crankcase (see lubricator assembly details in Appendix D). Since lubricators supplied with Corken compressors are made by a number of different manufacturers, refer to the manufacturer's instructions provided with the lubricator for specific details on priming, adjusting and maintaining your lubricator. Basic operating instructions and flow rate adjustments are also listed on the side of the lubricator reservoir.

At the initial setup of your compressor, the lubricator flow should be set to maximum capacity. After the first hour, reduce the flow to normal operating levels. Normal

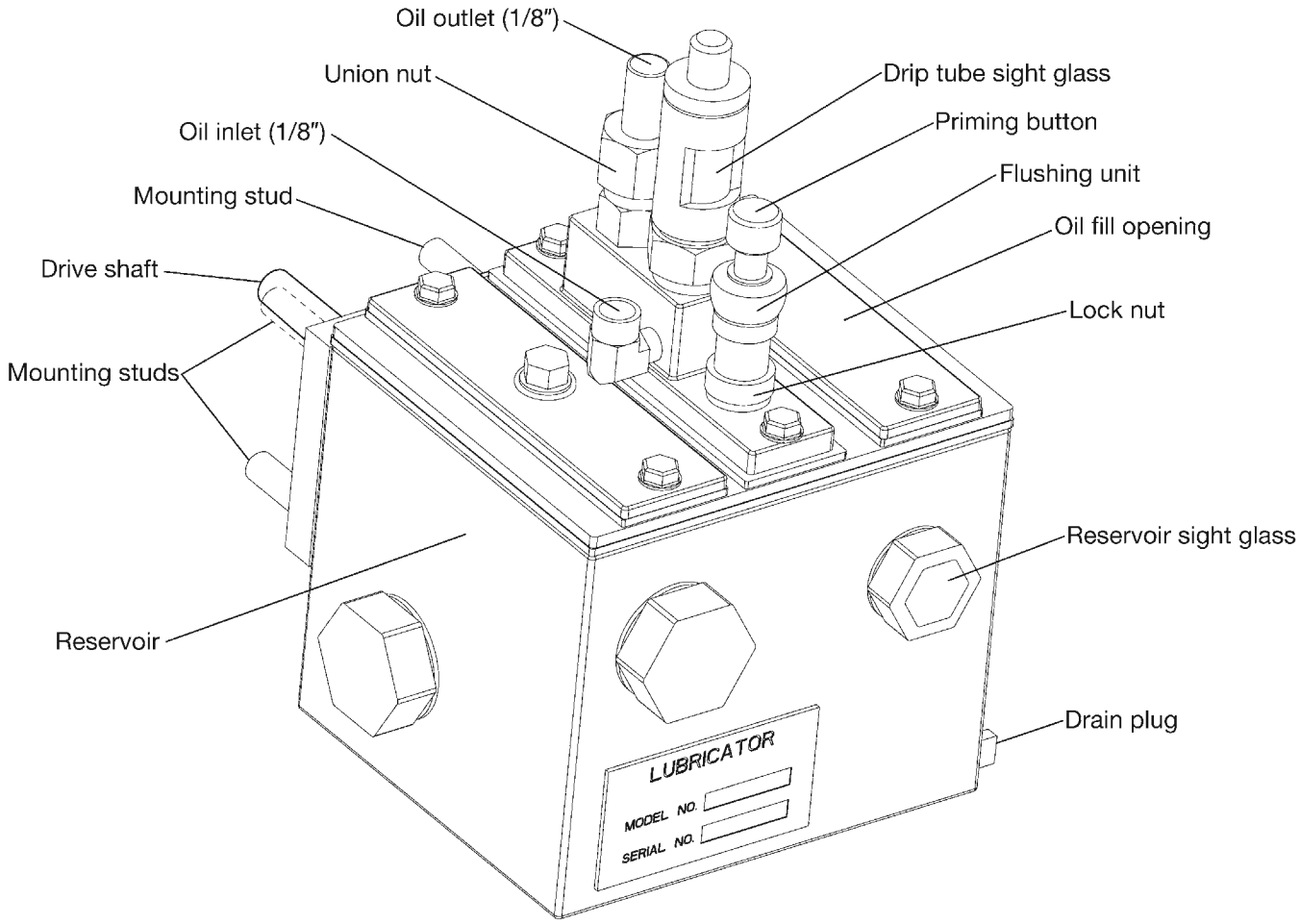
NOTE:

1) Since Corken uses more than one vendor when purchasing lubricators, the lubricator shown below and respective operational instructions may vary from the one used on your compressor.

2) Operational instructions can be found on the side of the lubricator reservoir.

3) Oil used in the reservoir is for lubricating the internal parts of the lubricator only and not the compressor.

4) Depending on the cylinder size, the oil flow rate for the drip tube site glass is three to six drops per minute during normal operations.



Premier lubricator model number P-55U with pump no. 91490 shown above.

operating levels range from three to six drops per minute depending upon the cylinder size.

NOTE: The lubricator supplied on your CORKEN compressor must be supplied with oil from an external supply tank and NOT from the compressor crankcase or lubricator reservoir.

Oil types: Refer to section 1.6 (crankcase lubrication).

2.6 Variable Clearance Heads (VCH)

Variable clearance head (VCH) assemblies (outboard) allow adjustment of the compressor when operating conditions change. By turning the clearance volume adjusting cup, you can easily change the capacity and bhp requirements of the cylinder. Normally, the packager will have already provided at least a preliminary adjustment of the VCH. If not, you may wish to adjust the heads for maximum clearance before startup. After startup, adjust the heads inward to increase the capacity and bhp of the cylinder to the desired levels.

To adjust the variable clearance heads, follow the steps below.

1) Remove the VCH adjusting screw nut. Adjustment can be made while the unit running.

2) Turn the end of the adjusting cup to adjust the cylinder head end clearance.

3) Turning the end of the adjusting cup inward (clockwise) reduces cylinder head end clearance.

4) Turning the end of the adjusting cup outward (counterclockwise) increases cylinder head end clearance.

5) Replace the VCH adjustable screw nut and O-ring.

The approximate clearance volume change per turn of the adjusting bolt is 3%.

2.7 Startup Check List

Please verify each item on this list below before starting your compressor! Failure to do so may result in a costly and/or dangerous mistake.

Before Starting the Compressor

1. Become familiar with the function of all piping associated with the compressor. Know each line's use!
2. Make certain actual operating conditions will match the anticipated conditions.
3. Ensure line pressures are within cylinder pressure ratings.
4. Clean out all piping.
5. Ensure all adapter and distance piece openings are tubed or plugged as desired.
6. Check all mounting shims, cylinder and piping supports to ensure that no twisting forces or other undesired nozzle forces or torque is applied to the compressor.
7. Make certain strainer elements are in place and clean.
8. Make certain cylinder bore and valve areas are clean.
9. Check V-belt tension and alignment or drive alignment on direct drive units.
10. Rotate unit by hand and make certain there is no wobble or play in the flywheel or sheave.
11. Check crankcase oil level.
12. Drain all liquid traps, separators, etc.
13. Verify proper electrical supply to motor and panel.
14. Check all gauges and confirm a zero level reading.
15. Test piping system for leaks.
16. Purge unit of air before pressurizing with gas. Follow your company procedures for this operation.
17. Carefully check for any loose connections or bolts.
18. Remove all stray objects (rags, tools, etc.) from vicinity of the unit.
19. Confirm all valves are open or closed as required.
20. Re-check all of the above.

After Starting Compressor

1. Verify and note proper oil pressure. Shut down and correct any problems immediately.
2. Observe noise and vibration levels. Correct immediately if excessive.
3. Verify proper compressor speed.
4. Examine entire system for gas or oil leaks.
5. Note rotation direction.
6. Check start-up voltage drop, running amperage and voltage.
7. Verify proper lubrication rate (lubed units only).
8. Test each shutdown device and record set points.
9. Test or confirm set point on all relief valves. Test all dump valves, relief valves and unloaders.
10. Check and record all temperatures and pressures after 30 minutes and 1 hour. Retain records for future reference.
11. After approximately one hour of running time, tighten all head bolts, valve holddown bolts, and baseplate bolts. See Appendix B for torque values.

Chapter 3—Routine Maintenance Chart

Item to Check	Daily	Weekly	Monthly	Six Months	Yearly
Crankcase oil pressure	●				
Compressor discharge pressure	●				
Overall visual check	●				
Crankcase oil level			●[2]	●[2]	
Drain liquid from accumulation points		●[3]			
Drain adapters and distance pieces		●			
Clean cooling surfaces on compressor and intercooler (if any)		●			
Lubricator supply tank level (if any)		●			
Check belts for correct tension			●		
Inspect valve assemblies				●	
Lubricate motor bearings in accordance with manufacturers' recommendations				●	
Inspect motor starter contact points					●
Inspect piston rings[1]				●[1]	●[1]

[1]Piston ring life varies greatly, depending on application, gas and operating pressures. Consult factory for additional recommendations for your specific application.
[2]Change oil every 2,200 hours of operation or every 6 months, whichever occurs first. If the oil is unusually dirty, change it as often as needed to maintain a clean oil condition. Change replacement filter 4225 with every oil change.
[3]Liquid traps should be drained prior to startup.

Chapter 4—Routine Service and Repair Procedures

CAUTION: Always relieve pressure in the unit before attempting any repairs. After repair, the unit should be pressure tested and checked for leaks at all joints and gasket surfaces.

If routine maintenance is performed as listed in chapter 3, repair service on your Corken gas compressor is generally limited to replacing valves or piston rings. When it comes time to order replacement parts, be sure to consult the part details appendix in the back of this Installation, Operation & Maintenance (IOM) manual for a complete list of part numbers and descriptions.

4.1 Compressor Valves

Test the compressor valves by closing the inlet piping valves while the unit is running; however, do not allow the machine to operate in this way very long. If the inlet pressure gauge does not drop to zero almost immediately, one or more of the compressor valves is probably damaged or dirty. However, it is possible for the pressure gauge itself to be faulty.

In most cases, if a compressor valve or valve gasket is leaking, it will create more heat. On a single stage compressor, you may be able to compare the operating temperatures of the two suction or discharge valves and cover plates to each other. If a valve or gasket is leaking, it will have a higher operating temperature. NOTE: This method will not be suitable for two stage compressors if each stage does not have more than one valve.

Each suction and/or discharge valve assembly is easily removed as a unit for inspection. If any part of the valve assembly is broken, the valve assembly should be replaced. See valve assembly parts details in the Appendix D for a complete list of part numbers and descriptions.

If a compressor valve is leaking due to dirt or any other foreign material that keeps the valve plate and seat from sealing, the valve may be cleaned and reused. New gaskets and/or O-rings should be used to ensure a good seal.

The valve holddown components and valve assemblies listed in Appendix D show the various specifications used on horizontal compressors. Since more than one suction valve arrangement is available for each model of compressor, it is necessary to know your complete model number so you can identify the valve type specification number (see example listed below).

Model number THG601BBGM 4 FBANSNNN
Valve type = spec 4

Valve Inspection and/or Replacement

Before removing and inspecting the valves, begin by depressurizing and purging (if necessary) the unit and refer to Appendix D.

Disassembly of 2.75" Cylinder Size

1. Remove the valve cover plate and O-ring by removing each of the three bolts.

2. After the cover plate and O-ring have been removed, the valve assembly and valve gasket can be lifted out.

3. Inspect valves for breakage, corrosion, debris and scratches on the valve plate. In many cases, valves may simply be cleaned and reinstalled. If the valves show any damage, they should be repaired or replaced. Replacement is usually preferable although repair parts are available. If valve plates are replaced, seats should also be lapped until they are perfectly smooth. If more than .005 of an inch must be removed to achieve a smooth surface, the valve should be discarded. If plates are replaced without re-lapping the seat, rapid wear and leakage may occur.

Assembly of 2.75" Cylinder Size

1. Insert metal valve gasket into the suction and/or discharge opening of the head. The metal valve gasket should always be replaced when the valve is reinstalled.

2. Insert cleaned or new valve assembly. Make sure the suction and discharge valves are in the proper suction and discharge opening in the head.

3. Replace the O-ring and valve cover plate. Torque the bolts to the value listed in Appendix B. CAUTION: Be sure the holddown screw has been removed. NOTE: Gaskets and O-rings are not normally reusable.

4. Check bolts after first week of operation. Re-torque if necessary. See Appendix B for torque values.

Disassembly of 3.25", 4", 5", 6" and 8" Cylinder Sizes

1. Unscrew the valve cap and remove the O-ring.

2. Remove the valve cover plate, O-ring and holddown screw by removing each of the four bolts. The holddown screw is easily removed with the special wrench supplied with your compressor.

3. After the cover plate and O-ring have been removed, the valve cage, valve assembly and valve gasket can be lifted out.

4. Inspect valves for breakage, corrosion, debris and scratches on the valve plate. In many cases, valves may simply be cleaned and reinstalled. If the valves show any damage, they should be repaired or replaced. Replacement is usually preferable although repair parts are available. If valve plates are replaced, seats should also be lapped until they are perfectly smooth. If more than .005 of an inch must be removed to achieve a smooth surface, the valve should be discarded. If plates are replaced without re-lapping the seat, rapid wear and leakage may occur.

Assembly of 3.25", 4", 5", 6" and 8" Cylinder Sizes

1. Insert metal valve gasket into the suction and/or discharge opening of the head. The metal valve gasket should always be replaced when the valve is reinstalled.

2. Insert cleaned or new valve assembly. Make sure the suction and discharge valves are in the proper suction and discharge opening in the head.

3. Insert the valve cage.

4. Replace the O-ring and valve cover plate. Torque the bolts to the value listed in Appendix B. CAUTION: Be sure the holddown screw has been removed.

5. To ensure the valve gasket is properly seated, insert the holddown screw and tighten to the value listed in Appendix B. NOTE: Gaskets and O-rings are not normally reusable.

6. Replace the O-ring and valve cap and tighten to the value listed in Appendix B.

7. Check bolts and valve holddown screws after first week of operation. Re-torque if necessary. See Appendix B for torque values.

4.2 Heads

A horizontal compressor cylinder head or adjusting cap seldom require replacement if the compressor is properly maintained. The primary cause of damage to a cylinder head and adjusting cap is corrosion and the entry of solid debris or liquid into the compression chamber. Improper storage can also result in corrosion damage to the cylinder heads and adjusting caps (for proper storage instructions see chapter 5).

Many compressor repair operations require removal of the cylinder heads and adjusting caps. While the compressor is disassembled, special care should be taken to avoid damage or corrosion. If the compressor is to be left open for more than a few hours, bare metal surfaces should be coated with rust preventative.

When reassembling the compressor, make sure the bolts are re-tightened to the torque values listed in Appendix B.

4.3 Piston Rings and Piston Ring Expander Replacement

Piston Ring Life - Dry Cylinder Compressor Applications

It is unrealistic to expect the same piston ring life from a dry cylinder compressor as from a lubricated cylinder machine because the PTFE rings have greater wear, particularly under high temperature conditions.

CORKEN uses one of the best PTFE ring formulations available. The normal life expectancy is approximately 2,200 hours of continuous service within recommended compression ratios. However, ring life will vary considerably depending upon piston speed (RPM), ambient temperature, intermittent service conditions, compression ratio and the nature of the gas being handled.

The secret to long ring life is operating at a low temperature. A low ambient temperature and compression ratio along with better intercooling will provide better ring wear.

Piston Ring Life - Lubricated Cylinder Compressor Applications

If your compressor is equipped with cylinder lubrication you can expect considerably longer life from your piston rings than the dry cylinder units described above.

Piston ring life will vary considerably from application to application. Ring life will improve dramatically at lower speeds and temperatures.

Piston and Piston Ring Expander Replacement

1. To replace the piston rings, depressurize the compressor and purge if necessary.

2. Remove the cylinder cap (if any) and head.

3. Loosen the piston cap screws and remove the piston cap as shown in figure 4.3 by pinching two loose screws together.

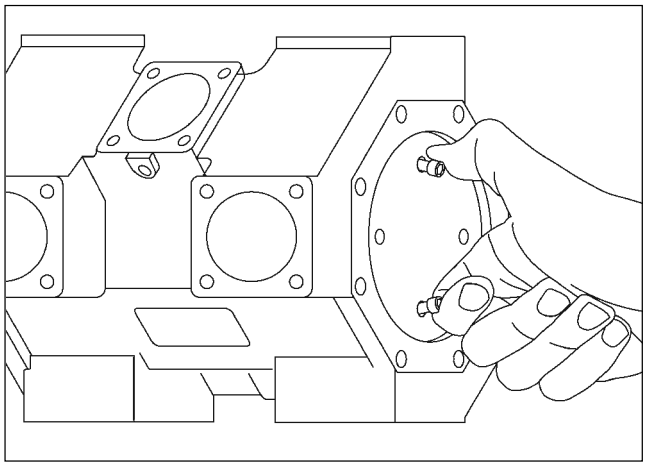


Figure 4.3

4. Remove the lock nut, washer and shims and pull the piston off the end of the piston rod. Keep track of which piston washer and shims came out of each cylinder.

5. Piston rings and expanders may then be easily removed and replaced. Corken recommends replacing expanders whenever rings are replaced. To determine if rings should be replaced, measure the radial thickness and compare it to the chart in Appendix B.

4.4 Pistons

As you read the following instructions, refer to Appendix D for parts details.

1. To replace the pistons, depressurize the compressor and purge if necessary.

2. Remove the head (or adjusting screw nut, cylinder cap, adjusting cup and head - applies to adjustable head configuration only) as shown in Appendix D.

3. Remove the piston cap and shims by loosening and removing the piston cap screws holding the piston cap to the piston. Re-insert two loose screws as shown in figure 4.3. Using your fingers, pinch the screws together and pull the piston cap out of the cylinder.

4. Remove the lock nut and thrust washer and pull the piston out of the cylinder. Then, remove the thrust washer and shims on the end of the piston rod.

5. Check the thrust washer and shims for damage and replace if necessary.

6. Measure the thickness of the existing shims.

7. Insert one thrust washer against piston rod shoulder followed by the same shims (or the same thickness of shims) as before.

8. Before installing the piston, attach the piston ring expanders and piston rings to the piston. Then, install the piston on the piston rod.

9. Install a thrust washer and lock nut and tighten the lock nut to the value listed in Appendix B.

10. Now remove an inboard valve and measure dimension “Y” on the inboard end of the piston as shown in Appendix B. If this measurement does not fall within the tolerances listed in the piston assembly details (Appendix B), remove the piston and adjust the shims as necessary. Re-install the piston and tighten the lock nut to the value listed in Appendix B. Re-measure the “Y” dimension.

11. After the “Y” dimension is within tolerance, install the piston cap with the same shim/shims (or same thickness of shims) as before.

12. Torque the piston cap screws to the value listed in Appendix B.

13. Install the head (or head and adjustable cap - applies to adjustable head configuration only) as show in Appendix D. Torque bolts to the value listed in Appendix B.

14. Now remove an outboard valve and measure dimension “X” at the outboard end of the piston as shown in the Appendix B. If this measurement does not fall within the tolerances in Appendix B, remove the head (or head and adjustable cap - applies to adjustable head configuration only) and piston cap and adjust the shims as necessary. Re-install the piston cap and tighten the piston cap screws in an alternating sequence to the values listed in Appendix B. Re-install the head (or head and adjustable cap - applies to adjustable head configuration only) and torque to the value listed in Appendix B. Re-measure the “X” dimension again.

15. After the “X” dimension is within tolerance, remove the adjustable cap and install the adjustable cup followed by the adjustable cap and adjustable screw nut as shown in Appendix D.

16. Torque the bolts in an alternating sequence to the values listed in Appendix B.

17. Replace the previously removed valves. Best results will be obtained if new valve gaskets are used.

18. Follow standard startup procedures.

4.5 Cylinder Replacement

Cylinders very seldom require replacement if the compressor is properly maintained. The primary cause of damage to cylinders is corrosion and the entry of solid debris or liquid into the compression chamber. Improper storage can also result in corrosion damage to cylinder (for proper storage instructions see chapter 5). Damage can also occur if the piston rings are allowed to wear so much that the ring expander can reach the cylinder wall.

Many compressor repair operations require removal of the cylinder. While the compressor is disassembled, special care should be taken to avoid damage or corrosion to the cylinder. If the compressor is to be left open for more than a few hours, bare metal surfaces should be coated with rust preventative.

If the cylinder does become damaged or corroded, use a hone to smooth the cylinder bore and then polish it to the value shown in Appendix B. If more than .005 of an inch must be removed to smooth the bore, replace the cylinder. Cylinder liners and oversized rings are not available. OVERBORING THE CYLINDER WILL RESULT IN GREATLY REDUCED RING LIFE.

1) Keep foreign material out of crosshead bore on crankcase. Wipe inside of bore with clean rag and coat bore with oil.

2) Inspect piston rod for cleanliness and coat with oil before assembly.

3) Before installing adapter and packing cartridge on piston rod, install packing installation cone (Corken #3905) over piston rod threads. This will aid and protect packing during installation. Failure to use this packing cone could result in packing damage. Refer to Appendix D for correct installation of packing.

4) Rotate flywheel/crankshaft by hand several revolutions to ensure proper fit of all assembled parts.

5) Orient cylinder inlet and outlet to piping installation to ensure proper valve alignment with system. Valves must be properly oriented with suction and discharge piping.

6) For piston installation instructions, see section 4.4.

7) After installing the piston, again, rotate flywheel/crankshaft by hand several revolutions to ensure proper fit of all assembled parts.

8) Check crankcase for proper oil level.

9) See start-up procedure in section 2.7. During start-up, listen to the compressor for any unusual noises. If any problems arise during assembly, please contact the factory.

When reassembling the compressor, make sure the bolts are retightened using the torque values listed in Appendix B.

4.6 Packing Replacement Instructions

Caution: Before installing the new piston rod packing, bleed all pressure from the compressor and piping and purge if necessary. After the new piston rod packing has been installed, the unit should be pressure tested and checked for leaks at all joints and gasket surfaces. When the compressor is being used with toxic, dangerous, flammable or explosive gases, this pressure and leak testing should be done with air or a dry, inert gas such as nitrogen.

For specific construction details and actual part numbers, consult Appendix D in the back of this Installation, Operation & Maintenance (IOM) manual. Use instructions below that apply to the MODEL and SERIAL NUMBER of your compressor.

Cleanliness:

Sealing a reciprocating piston rod is a very difficult task. In order to create the best seal possible between the piston rod and the packing, KEEP YOUR HANDS, PARTS AND TOOLS CLEAN DURING INSTALLATION.

Workmanship:

Your Corken compressor is a precision piece of equipment with very close tolerances. Treat it as such. Never beat on it to get parts in or out.

Disassembly of Packing—Plain-style Compressor Models HG601 and HG602

1. Depressurize and open the compressor before performing any tasks.

2. Remove the head (along with adjustable head components, if any), pistons and cylinder.

3. **Standard Packing Specification**

   a. Refer to Appendix D for your particular model of compressor and note the order in which the parts are removed.

   b. Mark the top of the packing cartridge body to facilitate later reassembly. Remove the four socket head bolts that attach the packing cartridge assembly to the adapter. It is not normally necessary to remove the adapter from the crankcase in order to disassemble or reassemble the packing.

   c. Partially insert the bolts in the puller holes in the outer end of the packing cartridge body and pull outward to remove the entire packing cartridge assembly from the adapter and over the piston rod. If the packing cartridge assembly does not slide out easily, it may be necessary to alternately turn the bolts clockwise in the puller holes so that the bolts engage the adapter and force the packing cartridge assembly to come out.

   d. Remove the outer retainer ring, solid packing breaker (not included on 6" and 8" cylinders), packing cups, all packing sets, backup rings, etc. from the cylinder side of the packing cartridge body.

   e. Remove the inner retainer ring, packing washer and oil wiper ring set from the crankcase side of the packing cartridge body.

4. **Purge Packing Specification**

   a. Refer to Appendix D for your particular model of compressor and note the order in which the parts are removed.

   b. Mark the top of the packing cartridge cap to facilitate later reassembly. Remove the four socket head bolts that attach the packing cartridge cap to the adapter. It is not normally necessary to remove the adapter from the crankcase in order to disassemble or reassemble the packing.

   c. Partially insert the bolts in the puller holes in the outer end of the packing cartridge cap and pull outward to remove the packing cartridge cap from the rest of the packing cartridge assembly, adapter and over the piston rod. If the packing cartridge cap does not slide out easily, it may be necessary to alternately turn the bolts clockwise in the puller holes so that the bolts engage the adapter and force the packing cartridge cap to come out.

   d. Mark the top of the packing cartridge body to facilitate later reassembly and proper alignment with the packing cartridge cap. Pull outward to remove the packing cartridge assembly from the adapter and piston rod.

      i. **2-3/4" and 3-1/4" Cylinders:** Using a pair of flat-bladed screwdrivers or similar tools, engage the annular groove on the outer end (cylinder side) of the packing cartridge body and pry the packing cartridge assembly from the adapter and over the piston rod.

      ii. **4", 5", 6" and 8" Cylinders:** Partially insert the bolts in the puller holes in the outer end of the packing cartridge body and pull outward to remove the packing cartridge assembly from the adapter and over the piston rod. If the packing cartridge assembly does not slide out easily, it may be necessary to alternately turn the bolts clockwise in the puller holes so that the bolts engage the adapter and force the packing cartridge assembly to come out.

   e. In addition to the packing cartridge cap previously removed, remove the solid packing breaker (not included on 6" and 8" cylinders), packing cups, all packing sets, backup rings, purge packing cups, cup spacer, packing spacer, oil wiper cup, oil wiper ring set, etc. from the cylinder side of the packing cartridge body.

Assembly of Packing—Plain-style Compressor Models HG601 and HG602

1. Always use new O-rings, packing and oil wiper ring sets during assembly.

2. Clean packing cartridge body and parts removed from it during disassembly process.

3. **Standard Packing Specification**

   a. Refer to Appendix D and note the order in which the parts are to be installed and their correct orientation.

b. Install the oil wiper ring set, packing washer and inner retainer ring into the crankcase side of the packing cartridge body.

c. Install the O-ring on the packing spacer, and install both into the cylinder side of the packing cartridge body.

d. Install a back-up ring, segmented packing set (tangent-tangent [TT]) and packing cup with O-ring into the cylinder side of the packing cartridge body.

e. Install a back-up ring, a segmented packing set (radial-tangent [RT]) and packing cup with O-ring into the cylinder side of the packing cartridge body. Repeat this process for the remaining RT packing sets.

f. Install the pressure breaker ring (not included on 6" and 8" cylinders) and final packing cup with O-ring into the cylinder side of the packing cartridge body. Reinstall outer retainer ring.

g. Install a packing installation cone (Part no. 3905) on threaded end of the piston rod

h. Install a new O-ring inside the adapter.

i. Carefully install the assembled packing cartridge assembly on the piston rod and insert into the adapter. Be sure the mark previously made on the packing cartridge body is oriented up because the packing cartridge body can only be installed in one position. Attach the packing cartridge body to the adapter with the four socket head bolts.

j. Remove the packing installation cone.

k. Replace the cylinder, pistons and cylinder head (along with adjustable head components, if any).

l. Rotate the unit by hand to insure proper assembly.

4. **Purge Packing Specification**

a. Refer to Appendix D and note the order in which the parts are to be installed and their correct orientation.

b. Install oil wiper ring set and oil wiper ring cup into the cylinder side of the packing cartridge body.

c. Install a biased packing set (tangent-tangent with springs toward cylinder [TTs]), purge packing cup with O-ring and cup spacer into the cylinder side of the packing cartridge body. **NOTE: The 6 springs in the biased packing sets are very small and fit loosely, so extra care is needed to keep from losing them or having them become dislodged during assembly.**

d. Install a purge packing cup with O-ring and biased packing set (tangent-tangent with springs toward crankcase [sTT]) into cylinder side of packing cartridge body.

e. Install the O-ring on the packing spacer, and install both into the cylinder side of the packing cartridge body.

f. Install the back-up ring, segmented packing set (tangent-tangent [TT]) and packing cup with the O-ring into the cylinder side of the packing cartridge body.

g. **2-3/4", 3-1/4" and 4" Cylinders:** Each of these cylinder sizes includes a pressure breaker ring on the outer end of the packing cartridge assembly. Also, these cylinder sizes include a packing cartridge cap into which at least some of the segmented packing sets (radial-tangent [RT]) are positioned.

i. Install a back-up ring, segmented packing set (radial-tangent [RT]) and packing cup with O-ring into cylinder side of packing cartridge body. Repeat this process as necessary for additional RT packing sets until a packing cup extends partially from the cylinder side of the packing cartridge body.

ii. Install the pressure breaker ring and packing cup with O-ring into the packing cartridge cap.

iii. Install a back-up ring, segmented packing set (radial-tangent [RT]) and packing cup with O-ring into the packing cartridge cap. Repeat this process for remaining RT packing sets.

iv. Install the packing cartridge cap on the packing cartridge body, making sure the previously-made markings on each are aligned. The portion of the packing cup extending from the packing cartridge body should extend into the packing cartridge cap.

v. Insure that the pin extending from the outer end of packing box cartridge fits into the corresponding hole in the packing cartridge cap. **NOTE: Some early models did not have this pin.**

h. **5", 6" and 8" Cylinders:** Each of these cylinder sizes includes a flat packing cartridge cap that fits on the outer end of the packing cartridge body.

i. Install a back-up ring, segmented packing set (radial-tangent [RT]) and packing cup with O-ring into the cylinder side of the packing cartridge body. Repeat this process for remaining RT packing sets.

ii. Position the packing cartridge cap on the packing cartridge body, making sure the previously-made markings on each are aligned. The holes in the packing cap should be aligned with the corresponding holes in the packing cartridge body.

i. Install a packing installation cone (Part no. 3905) on threaded end of the piston rod

j. Install a new O-ring inside the adapter.

k. Carefully install the assembled packing cartridge assembly with packing cartridge cap on the piston rod and insert into the adapter. Be sure the marks previously marked on the packing cartridge body and cap are oriented up because most packing cartridge bodies can only be installed in one position. Attach the packing cartridge cap to the adapter with the four socket head bolts.

l. Remove the packing installation cone.

m. Replace the cylinder, pistons and cylinder head (along with adjustable head components, if any).

n. Rotate the unit by hand to insure proper assembly.

Disassembly of Packing—T-style Compressor Models THG601 and THG602

1. Depressurize and open the compressor before performing any tasks.

2. Remove the head (along with adjustable head components, if any), pistons and cylinder.

3. Refer to Appendix D for your particular model of compressor and note the order in which the parts are removed.

4. Mark the top of the packing cartridge cap to facilitate later reassembly. Remove the four socket head bolts that attach the packing cartridge cap to the adapter. It is not normally necessary to remove the adapter from the distance piece or the distance piece from the crankcase in order to disassemble or reassemble the packing.

5. Partially insert the bolts in the puller holes in the outer end of the packing cartridge cap and pull outward to remove the packing cartridge cap from the rest of the packing cartridge assembly, adapter and over the piston rod. If the packing cartridge cap does not slide out easily, it may be necessary to alternately turn the bolts clockwise in the puller holes so that the bolts engage the adapter and force the packing cartridge cap to come out.

6. Mark the top of the packing cartridge body to facilitate later reassembly. Pull outward to remove the packing cartridge assembly from the adapter and over the piston rod.

a. **2-3/4" and 3-1/4" Cylinders:** Using a pair of flat-bladed screwdrivers or similar tools, engage the annular groove on the outer end (cylinder side) of the packing cartridge body and pry the packing cartridge assembly from the adapter and piston rod.

b. **4", 5", 6" and 8" Cylinders:** Partially insert the bolts in the puller holes in the outer end of the packing cartridge body and pull outward to remove the packing cartridge assembly from the adapter and over the piston rod. If the packing cartridge assembly does not slide out easily, it may be necessary to alternately turn the bolts clockwise in the puller holes so that the bolts engage the adapter and force the packing cartridge assembly to come out.

7. Separate the packing cartridge adapter from the packing cartridge body by removing the four small socket head screws. Remove the cup spacer by sliding it out of the packing cartridge body or packing cartridge adapter.

8. **Outer Packing**

   a. In addition to the packing cartridge cap previously removed, remove solid packing breaker (not included on 6" and 8" cylinders), packing cups, packing sets, backup rings, packing spacer and purge packing cup, etc. from the cylinder side of the packing cartridge body.

   b. If the packing components are not easily removable, it may be necessary to use Corken Packing Removal Tool 4789-X. Referring to Figure 4.6A, orient the packing cartridge body so that the open end (cylinder side) faces down, and align the tool with the center opening of the packing cartridge.

   c. Insert Tool 4789-X into the packing cartridge body until the engagement end of the tool is just above the purge packing cup. See Figure 4.6B.

   d. Press the spring-loaded lever inward so that the engagement end of the lever moves outward. While still holding the lever in, place the engagement ends of the tool and lever in contact with the purge packing cup, and use a hammer or similar device to drive the outer packing set from the packing cartridge body.

9. **Middle Packing:** Remove the packing cups, packing sets, backup rings, packing spacer and purge packing cup, etc. from the crankcase side of the packing cartridge body. If necessary Packing Removal Tool 4789-X may be used to remove the middle packing set in a manner similar to the outer packing set.

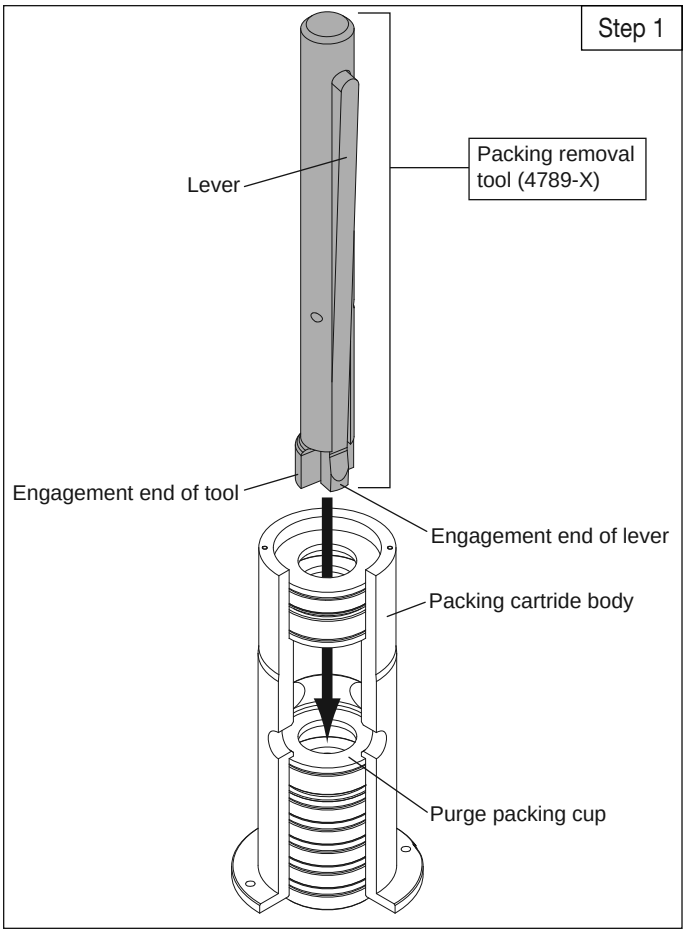


Figure 4.6A: Packing disassembly

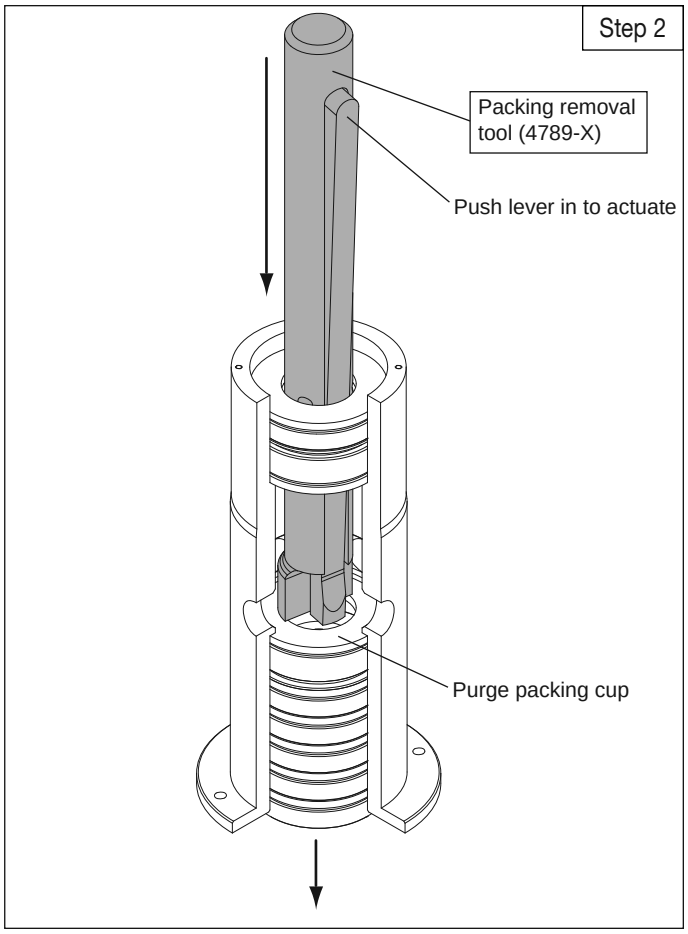


Figure 4.6B: Packing disassembly

10. **Inner Packing:** Remove the purge packing cup, segmented packing, oil wiper cup, oil wiper ring set, etc. from the cylinder side of the packing cartridge adapter.

Assembly of Packing—T-style Compressor Models THG601 and THG602

1. Always use new O-rings, packing sets and oil wiper ring sets during assembly.

2. Clean the packing cartridge body and parts removed from it during disassembly process.

3. Refer to Appendix D and note the order in which the parts are to be installed and their correct orientation.

4. **Inner Packing:** The inner packing set is most easily assembled using Packing Assembly Tool 4794-X.

   a. Set the end plate of the Tool 4794-X on a horizontal work surface and remove the slotted clamp of the tool.

   b. Place a purge packing cup and a biased packing set (TTs) onto the end plate of the tool and over the rod of the tool. The cylinder side of the packing should face the end plate of the tool such that the springs in the biased packing set face toward the end plate. **NOTE: The 6 springs in the biased packing sets are very small and fit loosely,**

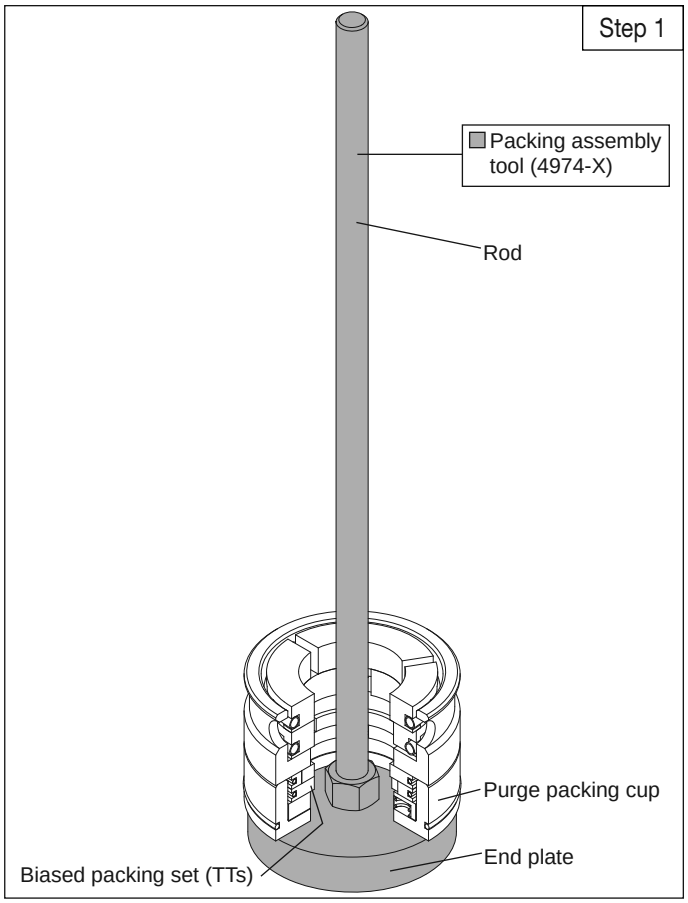


Figure 4.6C: Packing assembly

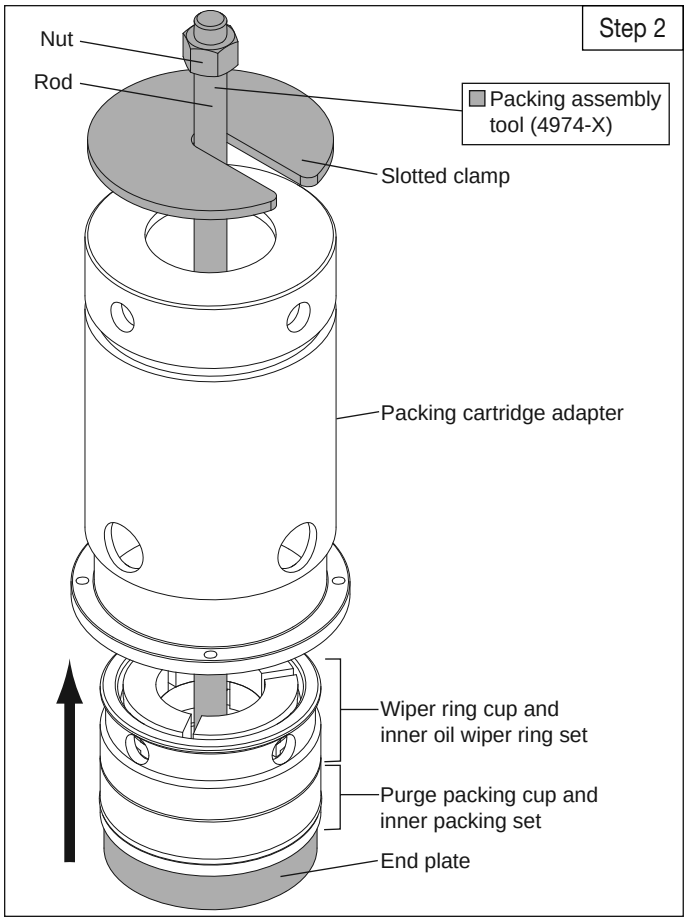


Figure 4.6D : Packing assembly

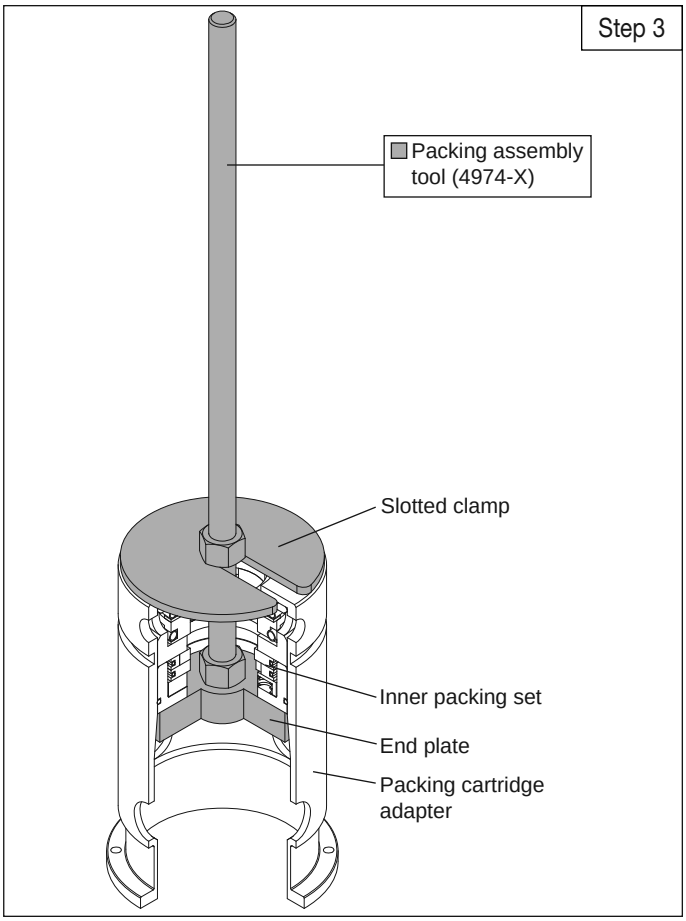


Figure 4.6E : Packing assembly

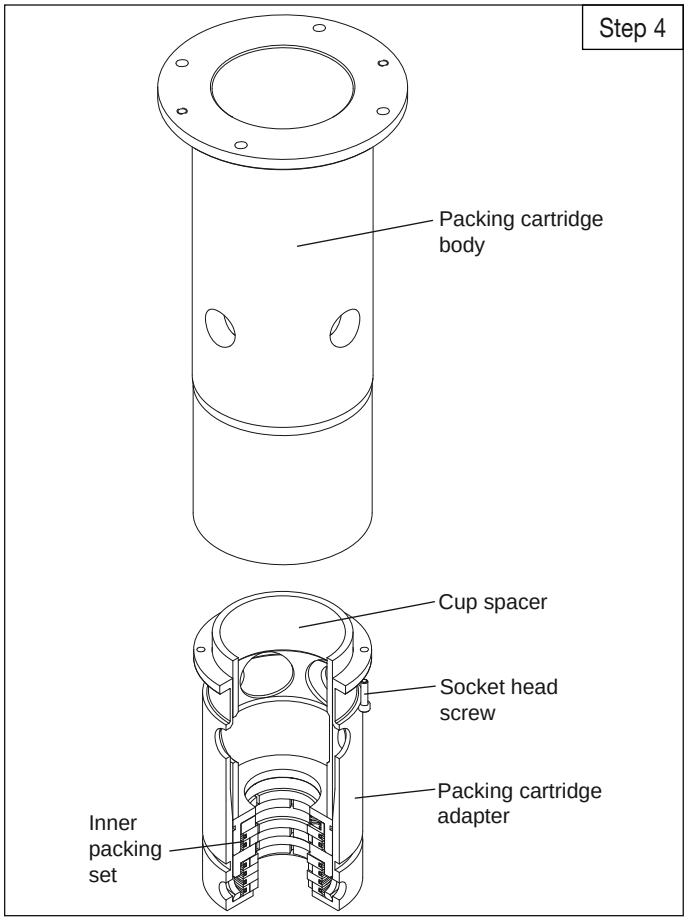


Figure 4.6F : Packing assembly

so extra care is needed to keep from losing them or having them become dislodged during assembly. Place the oil wiper ring cup and oil wiper ring set onto the purge packing cup. You now have a full inner packing set positioned on the end plate of the tool. See Figure 4.6C.

c. Orient the packing cartridge adapter so that the open end (cylinder side) faces down. Being careful not to dislodge the inner packing set previously placed on the end plate of the tool, position the packing cartridge adapter over the inner packing set and end plate of the tool so that the rod of the tool extends through the packing cartridge adapter. Place the slotted clamp above the packing cartridge adapter as shown in Figure 4.6D.

d. Tighten the nut on the rod of the tool until the inner packing set is fully drawn into the packing cartridge adapter. See Figure 4.6E.

e. Invert the packing cartridge adapter with the inner packing set in it, and remove Tool 4794-X. Slide the cup spacer into the packing cartridge adapter so that it engages the inner packing set. See Figure 4.6F.

f. Place an oil deflector ring inside the cup spacer so that it is generally concentric with the inner packing set.

5. **Middle Packing**

   a. For compressors set up for pad packing (Specification Code G), install a purge packing cup with O-ring and a biased packing set (tangent-tangent with springs toward cylinder [TTs]) into the crankcase side of the packing cartridge body. NOTE: The 6 springs in the biased packing sets are very small and fit loosely, so extra care is needed to keep from losing them or having them become dislodged during assembly.

   b. Install an O-ring on a packing spacer and install both into the crankcase side of the packing cartridge body.

   c. Install a backup ring, segmented packing set (tangent-tangent [TT]) and packing cup with O-ring into the crankcase side of the packing cartridge body.

   d. For compressors set up for purge packing (Specification Code H), the middle packing set components are installed in the opposite order from Specification Code G, so that the springs are toward the crankcase side of the packing cartridge body.

   e. For both Specification Codes G and H, install the packing cartridge adapter onto the crankcase side of the packing cartridge body such that the cup spacer slides into the crankcase side of the packing cartridge adapter and engages the middle packing set to retain it in the packing cartridge body. Attach the packing cartridge adapter to the packing cartridge body with the four small socket head screws.

6. **Outer Packing**

   a. Install a purge packing cup with O-ring and biased packing set (tangent-tangent with springs toward crankcase [sTT]) into cylinder side of packing cartridge body.

   b. Install an O-ring on a packing spacer, and install both into cylinder side of packing cartridge body.

   c. Install a back-up ring, segmented packing set (tangent-tangent [TT]) and packing cup with O-ring into the cylinder side of packing cartridge body.

   d. Install a back-up ring, segmented packing set (radial-tangent [RT]) and packing cup with O-ring into the cylinder side of packing cartridge body. Repeat this process for remaining RT packing sets

   e. Install a pressure breaker ring (not included on 6" and 8" cylinders) and final packing cup with O-ring into the cylinder side of packing cartridge body

   f. Install a new O-ring on the outside of the packing cartridge adapter and inside the adapter

   g. Install a packing installation cone (Part no. 3905) on the threaded end of the piston rod.

   h. Carefully install the completed packing cartridge assembly on the piston rod and insert into the adapter. Be sure the mark previously made on the packing cartridge body is oriented up because most packing cartridge bodies can only be installed in one position.

   i. Install the packing cartridge cap in the adapter. Be sure the mark previously made on the packing cartridge cap is oriented up because the packing cartridge cap can only be installed in one position. On 2-3/4", 3-1/4" and 4" Cylinders only, insure that the pin extending from the outer end of the packing box cartridge fits into the corresponding hole in the packing cartridge cap.

   j. Attach the packing cartridge cap to the adapter with the four socket head bolts

   k. Remove the packing installation cone.

7. Replace the cylinder, pistons and cylinder head (along with adjustable head components, if any).

8. Rotate unit by hand to insure proper assembly.

4.7 Bearing Replacement for Crankcase and Connecting Rod

1. To replace the crankcase roller bearings, wrist pin bushing and connecting rod bearings, begin by removing the head (or head, adjustable cap and adjustable cup - applies to adjustable head configuration only), cylinder, pistons, adapter, distance piece (THG600 only) and crosshead and connecting rod assemblies.

2. Drain the crankcase and remove the inspection plates.

3. Choose and mark one connecting rod and the corresponding connecting rod cap to identify them. DO NOT MIX CONNECTING RODS AND CAPS. Loosen and remove the connecting rod nuts in order to remove the crosshead and connecting rod assemblies.

4.7.1 Wrist Pin Bushing Replacement

1. To replace the wrist pin bushing, remove the retainer rings that position the wrist pin in the crosshead.

2. Press out the wrist pin so the crosshead and connecting rod may be separated. Inspect the wrist pin for wear and damage and replace if necessary.

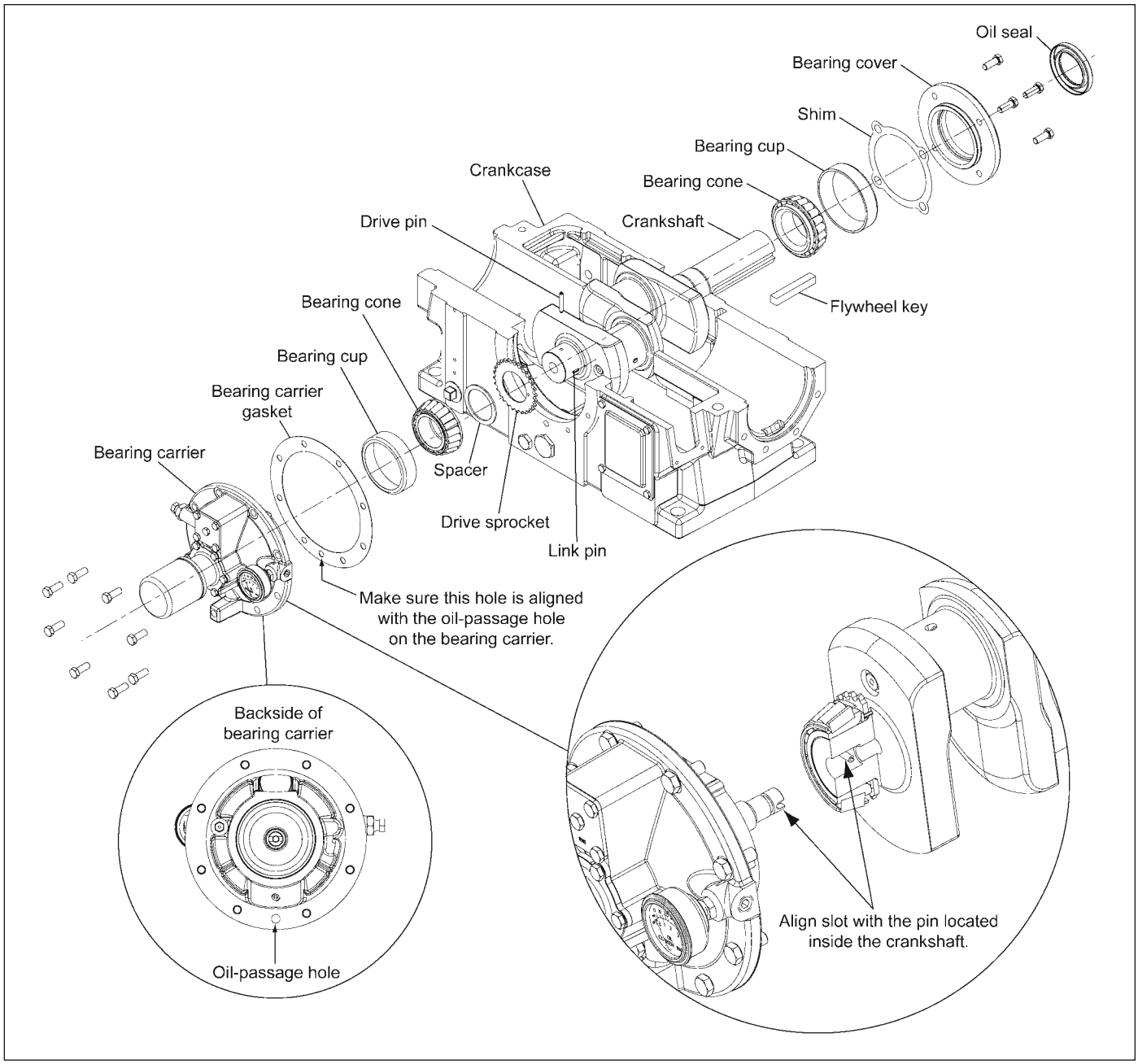


Figure 4.7

3. Press out the old wrist pin bushing and press a new bushing into the connecting rod. DO NOT MACHINE THE O.D. OR I.D. OF THE BUSHING BEFORE PRESSING INTO CONNECTING ROD.

4. Make sure the lubrication hole in the bushing matches the oil passage in the connecting rod. If the holes do not align, drill out the bushing through the connecting rod lubricant passage with a long drill. Bore the wrist pin bushing I.D. as indicated. See Appendix D for details. Over boring the bushing can lead to premature failure of the wrist pin bushing and/or wrist pin.

5. Inspect the oil passage for debris and clean thoroughly before proceeding.

6. Press the wrist pin back into the crosshead and wrist pin bushing and reinstall retainer rings. NOTE: The fit between the wrist pin and bushing is tighter than on lubricated air compressors and combustion engines.

4.7.2 Replacing Connecting Rod Bearings

The semi-circular connecting rod bearings are easily replaced by removing the connecting rods. Make sure the indentations in the connecting rod bearing and connecting rod line up when installing the new bearings. MAKE SURE THE ARROW AND/OR ALIGNMENT NOTCH ON CONNECTING ROD AND CAP ARE ALIGNED. BE SURE THE PREVIOUSLY MARKED CONNECTING ROD AND CAP ARE KEPT TOGETHER.

Before reinstalling the crosshead/connecting rod assemblies, make sure the crankshaft throw and bearing

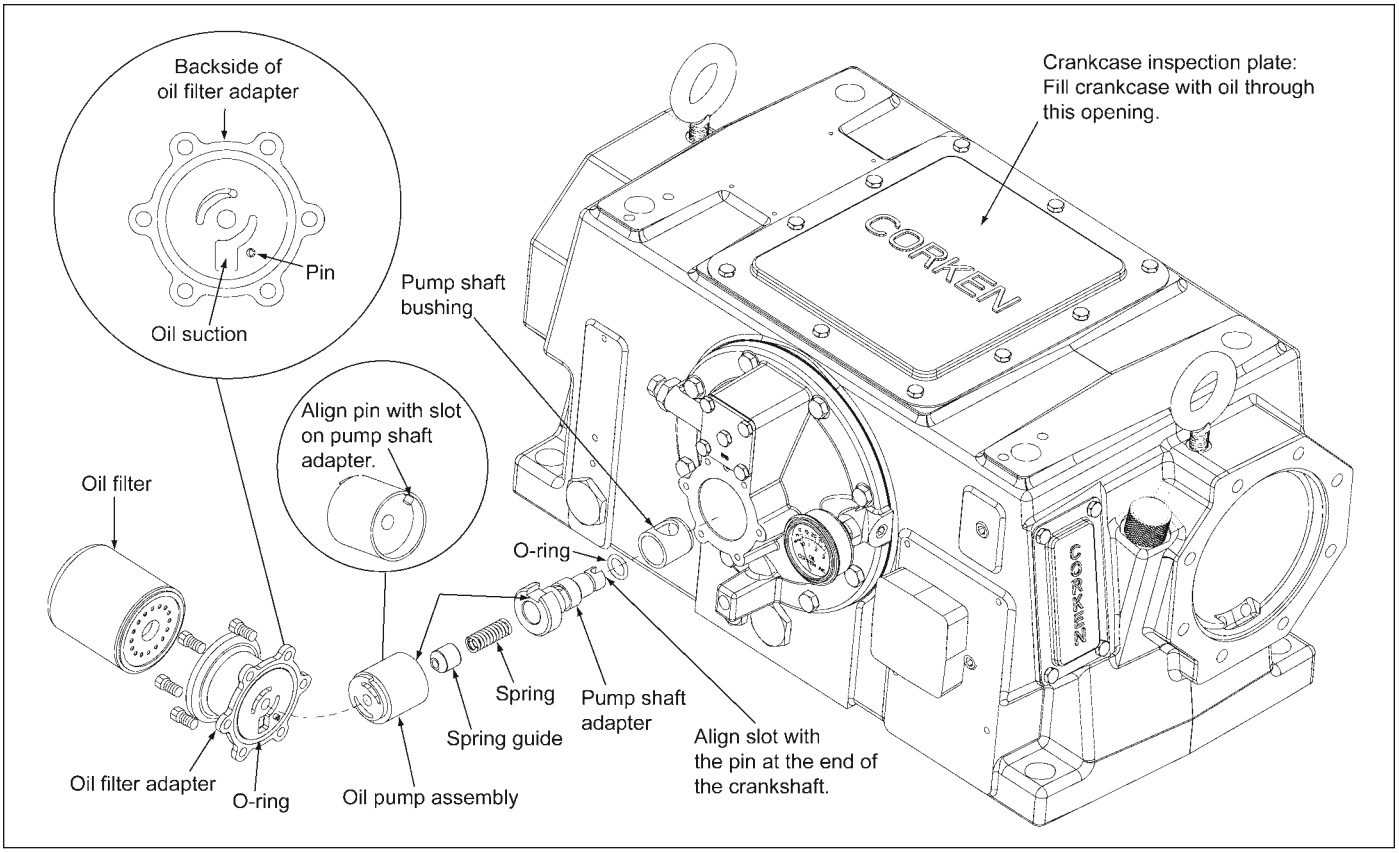


Figure 4.7: Oil Pump Inspection

surface are clean and lubricated. Tighten the connecting rod nuts to the torque value listed in Appendix B.

4.7.3 Replacing Crankcase Roller Bearings

To inspect the roller bearings, you must remove the flywheel, flywheel hub, bearing carrier and crankshaft using the following steps.

1. Remove the flywheel from the crankshaft by removing the three bolts that holds the flywheel to the hub. After removal, re-insert the bolts into the three THREADED flywheel removal holes (see figure 2.2A for details). Tighten the bolts EVENLY to remove the flywheel from the flywheel hub.

2. After the flywheel has been removed, remove the hub from the crankshaft. If the hub will not slide off the crankshaft easily, gently insert a flat head screw driver into the split on the hub and lightly tap with a screw driver. The hub should easily slide off the shaft.

3. Remove the bearing carrier and crankshaft from the crankcase (see figure 4.7 for details). If corrosion or pitting is present, the roller bearings should be replaced. When replacing the roller bearings, always replace the entire bearing and not just the cup or the cone. Purchasing extra shims is recommended as well. For crankcase assembly details, refer to Appendix D and figure 4.6.

   NOTE: REMOVING AND REPLACING THE BEARING CONES AND BEARING CUPS (STEPS FOUR AND FIVE LISTED BELOW) REQUIRES THE SERVICES OF A PROFESSIONAL MACHINE SHOP. DO NOT ATTEMPT TO REPLACE THEM IN THE FIELD.

4. To replace the bearings, press out the bearing cup on the flywheel side of the crankcase and the other bearing cup located on the bearing carrier. Using a bearing puller, remove the bearing cones from each end of the crankshaft.

5. Press one new bearing cup into the bearing carrier and press the other new bearing cup into the crankcase (opposite the bearing carrier side). Press one bearing cone on each end of the crankshaft. Insert the crankshaft through the bearing carrier opening. The flywheel side of the crankshaft should slide through the opening of the bearing cup and bearing cover. Slowly lower the opposite end of the crankshaft to the bottom of the bearing carrier opening.

6. Before installing the bearing carrier, **make sure the slot at the end of the oil pump shaft is aligned with the pin located at the end of the crankshaft.** Alignment should be either twelve and six o'clock or nine and three o'clock. Make sure the gasket for the bearing carrier is installed correctly. An improperly installed gasket will block the oil passage (see figure 4.6).

7. Push the end of the crankshaft toward the crankcase and pull back; if a clicking noise or motion is detected, the crankshaft has too much endplay. See Appendix B.

8. To reduce endplay, remove the bearing cover located on the flywheel side of the crankcase and remove a thin shim. Recheck the endplay after replacing the bearing cover.

9. When there is no detectable endplay, the shaft must still be able to rotate. If the crankshaft sticks or becomes abnormally warm, then the crankshaft bearings are too tight. If the crankshaft is too tight, add more shims but do not over shim. (Appendix B lists the proper crankshaft endplay). When the crankshaft can be rotated by hand with proper endplay, the rest of the compressor may be reassembled.

   NOTE: if the crankshaft roller bearings are too tight or too loose, premature bearing failure will result.

10. Reinstall the flywheel and check the runout as shown in Appendix B.

4.8 Oil Pump Inspection

If the compressor operates for a prolonged period with dirty or contaminated crankcase oil, damage to the oil pump and bearings may result.

1. To check the oil pump, unbolt the oil filter adapter and remove the oil pump, spring guide, spring and oil pump shaft adapter as shown in figure 4.7.

2. Inspect the gears in the oil pump for corrosion or pitting and replace if necessary.

3. Check the oil pump shaft bushing in the bearing carrier. If the bushing is corroded, pitted or worn, the oil pump shaft bushing should be replaced. Inspect and replace other parts as necessary.

4. Before reassembling the oil pump mechanism, replace the O-rings in the oil filter adapter and on the oil pump shaft adapter (see figure 4.7).

5. Rotate the drive pin in the crankshaft to a vertical position for easiest reassembly.

6. Insert the pump shaft adapter so it engages the drive pin.

7. Next, insert the spring, spring guide and oil pump assembly. The pin on the oil pump must align with the slot in the oil pump shaft adapter.

8. As you attach the oil filter adapter to the bearing carrier, make certain the pin on the back of the oil filter adapter aligns with the opening on the oil pump assembly as shown in figure 4.7. When you are sure the pin is properly aligned, install the oil filter adapter bolts finger tight. If alignment is correct, the oil filter adapter will mount flush to the bearing carrier. If it does not, re-check the pin alignment.

9. Tighten the bolts in an alternating sequence. See section 1.7 for directions on oil pressure adjustment.

10. Finally, rotate the crankshaft by hand to ensure smooth operation. Then rotate it in opposite directions, listening for a click, which indicates proper alignment of the oil pump's pins and slots.

Chapter 5—Extended Storage Procedures

Following a few simple procedures will greatly minimize the risk of the unit becoming corroded and damaged. Corken recommends the following precautions to protect the compressor during storage:

1. Drain the crankcase oil and refill with rust inhibiting oil.

2. Operate for a few minutes while fogging oil into the compressor suction.

3. Relieve V-belt tension.

4. Plug all openings to prevent entry of insects and moisture. (The cylinders may also be protected by the use of a vapor phase inhibitor, silica gel, or dry nitrogen gas. If the silica gel is used, hang a tag on the unit indicating that it must be removed before start-up.)

5. Store in a dry area and off the ground if possible.

6. Rotate the flywheel every two weeks if possible.

Compressor Troubleshooting

General

In most cases problems with your CORKEN gas compressor can be solved quite simply. The table below lists some of the more frequent problems that occur with reciprocating compressors along with a list of possible causes. If you are having a problem which is not listed or if you cannot find the source of the problem, consult the factory.

Two-Stage Compressor Trouble Shooting

Two-stage compressors can have problems that never occur with single-stage machines. Interstage pressure is an important indicator of the condition of a two-stage compressor.

If interstage pressure is too high:

- Second stage valves may be broken or leaking.
- Second stage piston rings may be worn.

If interstage pressure is too low:

- First stage valves may be broken or leaking.
- First stage piston rings may be worn.
- If suction and/or discharge pressures change, the interstage pressure will also change.

Compressor Trouble Shooting Guide

Problem	Possible Cause
Low Capacity	1, 2, 3, 4
Overheating	1, 2, 3, 5, 6, 11
Knocks, Rattles & Noise	1, 7, 9, 10, 11, 14
Abnormal Piston Ring Wear	1, 3, 5, 6, 11, 14
Product Leaking Through Crankcase Breather	8, 15
Product Leakage	4, 8, 14
Oil Leakage Around Compressor Base	15, 16
No Oil Pressure	17, 18
Excessive Vibration	1, 7, 9, 10, 11, 12, 13, 14, 26
Motor Overheating or Starter Tripping Out	19, 20, 21, 22, 23, 24, 25

Ref.	Possible Causes	What To Do
1.	Valves broken, stuck or leaking	Inspect and clean or repair
2.	Piston ring worn	Inspect and replace as necessary
3.	Inlet strainer clogged	Clean or replace screen as necessary
4.	Leaks in piping	Inspect and repair
5.	Inlet or ambient temperature too high	Consult Factory
6.	Compression ratio too high	Check Application and consult Factory
7.	Loose sheave or belt	Tighten
8.	Worn piston rod packing	Replace
9.	Worn wrist pin or wrist pin bushing	Replace
10.	Worn connecting rod bearing	Replace
11.	Unbalanced load	Inspect valves or consult Factory
12.	Inadequate compressor base	Strengthen, replace or gout
13.	Improper foundation or mounting	Tighten mounting or rebuild foundation
14.	Loose valve, piston or packing	Tighten or replace as necessary
15.	Leaking gas blowing oil from crankcase	Replace packing
16.	Bad oil seal	Replace
17.	No oil in crankcase	Add oil accordingly
18.	Oil pump malfunction	See "Oil Pressure Adjustment"
19.	Low voltage	Check line voltage with motor nameplate. Consult Power Company.
20.	Motor wired wrong	Check wiring diagram
21.	Wire size too small for length of run	Replace with correct size
22.	Wrong power characteristics	Voltage, phase and frequency must coincide with motor nameplate. Consult with Power Company.
23.	Wrong size heaters in starter	Check and replace according to manufacturer's instructions
24.	Compressor overloading	Reduce speed
25.	Motor shorted out	See "Driver Installation"
26.	Bad Motor Bearing	Lubricate according to manufacturer's instructions.

Gasket Sets and Repair Kits

Gasket Set	Part Type	Head Type
3582-X	Crankcase	
3582-X7_	8" cylinder	Standard
3582-X8_	8" cylinder	Adjustable
3582-X5_	6" cylinder	Standard
3582-X6_	6" cylinder	Adjustable
	5" cylinder	Standard
	5" cylinder	Adjustable
3582-X3_	4" cylinder	Standard
3582-X4_	4" cylinder	Adjustable
3582-X1_	3-1/4" cylinder	Standard
3582-X2_	3-1/4" cylinder	Adjustable
3582-X9_	2-3/4" cylinder	Adjustable

Repair kit	Part Type
3788-X1	Crankcase
3792-X1_	8" cylinder
3791-X1_	6" cylinder
5335-X1_	5" cylinder
3790-X1_	4" cylinder
3789-X1_	3-1/4" cylinder
3950-X1_	2-3/4" cylinder

NOTE: The crankcase repair kit includes a gasket set, bearing cups and cones, connecting rod bearings and wrist pin bushings. The cylinder repair kits include a gasket set (for adjustable head), piston rings, expanders, rider ring, oil wiper ring and segmented packing. The repair kits do not include compressor valves.

CAUTION: Always relieve pressure in the unit before attempting any repairs.

O-ring Code	
A	Buna-N
B	Neoprene®[1]
D	Viton®[1]
E	PTFE

[1] *Registered trademarks of the DuPont company.*

Crankcase and Cylinder Kit Options

Crankcase Options (frame only)

Model Number	Lubricator
HG600XXM	Not included
THG600XXM	Not included
HG600XXL	Included
THG600XXL	Included

Cylinder Kit Options

Each kit contains all parts required to change from one cylinder size to another in the field. The crosshead assembly is not included in the kit. The kits will be assembled "hand tight' and will include a cylinder nameplate.

Care must be exercised when selecting the cylinder kit required for a specific application. The proper head type and piston material must be chosen. To maintain proper balance, the following piston combinations are required for two-stage compressors.

Model	Size	Piston Material	
		1st stage	2nd stage
HG602AB	8" x 6"	Aluminum	Iron
THG602AB	8" x 6"	Aluminum	Iron
HG602AC	8" x 5"	Aluminum	Iron
THG602AC	8" x 5"	Aluminum	Iron
HG602AD	8" x 4"	Aluminum	Iron
THG602AD	8" x 4"	Aluminum	Iron
HG602BC	6" x 5"	Aluminum	Iron
THG602BC	6" x 5"	Aluminum	Iron
HG602BD	6" x 4"	Aluminum	Iron
THG602BD	6" x 4"	Aluminum	Iron
HG602BE	6" x 3-1/4"	Aluminum	Iron
THG602BE	6" x 3-1/4"	Aluminum	Iron
HG602BF	6" x 2-3/4"	Aluminum	Iron
THG602BF	6" x 2-3/4"	Aluminum	Iron
HG602CD	5" x 4"	Iron	Iron
THG602CD	5" x 4"	Iron	Iron
HG602DE	4" x 3-1/4"	Iron	Iron
THG602DE	4" x 3-1/4"	Iron	Iron
HG602DF	4" x 2-3/4"	Iron	Iron
THG602DF	4" x 2-3/4"	Iron	Iron
HG602EF	3-1/4" x 2-3/4"	Iron	Iron
THG602EF	3-1/4" x 2-3/4"	Iron	Iron

NOTE: Single-stage compressors must use the same material for each piston.

Cylinder Kit Number	Size	Head Type	Piston
3671-X1_	8"	Standard	Aluminum
3671-X2_	8"	Standard	Iron
3671-X3_	8"	Adjustable	Aluminum
3671-X4_	8"	Adjustable	Iron
3528-X1_	6"	Standard	Aluminum
3528-X2_	6"	Standard	Iron
3528-X3_	6"	Adjustable	Aluminum
3528-X4_	6"	Adjustable	Iron
5290-X1_	5"	Adjustable	Iron
4276-X1_	4"	Standard	Iron
4276-X2_	4"	Adjustable	Iron
4276-X3_	4"	Standard	Iron
4276-X4_	4"	Adjustable	Iron
3523-X1_	3-1/4"	Standard	Iron
3523-X2_	3-1/4"	Adjustable	Iron
3888-X1_	2-3/4"	Adjustable	Iron
5290-X1_	5"	Adjustable	Iron
5290-X2_	5"	Standard	Iron

Appendix A—Model Number Identification Code

INDUSTRIAL HORIZONTAL SINGLE CYLINDER COMPRESSORS

MODEL NUMBER

BASE X X X X X X X X X X X

	BASE MODEL NUMBER	HG601AX	HG601BX	HG601CX	HG601DX	HG601EX	HG601FX
Plain Style	Cylinder size	8"	6"	5"	4"	3¼"	2¾"
	Approximate shipping weight (lbs.)	730	650	640	630	620	620

	BASE MODEL NUMBER	THG601AX	THG601BX	THG601CX	THG601DX	THG601EX	THG601FX
T-Style	Cylinder size	8"	6"	5"	4"	3¼"	2¾"
	Approximate shipping weight (lbs.)	780	700	690	680	670	670

SPECIFICATION FIELDS

Packing Arrangement	Plain style only	Standard packing	Standard	O
		Purge packing	Optional	P
	T-Style only	Pad packing	Standard	G
		Purge packing	Optional	H

Crankcase Style	Standard lubricating w/external lubricator	Optional	L
	Standard lubricating w/ext. lubricator & heater	Optional	LH
	Standard pressure lubricated crankcase	Standard	M
	Standard pressure lubricator w/crankcase heater	Optional	MH

Valves	Standard suction & discharge valves	Standard						4
	Standard valves w/blank valves in both cylinders	Optional						4B
	Low inlet pressure valves	Optional	Optional	NA	NA	NA	NA	4L
	Low inlet press.valves w/blank valves in both cylinders	Optional	Optional	NA	NA	NA	NA	4BL
	Unloaders	Optional	Optional	Optional	Optional	Optional	NA	9
	Unloaders w/blank valves in both cylinders	Optional	Optional	Optional	Optional	Optional	NA	9B
	Unloaders with low inlet pressure valves	Optional	Optional	NA	NA	NA	NA	9L
	Unloaders w/low inlet pressure valves & blank valves in both cylinders	Optional	Optional	NA	NA	NA	NA	9BL

Piston Ring and Packing Material	Alloy / Alloy	Optional	G
	PTFE / Alloy	Standard	F
	PEEK / Alloy	Optional	H

Gasket Material	Iron gasket material	Standard	D

O-ring Material	Buna-N	Standard	A
	Neoprene®	Optional	B
	Viton®	Optional	D
	PTFE	Optional	E

Intercooler	No intercooler	Standard	N

Flywheel	No flywheel supplied	Optional	N
	Standard flywheel	Standard	S

Protective Coating	Coated cylinder only	Optional	C
	No coating	Standard	N
	Coating on all necessary wetted parts	Optional	W

Piston Rod Coating	Nitrotec®	Standard	N

Adjustable Head	None	Standard	Standard	Standard	Standard	Standard	NA	N
	Adjustable head	Optional	Optional	Optional	Optional	Optional	Standard	1

NA = Not Available

Neoprene®, Viton® and Nitrotec® are registered trademarks of the Dupont company.

Appendix A—Model Number Identification Code

INDUSTRIAL HORIZONTAL TWO CYLINDER, SINGLE-STAGE COMPRESSORS

MODEL NUMBER

BASE X X X X X X X X X X X X

Plain Style	**BASE MODEL NUMBER**	**HG601AA**	**HG601BB**	**HG601CC**	**HG601DD**	**HG601EE**	**HG601FF**	
	Cylinder size	8" x 8"	6" x 6"	5" x 5"	4" x 4"	3¼" x 3¼"	2¾" x 2¾"	
	Approximate shipping weight (lbs.)	1,070	910	890	870	845	845	
T-Style	**BASE MODEL NUMBER**	**THG601AA**	**THG601BB**	**THG601CC**	**THG601DD**	**THG601EE**	**THG601FF**	
	Cylinder size	8" x 8"	6" x 6"	5" x 5"	4" x 4"	3¼" x 3¼"	2¾" x 2¾"	
	Approximate shipping weight (lbs.)	1,170	1,010	990	970	945	945	

SPECIFICATION FIELDS

Packing Arrangement	Plain style only	Standard packing	Standard							O
		Purge packing	Optional							P
	T-Style only	Pad packing	Standard							G
		Purge packing	Optional							H
Crankcase Style	Standard lubricating w/external lubricator		Optional							L
	Standard lubricating w/ext. lubricator & heater		Optional							LH
	Standard pressure lubricated crankcase		Standard							M
	Standard pressure lubricated w/crankcase htr.		Optional							MH
Valves	Standard suction & discharge valves		Standard							4
	Standard valves w/blank valves in both cylinders		Optional							4B
	Low inlet pressure valves		Optional	Optional	NA	NA	NA	NA		4L
	Low inlet pressure valves w/blank valves in both cylinders		Optional	Optional	NA	NA	NA	NA		4BL
	Unloaders		Optional	Optional	Optional	Optional	Optional	NA		9
	Unloaders w/blank valves in both cylinders		Optional	Optional	Optional	Optional	Optional	NA		9B
	Unloaders with low inlet pressure valves		Optional	Optional	NA	NA	NA	NA		9L
	Unloaders w/low inlet pressure valves & blank valves in both cylinders		Optional	Optional	NA	NA	NA	NA		9BL
Piston Ring and Packing Material	Alloy / Alloy		Optional							G
	PTFE / Alloy		Standard							F
	PEEK / Alloy		Optional							H
Gasket Material	Iron gasket material		Standard							D
O-ring Material	Buna-N		Standard							A
	Neoprene®		Optional							B
	Viton®		Optional							D
	PTFE		Optional							E
Intercooler	No intercooler		Standard							N
Flywheel	No flywheel supplied		Optional							N
	Standard flywheel		Standard							S
Protective Coating	Coated cylinder only		Optional							C
	No coating		Standard							N
	Coating on all necessary wetted parts		Optional							W
Piston Rod Coating	Nitrotec®		Standard							N
Adjustable Head	None		Standard	Standard	Standard	Standard	Standard	NA		N
	Adjustable heads on both cylinders		Optional	Optional	Optional	Optional	Optional	Standard		3

NA = Not Available

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Appendix A—Model Number Identification Code

INDUSTRIAL HORIZONTAL TWO CYLINDER, TWO-STAGE COMPRESSORS

MODEL NUMBER

BASE XXXXXXXXXXXX

	BASE MODEL NUMBER	HG602AB	HG602AC	HG602AD	HG602BC	HG602BD
Plain Style	Cylinder size	8" x 6"	8" x 5"	8" x 4"	6" x 5"	6" x 4"
	Approximate shipping weight (lbs.)	990	980	970	930	895

	BASE MODEL NUMBER	THG602AB	THG602AC	THG602AD	THG602BC	THG602BD
T-Style	Cylinder size	8" x 6"	8" x 5"	8" x 4"	6" x 5"	6" x 4"
	Approximate shipping weight (lbs.)	1090	1080	1070	1030	995

SPECIFICATION FIELDS

Packing Arrangement	Plain style only	Standard packing	Standard	O
		Purge packing	Optional	P
	T-Style only	Pad packing	Standard	G
		Purge packing	Optional	H

Crankcase Style	Std. lubricating w/external lubricator	Optional	L
	Std. lubricating w/external lube. & heater	Optional	LH
	Std. pressure lubricated crankcase	Standard	M
	Std. pressure lubricated w/crankcase heater	Optional	MH

Valves	Standard suction & discharge valves	Standard	4
	Standard valves w/blank valves in both stages	Optional	4B
	Low inlet pressure valves	Optional	4L
	Low inlet pressure valves w/blank valves in both stages	Optional	4BL
	Standard valves w/blank valves in 1st stage	Optional	4F
	Low inlet pressure valves w/blank valves in 1st stage	Optional	4FL
	Standard valves w/blank valves in 2nd stage	Optional	4S
	Low inlet pressure valves w/blank valves in 2nd stage	Optional	4SL
	Unloaders	Optional	9
	Unloaders w/blank valves in both stages	Optional	9B
	Unloaders w/low inlet pressure valves	Optional	9L
	Unloaders w/low inlet pressure valves & blank valves in both stages	Optional	9BL
	Unloaders w/blank valves in 1st stage	Optional	9F
	Unloaders w/low inlet pressure valves & blank valves in 1st stage	Optional	9FL
	Unloaders w/blank valves in 2nd stage	Optional	9S
	Unloaders w/low inlet pressure valves & blank valves in 2nd stage	Optional	9SL

Piston Ring & Packing Material	Alloy / Alloy	Optional	G
	PTFE / Alloy	Standard	F
	PEEK / ALLOY	Optional	H

Gasket Material	Iron gasket material	Standard	D

O-ring Material	Buna-N	Standard	A
	Neoprene®	Optional	B
	Viton®	Optional	D
	PTFE	Optional	E

Intercooler	No intercooler	Standard	N

Flywheel	No flywheel supplied	Optional	N
	Standard flywheel	Standard	S

Protective Coating	Coated cylinder only	Optional	C
	No coating	Standard	N
	Coating on all necessary wetted parts	Optional	W

Piston Rod Coating	Nitrotec®	Standard	N

Adjustable Head	None	Standard	N
	Adjustable head on 1st stage cylnder only	Optional	1
	Adjustable head on 2nd stage cylnder only	Optional	2
	Adjustable heads on both cylinders	Optional	3

NA = Not Available

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Appendix A—Model Number Identification Code

INDUSTRIAL HORIZONTAL TWO CYLINDER, TWO-STAGE COMPRESSORS (cont'd.)

MODEL NUMBER

BASE XXXXXXXXXXXX

	BASE MODEL NUMBER	HG602BE	HG602BF	HG602DE	HG602DF	HG602EF
Plain Style	Cylinder size	6" x 3¼"	6" x 2¾"	4" x 3¼"	4" x 2¾"	3¼" x 2¾"
	Approximate shipping weight (lbs.)	880	880	860	860	845

	BASE MODEL NUMBER	THG602BE	THG602BF	THG602DE	THG602DF	THG602EF
T-Style	Cylinder size	6" x 3¼"	6" x 2¾"	4" x 3¼"	4" x 2¾"	3¼" x 2¾"
	Approximate shipping weight (lbs.)	980	980	960	960	945

SPECIFICATION FIELDS

Packing Arrangement	Plain style only	Standard packing	Standard					O
		Purge packing	Optional					P
	T-Style only	Pad packing	Standard					G
		Purge packing	Optional					H
Crankcase Style	Std. lubricating w/external lubricator		Optional					L
	Std. lubricating w/external lube. & heater		Optional					LH
	Std. pressure lubricated crankcase		Standard					M
	Std. pressure lubricated w/crankcase heater		Optional					MH
Valves	Standard suction & discharge valves		Standard					4
	Standard valves w/blank valves in both stages		Optional					4B
	Low inlet pressure valves		Optional	Optional	NA	NA	NA	4L
	Low inlet pressure valves w/blank valves in both stages		Optional	Optional	NA	NA	NA	4BL
	Standard valves w/blank valves in 1st stage		Optional					4F
	Low inlet pressure valves w/blank valves in 1st stage		Optional	Optional	NA	NA	NA	4FL
	Standard valves w/blank valves in 2nd stage		Optional					4S
	Low inlet pressure valves w/blank valves in 2nd stage		Optional	Optional	NA	NA	NA	4SL
	Unloaders		Optional	NA	Optional	NA	NA	9
	Unloaders w/blank valves in both stages		Optional	NA	Optional	NA	NA	9B
	Unloaders w/low inlet pressure valves		Optional	NA	Optional	NA	NA	9L
	Unloaders w/low inlet pressure valves & blank valves in both stages		Optional	NA	NA	NA	NA	9BL
	Unloaders w/blank valves in 1st stage		Optional	NA	Optional	NA	NA	9F
	Unloaders w/low inlet pressure valves & blank valves in 1st stage		Optional	NA	NA	NA	NA	9FL
	Unloaders w/blank valves in 2nd stage		Optional	NA	Optional	NA	NA	9S
	Unloaders w/low inlet pressure valves & blank valves in 2nd stage		Optional	NA	NA	NA	NA	9SL
Piston Ring & Packing Material	Alloy / Alloy		Optional					G
	PTFE / Alloy		Standard					F
	PEEK / ALLOY		Optional					H
Gasket Material	Iron gasket material		Standard					D
O-ring Material	Buna-N		Standard					A
	Neoprene®		Optional					B
	Viton®		Optional					D
	PTFE		Optional					E
Intercooler	No intercooler		Standard					N
Flywheel	No flywheel supplied		Optional					N
	Standard flywheel		Standard					S
Protective Coating	Coated cylinder only		Optional					C
	No coating		Standard					N
	Coating on all necessary wetted parts		Optional					W
Piston Rod Coating	Nitrotec®		Standard					N
Adjustable Head	None		Standard					N
	Adjustable head on 1st stage cylnder only		Optional					1
	Adjustable head on 2nd stage cylnder only		Optional					2
	Adjustable heads on both cylinders		Optional					3

NA = Not Available

Neoprene®, Viton® and Nitrotec® are registered trademarks of the DuPont company.

Appendix A—Model Number Identification Code

LPG HORIZONTAL TWO CYLINDER, SINGLE-STAGE COMPRESSORS

MODEL NUMBER

BASE X X X X X X X X X X X

	BASE MODEL NUMBER	HG601AA	HG601BB	HG601CC	HG601DD	HG601EE	HG601FF
Plain Style	Cylinders	8" x 8"	6" x 6"	5" x 5"	4" x 4"	3¼" x 3¼"	2¾" x 2¾"
	Approx. shipping weight (lbs.)	1070	910	890	870	845	845

	BASE MODEL NUMBER	THG601AA	THG601BB	THG601DD	THG601DD	THG601EE	THG601FF
T-Style	Cylinders	8" x 8"	6" x 6"	5" x 5"	4" x 4"	3¼" x 3¼"	2¾" x 2¾"
	Approx. shipping weight (lbs.)	1170	1010	990	970	945	945

SPECIFICATION FIELDS

Packing Arrangement	Plain style only	Standard packing	Standard	O
		Purge packing	Optional	P
	T-Style only	Pad packing	Standard	G
		Purge packing	Optional	H

Crankcase Style	Standard pressure lube	Standard	M
	Standard pressure lube with heater	Optional	MH

Valves	Standard valves	Standard							4
	Suction valve	Optional	Optional	Optional	Optional	Optional	NA		9

Piston Ring and Packing Material	PTFE Alloy	Standard	F

Gasket Material	Aluminum gaskets	Standard	NA	B
	Iron/lead gaskets	NC	Standard	D

O-ring Material	Buna-N	Standard	A
	Neoprene®	Optional	B

Intercooler	No intercooler	Standard	N

Flywheel	None	Optional	N
	Standard	Standard	S

Protective Coating	No coating	Standard	N

Piston Rod Coating	Nitrotec®	Standard	N

Adjustable Head	None	Standard					NA		N
	Adjustable heads on both ends	Optional	Optional	Optional	Optional	Optional	Standard		3

NA = Not Available NC = No Charge

Neoprene® is a registered trademark of DuPont.
Nitrotec® is a registered trademark of TTI Group Ltd.

Appendix B—Operating Specifications

Single-Stage Horizontal Compressors

Single Cylinder Models	**HG601AX THG601AX**	**HG601BX THG601BX**	**HG601CX THG601CX**	**HG601DX THG601DX**	**HG601EX THG601EX**	**HG601FX THG601FX**
Size	8"	6"	5"	4"	3.25"	2.75"
Displacement cfm (m^3/hr)						
400 rpm	68.8 (116.9)	38.4 (65.2)	26.4 (44.9)	16.8 (28.5)	10.8 (18.3)	7.6 (12.9)
1200 rpm	207.0 (351.7)	115.0 (195.4)	79.2 (134.4)	49.8 (84.6)	32.2 (54.5)	22.8 (56.0)
Approximate shipping weight lb. (kg.)						
HG model	730 (331.1)	650 (295.0)	640 (290.3)	630 (285.8)	620 (281.2)	620 (281.2)
THG model	780 (353.8)	700 (317.5)	690 (313.0)	680 (308.4)	670 (303.9)	670 (303.9)
Two Cylinder Models	**HG601AA THG601AA**	**HG601BB THG601BB**	**HG601CC THG601CC**	**HG601DD THG601DD**	**HG601EE THG601EE**	**HG601FF THG601FF**
Size	8" x 8"	6" x 6"	5" x 5"	4" x 4"	3.25" x 3.25"	2.75" x 2.75"
Displacement cfm (m^3/hr)						
400 rpm	138 (234.5)	76.8 (130.5)	52.8 (89.7)	33.2 (56.4)	21.2 (36.0)	14.8 (25.1)
1200 rpm	414 (704)	231 (393)	158.4 (268.8)	99.6 (169.2)	64 (108.7)	44.4 (75.6)
Approximate shipping weight lb. (kg.)						
HG model	1,070 (485.4)	910 (412.8)	890 (403.7)	870 (394.6)	845 (383.3)	845 (383.3)
THG model	1,170 (530.7)	1,010 (458.1)	990 (449.1)	970 (440.0)	945 (428.7)	945 (428.7)

Two-Stage Horizontal Compressors

Two Cylinder Models	**HG602AB THG602AB**	**HG602AC THG602AC**	**HG602AD THG602AD**	**HG602BC THG602BC**	**HG602BD THG602BD**	**HG602BF THG602BF**
Size	8" x 6"	8" x 5"	8" x 4"	6" x 5"	6" x 4"	6" x 2.75"
Displacement cfm (m^3/hr)						
400 rpm	68.8 (116.9)	68.8 (116.9)	68.8 (116.9)	38.4 (65.2)	38.4 (65.2)	38.4 (65.2)
1200 rpm	207.0 (351.7)	207.0 (351.7)	207.0 (351.7)	115.0 (195.4)	115.0 (195.4)	115.0 (195.4)
Approximate shipping weight lb. (kg.)						
HG model	990 (449.1)	980 (444.5)	970 (440.0)	930 (421.9)	895 (406.0)	880 (399.2)
THG model	1,090 (494.4)	1,080 (489.9)	1,070 (485.4)	1,030 (467.2)	995 (451.3)	980 (444.5)

Two Cylinder Models	**HG602BE THG602BE**	**HG602CD THG602CD**	**HG602CF THG602CF**	**HG602DE THG602DE**	**HG602DF THG602DF**	**HG602EF THG602EF**
Size	6" x 3.25"	5" x 4"	5" x 2.75"	4" x 3.25"	4" x 2.75"	3.25" x 2.75"
Displacement cfm (m^3/hr)						
400 rpm	38.4 (65.2)	26.4 (44.9)	26.4 (44.9)	16.8 (28.5)	16.8 (28.5)	10.8 (18.3)
1200 rpm	79.2 (134.4)	79.2 (134.4)	79.2 (134.4)	49.8 (84.6)	49.8 (84.6)	32.2 (54.5)
Approximate shipping weight lb. (kg.)						
HG model	880 (399.2)	880 (399.2)	867 (393.3)	860 (390.1)	860 (390.1)	845 (383.3)
THG model	980 (444.5)	980 (444.5)	967 (438.6)	960 (435.5)	960 (435.5)	945 (428.7)

Appendix B—Operating Specifications

Cylinder Data

Description	Cylinder Code					
	A	B	C	D	E	F
Cylinder Bore in. (mm)	8.0 (203.2)	6.0 (152.4)	5.0 (127)	4.0 (101.6)	3.25 (82.6)	2.75 (69.9)
Maximum working pressure psia (bar g)	300.0 (20.7)	350 (24.1)	750 (51.7)	1,000.0 (69.0)	1,200.0 (82.8)	1,650.0 (113.8)
Piston ring radial thickness (minimum) inches (mm)	0.215 (5.46)	0.155 (3.98)	0.155 (3.98)	0.082 (2.08)	0.082 (2.08)	0.090 (2.29)

Frame Data

Stroke inches (mm)	3.0 (76.2)
Maximum gas rod load lb (kg)	7,000 (3,175.2)
Maximum motor size hp (kg)	75 (55.9)
Maximum discharge temp °F (°C)	350.0 (176.7)
Minimum temp °F (°C)	-25 (-31.6)
RPM range	400 - 1,200

THG/HG600 Series Clearances and Dimensions

Specification	Inches
Piston clearance	see figure on page 33
Clearance: connecting rod bearing to crankshaft journal	0.0013 0.0033
Clearance: wrist pin to wrist pin bushing (maximum)[1]	0.001
Cylinder finish	16–32 RMS
Clearance: oil pump adapter shaft to bushing (maximum)[1]	0.0036
Crankshaft end play (cold)	0.002 0.003
Flywheel runout at O.D. (maximum)	0.020
Clearance: crosshead to crosshead guide bore (maximum)	0.008
Crosshead guide bore finish in crankcase	32 RMS (limited number of small pits and scratches are acceptable)

[1]Dimensions for honing are included with new bushings (which must be installed, then honed).

Appendix B—Material Specifications (HG600/THG600 Series)

Part	Model No.	Standard Material	Optional Material
Crankcase	All	Ductile iron ASTM A536, Grade 65-45-12	
Adapters	All	Ductile iron ASTM A536, Grade 65-45-12	
Cylinders	All	Ductile iron ASTM A536, Grade 65-45-12	
Cylinder heads (adjustable & standard)	All	Ductile iron ASTM A536, Grade 65-45-12	
Valve caps	All	Ductile iron ASTM A536, Grade 65-45-12	
Crankcase bearing carrier	All	Gray iron ASTM A48, Class 30	
Flanges	All	Steel slip-on weld	
Valve bumper (guard)	All	Stainless steel	
Valve seat	All	Stainless steel	
Valve plates and springs	All	Stainless steel	
Valve gaskets	All	Iron	
Pistons	2.75", 3.25", 4", 5"	Steel	
Pistons	6", 8"	Aluminum A356-T6	Ductile iron A536 Grade 65-45-12 (single stage only)
Piston rod	All	C-1050 Steel Nitrotec[1]	
Crosshead	All	Gray iron ASTM A48, Class 30	
Connecting rod & packing cartridge	All	Ductile iron ASTM A536, Grade 65-45-12	
Piston rings	All	PTFE (glass and moly filled)	
Rider rings	All	PTFE (glass and moly filled)	
Packing: segmented rings	All	PTFE (carbon filled)	
Packing: segmented oil wiper rings	All	Brass	
Connecting rod bearing	All	Bimetal D-2 Babbit	
Crankshaft	All	Ductile iron ASTM A536, Grade 80-55-06	
Wrist pin	All	C-1018 steel	
Wrist pin bushing	All	Bronze SAE 660	
Main bearings	All	Tapered roller	
Inspection plate	All	Carbon steel	
O-rings	All	Buna-N	PTFE, Viton[2], Neoprene[2]
Retainer rings	All	Carbon steel	
Lubricator tubing	Lube models	Steel	
Lubricator	Lube models	Force feed with divider block - no flow shutdown	

[1] Nitrotec® is a registered trademark of TTI Group Ltd.

[2] Viton® and Neoprene® are registered trademarks of the DuPont company.

Appendix B—Bolt Torque Values

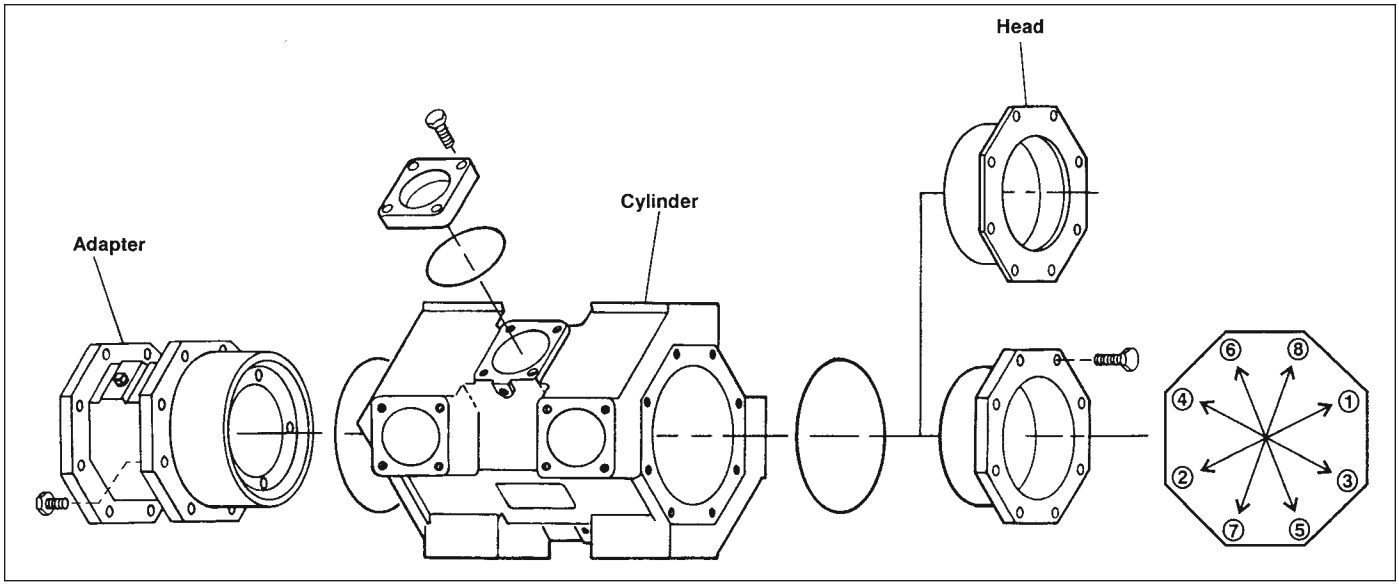
Horizontal Compressor Bolt Torque Values

Cylinder Size	2.75"	3.25"	4"	5"	6"	8"
Connection rod bolt ft•lb	40	40	40	40	40	40
Bearing carrier ft•lb	40	40	40	40	40	40
Bearing cover ft•lb	40	40	40	40	40	40
Crankcase inspection plate ft•lb	8	8	8	8	8	8
Adapter to crankcase or distance piece[1]	65	65	65	65	65	65
Distance piece to crankcase[1]	65	65	65	65	65	65
Cylinder to adapter ft•lb[1]	65	65	65	65	65	65
Valve cover plate bolt ft•lb	CF	35	37	37	37	37
Valve holddown screw ft•lb[2]	40	40	40	40	40	40
Piston nut torque ft•lb	150	150	150	150	150	150
Piston screw torque in•lb	100	50	100	100	100	100
Valve unloader cap torque ft•lb	25	25	25	25	25	25
Head to cylinder ft•lb[1]	65	65	65	65	65	65

[1]Preliminary tightening: Snug all headbolts in the sequence show. Final tightening: Torque all headbolts in the sequence shown to the value listed above.

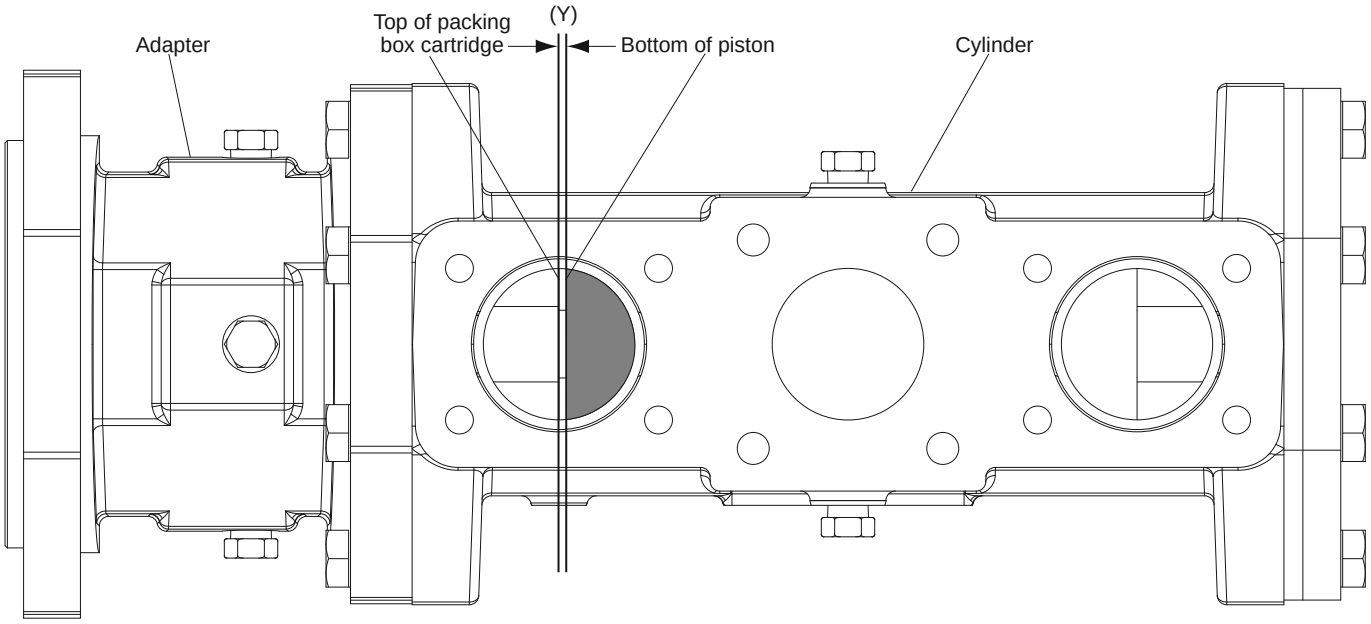
[2] Retorque to the value listed above after 2 to 5 hours of running time.

Horizontal Compressor Bolt Tightening Sequence

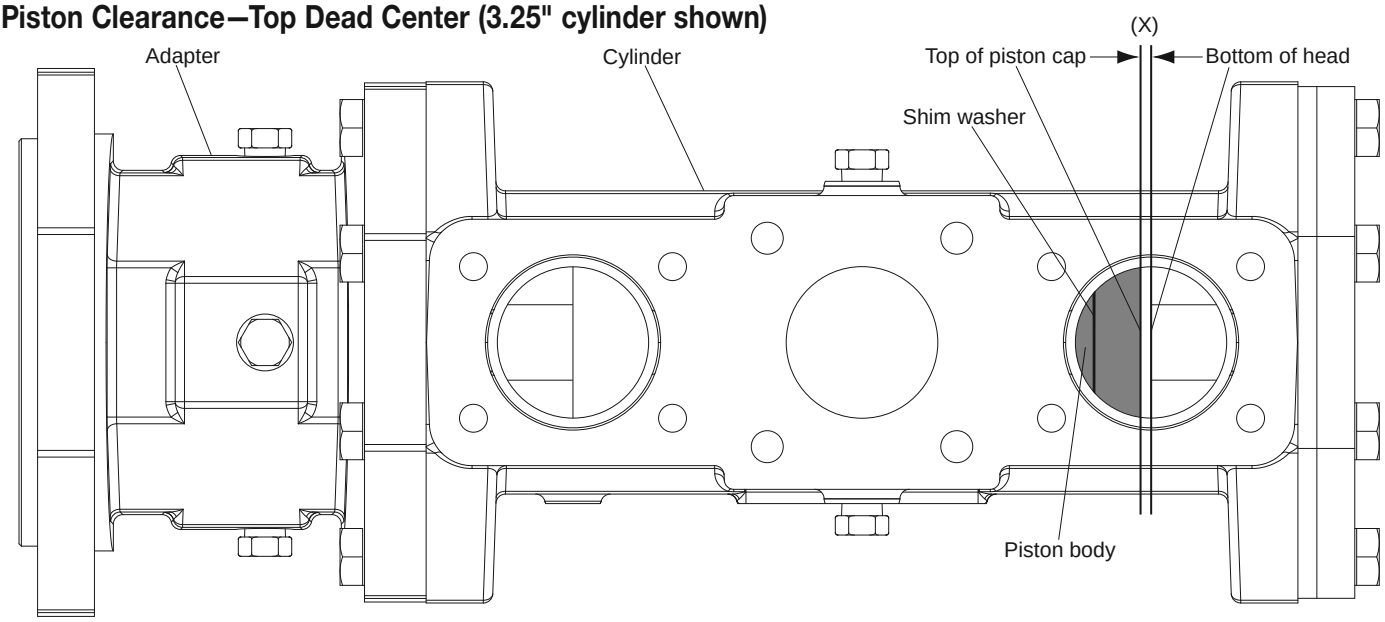


Appendix B—Piston Clearance Details

Piston Clearance—Bottom Dead Center (3.25" cylinder shown)



Piston Clearance—Top Dead Center (3.25" cylinder shown)

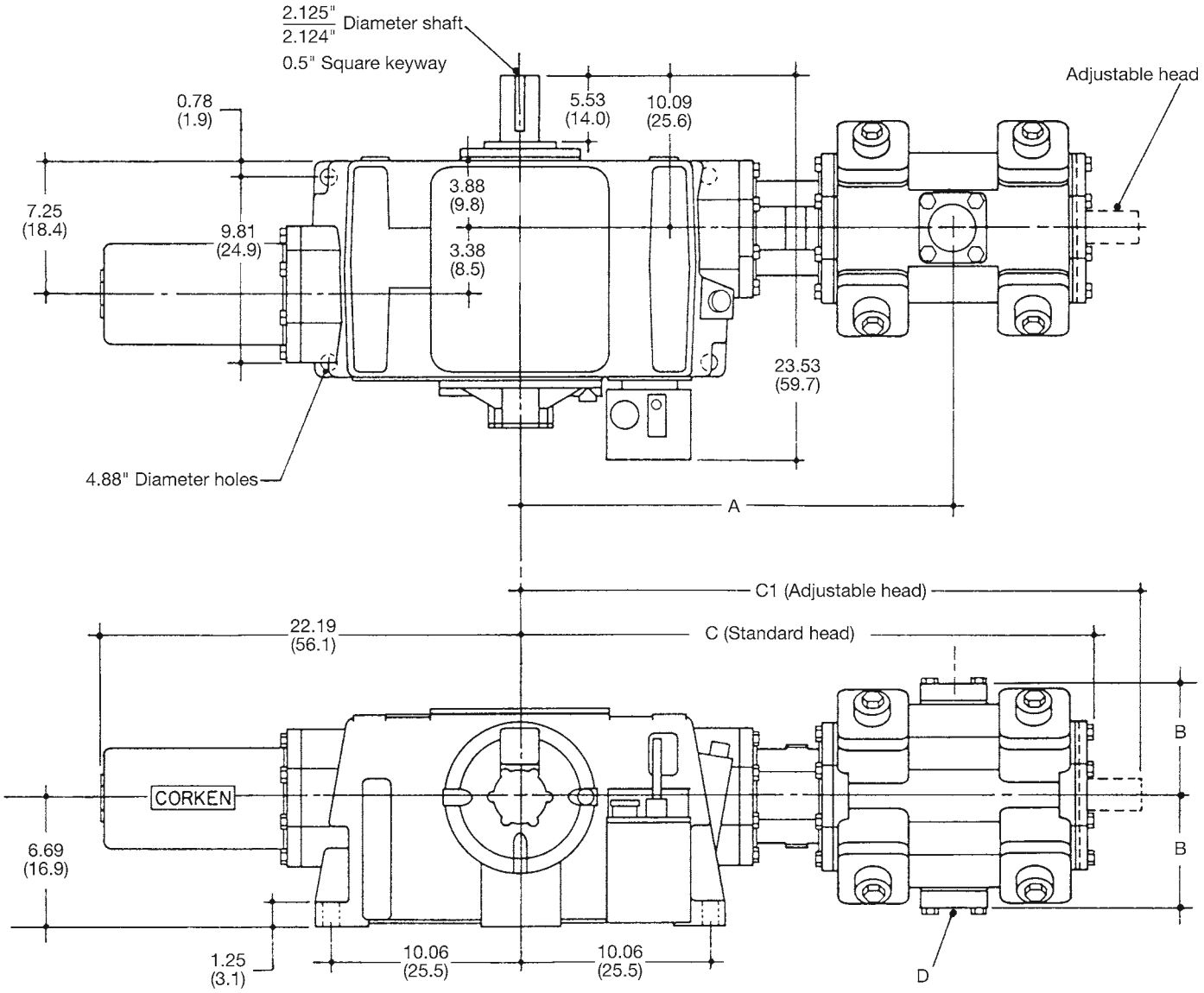


X and Y Dimension–Inches (mm)

	Piston Size					
	2.75"	**3.25"**	**4"**	**5"**	**6"**	**8"**
Plain style						
Bottom min. clearance (Y)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)
Bottom max. clearance (Y)	0.020 (0.51)	0.020 (0.51)	0.020 (0.51)	0.020 (0.51)	0.020 (0.51)	0.020 (0.51)
Top min. clearance (X)	0.040 (1.02)	0.083 (2.11)	0.083 (2.11)	0.083 (2.11)	0.083 (2.11)	0.088 (2.24)
Top max. clearance (X)	0.065 (1.65)	0.093 (2.36)	0.093 (2.36)	0.093 (2.36)	0.093 (2.36)	0.098 (2.49)
T-Style						
Bottom min. clearance (Y)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)	0.005 (0.13)
Bottom max. clearance (Y)	0.015 (0.38)	0.015 (0.38)	0.015 (0.38)	0.015 (0.38)	0.015 (0.38)	0.015 (0.38)
Top min. clearance (X)	0.030 (0.76)	0.073 (1.85)	0.073 (1.85)	0.073 (1.85)	0.073 (1.85)	0.078 (1.98)
Top max. clearance (X)	0.055 (1.46)	0.083 (2.11)	0.083 (2.11)	0.083 (2.11)	0.083 (2.11)	0.088 (2.24)

Appendix C—Outline Dimensions

HG601 Series—Plain Style Single Cylinder



Inches (Centimeters)

Cylinder Size	A Nozzle C_L	B Flange Height	C (Standard head)	C1 (Adjustable head)	D Flange Size
2.75"	23.41 (59.4)	6.19 (15.7)	—	33.94 (86.1)	[a]
3.25"	22.50 (57.1)	5.00 (12.7)	29.31 (74.4)	32.19 (81.5)	2" slip on
4"	22.69 (57.6)	5.88 (14.9)	30.00 (76.2)	32.81 (83.3)	2" slip on
5"	22.32 (56.7)	5.09 (12.9)	29.26 (74.3)	32.07 (81.5)	2" slip on
6"	22.94 (58.2)	5.94 (15.0)	30.25 (76.8)	33.06 (83.9)	2" slip on
8"	23.63 (60.0)	7.25 (18.4)	32.13 (81.5)	34.94 (88.7)	3" slip on

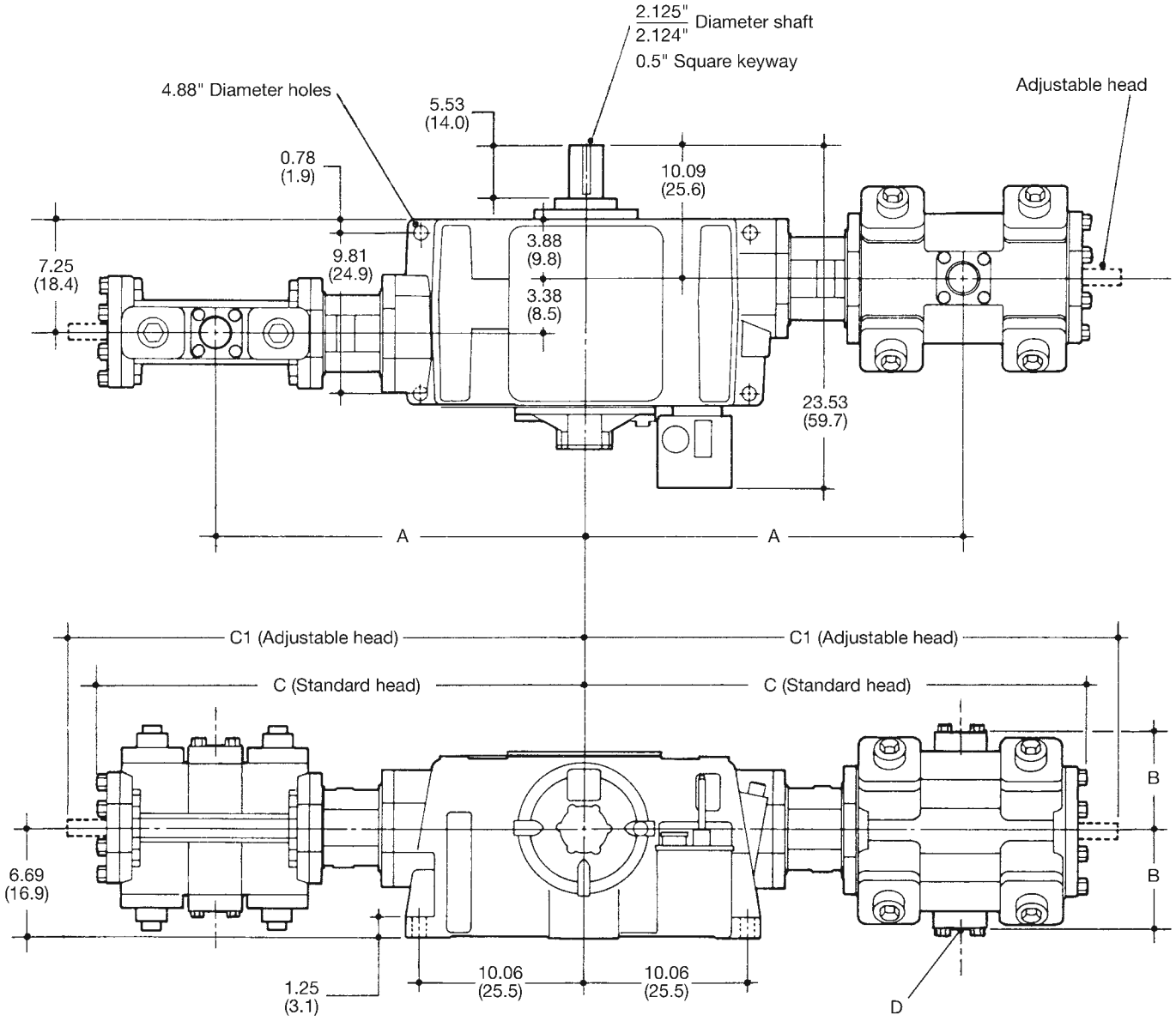
[a] 1.5" 1500 lb. ASA flange not supplied.

NOTE: 1. Standard flywheel (not shown) 5-5V 21.2

2. Jacking screw provided for cylinder support (8" and 6" cylinders only).

Appendix C—Outline Dimensions

HG601/HG602 Series— Plain Style Double Cylinder



Inches (Centimeters)

Cylinder Size	A Nozzle C_L	B Flange Height	C (Standard head)	C1 (Adjustable head)	D Flange Size
2.75"	23.41 (59.4)	6.19 (15.7)	—	33.94 (86.1)	[a]
3.25"	22.50 (57.1)	5.00 (12.7)	29.31 (74.4)	32.19 (81.5)	2" slip on
4"	22.69 (57.6)	5.88 (14.9)	30.00 (76.2)	32.81 (83.3)	2" slip on
5"	22.32 (56.7)	5.09 (12.9)	29.26 (74.3)	32.07 (81.5)	2" slip on
6"	22.94 (58.2)	5.94 (15.0)	30.25 (76.8)	33.06 (83.9)	2" slip on
8"	23.63 (60.0)	7.25 (18.4)	32.13 (81.5)	34.94 (88.7)	3" slip on

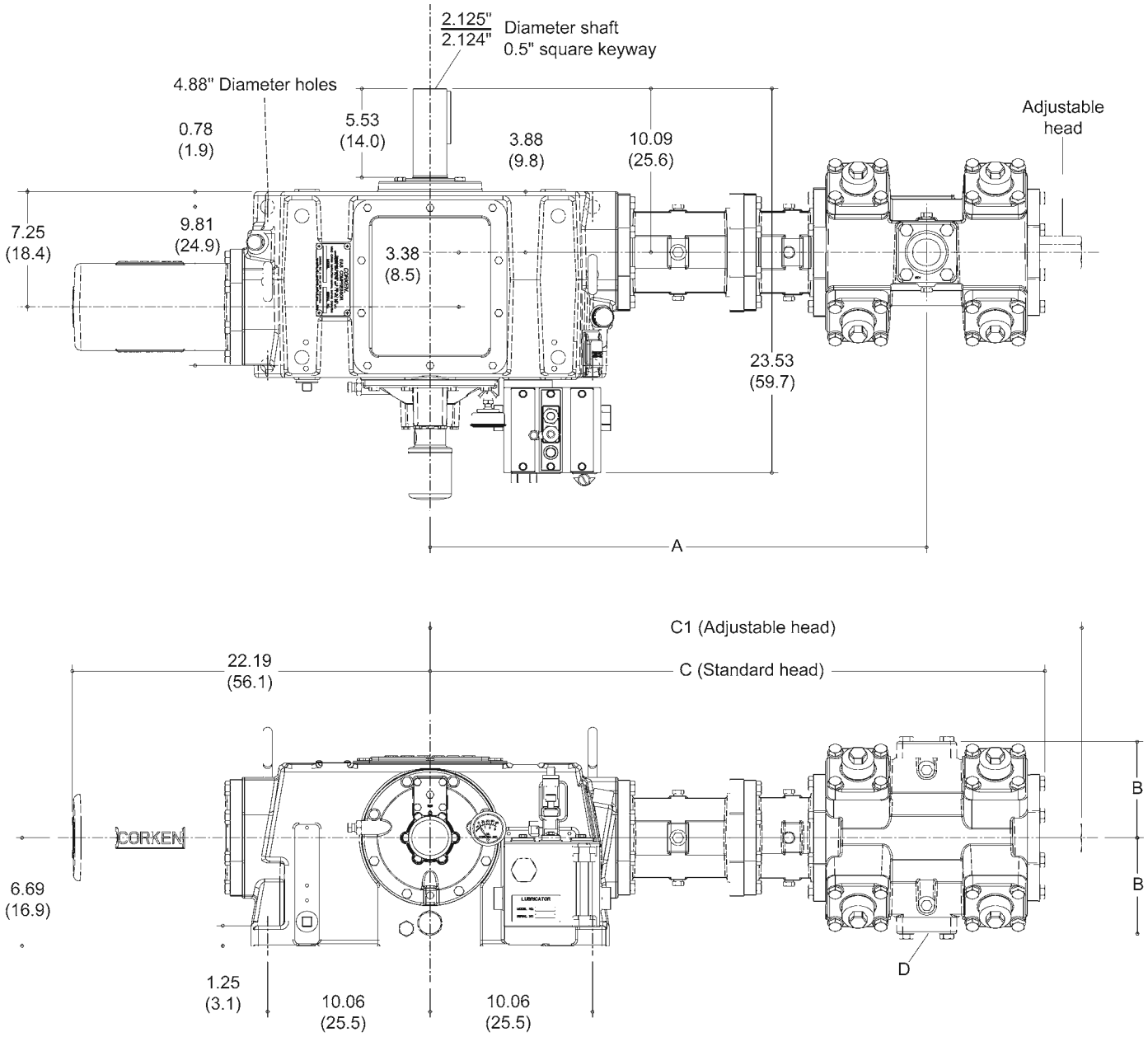
[a] 1.5" 1500 lb. ASA flange not supplied.

NOTE: 1. Standard flywheel (not shown) 5-5V 21.2

2. Jacking screw provided for cylinder support (8" and 6" cylinders only).

Appendix C—Outline Dimensions

THG601 Series—T-Style Single Cylinder



Inches (Centimeters)

Cylinder Size	A Nozzle C_L	B Flange Height	C (Standard head)	C1 (Adjustable head)	D Flange Size
2.75"	31.22 (79.3)	6.19 (15.7)	—	41.75 (106.0)	[a]
3.25"	30.31 (77.0)	5.00 (12.7)	37.12 (94.3)	40.00 (106.6)	2" slip on
4"	30.50 (77.5)	5.88 (14.9)	37.81 (96.0)	40.62 (103.2)	2" slip on
5"	30.13 (76.5)	5.09 (12.9)	37.07 (94.2)	39.88 (101.3)	2" slip on
6"	30.75 (78.1)	5.94 (15.0)	38.06 (96.7)	40.88 (103.8)	2" slip on
8"	31.44 (79.9)	7.25 (18.4)	39.94 (101.5)	42.75 (108.6)	3" slip on

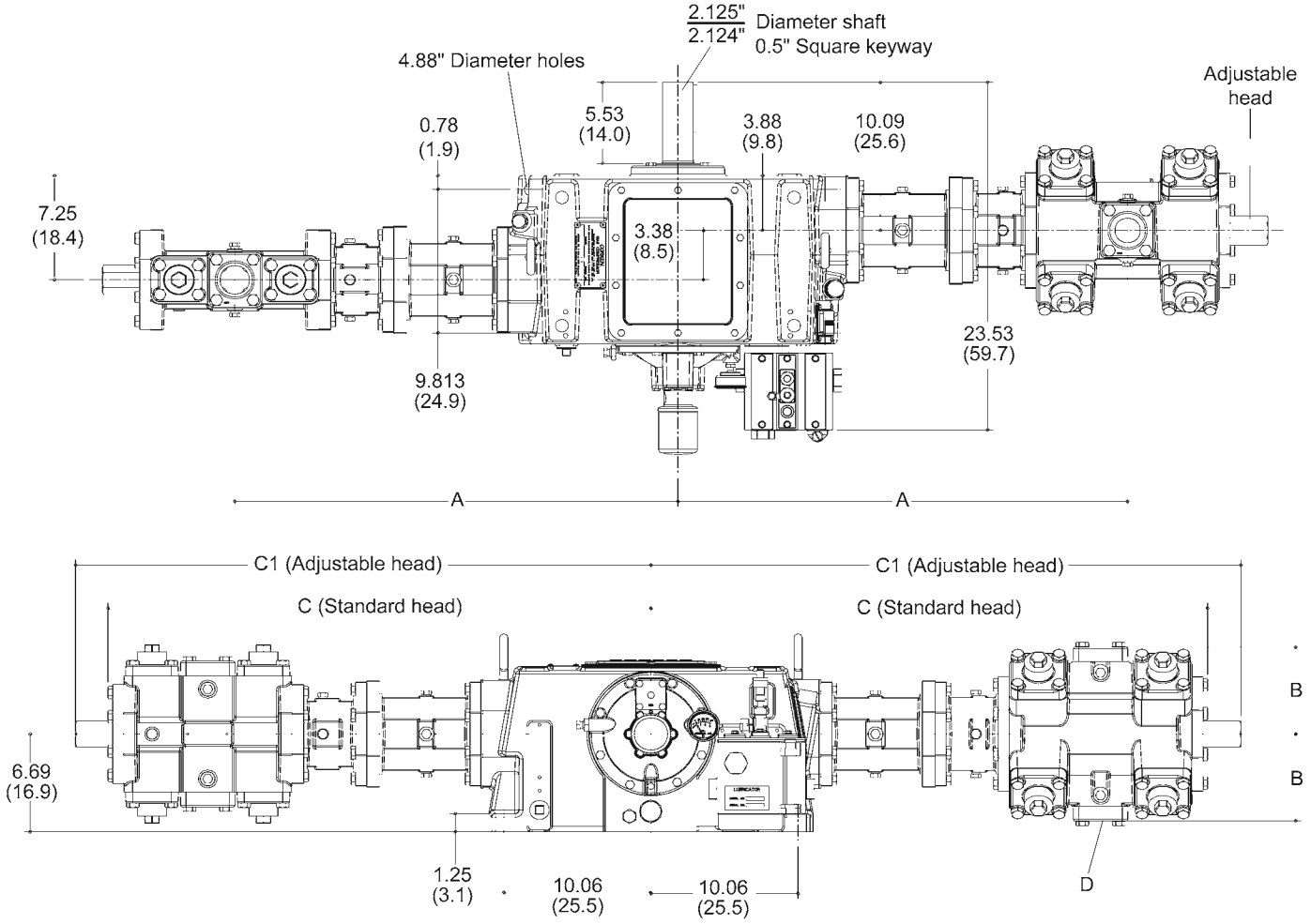
[a] 1.5" 1500 lb. ASA flange not supplied.

NOTE: 1. Standard flywheel (not shown) 5-5V 21.2

2. Jacking screw provided for cylinder support (8" and 6" cylinders only).

Appendix C—Outline Dimensions

THG601/THG602 Series—T-Style Double Cylinder



Inches (Centimeters)

Cylinder Size	A Nozzle C_L	B Flange Height	C (Standard head)	C1 (Adjustable head)	D Flange Size
2.75"	31.22 (79.3)	6.19 (15.7)	—	41.75 (106.0)	[a]
3.25"	30.31 (77.0)	5.00 (12.7)	37.12 (94.3)	40.00 (106.6)	2" slip on
4"	30.50 (77.5)	5.88 (14.9)	37.81 (96.0)	40.62 (103.2)	2" slip on
5"	30.13 (76.5)	5.09 (12.9)	37.07 (94.2)	39.88 (101.3)	2" slip on
6"	30.75 (78.1)	5.94 (15.0)	38.06 (96.7)	40.88 (103.8)	2" slip on
8"	31.44 (79.9)	7.25 (18.4)	39.94 (101.5)	42.75 (108.6)	3" slip on

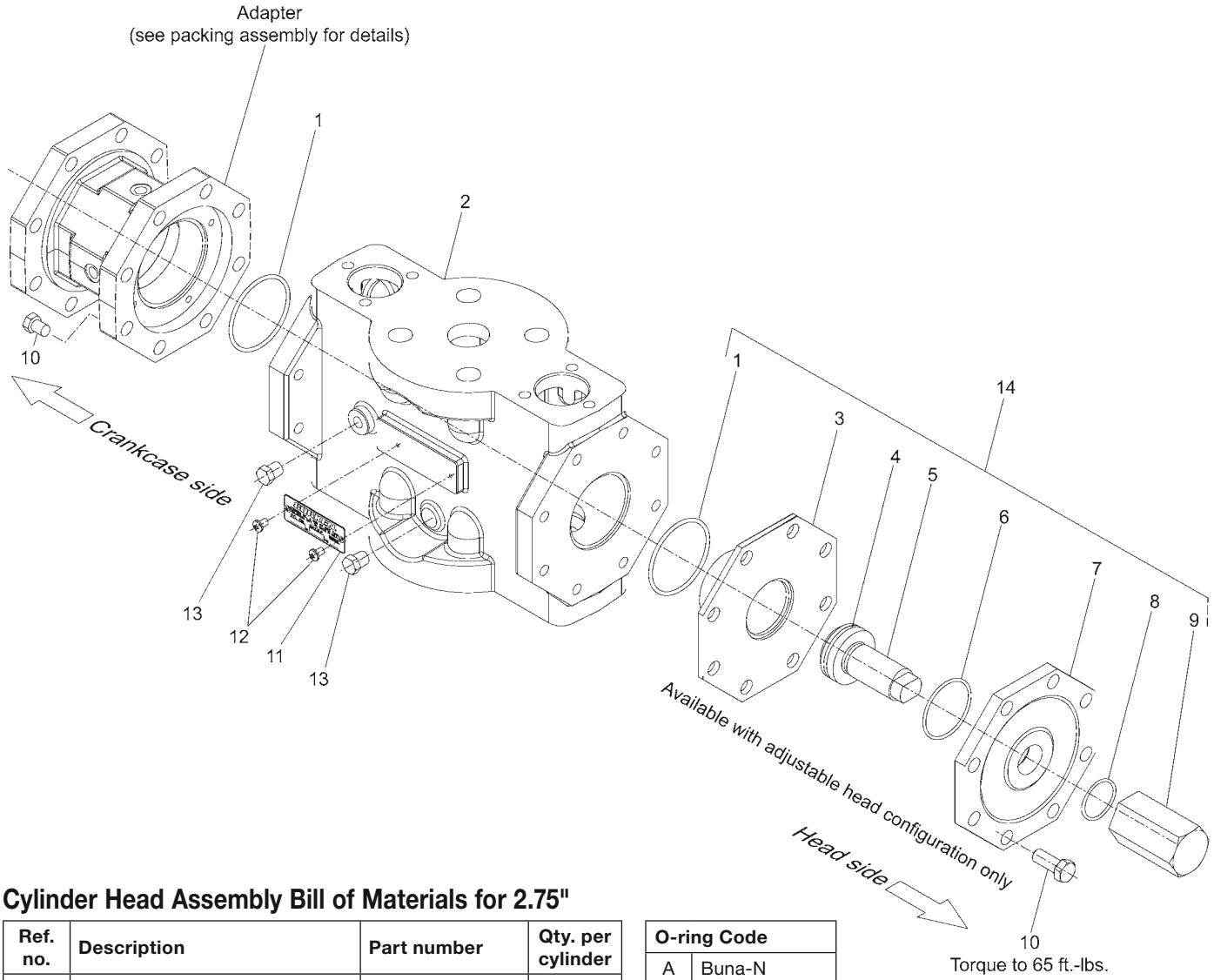
[a] 1.5" 1500 lb. ASA flange not supplied.

NOTE: 1. Standard flywheel (not shown) 5-5V 21.2

2. Jacking screw provided for cylinder support (8" and 6" cylinders only).

Appendix D—Cylinder Head Assembly Details (HG600/THG600 Series)

2.75" Cylinder Head



Cylinder Head Assembly Bill of Materials for 2.75"

Ref. no.	Description	Part number	Qty. per cylinder
1.	O-ring	2-232_[a]	2
2.	Cylinder	3888	1
3.	Adjustable head	3899-1	1
4.	O-ring	2-225_[a,f]	1
5.	Adjusting cup	3898	1
6.	O-ring	2-227_[a]	1
7.	Adjusting cap	3897	1
8.	O-ring	2-127_[a]	1
9.	Adjusting screw nut	3665	1
10.	Hex head bolt (1/2 - 13 x 1-1/2)	7001-050NC150A	16
11.	Nameplate	3698	1
12.	Drive screw	7012-006DR019E	2
13.	Pipe plug (1/4")	3442	5
14.	Adjustable head assembly	3899-1X	1
–	Flange	[b]	1
–	Flange gasket	[c]	1
–	Flange bolt	[d]	1

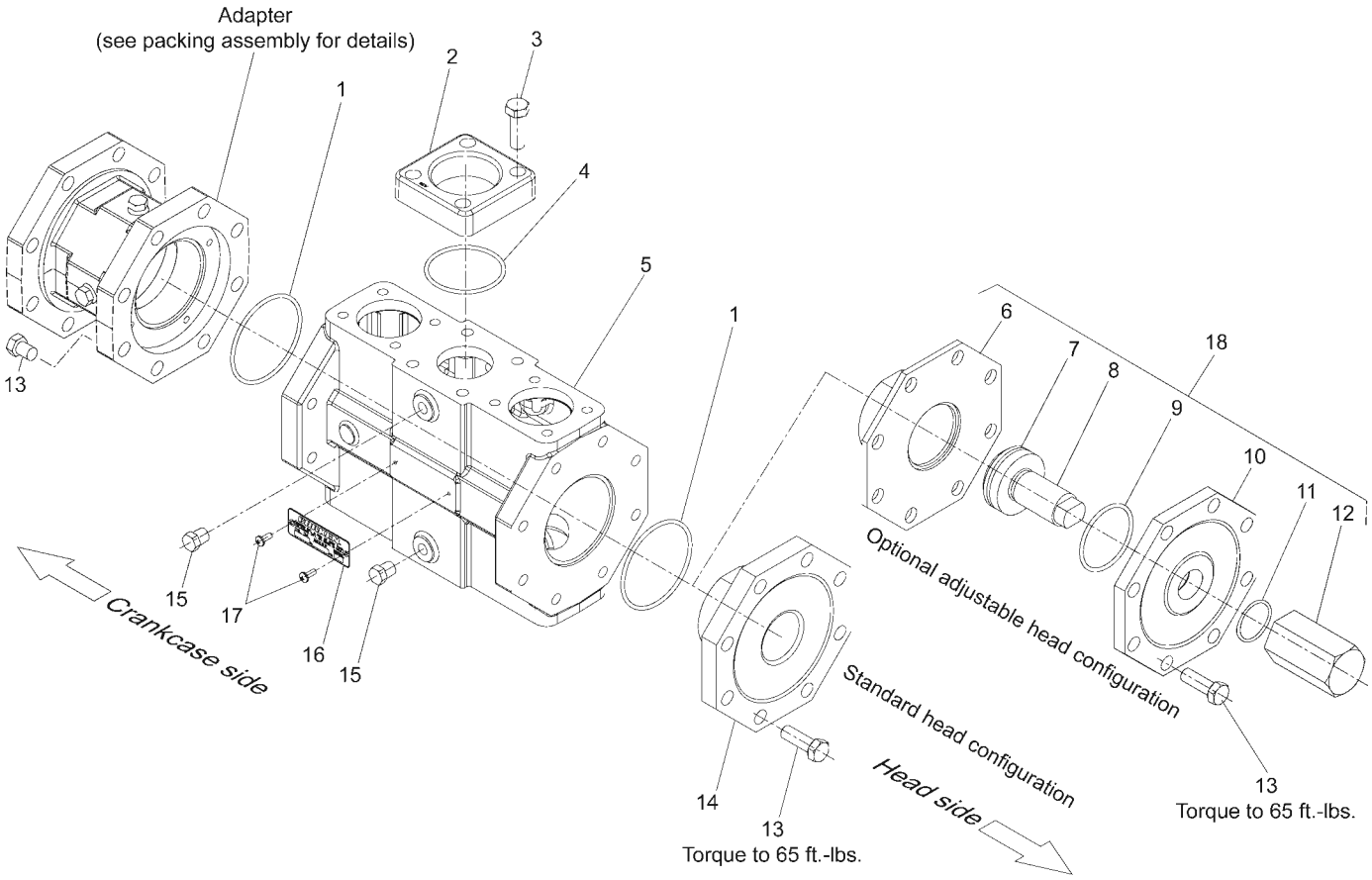
O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

[a]_ denotes O-ring code. See O-ring chart for details.
[b]Use 1-1/2" 15001 ASA weld flange (not provided).
[c]Use 1-1/2" ASA flange gasket (not provided).
[d]Use 1" - 8 x 3-1/2" hex head bolt (not provided).
[e]Registered trademarks of the DuPont company.
[f] O-ring code D or K only.

CAUTION: Always Relieve Pressure In The Unit Before Attempting Any Repairs.

Appendix D—Cylinder Head Assembly Details (HG600/THG600 Series)

3.25", 4", and 5" Cylinder Head



Cylinder Head Assembly Bill of Materials for 3.25", 4", and 5"

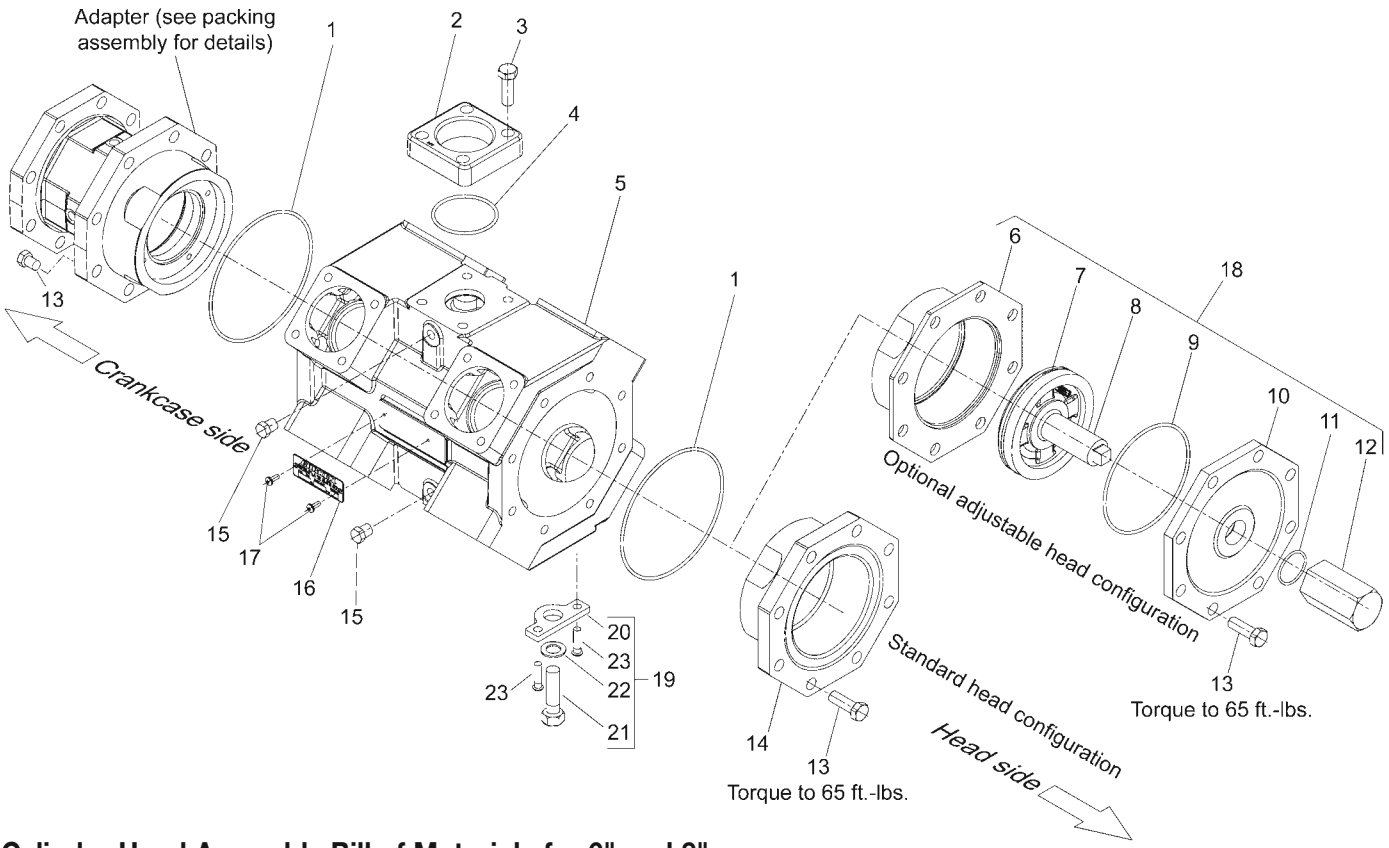
Ref. no.	Description	Part number			Qty. per cylinder
		Size			
		3.25"	4"	5"	
1.	O-ring	2-236_[a]	2-242_[a]	2-250	2
2.	Flange	3793-2S	3793-2S	3793-2S	2
3.	Hex head bolt (1/2 - 13 x 1-3/4)	7001-150NC175A	7001-050NC175A	7001-050NC175A	8
4.	O-ring	2-231_[a]	2-231_[a]	2-231_[a]	2
5.	Cylinder	3523	4276	5290	1
6.	Adjustable head	3527-1	3763-1	5293-1	1
7.	O-ring	2-227_[a]	2-233_[a,c]	2-240_[a,c]	1
8.	Adjusting cup	3664	3775	5295	1
9.	O-ring	2-229_[a]	2-235_[a]	2-242_[a]	1
10.	Adjusting cap	3660	3774	5294	1
11.	O-ring	2-127_[a]	2-127_[a]	2-127_[a]	1
12.	Adjusting screw nut	3665	3665	3665	1
13.	Hex head bolt (1/2 - 13 x 1-1/2)	7001-050NC150A	7001-050NC150A	7001-050NC150A	16
14.	Head	3527	3763	5293	1
15.	Pipe plug (1/4")	3442	3442	3442	4
16.	Nameplate	3698	3698	3698	1
17.	Drive screw	7012-006SF019E	7012-006SF019E	7012-006SF019E	2
18.	Adjustable head assembly	3527-1X	3763-1X	5293-1X	1

O-ring Code	
A	Buna-N
B	Neoprene®[b]
D	Viton®[b]
E	PTFE
K	Kalrez®[b]

[a] *_ denotes O-ring code. See O-ring chart for details.*
[b] *Registered trademarks of the DuPont company.*
[c] *O-ring code D or K only.*

Appendix D—Cylinder Head Assembly Details (HG600/THG600 Series)

6" and 8" Cylinder Head



Cylinder Head Assembly Bill of Materials for 6" and 8"

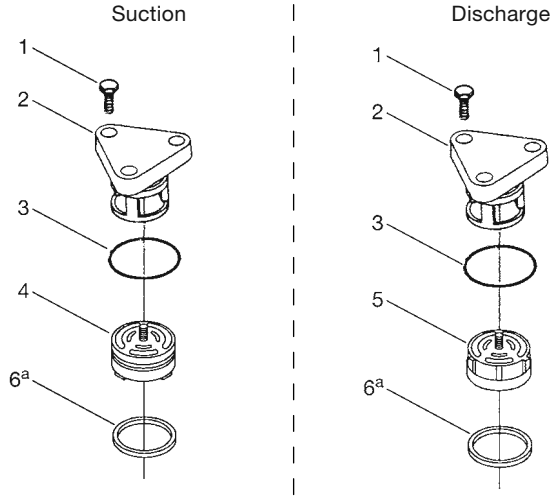
Ref. no.	Description	Part number Size 6"	Part number Size 8"	Qty. per cylinder
1.	O-ring	2-258_[a]	2-266_[a]	2
2.	Flange	3793-2S	3794-3S	2
3.	Hex head bolt (1/2 - 13 x 1-3/4)	7001-050NC175A	7001-050NC175A	8
4.	O-ring	2-231_[a]	2-242_[a]	2
5.	Cylinder	3528	3671	1
6.	Adjustable head	3532-1	3672-1	1
7.	O-ring	2-248_[a,c]	2-261_[a,c]	1
8.	Adjusting cup	3663	3683	1
9.	O-ring	2-250_[a]	2-262_[a]	1
10.	Adjusting cap	3637	3682	1
11.	O-ring	2-127_[a]	2-127_[a]	1
12.	Adjusting screw nut	3665	3665	1
13.	Hex head bolt (1/2 - 13 x 1-1/2)	7001-050NC150A	7001-050NC150A	16
14.	Head	3532	3672	1
15.	Pipe plug (1/4")	3442	3442	4
16.	Nameplate	3698	3698	1
17.	Drive screw	7012-006SF019E	7012-006SF019E	2
18.	Adjustable head assembly	3532-1X	3672-1X	1
19.	Cylinder support assembly (opt.)	3840-X1	3840-X1	1
20.	Support base	3840	3840	1
21.	Support screw	7001-087NC150E	7001-087NC150E	1
22.	Jam nut	2903	2903	2
23.	Hex head bolt (3/8-16 x 3/4)	7001-037NC075A	7001-037NC075A	2

O-ring Code	
A	Buna-N
B	Neoprene®[b]
D	Viton®[b]
E	PTFE
K	Kalrez®[b]

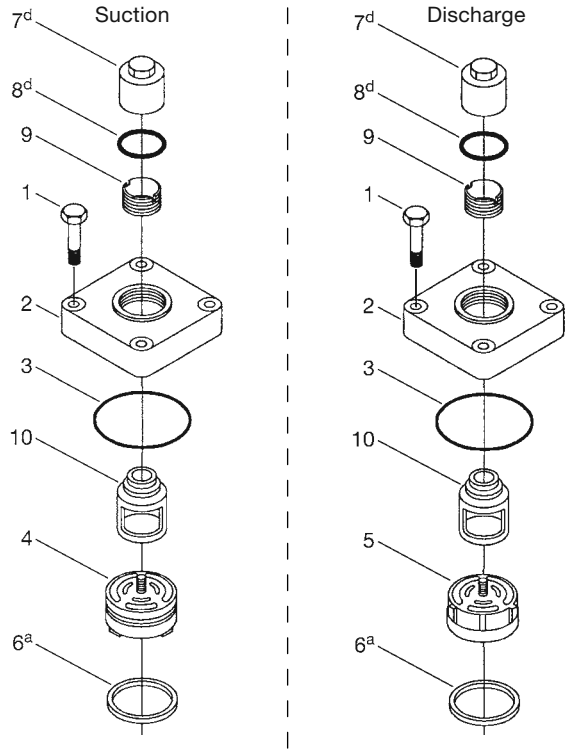
[a]_ denotes O-ring code. See O-ring chart for details.
[b]Registered trademarks of the DuPont company.
[c]O-ring code D or K only.

Appendix D—Valve Holddown Assembly Details (HG600/THG600 Series)

Valve Holddown Assembly (2.75" only)



Valve Holddown Assembly (3.25", 4", 5", 6", & 8" only)

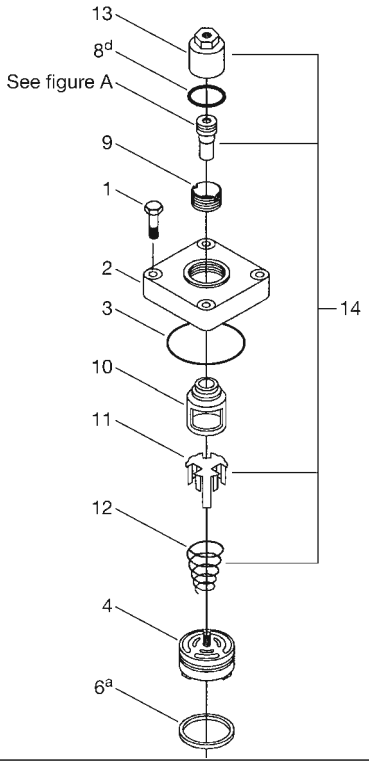


Ref. No.	Description	Cylinder Diameter					
		2.75"	Quantity per cylinder	3.25"	Quantity per cylinder	4"	Quantity per cylinder
1.	Hex head bolt	7001-050NC150A	12	7001-043NC150A	16	7001-043NC150A	16
2.	Valve cover plate	3894	4	2205	4	1764	4
3.	O-ring	2-224_[b]	4	2-143_[b]	4	2-235_[b]	4
4.	Suction valve assembly	3900-X (iron)	2	4029-X2 (iron)	2	3807-X (iron)	2
	Suction valve assembly	N/A	—	—	—	3807-X1 (copper)	2
	Suction valve assembly	N/A	—	—	—	—	—
5.	Discharge valve assembly	3901-X (iron)	2	4030-X2 (iron)	2	3808-X (iron lead)	2
	Discharge valve assembly	—	—	—	—	3808-X1 (copper)	2
	Discharge valve assembly	—	—	—	—	—	—
6.	Valve gasket	3896[a]	4	1481-2[a] (iron)	4	2114-2[a] (iron) 2112-1 (copper)	4
7.	Valve cap	N/A	—	2714-1[d]	4	2714-1[d]	4
8.	O-ring	N/A	—	2-031_[b]	4	2-031_[b]	4
9.	Holddown screw	N/A	—	2715	4	2715	4
10.	Valve cage	N/A	—	3569	4	3809	4
11.	Actuator	N/A	—	3689	2	3956	2
12.	Unloader spring	N/A	—	3690	2	3695	2
13.	Unloader cap	N/A	—	2598-1	2	2598-1	2
14.	Unloader assembly	N/A	—	3689-X1	2	3956-X	2
15.	Bolt	N/A	—	1910	2	1910	2
16.	Bal-seal	N/A	—	2619-X	4	2619-X	4
17.	Unloader piston cap	N/A	—	2857	2	2857	2
18.	Gasket	N/A	—	2858	2	2858	2
19.	Unloader piston	N/A	—	4205	2	3957	2

[a]Included with valve assembly.
[b]_ denotes O-ring code. See O-ring chart for details.
[c]Prior to serial number FN (January 1, 1984), use valve cap #2714 and gasket #2716.
[d]Quantity = 2 if equipped with unloaders.
[e]H_2O cylinder requires cage #4311.
[f] Registered trademarks of the DuPont company.

Appendix D—Valve Holddown Assembly Details (HG600/THG600 Series)

Suction Valve with Unloader (3.25", 4", 5", 6", & 8" only)



Unloader Piston Assembly Details

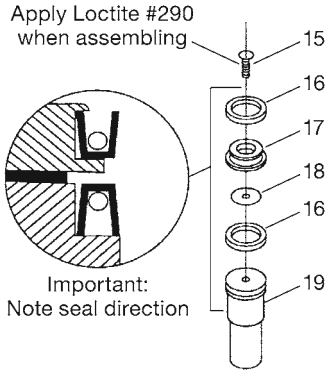


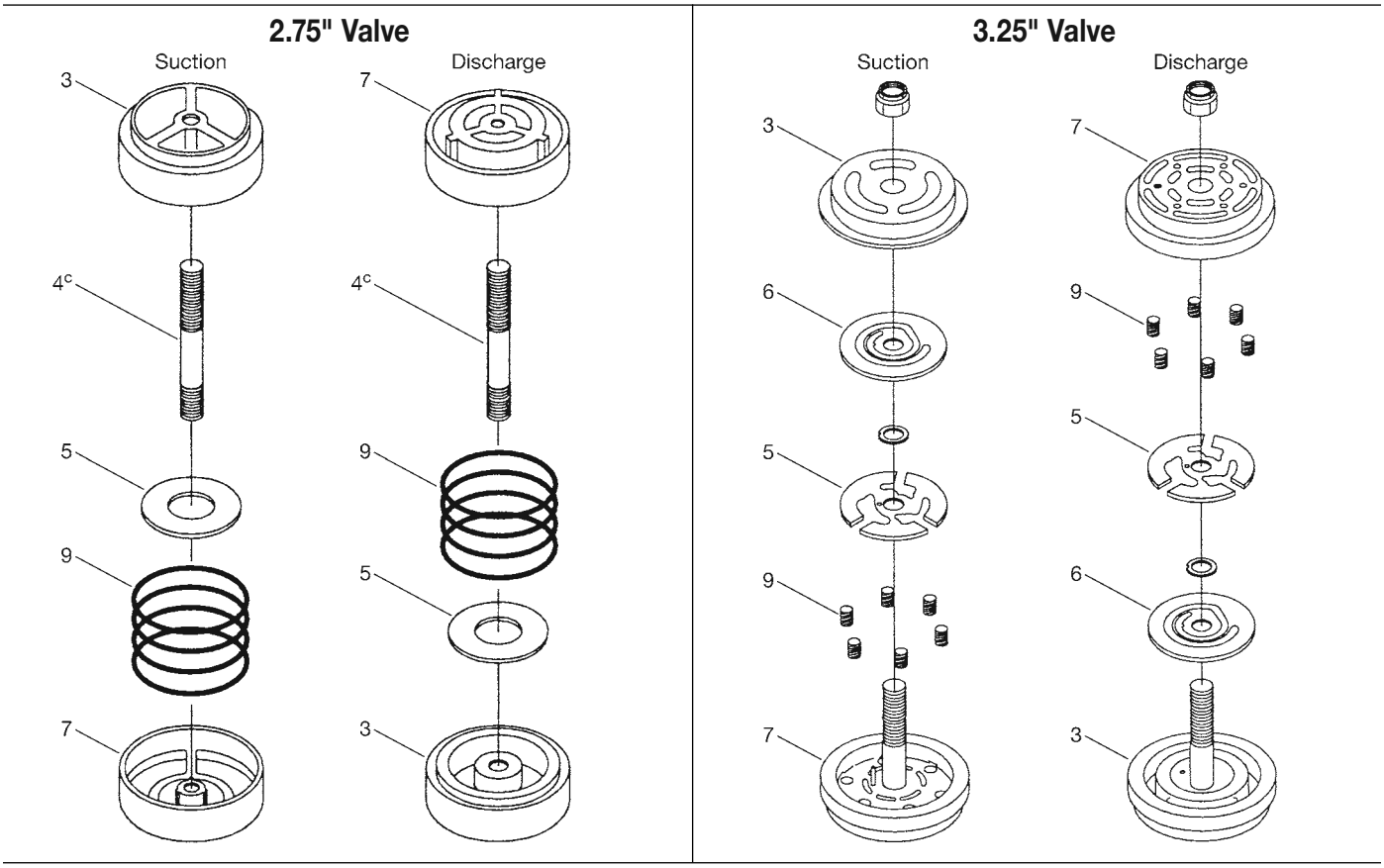
Figure A

O-ring Code	
A	Buna-N
B	Neoprene®[f]
D	Viton®[f]
E	PTFE
K	Kalrez®[f]

CAUTION: Always Relieve Pressure In The Unit Before Attempting Any Repairs.

Ref. No.	Description	Cylinder Diameter					
		5"	Quantity per cylinder	6"	Quantity per cylinder	8"	Quantity per cylinder
1.	Hex head bolt	7001-043NC150A	16	7001-043NC150A	16	7001-043NC150A	16
2.	Valve cover plate	1764	4	1764	4	3675	4
3.	O-ring	2-235_[b]	4	2-235_[b]	4	2-242_[b]	4
4.	Suction valve assembly	3856-4X (aluminum)	2	3856-X (aluminum)	2	3710-X (aluminum)	2
	Suction valve assembly	3856-4X1 (copper)	2	3856-X1 (copper)	2	3710-X1 (copper)	2
	Suction valve assembly	3856-4X2 (iron lead)	2	2856-X2 (iron lead)	2	3710-X2 (iron lead)	2
5.	Discharge valve assembly	3857-4X (aluminum)	2	3857-X (aluminum)	2	3709-X (aluminum)	2
	Discharge valve assembly	3857-4X1 (copper)	2	3857-X1 (copper)	2	3709-X1 (copper)	2
	Discharge valve assembly	3857-4X2 (iron)	2	3857-X2 (iron lead)	2	3709-X2 (iron lead)	2
6.	Valve gasket	2114-_[a]	4	2114[a]	4	3691[a]	4
7.	Valve cap	2714-1[d]	4	2714-1[d]	4	2714-1[d]	4
8.	O-ring	2-031_[b]	4	2-031_[b]	4	2-031_[b]	4
9.	Holddown screw	2715	4	2715	4	2715	4
10.	Valve cage	3570-1	4	3570-1[e]	4	3676	4
11.	Actuator	3694	2	3694	2	3697	2
12.	Unloader spring	5324	2	3695	2	3695	2
13.	Unloader cap	2598-1	2	2598-1	2	2598-1	2
14.	Unloader assembly	3694-X2	2	3694-X	2	3697-X	2
15.	Bolt	1910	2	1910	2	1910	2
16.	Bal-seal	2619-X	4	2619-X	4	2619-X	4
17.	Unloader piston cap	2857	2	2857	2	2857	2
18.	Gasket	2858	2	2858	2	2858	2
19.	Unloader piston	5323	2	3696	2	2710	2

Appendix D—Valve Assembly Details (HG600/THG600 Series)

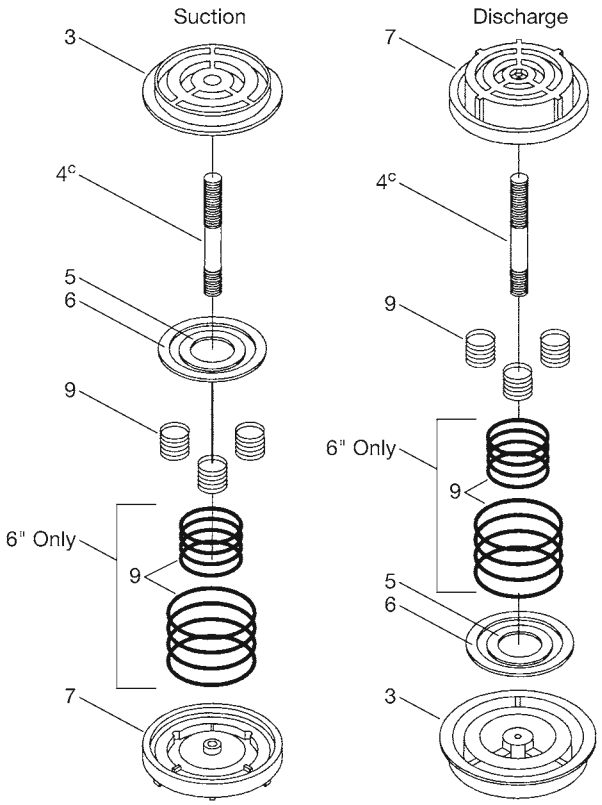


Ref. No.	Description	Cylinder Diameter							
		2.75"	Quantity per cylinder	3.25"	Quantity per cylinder	4"	Quantity per cylinder	5"	Quantity per cylinder
1.	Suction valve assembly[b]	3900-X (iron)	2	4029-X2 (iron)	2	3807-X (iron)	2	3856-4X (aluminum)	2
		—		—		3807-X1 (copper)		3856-4X1 (copper)	2
		—		—		—		3856-4X2 (iron)	2
2.	Discharge valve assembly[b]	3901-X (iron)	2	4030-X2 (iron)	2	3808-X (iron)	2	3857-4X (aluminum)	2
		—		—		3808-X1 (copper)		3857-4X (copper)	2
		—		—		—		3857-4X (iron)	2
3.	Valve seat	3940	4	—		3832	4	3856-4	4
4.	Stud[c]	3828	4	—		3828	4	3920	4
5.	Valve plate (inner)[a]	—		—		3831	4	3872	4
6.	Valve plate (outer)[a]	3941	4	—		3830	4	3871	4
7.	Valve bumper	3939	4	—		3826	4	3857	4
8.	Spring button[a]	—		—		—		-	
9.	Spring (inner)[a]	3924	4	—		3829	4	3929	4
						3829-1 (Inconel opt.)			
	Spring (outer)[a]	—		—		—		3928	4
10.	Repair kit	3804-X1	4	3124-X (suction)	2	3805-X1	4	3146-X1	4
				3125-X (discharge)	2				
11.	Blank (not shown)[d]	3943	1	3767	1	3838	1	3768	1

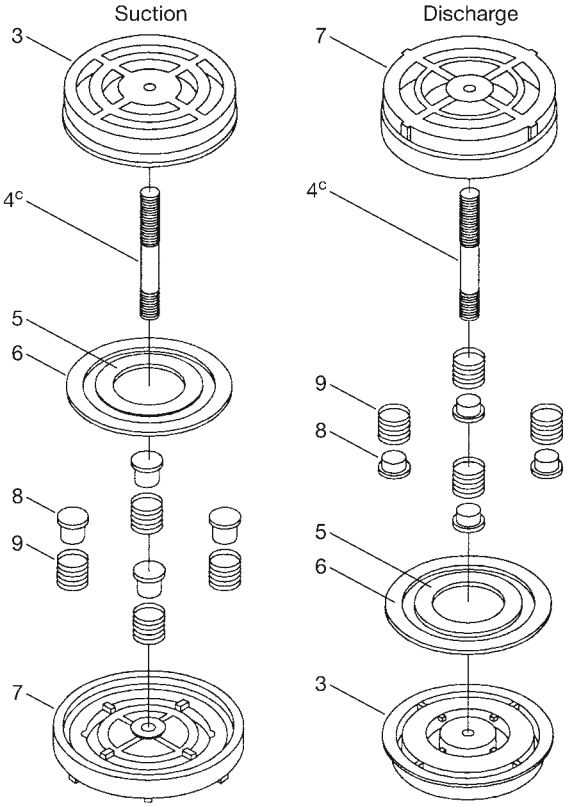
[a]These parts included in the repair kit.
[b]Valve assembly also includes gaskets (not O-rings) as required for installation. See valve holddown assembly details.
[c]Direction of the stud MUST be as shown.
[d]Use when blank valve option is required for reduced capacity.
[e]Prior to serial number NN51400 used 3732-X for suction and 3733-X for discharge.

Appendix D—Valve Assembly Details (HG600/THG600 Series)

4", 5", 6" Valve



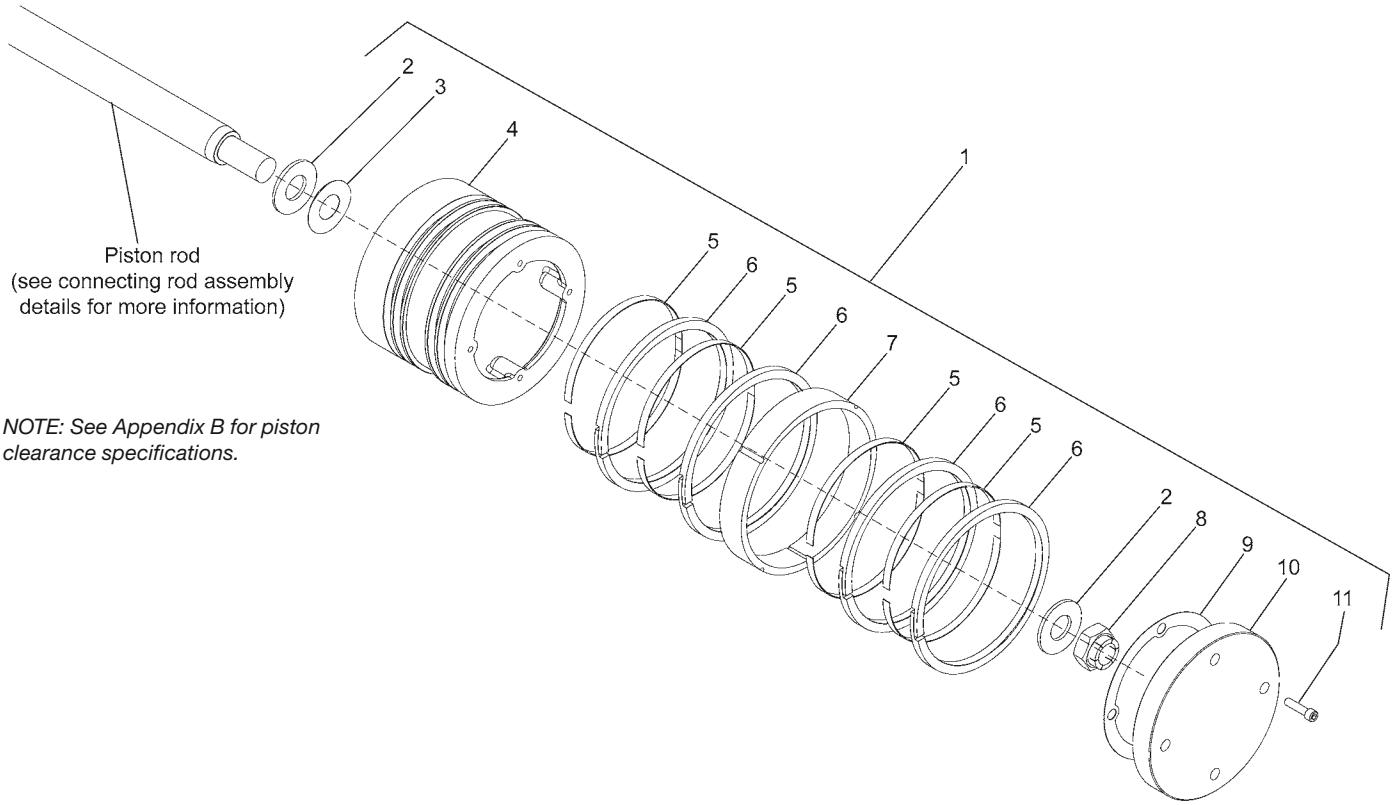
8" Valve



Ref. No.	Description	Cylinder Diameter							
		6"	Quantity per cylinder	6"	Quantity per cylinder	8"	Quantity per cylinder	8"	Quantity per cylinder
		(15+ psi suction pressure)		(0 to 15 psi suction pressure)		(15+ psi suction pressure)		(0 to 15 psi suction pressure)	
1.	Suction valve assembly[b]	3856-X (aluminum)[e]	2	3856-1X (aluminum)	2	3710-X (aluminum)	2	3710-X (aluminum)	2
		3856-X1 (copper)[e]	2	3856-1X1 (copper)	2	3710-X1 (copper)		3710-X1 (copper)	2
		2856-X2 (iron)	2	2856-1X2 (iron)	2	3710-X2 (iron)		3710-X2 (iron)	2
2.	Discharge valve assembly[b]	3857-X (aluminum)	2	3857-X (aluminum)	2	3709-X (aluminum)	2	3709-X (aluminum)	2
		3857-X1 (copper)	2	3857-X1 (copper)	2	3709-X1 (copper)		3709-X1 (copper)	2
		3857-X2 (iron)	2	3857-X2 (iron)	2	3709-X2 (iron)		3709-X2 (iron)	2
3.	Valve seat	3856	4	3856	4	3834	2	3834	2
4.	Stud[c]	3920	4	3920	4	3828	2	3828	2
5.	Valve plate (inner)[a]	3872	4	3872	4	3837	2	3837	2
6.	Valve plate (outer)	3871	4	3871	4	3836	2	3836	2
7.	Valve bumper	3857	4	3857	4	3833	2	3833	2
8.	Spring button[a]	—		—		3835	4	3835	4
9.	Spring (inner)[a]	3929	4	3951 (suction) 3929 (discharge)	4	3829	4	3818 (suction)	2
						3829-1 (Inconel opt.)	4	3829 (discharge)	2
	Spring (outer)	3928	4	3993 (suction) 3928 (discharge)	4				
10.	Repair kit	3146-X1	4	—	4	3806-X1	2	3806-1X1	2
11.	Blank[d]	3768	2	3768	2	3769	2	3769	2

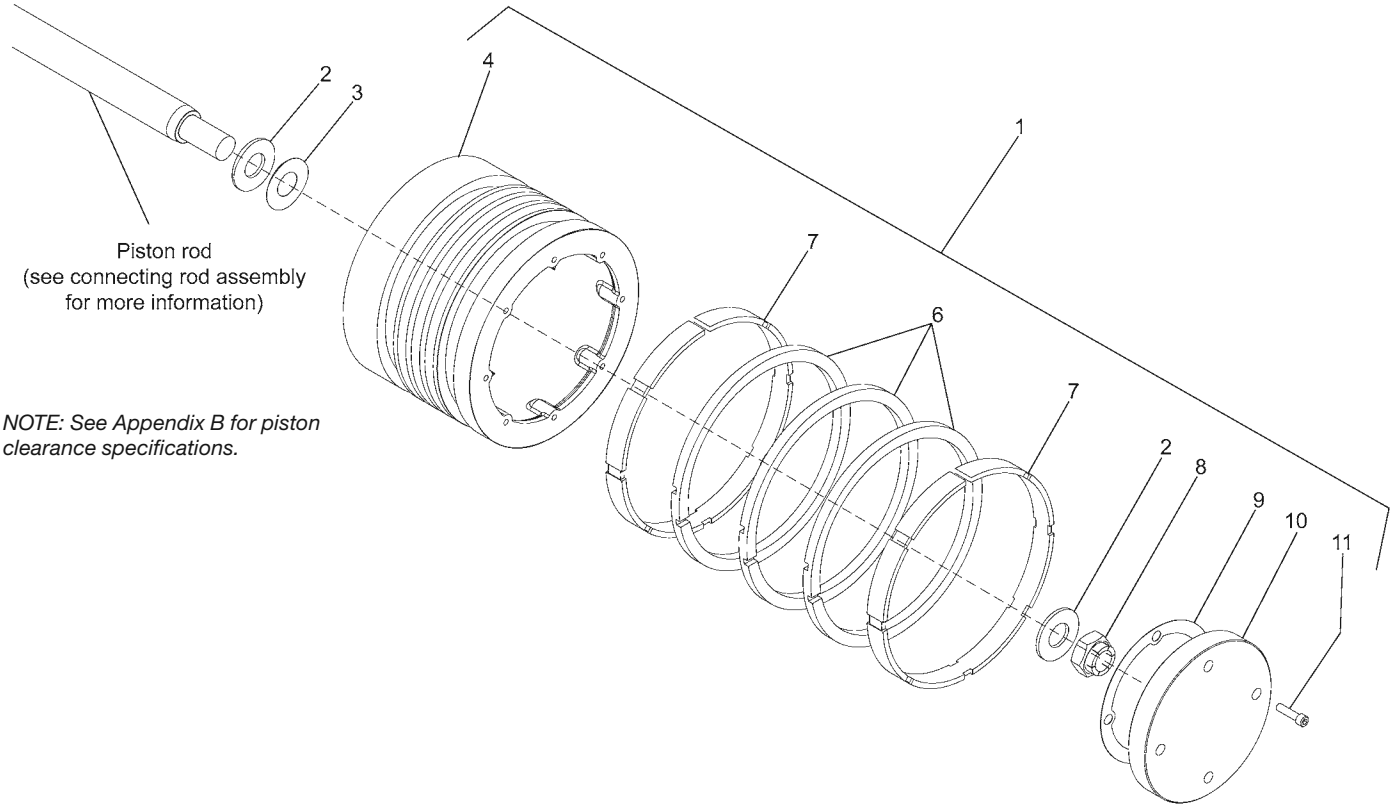
Appendix D—Piston Assembly Details (HG600/THG600 Series)

2.75", 3.25", 4", 5" and 6" Piston Sizes



NOTE: See Appendix B for piston clearance specifications.

8" Piston Size



NOTE: See Appendix B for piston clearance specifications.

Appendix D—Piston Assembly Details (HG600/THG600 Series)

Piston Assembly Bill of Materials for the 2.75", 3.25", and 4" Piston Sizes

Ref. No.	Description	Cylinder Diameter					
		2.75"		3.25"		4"	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1.	Piston assembly - Iron	3889-X1	1	3525-X1	1	4292-X1	1
2.	Thrust washer	3730	2	3730	2	3730	2
3.	Shim washer, thick	3603	As req.	3603	As req.	3603	As req.
	Shim washer, thin	3603-1	As req.	3603-1	As req.	3603-1	As req.
4.	Piston - iron	3889	1	3525	1	4292	1
5.	Expander ring	1774	8	1757	4	1776	4
6.	Piston ring	3892	8	1756	4	3781	4
7.	Rider ring	3893	1	3574	1	3776	1
8.	Lock nut	3604	1	3604	1	3604	1
9.	Shim washer - thick	3895	As req.	3731	As req.	3780	As req.
	Shim washer - thin	3895-1	As req.	3731-1	As req.	3780-1	As req.
10.	Piston cap - iron	3890	1	3561	1	4291	1
11.	Socket head cap screw	7002-025TP062A	6	7002-010TP100A	4	7002-025TP100A	4
12.	Loctite 620 tube[b]	3812	1	3812	1	3812	1

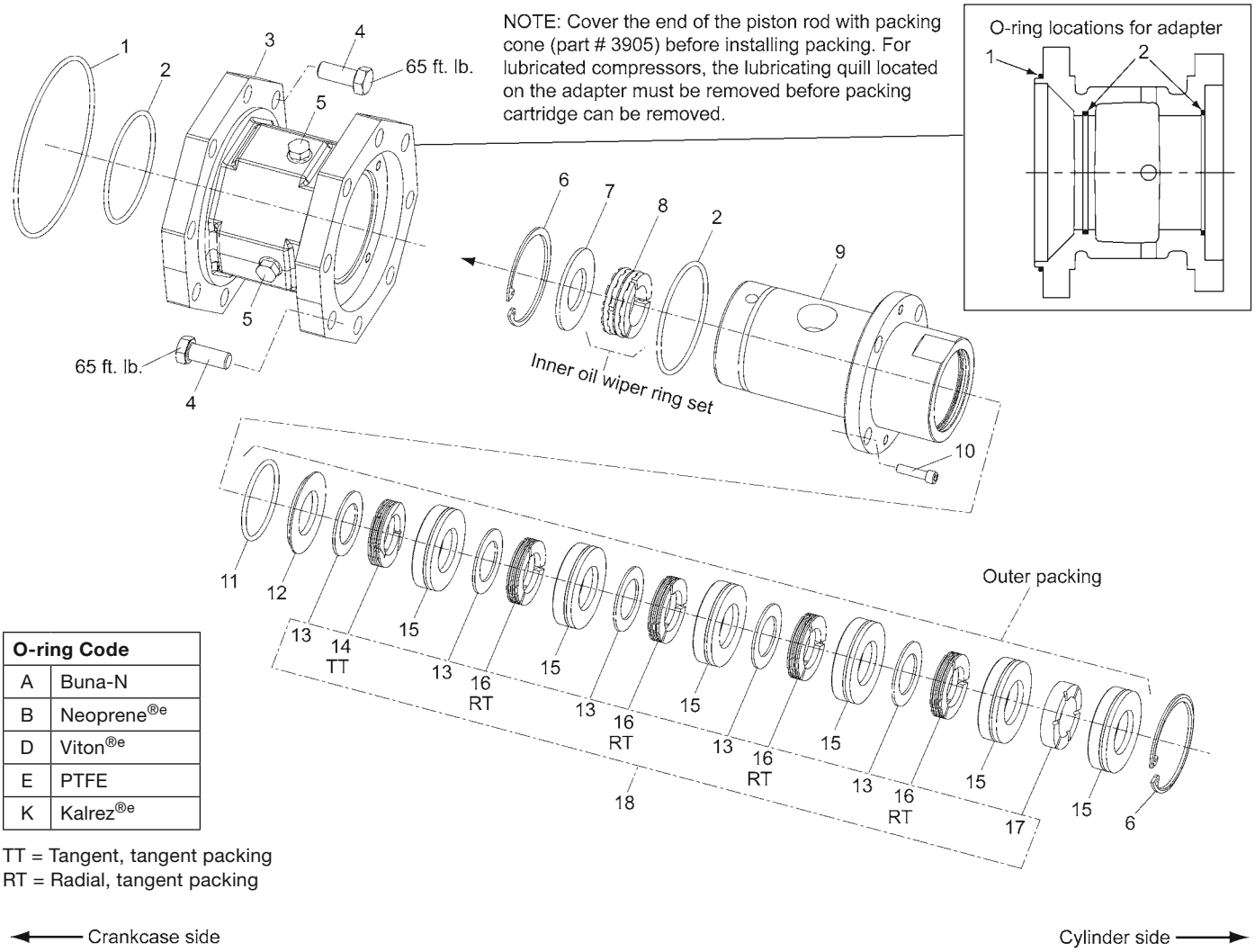
[a]Prior to serial number S/N FZ44175 uses 7002-010TP100A. Serial number FZ44175 and later use 7002-025TP100A.
[b]Use Loctite retaining compound 620.

Piston Assembly Bill of Materials for the 5", 6" and 8" Piston Sizes

Ref. No.	Description	Cylinder Diameter					
		5"		6"		8"	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
1.	Piston assembly - Iron	5301-X1	–	3530-X1	1	3674-X1	1
	Piston assembly - Aluminum	—	1	3530-1X1	1	3674-1X1	1
2.	Thrust washer	3730	2	3730	2	3730	2
3.	Shim washer, thick	3603	As req.	3603	As req.	3603	As req.
	Shim washer, thin	3603-1	As req.	3603-1	As req.	3603-1	As req.
4.	Piston - iron	5301	1	3530	1	3674	1
	Piston - aluminum	—	1	3530-1	1	3674-1	1
5.	Expander ring	5326	6	1753	4	—	–
6.	Piston ring	5302	6	1752	4	3677	3
7.	Rider ring	5303	1	3573	1	3679	2
8.	Lock nut	3604	1	3604	1	3604	1
9.	Shim washer - thick	5322	As req.	3625	As req.	3681	As req.
	Shim washer - thin	5322-1	As req.	3625-1	As req.	3681-1	As req.
10.	Piston cap - iron	5325	1	3562	1	3680	1
	Piston cap - aluminum	—	1	3562-1	1	3680-1	1
11.	Socket head cap screw	7002-025TP100A	4	7002-025TP100A	4	7002-025TP100A	8
12.	Loctite 620 tube[b]	3812	1	3812	1	3812	1

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

2.75" Standard Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 2.75" Standard

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	2
3	3524	Adapter	1
4	7001-050NC150A	Hex head bolt (1/2 - 13 x 1-1/2)	16
5	3442	Pipe plug	Varies
6	5002-250	Retainer ring	2
7	3631	Packing washer	1
8	3816[c]	Oil wiper ring set (two per set)	1
9	3891	Packing cartridge	1
10	7002-031NC075A[f]	Socket head bolt (5/16 - 18 X 3/4")	4
11	2-228_ [a, d]	O-ring	1
12	3819	Packing spacer	1

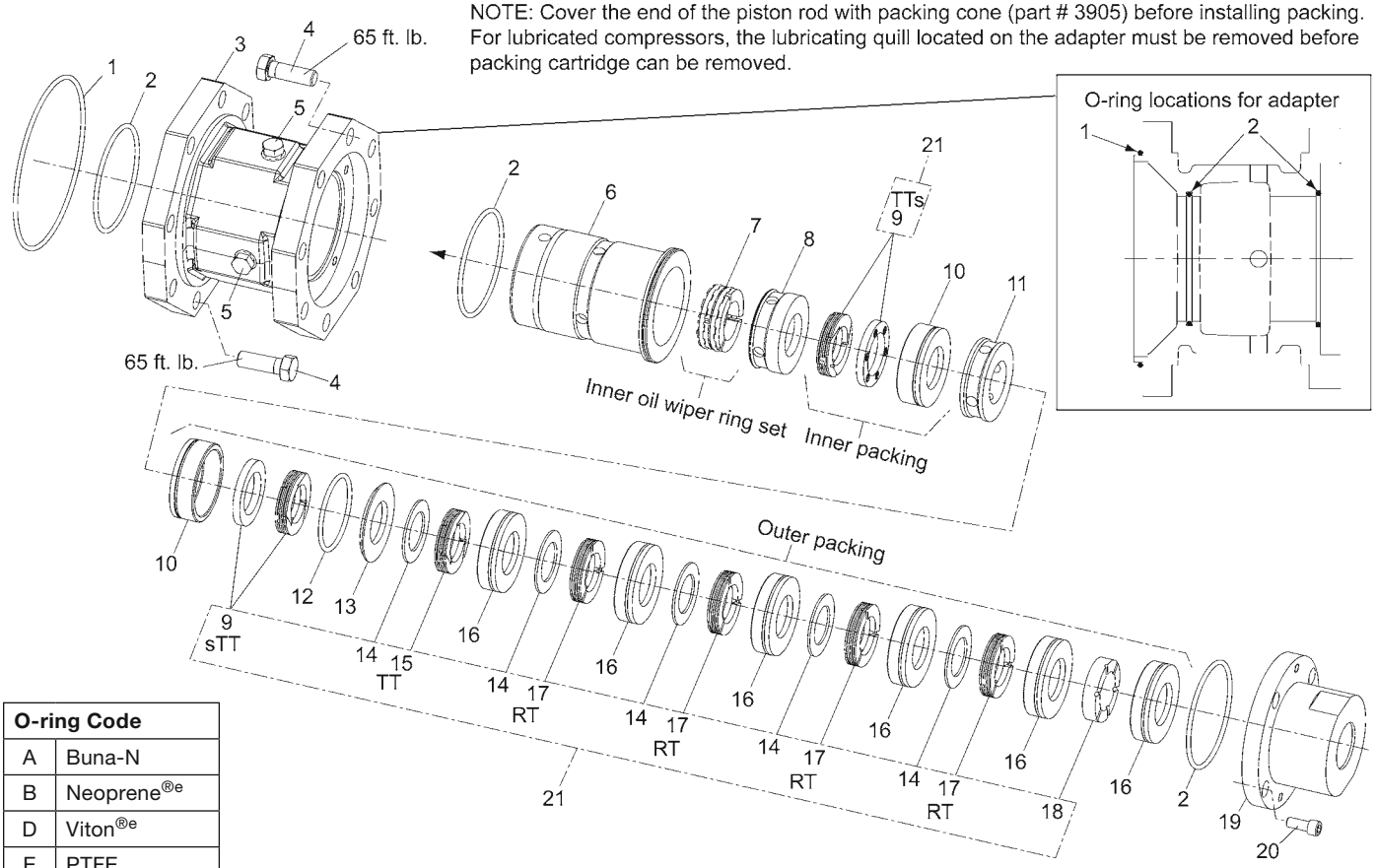
Ref No.	Part No.	Description	Qty.
13	3811	Back-up ring	5
14	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
15	3817	Packing cup	6
	2-036_ [a, d]	O-ring	6
16	3810[b]	Segmented packing ring (radial, tangent - pair)	4
17	3815	Pressure breaker ring	1
18	3810-X3	Packing set	1

[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

2.75" Purge Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 2.75" Purge

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	3
3	3524-2	Adapter	1
4	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	16
5	3442	Pipe plug (1/4")	Varies
6	4363	Packing cartridge body	1
7	3816[c]	Oil wiper ring set (two per set)	1
8	4270	Oil wiper ring cup	1
9	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
10	4271	Purge packing cup	2
11	4364	Cup spacer	1
12	2-228_ [a, d]	O-ring	1
13	4272	Packing spacer	1
14	3811	Back-up ring	5

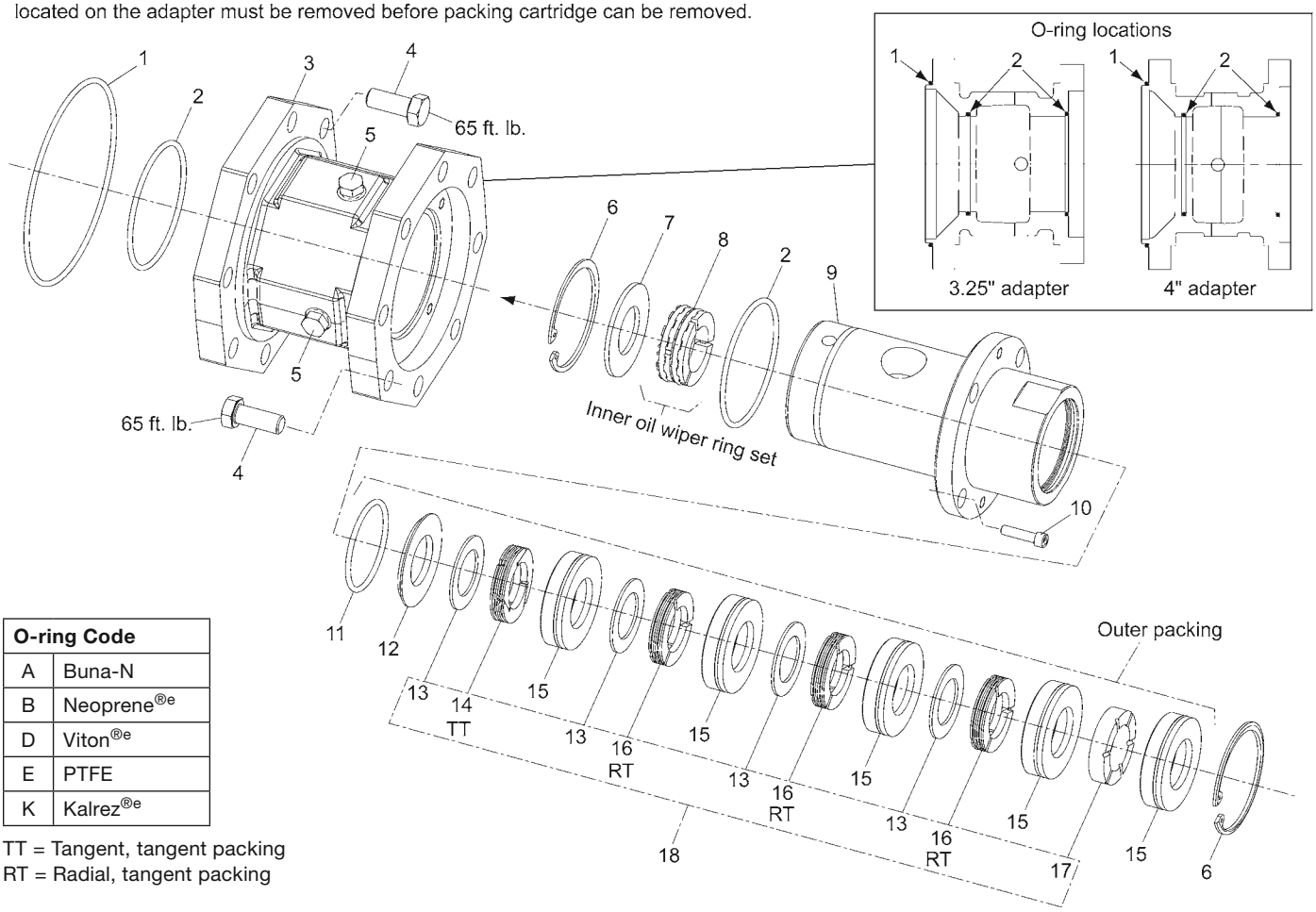
Ref No.	Part No.	Description	Qty.
15	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
16	3817	Packing cup	6
	2-036_ [a, d]	O-ring	8
17	3810[b]	Segmented packing ring (radial, tangent - pair)	4
18	3815	Pressure breaker ring	1
19	4362	Packing cartridge cap	1
20	7002-031NC075A[f]	Socket head bolt (5/16 - 18 x 3/4")	4
21	4273-X3	Packing set	1

[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

3.25" and 4" Standard Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 3.25" and 4" Standard

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	2
3	3524	Adapter (3.25")	1
	3762	Adapter (4")	1
4	7001-050NC150A	Hex head bolt (1/2 - 13 x 1-1/2)	16
5	3442	Pipe plug	Varies
6	5002-250	Retainer ring	2
7	3631	Packing washer	1
8	3816[c]	Oil wiper ring set (two per set)	1
9	3594	Packing cartridge (3.25")	1
	3764	Packing cartridge (4")	1
10	7002-031NC075A[f]	Socket head bolt (5/16 - 18 x 3/4") - 3.25"	4
	7002-025NC062A[f]	Socket head bolt (1/4 - 20 x 5/8") - 4"	4
11	2-228_ [a, d]	O-ring	1

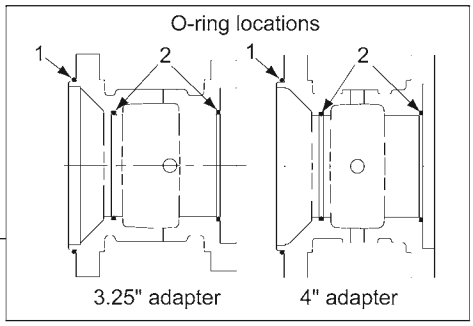
Ref No.	Part No.	Description	Qty.
12	3819	Packing spacer	1
13	3811	Back-up ring	4
14	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
15	3817	Packing cup	5
	2-036_ [a, d]	O-ring	5
16	3810[b]	Segmented packing ring (radial, tangent - pair)	3
17	3815	Pressure breaker ring	1
18	3810-X2	Packing set (fits 3.25" & 4")	1

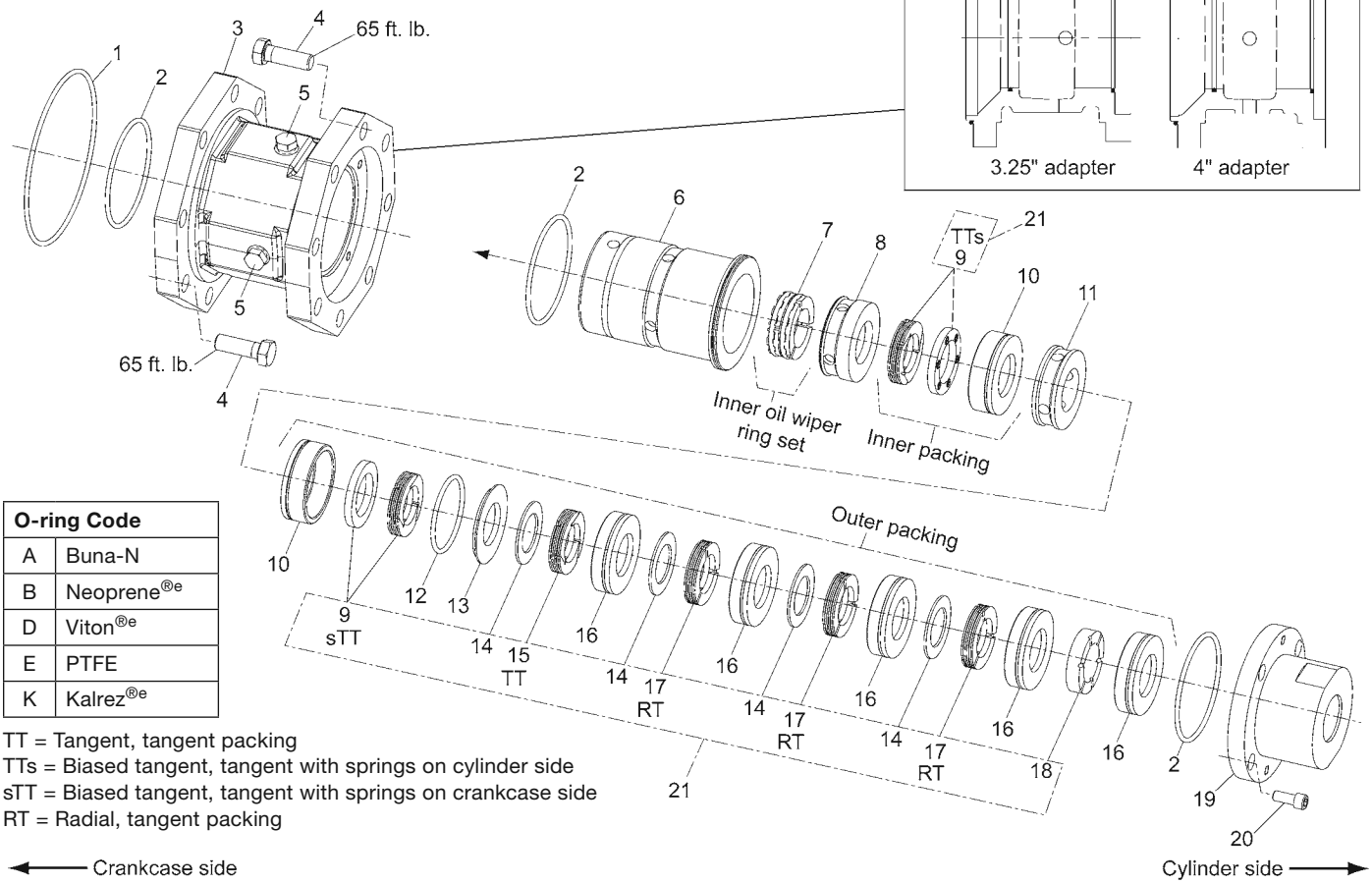
[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

3.25" and 4" Purge Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.





O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 3.25" and 4" Purge

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	3
3	3524-1	Adapter (3.25")	1
	3762-1	Adapter (4")	1
4	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	16
5	3442	Pipe plug (1/4")	Varies
6	4287	Packing cartridge body (3.25")	1
	4289	Packing cartridge body (4")	1
7	3816[c]	Oil wiper ring set (two per set)	1
8	4270	Oil wiper ring cup	1
9	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
10	4271	Purge packing cup	2
11	4285	Cup spacer	1
12	2-228_ [a, d]	O-ring	1
13	4272	Packing spacer	1
14	3811	Back-up ring	4

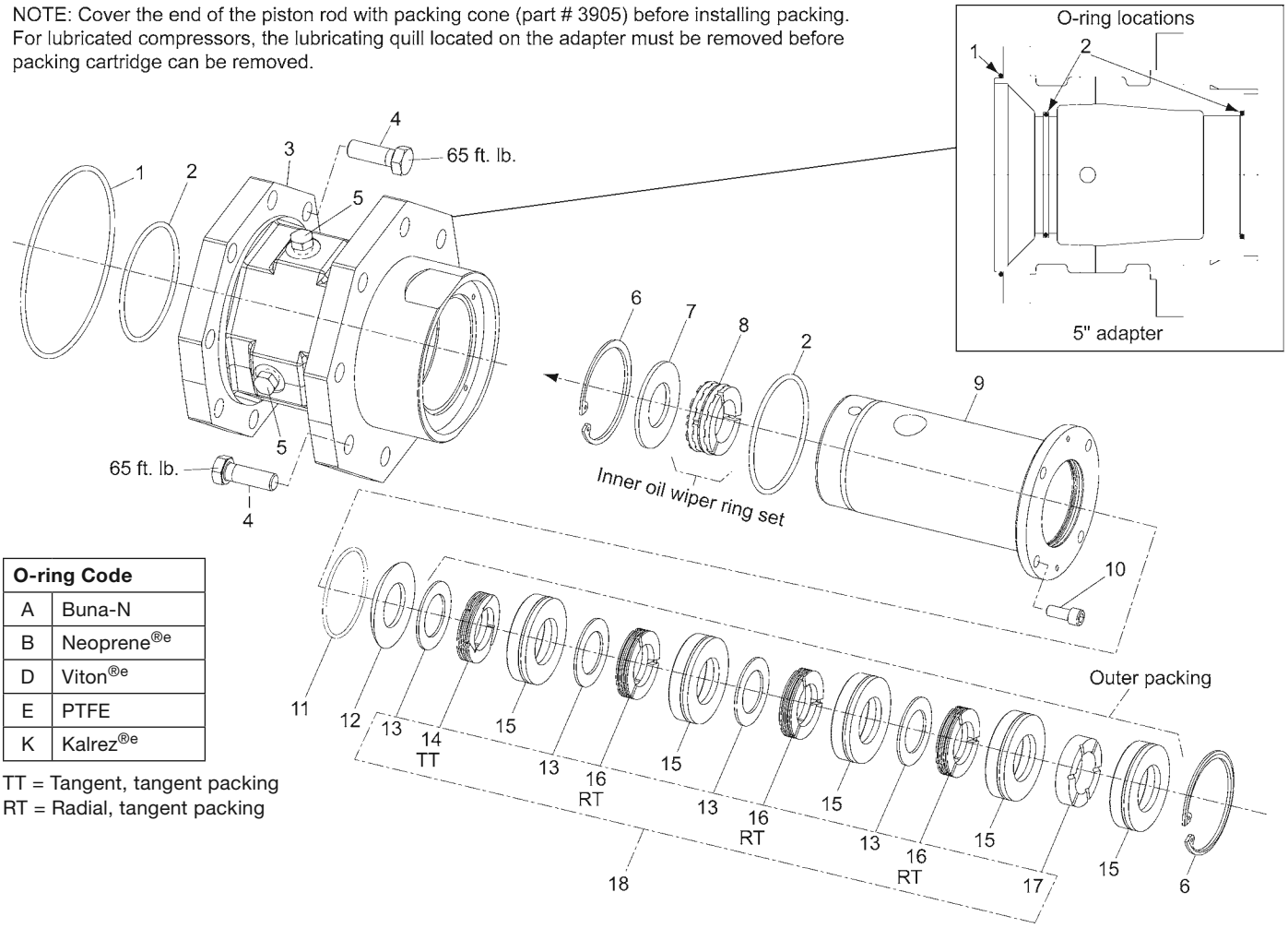
Ref No.	Part No.	Description	Qty.
15	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
16	3817	Packing cup	5
	2-036_ [a, d]	O-ring	7
17	3810[b]	Segmented packing ring (radial, tangent - pair)	3
18	3815	Pressure breaker ring	1
19	4286	Packing cartridge cap (3.25")	1
	4288	Packing cartridge cap (4")	1
20	7002-031NC075A[f]	Socket head bolt (5/16 - 18 X 3/4") - 3.25"	4
	7002-010NC075A[f]	Socket head bolt (10 - 24 x 3/4") - 4"	4
21	4273-X2	Packing set (fits 3.25" & 4")	1

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

5" Standard Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 5" Standard

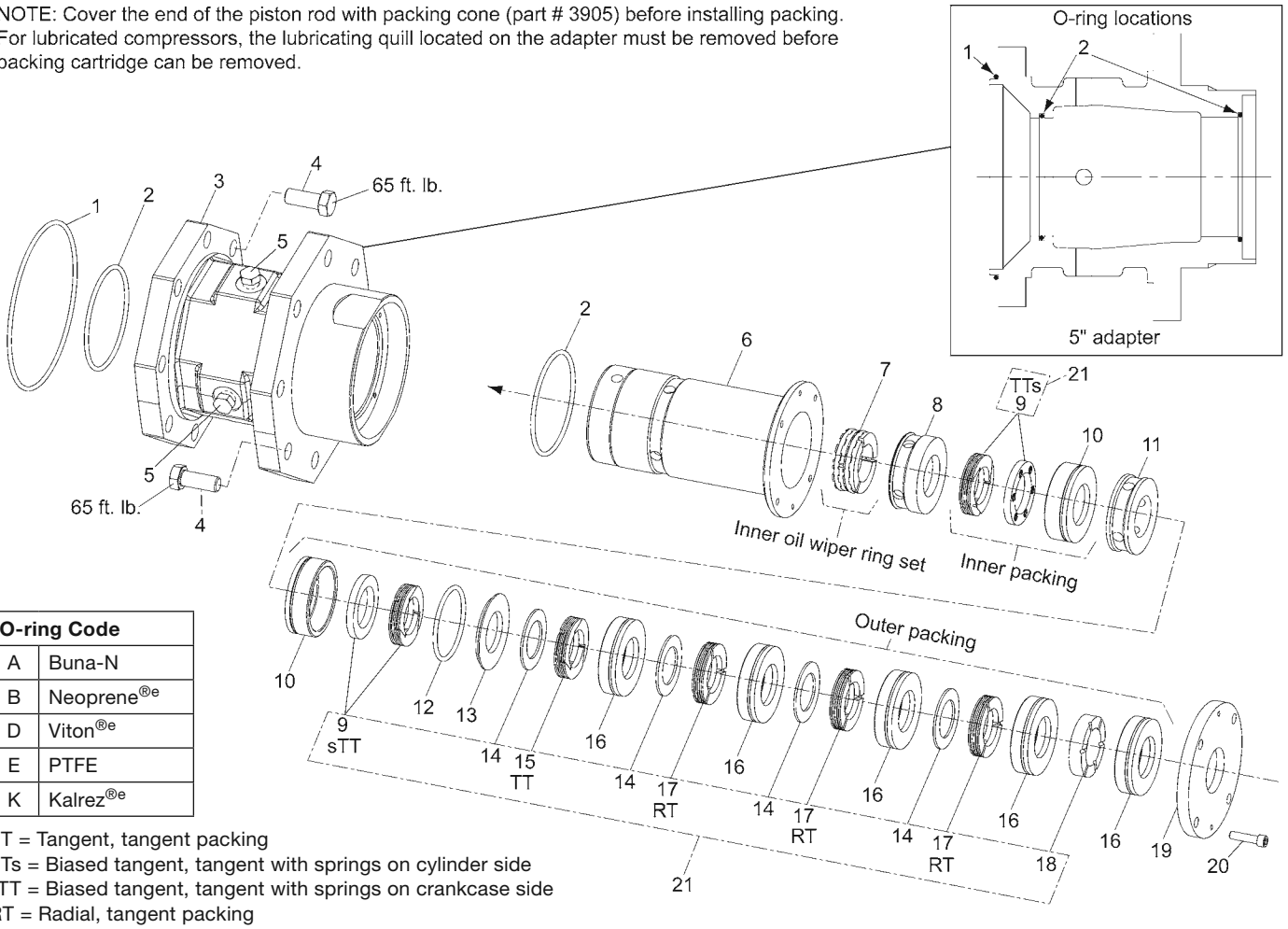
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	2
3	5291	Adapter	1
4	7001-050NC150A	Hex head bolt (1/2 - 13 x 1-1/2)	16
5	3442	Pipe plug	Varies
6	5002-250	Retainer ring	2
7	3631	Packing washer	1
8	3816[c]	Oil wiper ring set (two per set)	1
9	5304	Packing cartridge	1
10	7002-010NC075A[f]	Socket head bolt (5/16 - 18 X 3/4")	4
11	2-228_ [a, d]	O-ring	1
12	3819	Packing spacer	1
13	3811	Back-up ring	4
14	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
15	3817	Packing cup	5
	2-036_ [a, d]	O-ring	5
16	3810[b]	Segmented packing ring (radial, tangent - pair)	3
17	3815	Pressure breaker ring	1
18	3810-X2	Packing set	1

[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

5" Purge Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

← Crankcase side

Cylinder side →

Packing Assembly Bill of Materials for 5" Purge

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	2
3	5291-1	Adapter	1
4	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	16
5	3442	Pipe plug (1/4")	Varies
6	5298	Packing cartridge body	1
7	3816[c]	Oil wiper ring set (two per set)	1
8	4270	Oil wiper ring cup	1
9	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
10	4271	Purge packing cup	2
11	4285	Cup spacer	1
12	2-228_ [a, d]	O-ring	1
13	4272	Packing spacer	1
14	3811	Back-up ring	4

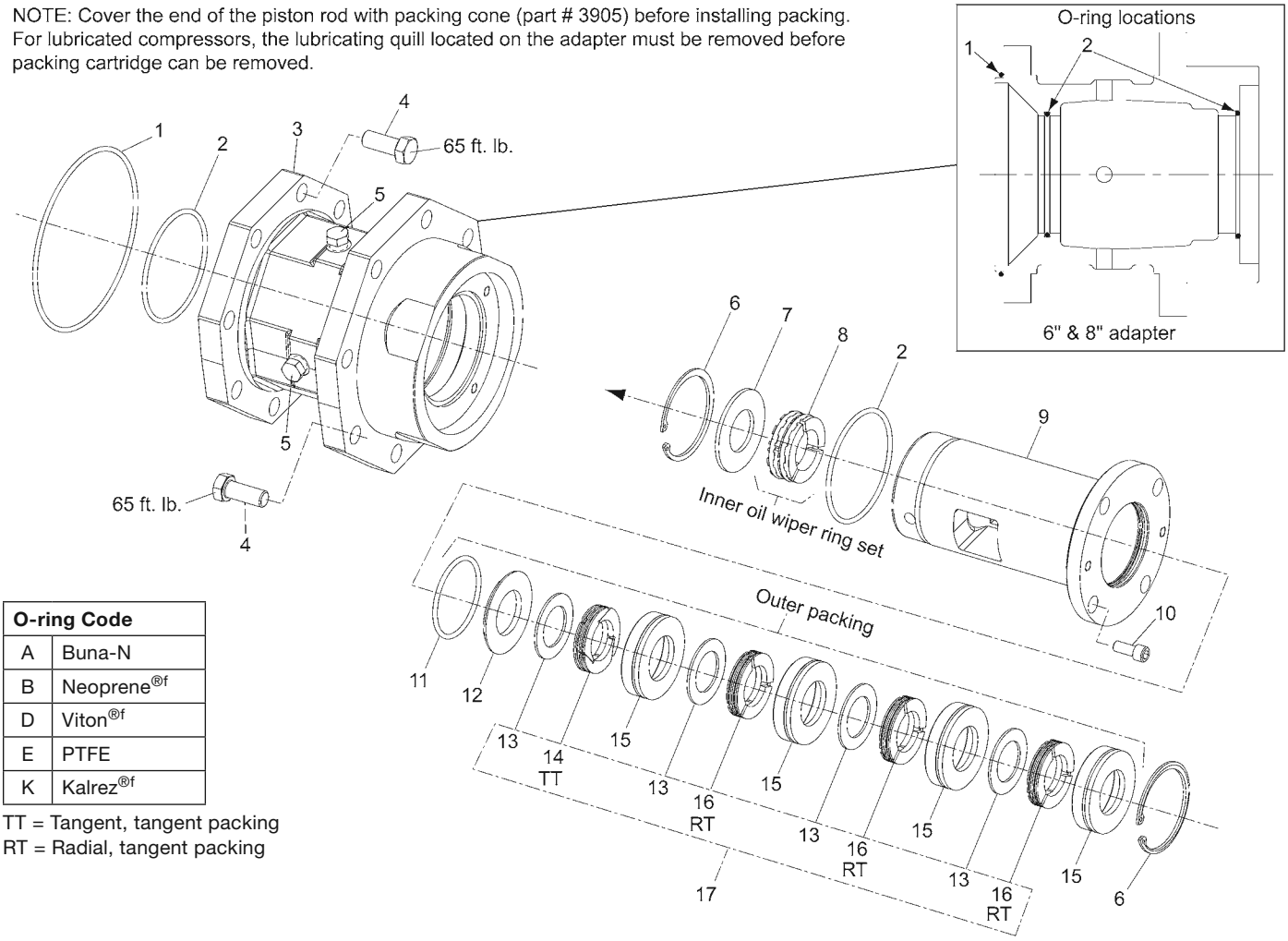
Ref No.	Part No.	Description	Qty.
15	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
16	3817	Packing cup	5
	2-036_ [a, d]	O-ring	7
17	3810[b]	Segmented packing ring (radial, tangent - pair)	3
18	3815	Pressure breaker ring	1
19	5321	Packing cartridge cap	1
20	7002-010NC075A[f]	Socket head bolt	4
21	4273-X2	Packing set	1

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

6" and 8" Standard Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.



O-ring Code	
A	Buna-N
B	Neoprene®[f]
D	Viton®[f]
E	PTFE
K	Kalrez®[f]

TT = Tangent, tangent packing
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 6" and 8" Standard

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d, e]	O-ring	2
3	3529	Adapter (6")	1
	3673	Adapter (8")	1
4	7001-050NC150A	Hex head bolt (1/2 - 13 x 1-1/2)	16
5	3442	Pipe plug	Varies
6	5002-250	Retainer ring	2
7	3631	Packing washer	1
8	3816[c]	Oil wiper ring set (two per set)	1
9	3533	Packing box cartridge (6" & 8")	1
10	7002-031NC075A[g]	Socket head bolt (5/16 - 18 X 3/4")	4
11	2-228_ [a, d]	O-ring	1
12	3819	Packing spacer	1
13	3811	Back-up ring	4

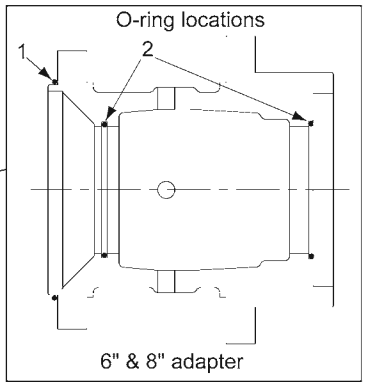
Ref No.	Part No.	Description	Qty.
14	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
15	3817	Packing cup	4
	2-036_ [a, d]	O-ring	4
16	3810[b]	Segmented packing ring (radial, tangent - pair)	3
17	3810-X1	Packing set (6" & 8")	1

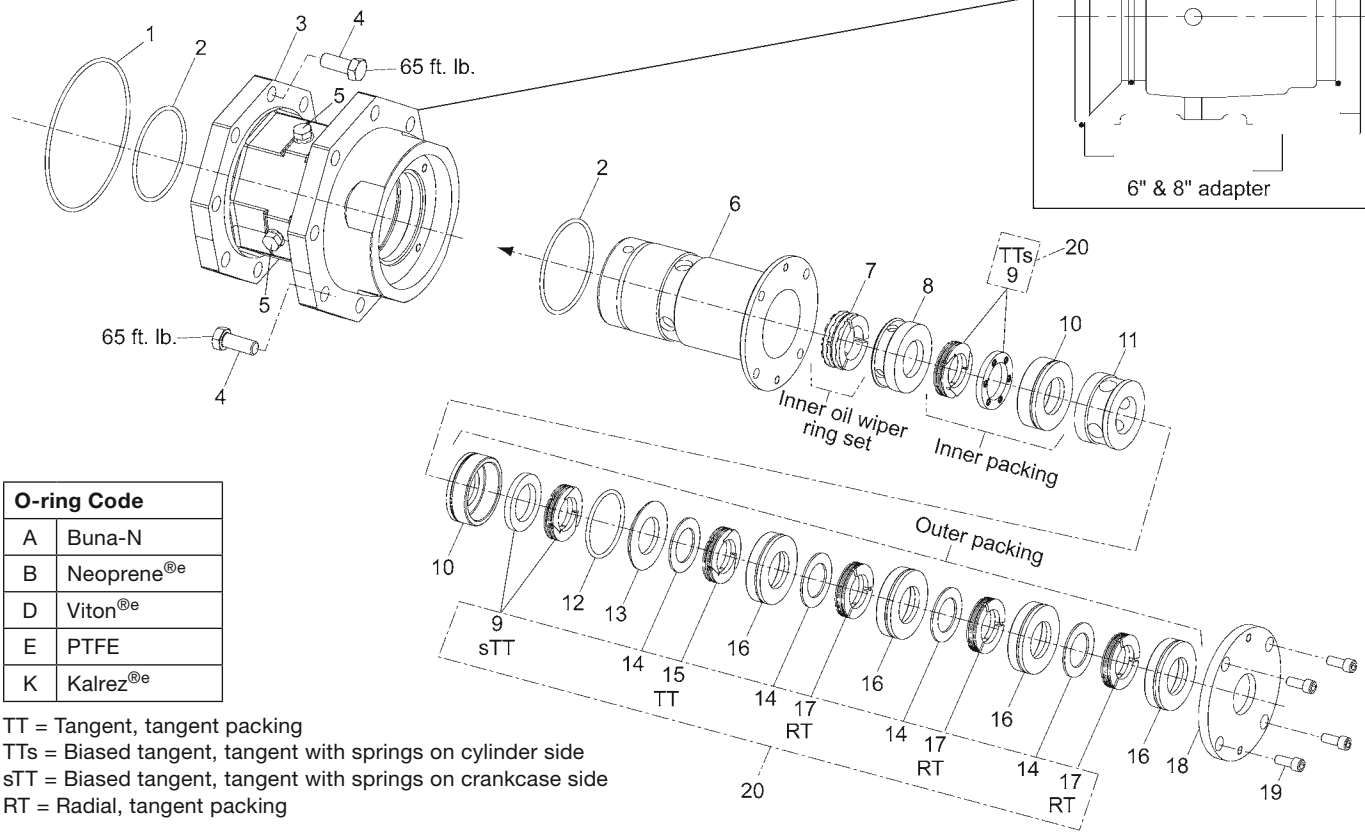
[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Beginning with serial number NN51397.
[f] Registered trademarks of the DuPont company.
[g]Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG600 Series (Plain Style)

6" and 8" Purge Packing Specification

NOTE: Cover the end of the piston rod with packing cone (part # 3905) before installing packing. For lubricated compressors, the lubricating quill located on the adapter must be removed before packing cartridge can be removed.





O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Crankcase side ← → Cylinder side

Packing Assembly Bill of Materials for 6" and 8" Purge

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	1
2	2-236_ [a, d]	O-ring	2
3	3529-1	Adapter (6")	1
	3673-1	Adapter (8")	1
4	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	16
5	3442	Pipe plug (1/4")	Varies
6	4268	Packing cartridge body	1
7	3816[c]	Oil wiper ring set (two per set)	1
8	4270	Oil wiper ring cup	1
9	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
10	4271	Purge packing cup	2
11	4269	Cup spacer	1
12	2-228_ [a, d]	O-ring	1
13	4272	Packing spacer	1

Ref No.	Part No.	Description	Qty.
14	3811	Back-up ring	4
15	3814[b]	Segmented packing ring (tangent, tangent - pair)	1
16	3817	Packing cup	4
	2-036_ [a, d]	O-ring	6
17	3810[b]	Segmented packing ring (radial, tangent - pair)	3
18	4267	Packing cartridge cap	1
19	7002-031NC075A[f]	Socket head bolt	4
20	4273-X1	Packing set	1

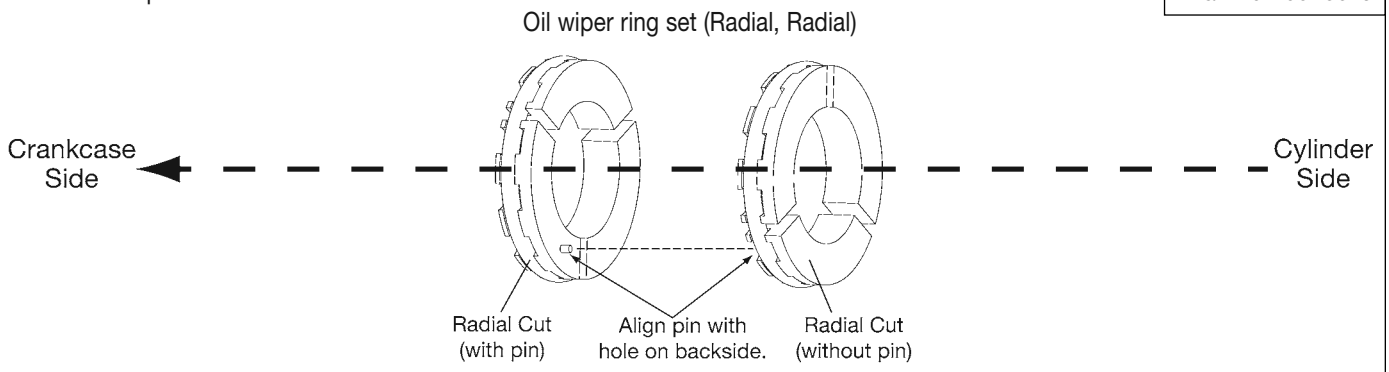
[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for HG601/HG602 Series (Plain Style)

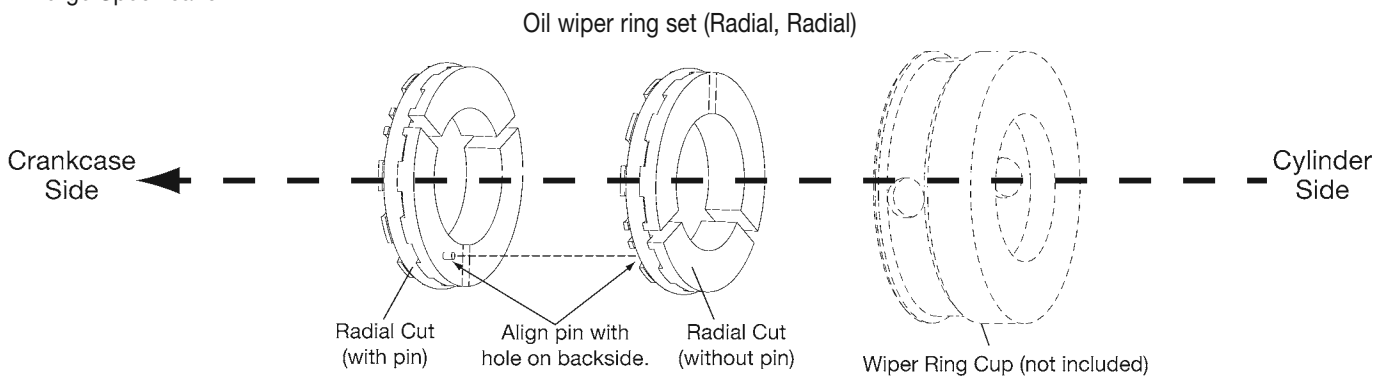
Inner Oil Wiper Ring Sets

1. Standard Specification

Part number 3816



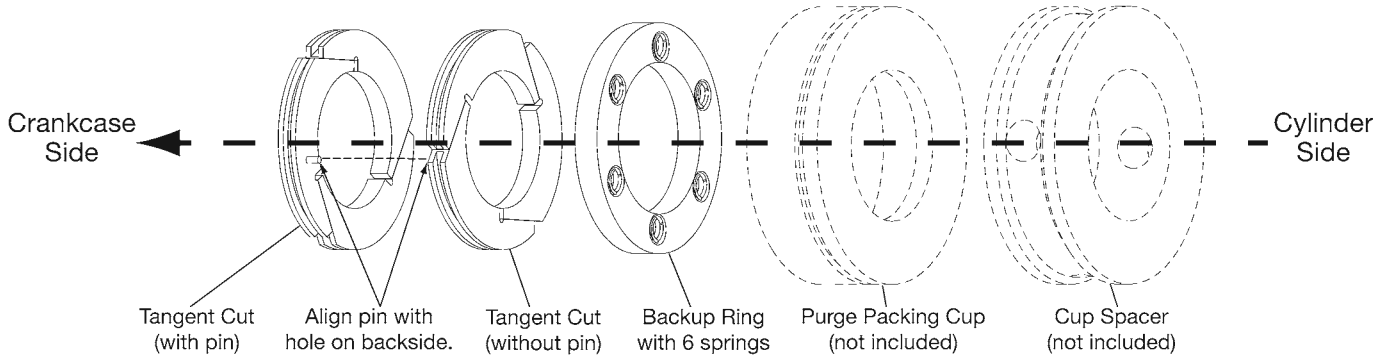
2. Purge Specification



Inner Packing Details for Purge Specification Only

Biased Segmented Purge Packing Set (Tangent, Tangent with spring toward cylinder—TTs)

Part number 4273



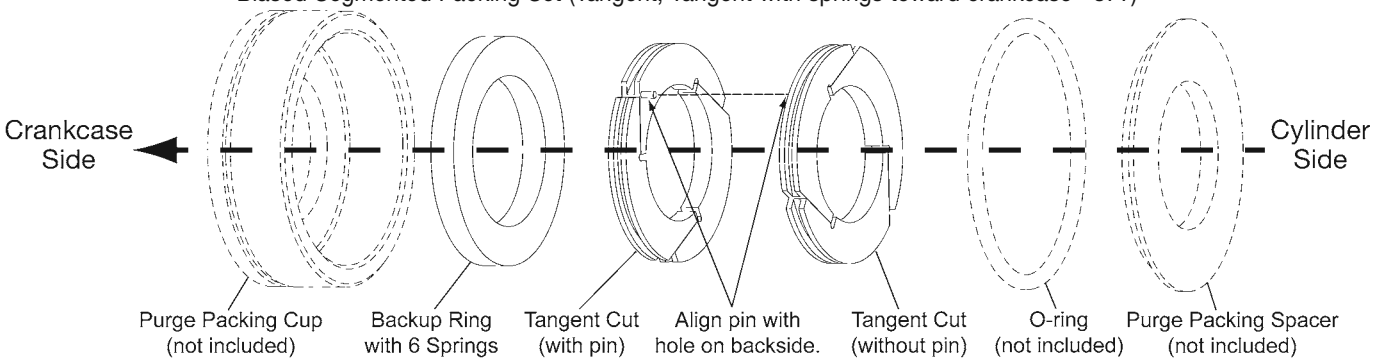
Appendix D—Packing Assembly Details for HG601/HG602 Series (Plain Style)

Outer Packing Details for Standard and Purge Packing Specifications

1. Purge Specification

Part number 4273

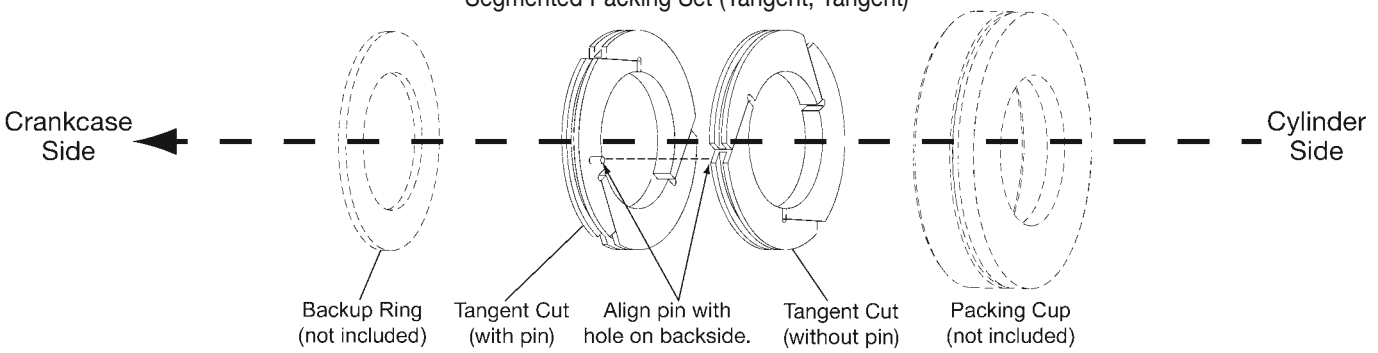
Biased Segmented Packing Set (Tangent, Tangent with springs toward crankcase—sTT)



2. Standard or Purge Specification

Part number 3814

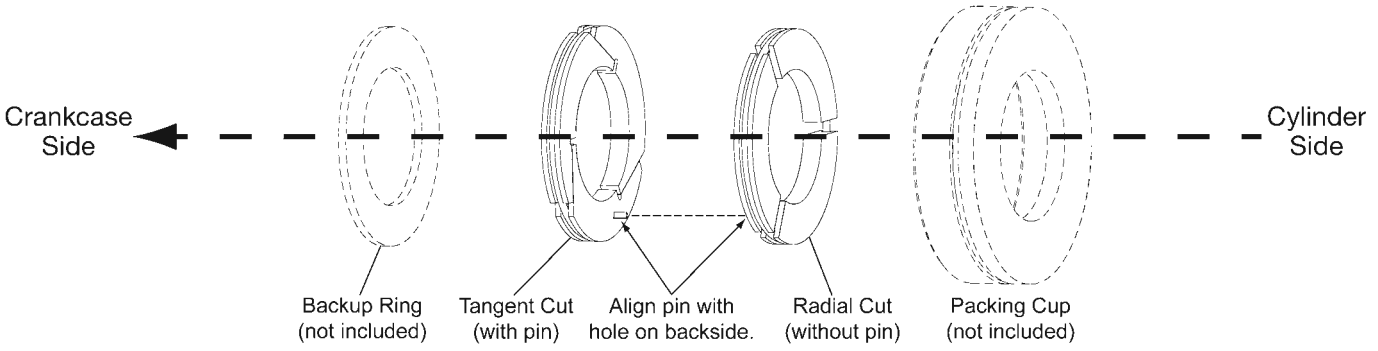
Segmented Packing Set (Tangent, Tangent)



3. Standard or Purge Specification

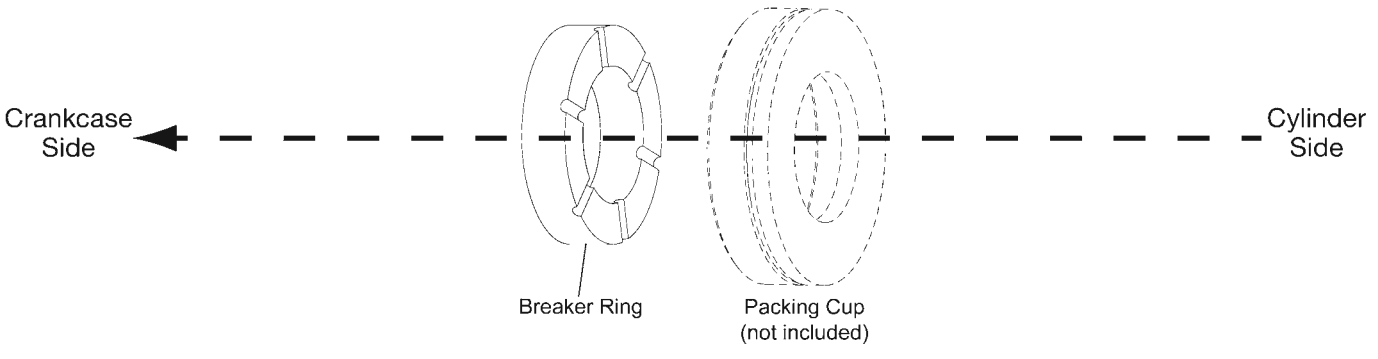
Part number 3810

Segmented Packing Set (Radial, Tangent)



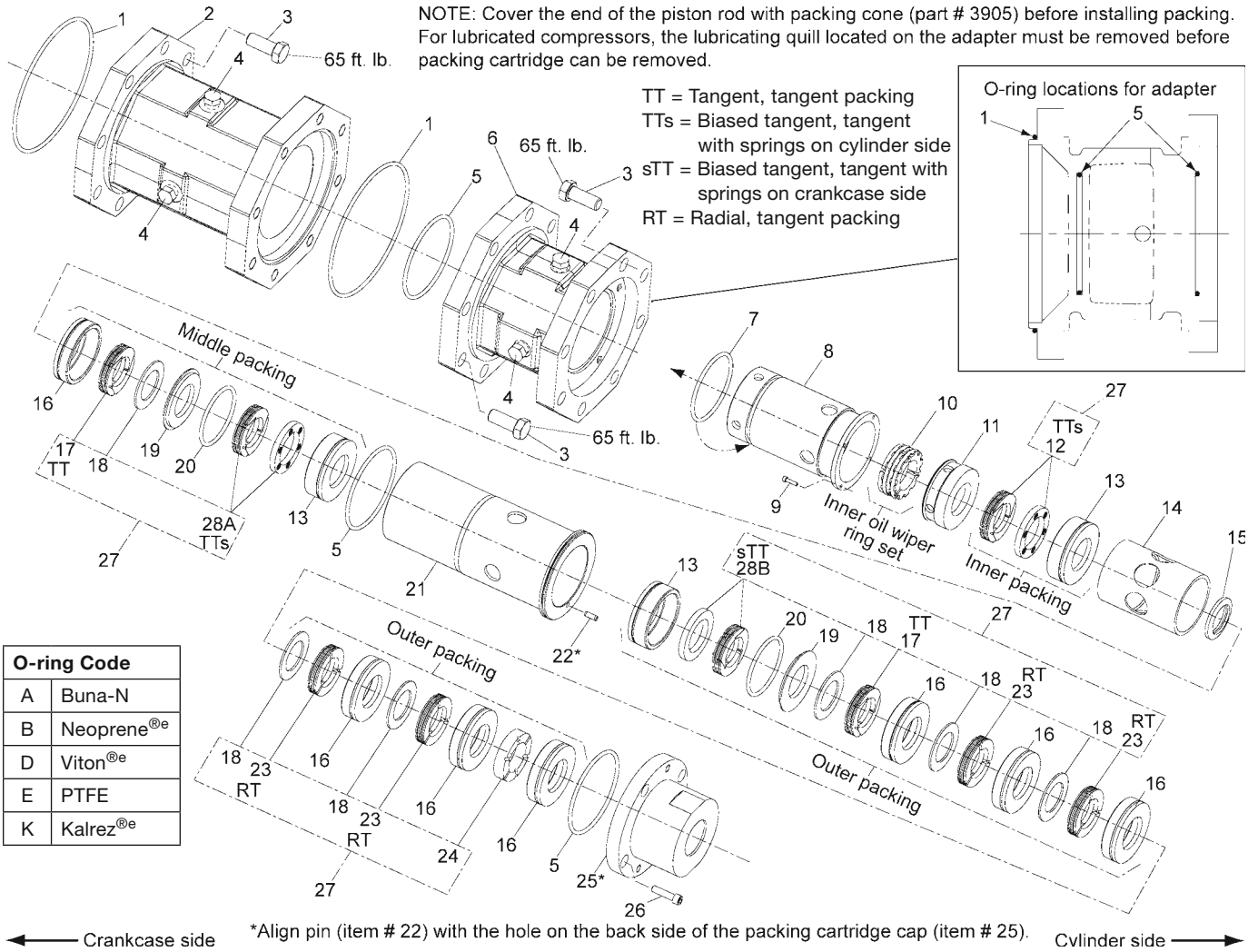
4. Solid Pressure Breaker Ring (applies to 2.75", 3.25", 4", and 5" cylinder sizes only)

Part number 3815



Appendix D—Packing Assembly Details for THG600 Series (T-Style)

2.75" Pad Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

*Align pin (item # 22) with the hole on the back side of the packing cartridge cap (item # 25).

Packing Assembly Bill of Materials for 2.75" Pad

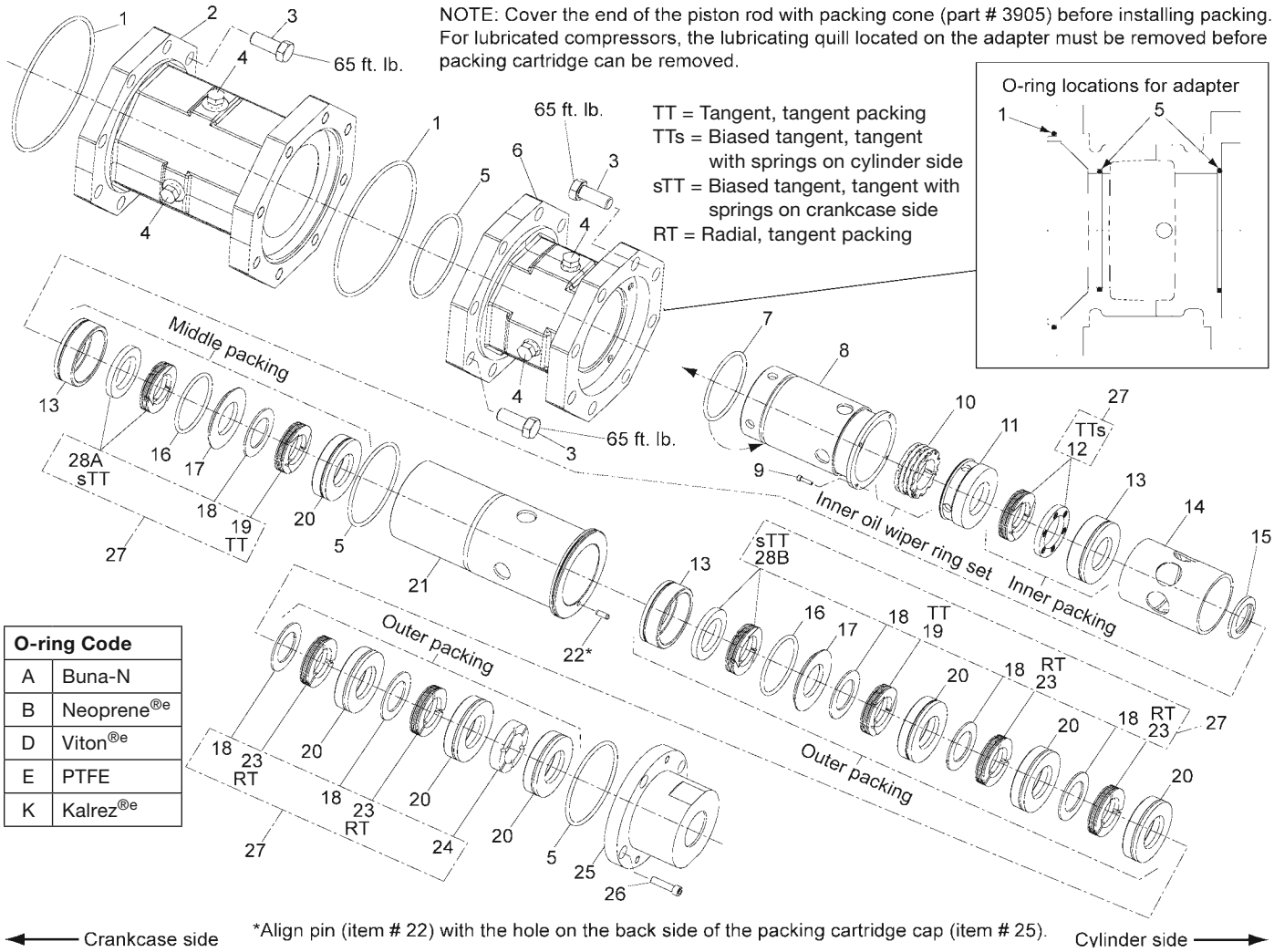
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	3524-2	Adapter	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	3817	Packing cup	6
	2-036_ [a, d]	O-ring	8
17	3814[b]	Segmented packing ring (tangent, tangent - pair)	2

Ref No.	Part No.	Description	Qty.
18	3811	Back-up ring	6
19	4272	Packing spacer	1
20	2-228_ [a, d]	O-ring	1
21	4773	Packing cartridge body	1
22	3253	Pin	1
23	3810[b]	Segmented packing ring (radial, tangent - pair)	4
24	3815	Pressure breaker ring	1
25	4362	Packing cartridge cap	1
26	7002-031NC075A[f]	Socket head bolt (5/16 - 18 x 3/4")	4
27	4273-1X3	Packing set	1
28A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
28B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

2.75" Purge Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

Packing Assembly Bill of Materials for 2.75" Purge

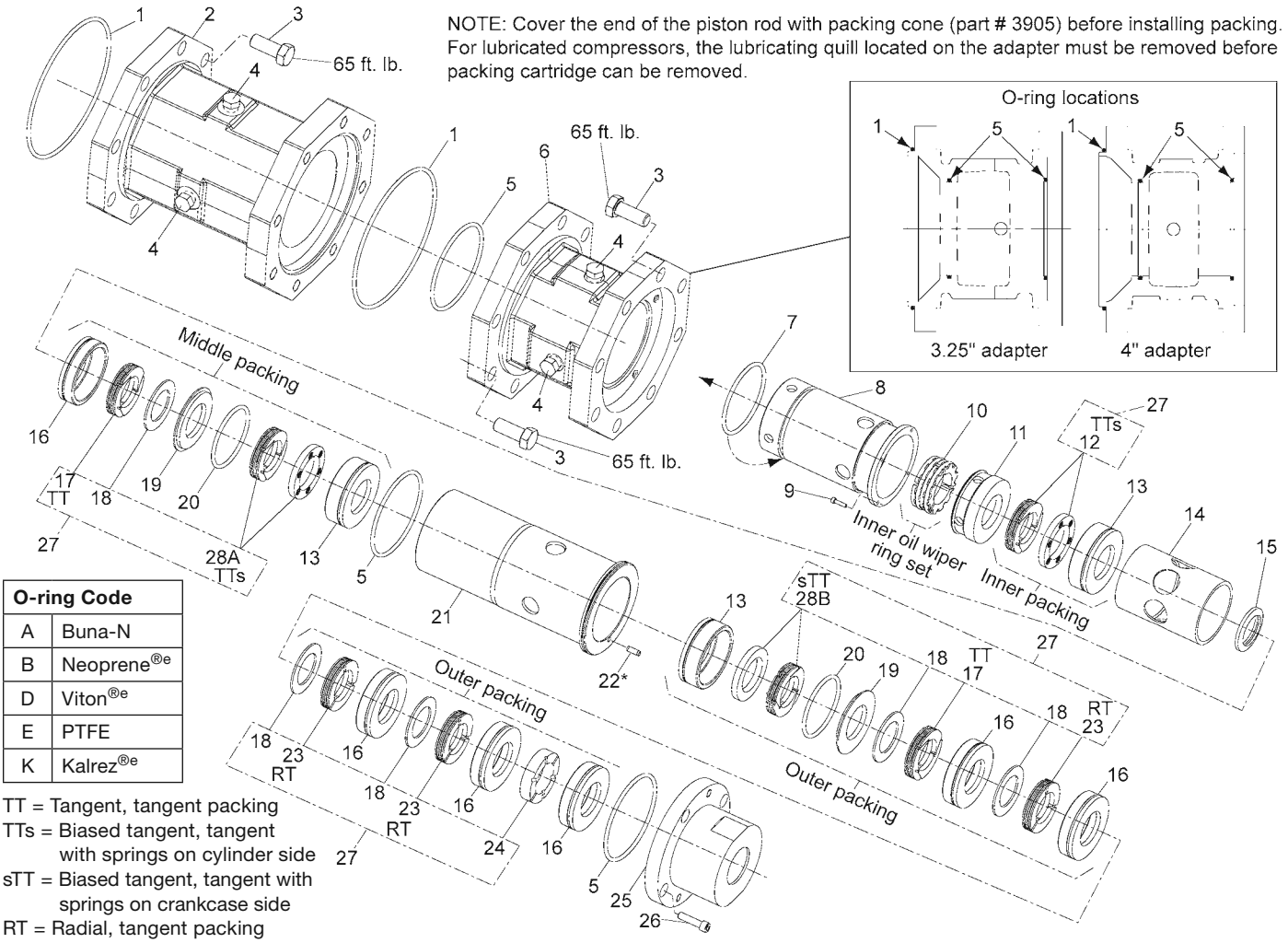
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	3524-2	Adapter	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	3
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	2-228_ [a, d]	O-ring	2
17	4272	Packing spacer	2
18	3811	Back-up ring	4

Ref No.	Part No.	Description	Qty.
19	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
20	3817	Packing cup	7
	2-036_ [a, d]	O-ring	10
21	4773	Packing cartridge body	1
22	3253	Pin	1
23	3810[b]	Segmented packing ring (radial, tangent - pair)	4
24	3815	Pressure breaker ring	1
25	4362	Packing cartridge cap	1
26	7002-031NC075A[f]	Socket head bolt (5/16 - 18 x 3/4")	4
27	4273-1X3	Packing set	1
28A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
28B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

3.25" and 4" Pad Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

*Align pin (item # 22) with the hole on the back side of the packing cartridge cap (item # 25).

Packing Assembly Bill of Materials for 3.25" and 4" Pad

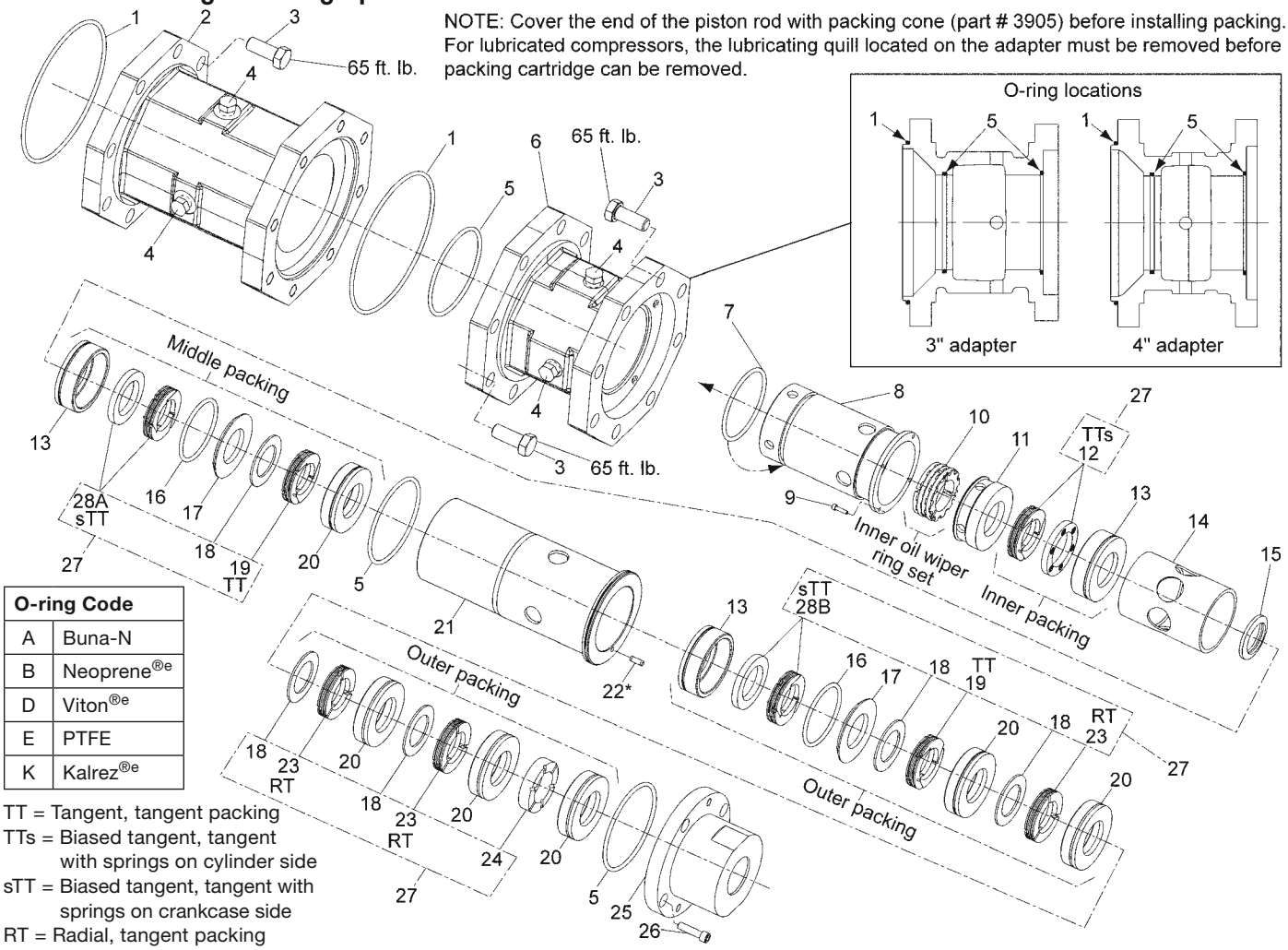
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	3524-1	Adapter (3.25")	1
	3762-1	Adapter (4")	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	3817	Packing cup	6
	2-036_ [a, d]	O-ring	9
17	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
18	3811	Back-up ring	5

Ref No.	Part No.	Description	Qty.
19	4272	Packing spacer	2
20	2-228_ [a, d]	O-ring	2
21	4773	Packing cartridge body (3.25")	1
	4774	Packing cartridge body (4")	1
22	3253	Pin	1
23	3810[b]	Segmented packing ring (radial, tangent - pair)	3
24	3815	Pressure breaker ring	1
25	4286	Packing cartridge cap (3.25")	1
	4288	Packing cartridge cap (4")	1
26	7002-031NC075A[f]	Socket head bolt (5/16 - 18 X 3/4") - 3.25"	4
	7002-010NC075A[f]	Socket head bolt (10 - 24 x 3/4") - 4"	4
27	4273-X2	Packing set (fits 3.25" & 4")	1
28A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
28B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

3.25" and 4" Purge Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 3.25" and 4" Purge

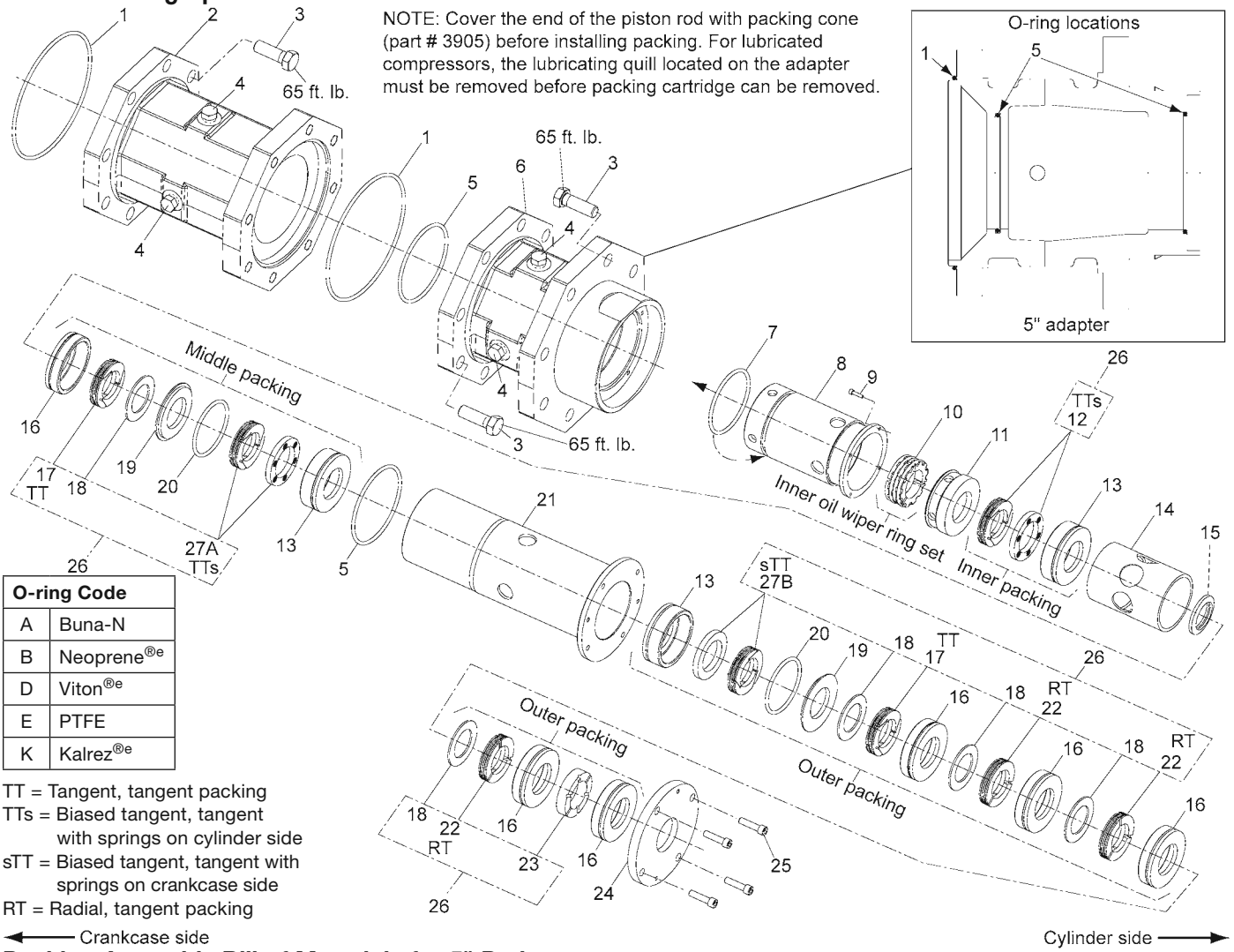
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	3524-1	Adapter (3.25")	1
	3762-1	Adapter (4")	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	2-228_ [a, d]	O-ring	2
17	4272	Packing spacer	2
18	3811	Back-up ring	5
19	3814[b]	Segmented packing ring (tangent, tangent - pair)	2

Ref No.	Part No.	Description	Qty.
20	3817	Packing cup	6
	2-036_ [a, d]	O-ring	9
21	4774	Packing cartridge body (3.25")	1
	4775	Packing cartridge body (4")	1
22	3253	Pin	1
23	3810[b]	Segmented packing ring (radial, tangent - pair)	3
24	3815	Pressure breaker ring	1
25	4286	Packing cartridge cap (3.25")	1
	4288	Packing cartridge cap (4")	1
26	7002-031NC075A[f]	Socket head bolt (5/16 - 18 X 3/4") - 3.25"	4
	7002-010NC075A[f]	Socket head bolt (10 - 24 x 3/4") - 4"	4
27	4273-1X2	Packing set (fits 3.25" & 4")	1
28A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
28B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

5" Pad Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

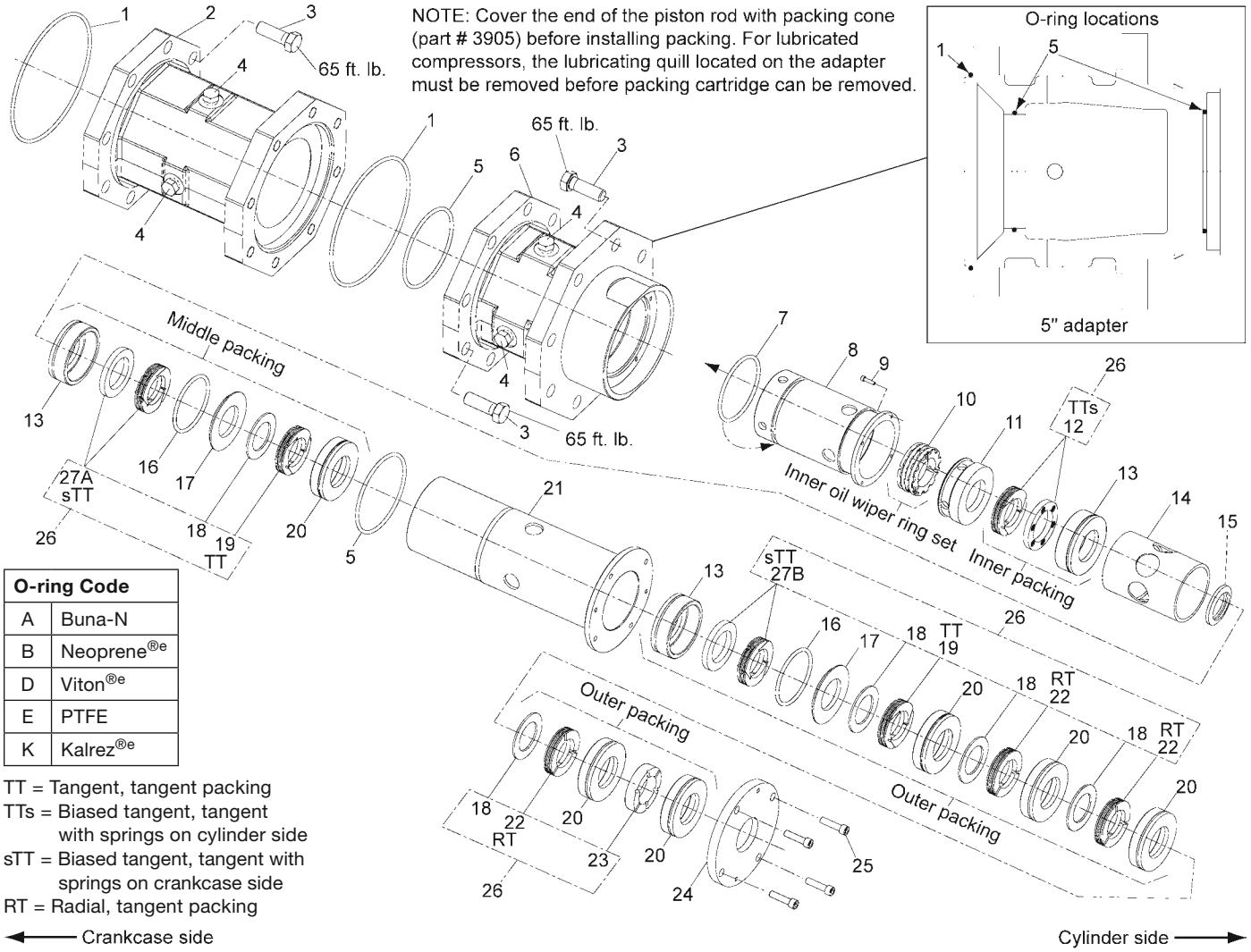
Packing Assembly Bill of Materials for 5" Pad

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	5291-1	Adapter	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	3817	Packing cup	5
	2-036_ [a, d]	O-ring	8
17	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
18	3811	Back-up ring	5
19	4272	Packing spacer	2
20	2-228_ [a, d]	O-ring	2
21	4776	Packing cartridge body	1
22	3810[b]	Segmented packing ring (radial, tangent - pair)	3
23	3815	Pressure breaker ring	1
24	5321	Packing cartridge cap	1
25	7002-010NC075A[f]	Socket head bolt	4
26	4273-1X2	Packing set	1
27A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
27B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

5" Purge Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 5" Purge

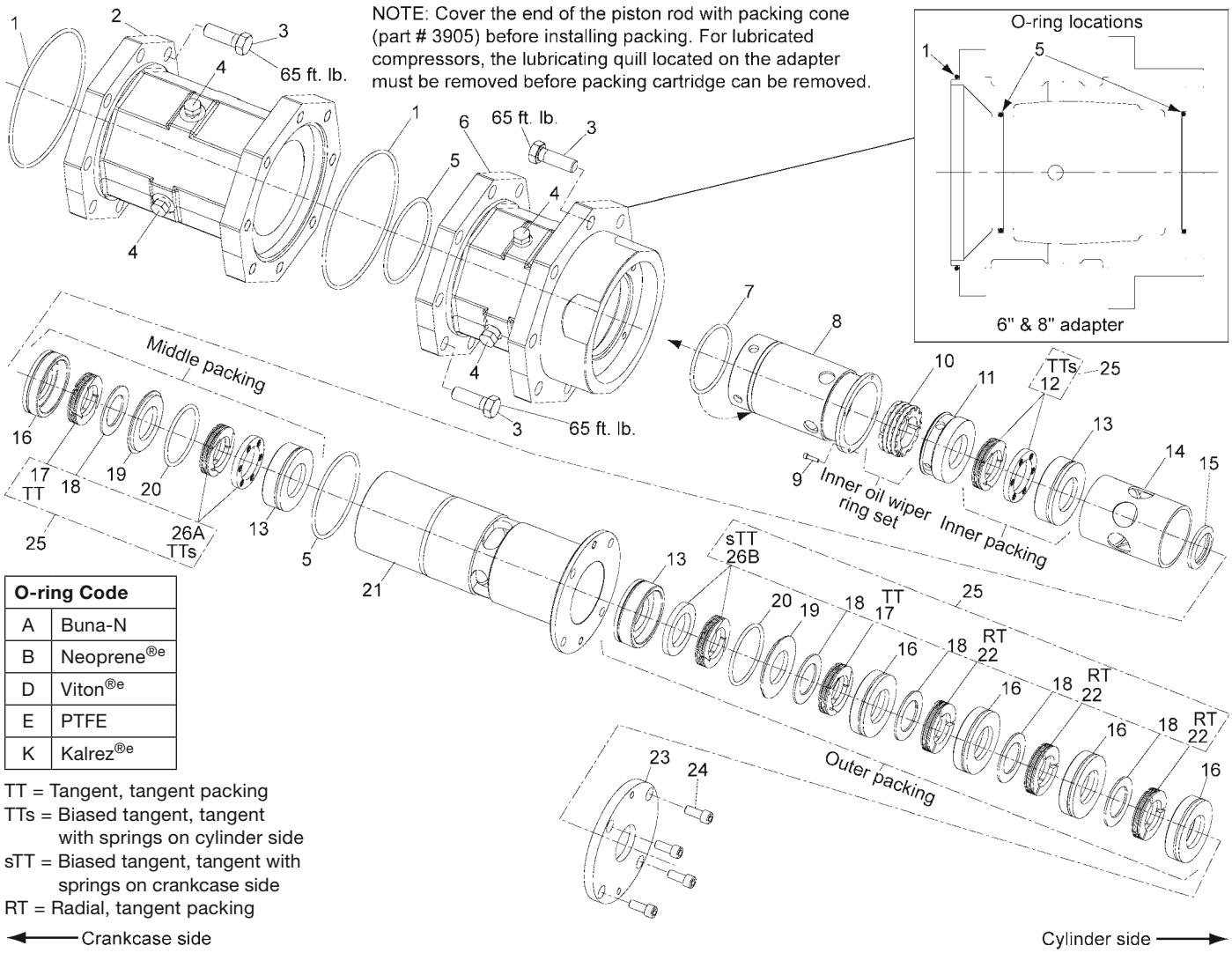
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	3
6	5291-1	Adapter	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-005NC050A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	2-228_ [a, d]	O-ring	2
17	4272	Packing spacer	2
18	3811	Back-up ring	5

Ref No.	Part No.	Description	Qty.
19	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
20	3817	Packing cup	5
	2-036_ [a, d]	O-ring	8
21	4776	Packing cartridge body	1
22	3810[b]	Segmented packing ring (radial, tangent - pair)	3
23	3815	Pressure breaker ring	1
24	5321	Packing cartridge cap	1
25	7002-010NC075A[f]	Socket head bolt	4
26	4273-1X2	Packing set	1
27A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
27B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

6" and 8" Pad Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 6" and 8" Pad

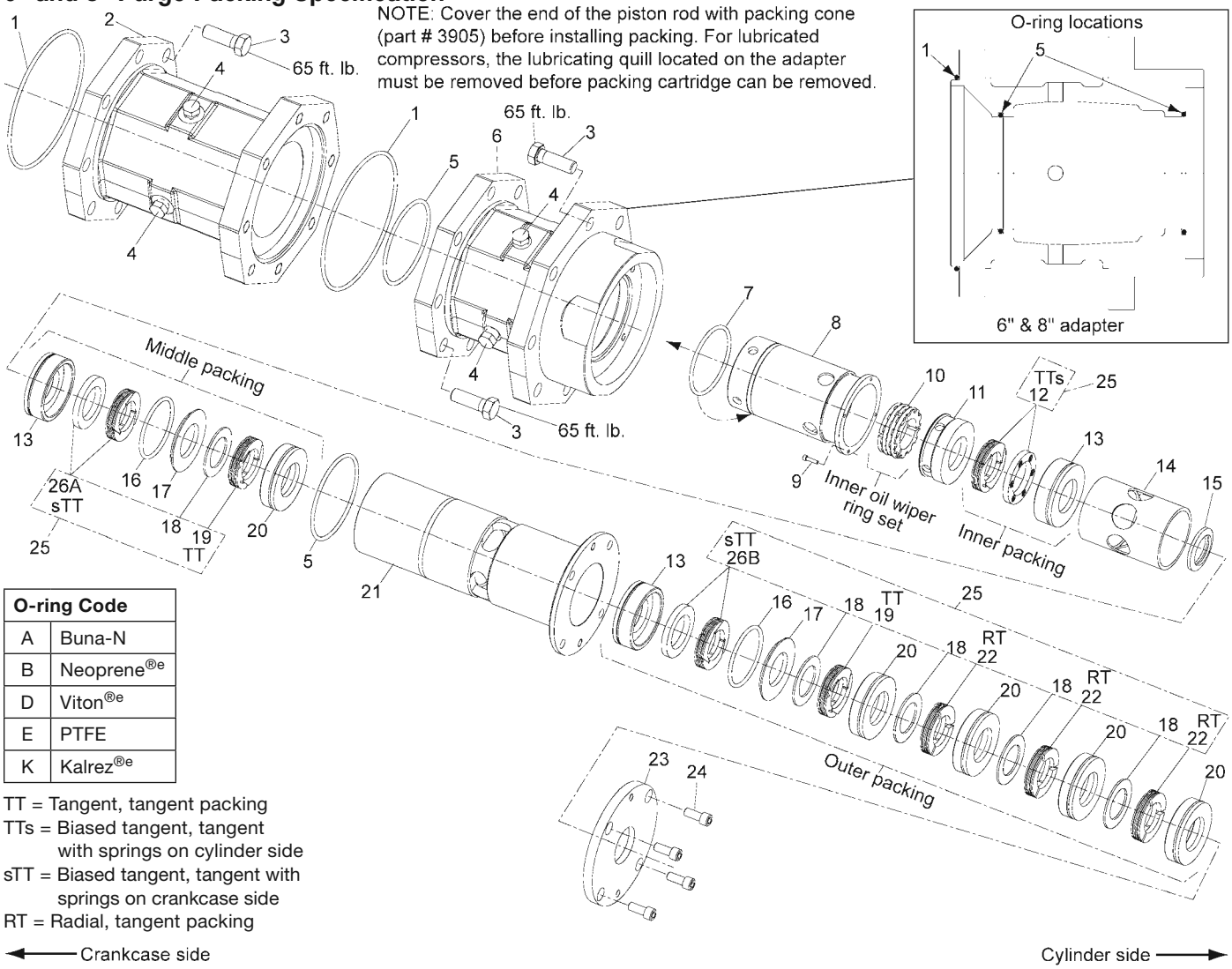
Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	2
6	3529-1	Adapter (6")	1
	3673-1	Adapter (8")	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-050NC150A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	3817	Packing cup	5

Ref No.	Part No.	Description	Qty.
17	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
18	3811	Back-up ring	4
19	4272	Packing spacer	2
20	2-228_ [a, d]	O-ring	2
21	4777	Packing cartridge body	1
22	3810[b]	Segmented packing ring (radial, tangent - pair)	3
23	4267	Packing cartridge cap	1
24	7002-031NC175A[f]	Socket head bolt	4
25	4273-1X1	Packing set	1
26A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
26B			

[a]See detail for O-ring location
[b]Direction of packing is important. See packing assembly page for details.
[c]Direction of oil wiper ring set is important. See packing assembly page for details.
[d]For O-ring material codes, see O-ring chart.
[e]Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

Appendix D—Packing Assembly Details for THG600 Series (T-Style)

6" and 8" Purge Packing Specification



O-ring Code	
A	Buna-N
B	Neoprene®[e]
D	Viton®[e]
E	PTFE
K	Kalrez®[e]

TT = Tangent, tangent packing
TTs = Biased tangent, tangent with springs on cylinder side
sTT = Biased tangent, tangent with springs on crankcase side
RT = Radial, tangent packing

Packing Assembly Bill of Materials for 6" and 8" Purge

Ref No.	Part No.	Description	Qty.
1	2-253_ [a, d]	O-ring	2
2	4772	Distance piece	1
3	7001-050NC150A	Hex head bolt (1/2" - 13 x 1-1/2")	24
4	3442	Pipe plug (1/4")	Varies
5	2-236_ [a, d]	O-ring	2
6	3529-1	Adapter (6")	1
	3673-1	Adapter (8")	1
7	2-231_ [a, d]	O-ring	1
8	4778	Packing cartridge adapter	1
9	7002-050NC150A[f]	Socket head bolt	4
10	3816[c]	Oil wiper ring set (two per set)	1
11	4270	Oil wiper ring cup	1
12	4273-1	Biased segmented packing set (tangent, tangent - includes 1 TT pair, 1 iron backup rings, and 6 springs)	1
13	4271	Purge packing cup	3
14	4779	Cup spacer	1
15	1732	Oil deflector ring	1
16	2-228_ [a, d]	O-ring	2

Ref No.	Part No.	Description	Qty.
17	4272	Packing spacer	2
18	3811	Back-up ring	4
19	3814[b]	Segmented packing ring (tangent, tangent - pair)	2
20	3817	Packing cup	5
21	4777	Packing cartridge body	1
22	3810[b]	Segmented packing ring (radial, tangent - pair)	3
23	4267	Packing cartridge cap	1
24	7002-031NC175A[f]	Socket head bolt	4
25	4273-1X1	Packing set	1
26A	4273	Biased segmented packing set (tangent, tangent - includes 2 TT pairs, 2 iron backup rings, and 12 springs)	1
26B			

[a] See detail for O-ring location
[b] Direction of packing is important. See packing assembly page for details.
[c] Direction of oil wiper ring set is important. See packing assembly page for details.
[d] For O-ring material codes, see O-ring chart.
[e] Registered trademarks of the DuPont company.
[f] Apply a small amount of loctite #272 to the circumference of the threads.

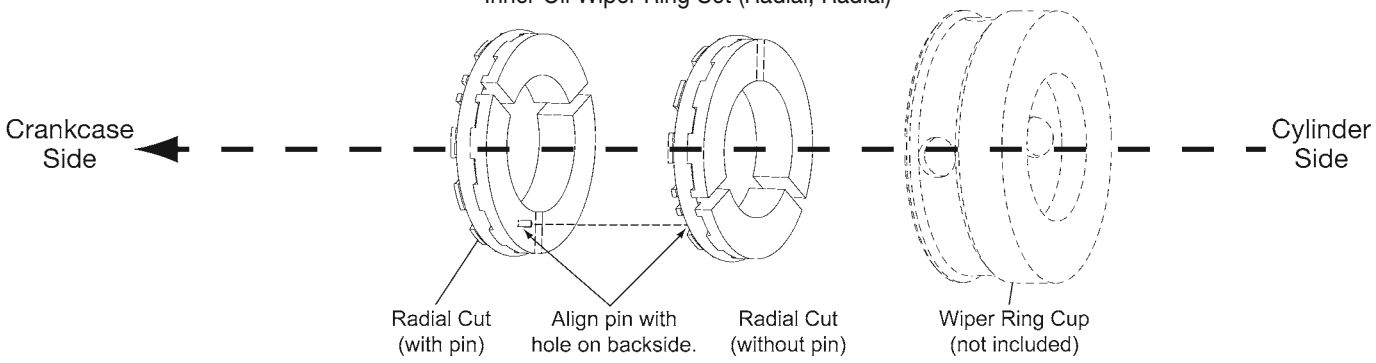
Appendix D—Packing Assembly Details for THG600 Series (T-Style)

Inner Oil Wiper Ring Set

Pad or Purge Specification

Part number 3816

Inner Oil Wiper Ring Set (Radial, Radial)

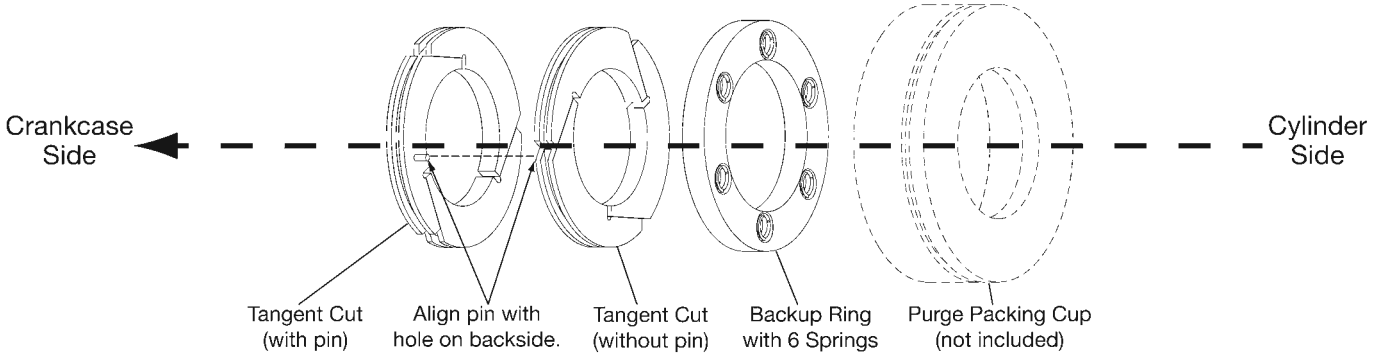


Inner Packing Details

Pad or Purge Specification

Part number 4273

Biased Segmented Packing Set (Tangent, Tangent with springs toward cylinder—TTs)



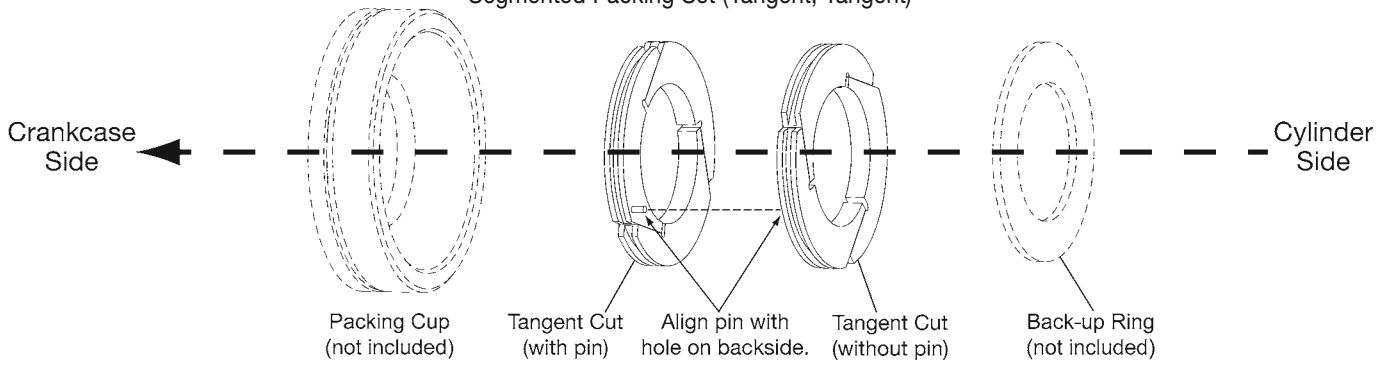
Appendix D—Packing Assembly Details for THG600 Series (T-Style)

Middle Packing Details

1. Pad Specification

Part number 3814

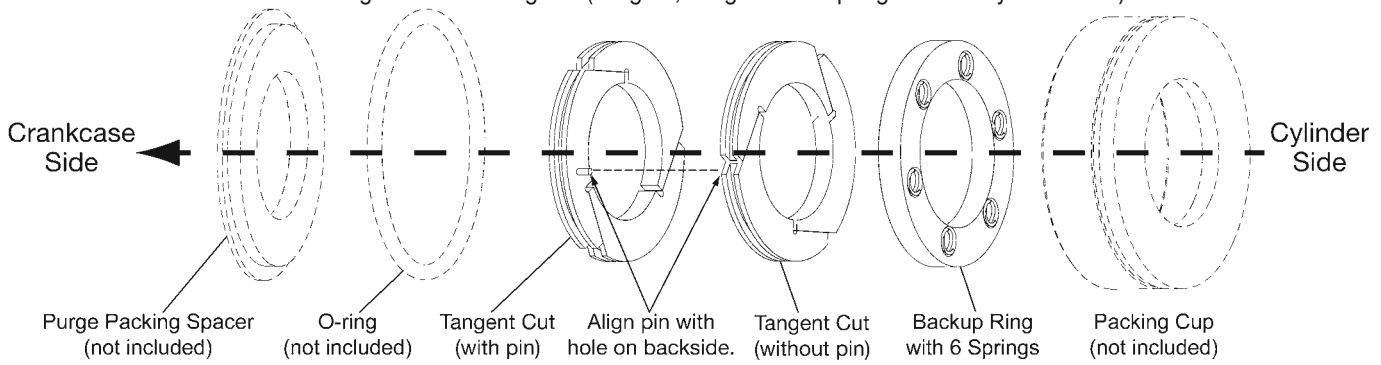
Segmented Packing Set (Tangent, Tangent)



2. Pad Specification

Part number 4273

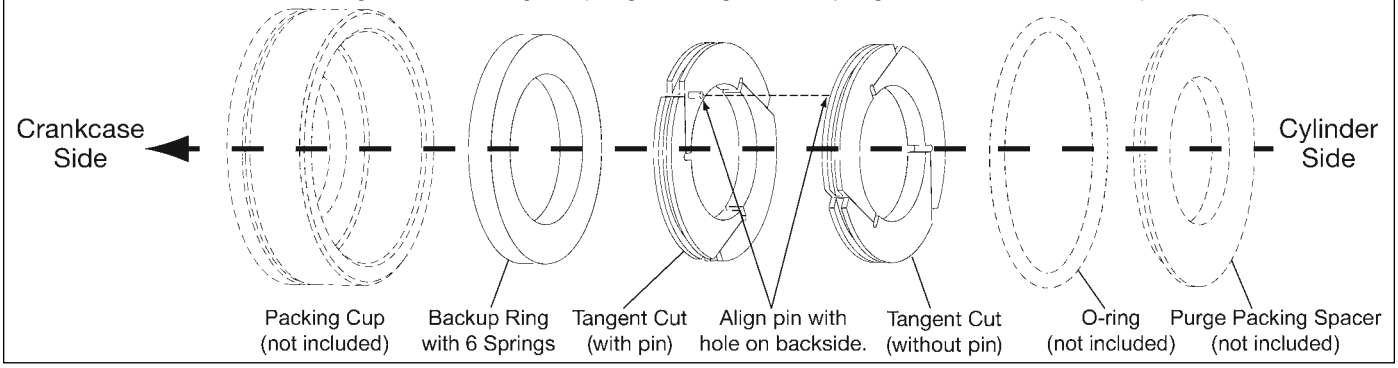
Biased Segmented Packing Set (Tangent, Tangent with springs toward cylinder—TTs)



3. Purge Specification

Part number 4273

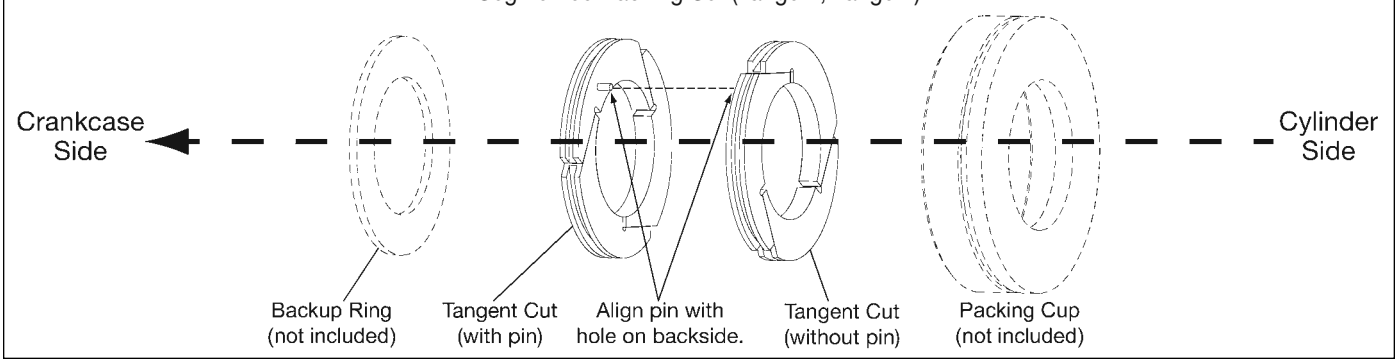
Biased Segmented Packing Set (Tangent, Tangent with springs toward crankcase—TTs)



4. Purge Specification

Part number 3814

Segmented Packing Set (Tangent, Tangent)

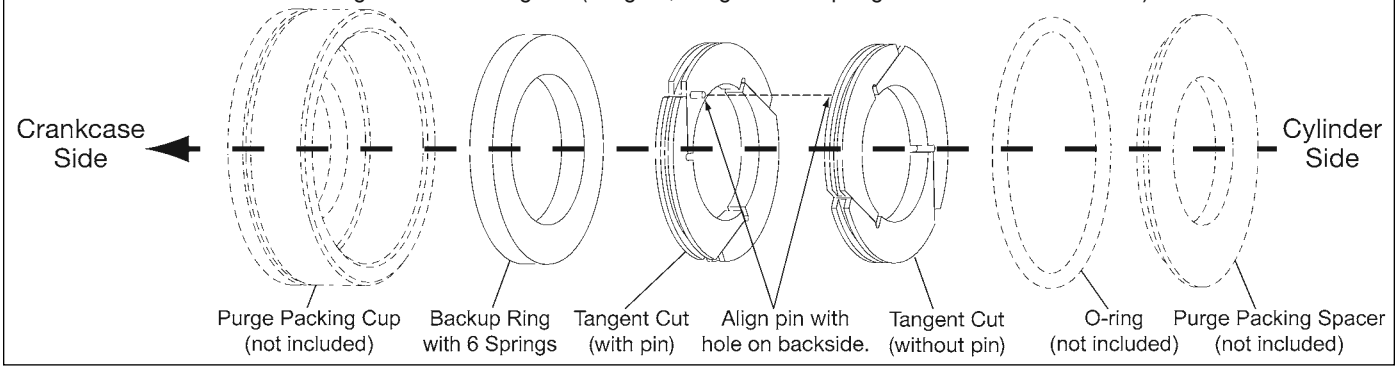


Appendix D—Packing Assembly Details for THG600 Series (T-Style)

Outer Packing Details

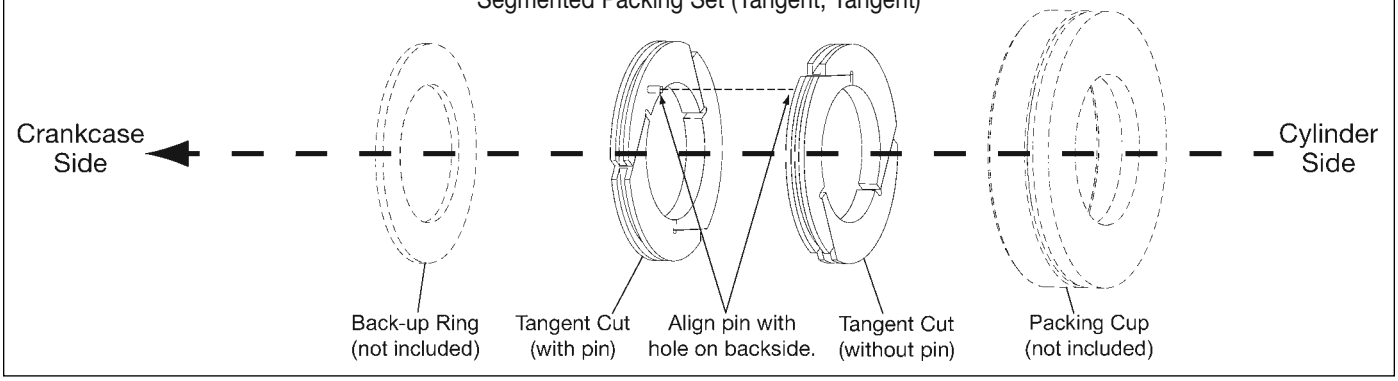
1. Purge Specification — Part number 4273

Biased Segmented Packing Set (Tangent, Tangent with springs toward crankcase—sTT)



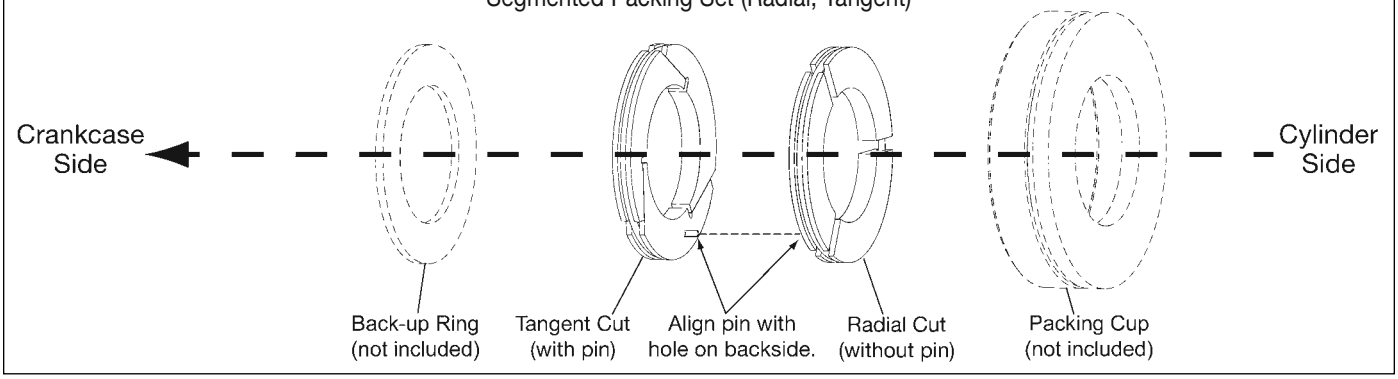
2. Pad Specification — Part number 3814

Segmented Packing Set (Tangent, Tangent)

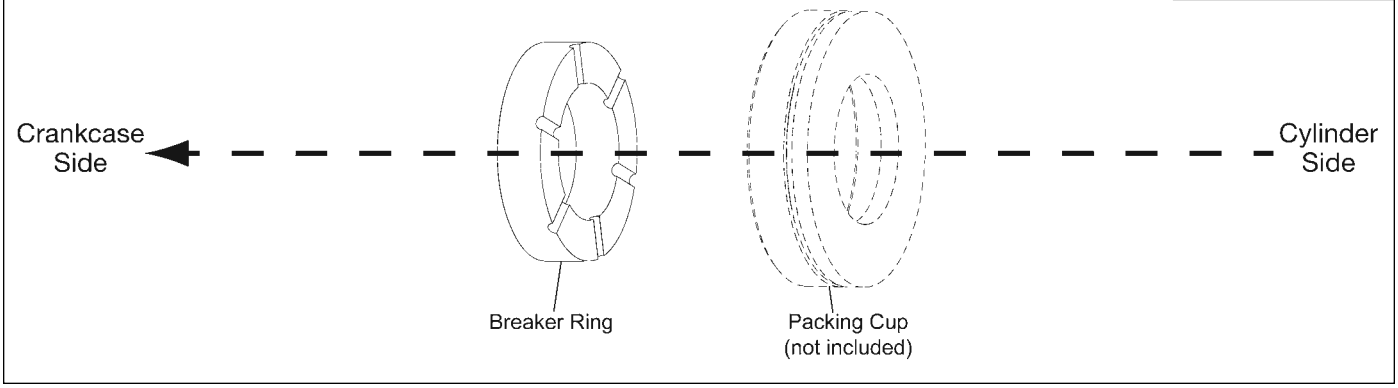


3. Pad Specification — Part number 3810

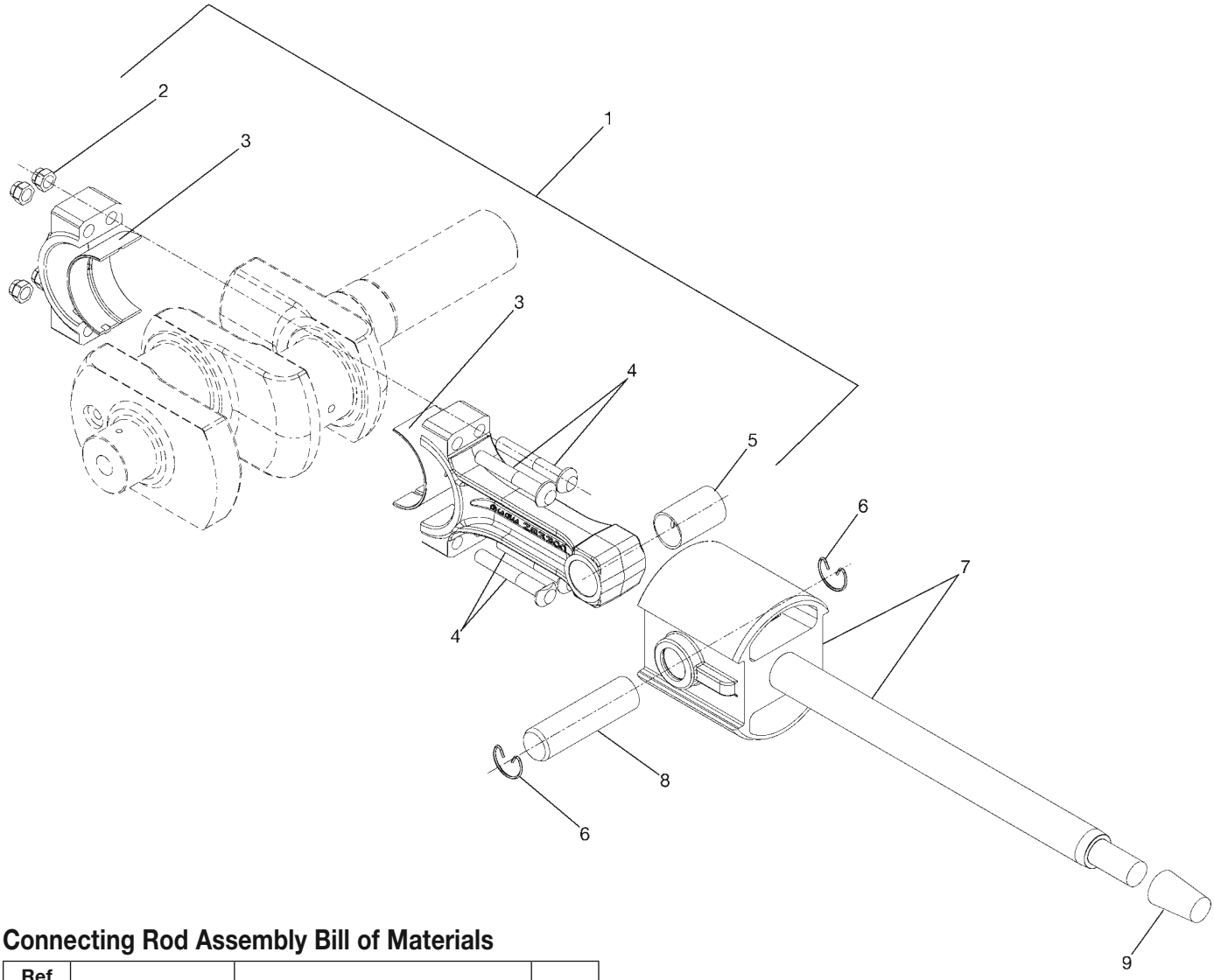
Segmented Packing Set (Radial, Tangent)



4. Solid Pressure Breaker Ring (applies to 2.75", 3.25", 4", and 5" cylinder sizes only) — Part number 3815



Appendix D—Connecting Rod Assembly Details for HG600/THG600 Series

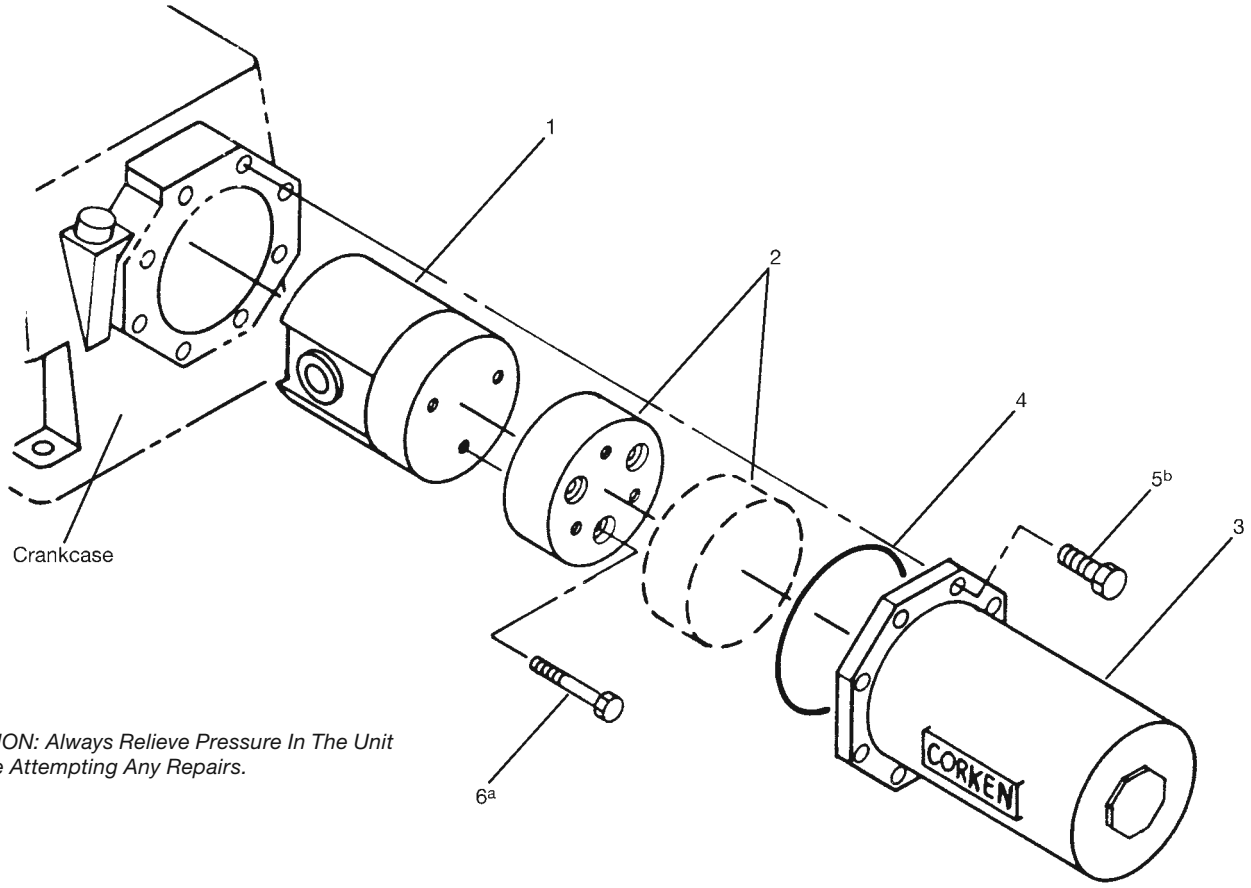


Connecting Rod Assembly Bill of Materials

Ref No.	Part No.	Description	Qty.
1.	3536-X	Connecting rod assembly	1
2.	1727[b]	Connecting rod nut	4
3.	3542	Connecting rod bearing (pair)	1
4.	1726	Connecting rod bolt	4
5.	3541[a]	Wrist pin bushing	1
6.	3590	Wrist pin retainer ring	2
7.	3544-X1	Crosshead assembly	1
8.	3540	Wrist pin	1
9.	3905	Packing cone	1

[a]Must be rebored & honed after replacing (1.1256"/1.1252" diameter).
[b]Torque connecting rod nuts to 40 ft. lb.

Appendix D—Single Cylinder Assembly Details for HG600/THG600 Series



CAUTION: Always Relieve Pressure In The Unit Before Attempting Any Repairs.

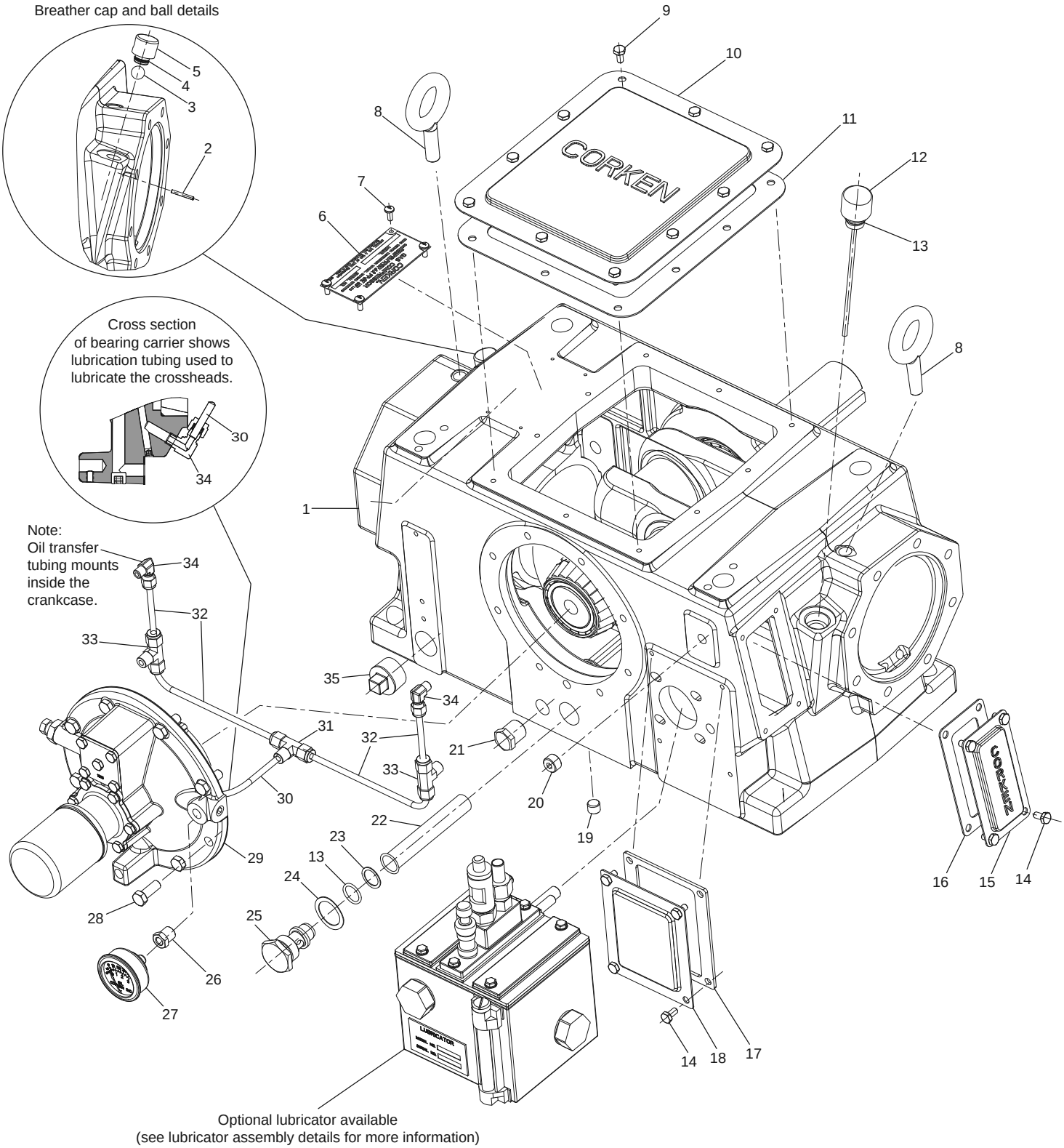
Ref. No.	Part Number	Description	Cylinder Diameter							
			2.75"	3.25"	4"	5"	6"	6"	8"	8"
			Piston Material							
			Steel	Steel	Steel		Aluminum	Iron	Aluminum	Iron
			Quantity per Compressor							
1.	3544-X2	Crosshead assembly	1	1	1	1	1	1	1	1
2.	3864	Balance weight	–	–	1	1	–	1	1	3
3.	3861	Crosshead cap	1	1	1	1	1	1	1	1
4.	2-253_[c]	O-ring	1	1	1	1	1	1	1	1
5.	7001-050NC250A[b]	1/2 - 13X1-1/2" hex head bolt	8	8	8	8	8	8	8	8
6.	7001-043NC150A[a]	716 - 14 x 2-1/2" hex head bolt	–	–	3	3	–	3	3	9
7.	3812	Loctite 620 tube	1	1	1	1	1	1	1	1

O-ring Code	
A	Buna-N
B	Neoprene®[d]
D	Viton®[d]
E	PTFE
K	Kalrez®[d]

[a]Use Loctite retaining compound 620 and torque bolts to 40 ft. lb. when assembling.
[b]Torque to 65 ft. lb.
[c]_ denotes O-ring code. See O-ring chart for details.
[d]Registered trademarks of the DuPont company.

Note: 3861-X1 single cylinder balance kit includes: (1) 3544-X2, (3) 3864, (1) 3861, (1) 2-253A, (9) 7001-043NC250A, (1) 3812

Appendix D—Crankcase Assembly Details for HG600/THG600 Series



CAUTION: Always Relieve Pressure In The Unit Before Attempting Any Repairs.

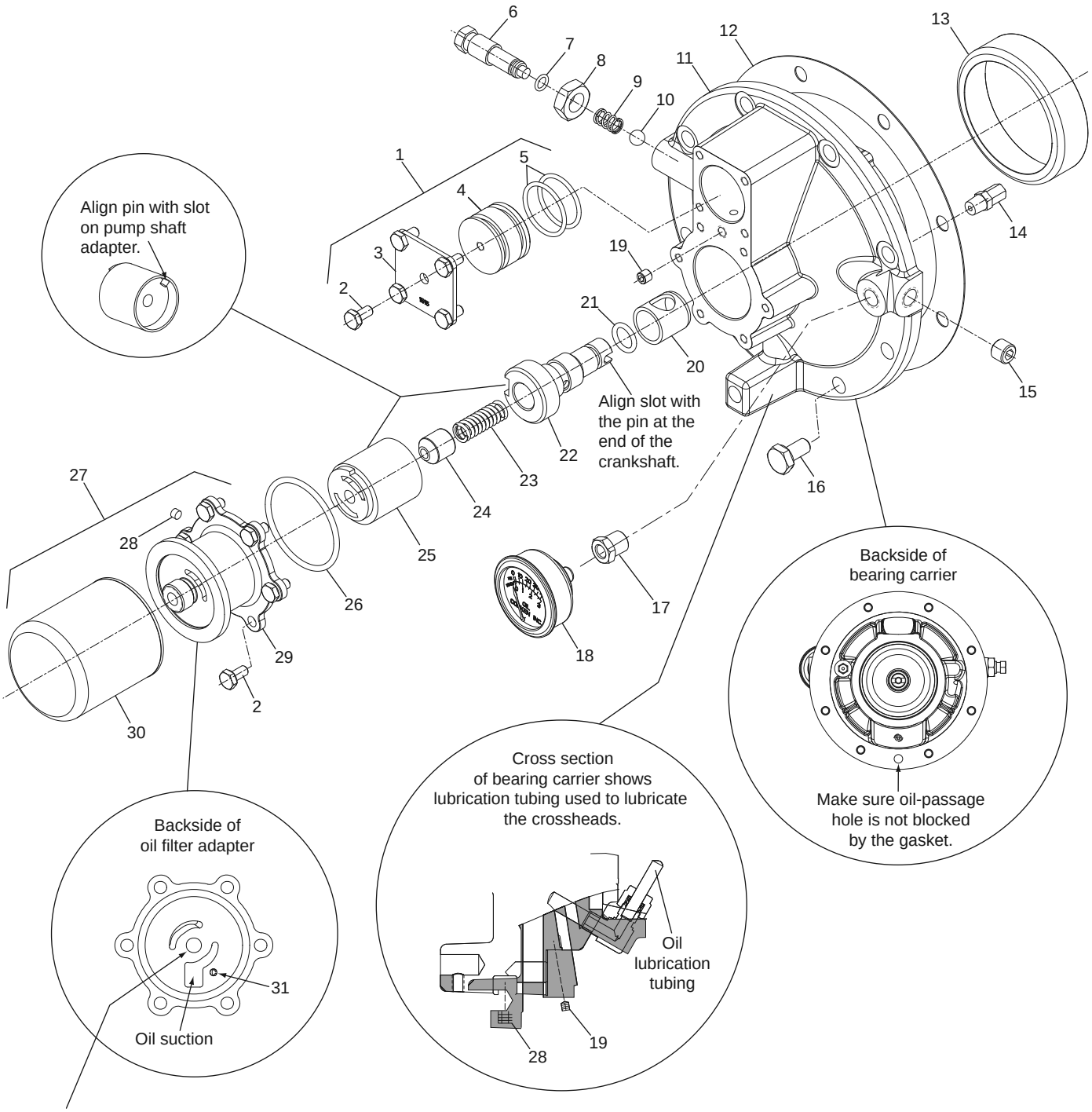
Appendix D—Crankcase Assembly Details for HG600/THG600 Series

Crankcase Assembly Bill of Materials

Ref No.	Part No.	Description	Qty.
1.	3538	Crankcase	1
	3538-X1	Crankcase assembly - HG600M (without external lubricator)	1
	3538-X2	Crankcase assembly - HG600L (with external lubricator)	1
2.	1483	Lock pin	1
3.	2796	Breather ball	1
4.	2-111A	O-ring	1
5.	1279-X	Breather cap assembly (including O-ring)	1
	1279	Breather cap	1
6.	3606	Nameplate	1
7.	7003-004DR019B	Drive screw	4
8.	3567	Eyebolt	2
9.	7001-025NC050A	Hex head bolt (1/4" - 20 x 1/2")	10
10.	3581	Crankcase inspection plate	1
11.	3582	Inspection plate gasket	1
12.	3583-X1	Oil bayonet assembly with O-ring	1
13.	2-116A	O-ring	2
14.	7003-025NC037E	Phillips head (1/4" x 3/8")	8
15.	3946	Lubricator access cover	1
16.	3947	Lubricator access cover gasket	1
17.	3874	Access cover gasket	1
18.	3875	Access cover	1

Ref No.	Part No.	Description	Qty.
19.	3289	Pipe plug (1/4 NPT flush seal)	1
20.	3823	Pipe plug (3/8" NPT flush seal)	2
21.	3443	Pipe plug (1/2" NPT steel)	1
22.	1275	Oil filter screen	1
23.	1276	Filter screen washer	1
24.	1281	Filter screen screw gasket	1
25.	1280	Filter screw	1
26.	1044	Bushing (1/4" NPT x 1/8" NPT)	1
27.	1302	Oil pressure gauge	1
28.	7001-037NC100A	Hex head bolt (3/8 - 16 x 1")	8
29.	3220-2X1	Bearing carrier assembly	1
30.	R3387	1/4" plastic tubing (specify length)	–
31.	3652	Union tee (1/4" T brass)	1
32.	R2886	1/4" copper tube (specify length)	–
33.	1435	Tee (1/8" P x 1/4" T x 1/4" T brass)	2
34.	1399	Male elbow (1/8" P x 1/4" T brass)	3
35.	3643	Pipe plug (1" NPT steel)	1

Appendix D—Bearing Carrier Assembly Details for HG600/THG600 Series



Note:
When using an external oil cooler, this threaded hole must be plugged using the 1/8″ NPT threaded pipe plug (part number 2590) included with the 3870-X1 external oil cooler assembly. Otherwise, the oil will not flow through the oil cooler. See external oil cooler assembly details near the end of this manual.

CAUTION: Always Relieve Pressure In The Unit Before Attempting Any Repairs.

Appendix D—Bearing Carrier Assembly Details for HG600/THG600 Series

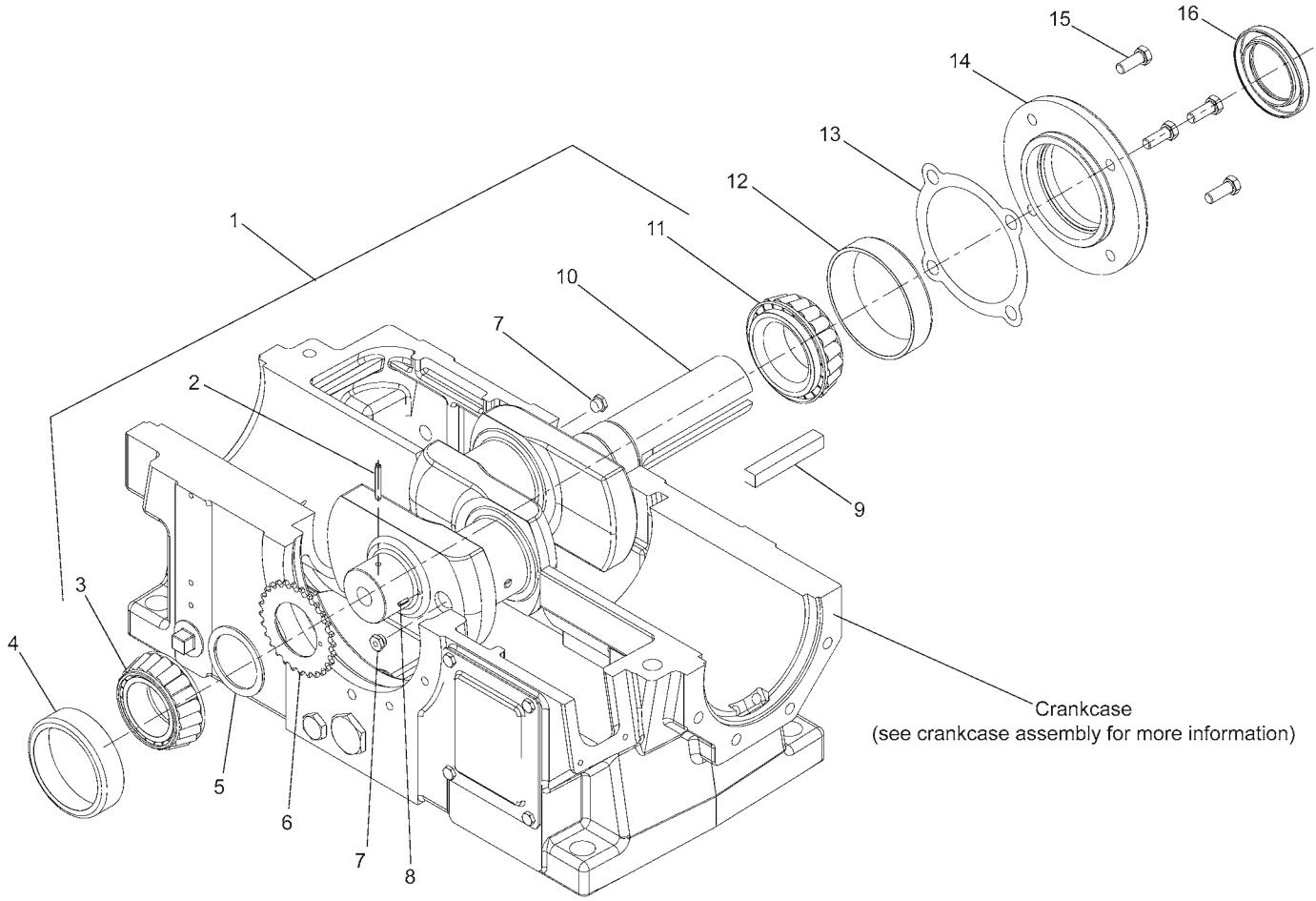
Crankcase Assembly Bill of Materials

Ref No.	Part No.	Description	Qty.
1.	1515-X	Closure cap assembly	1
2.	7001-025NC050A	Hex head bolt (1/4" - 20 x 1/2")	11
3.	1515	Closure cap	1
4.	1516	Closure body	1
5.	2-218A	O-ring	2
6.	1290	Relief valve adjusting screw	1
7.	2-011A	O-ring	1
8.	1291	Adjusting screw locknut	1
9.	1292	Relief valve spring	1
10.	1293	Relief valve ball	1
11.	3220-2	Bearing carrier	1
	3220-2X	Bearing carrier assembly	1
12.	2131	Bearing carrier gasket	1
13.	1736	Bearing cup	1
14.	2961-X	Air release valve assembly	1
16.	7001-037NC100A	Hex head bolt (3/8" - 16 x 1")	8
17.	1044	Bushing (1/8" x 1/4" NPT)	1
18.	1302	Oil pressure gauge	1

Ref No.	Part No.	Description	Qty.
19.	1629	Pipe plug (1/16" NPT flush seal)	2
20.	2805	Pump shaft bushing	1
	2805-X	Pump shaft bushing with tag	1
21.	2-112A	O-ring	1
22.	3219	Pump shaft adapter	1
23.	2852	Oil pump spring	1
24.	2851	Spring guide	1
25.	2849-1X[a]	Oil pump assembly	1
26.	2-228A	O-ring	1
27.	4222-X[a]	Oil filter adapter assembly (includes pin)	1
28.	3289	Pipe plug (1/4" NPT fl. Seal)	2
29.	4222	Oil filter adapter	1
30.	4225	Filter	1
31.	2798	Oil filter adapter pin (included with 4222-X	1

[a]*Caution: To avoid damage during assembly, refer to Important Instructions IE400.*

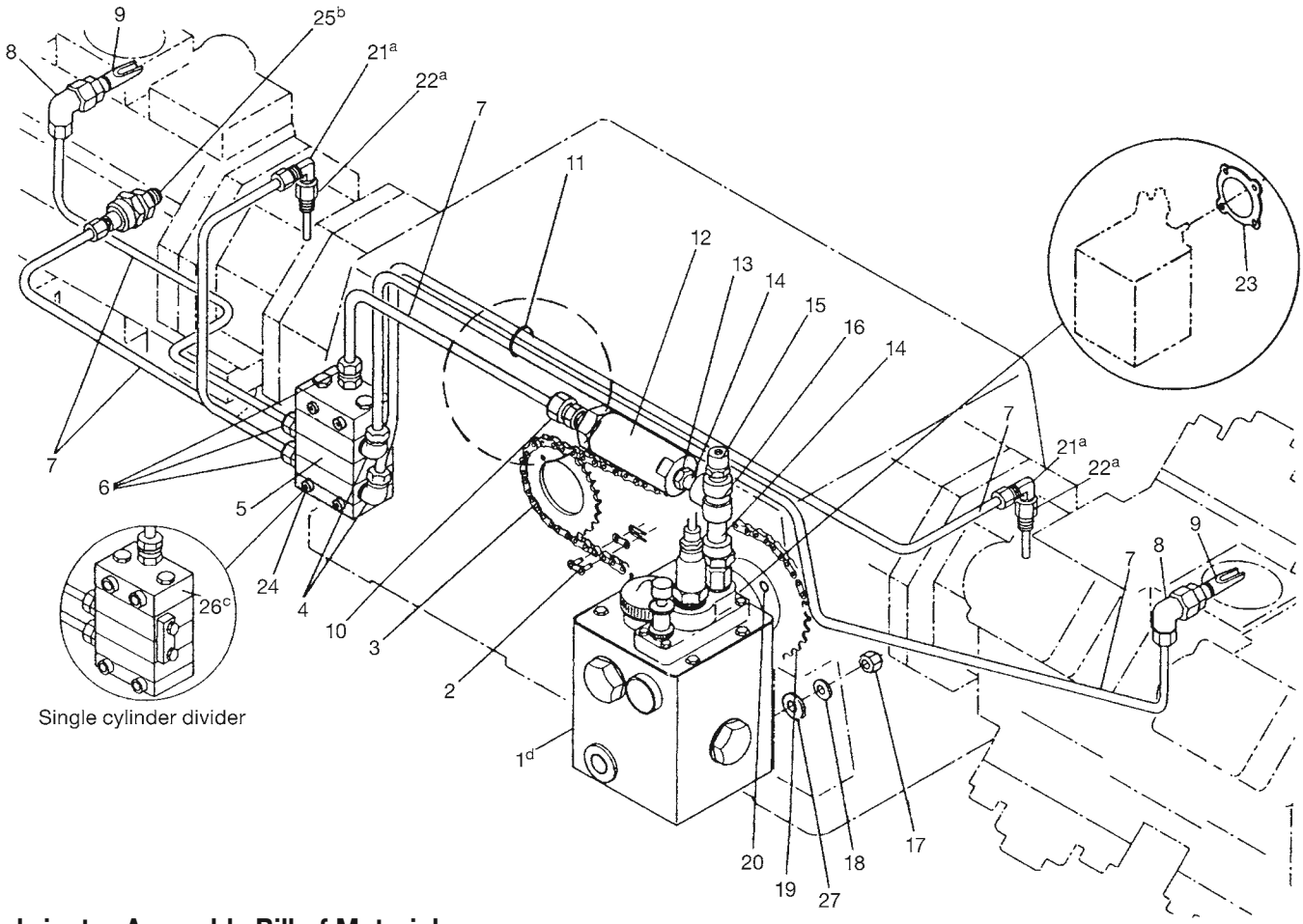
Appendix D—Crankshaft Assembly Details for HG600/THG600 Series



Crankshaft Assembly Bill of Materials

Ref No.	Part No.	Description	Qty.
1.	3537-X1	Crankshaft assembly	1
2.	2135	Rotor drive pin	1
3.	1737	Bearing cone	1
4.	1736	Bearing cup	1
5.	3638	Spacer	1
6.	3635	Drive sprocket	1
7.	1287	Crankshaft orifice	2
8.	2933	Link pin	1
9.	3503	Flywheel key	1
10.	3537	Crankshaft	1
11.	3580	Bearing cone	1
12.	3579	Bearing cup	1
13.	3589	Bearing adjustment shim (0.005")	As req.
	3589-1	Bearing adjustment shim (0.007")	As req.
	3589-2	Bearing adjustment shim (0.020")	As req.
14.	3539	Bearing cover	1
15.	7001-037NC100A	Hex head bolt (3/8" - 16 x 1")	4
16.	3526	Oil seal	1

Appendix D—Lubricator Assembly Details for HG600/THG600 Series



Lubricator Assembly Bill of Materials

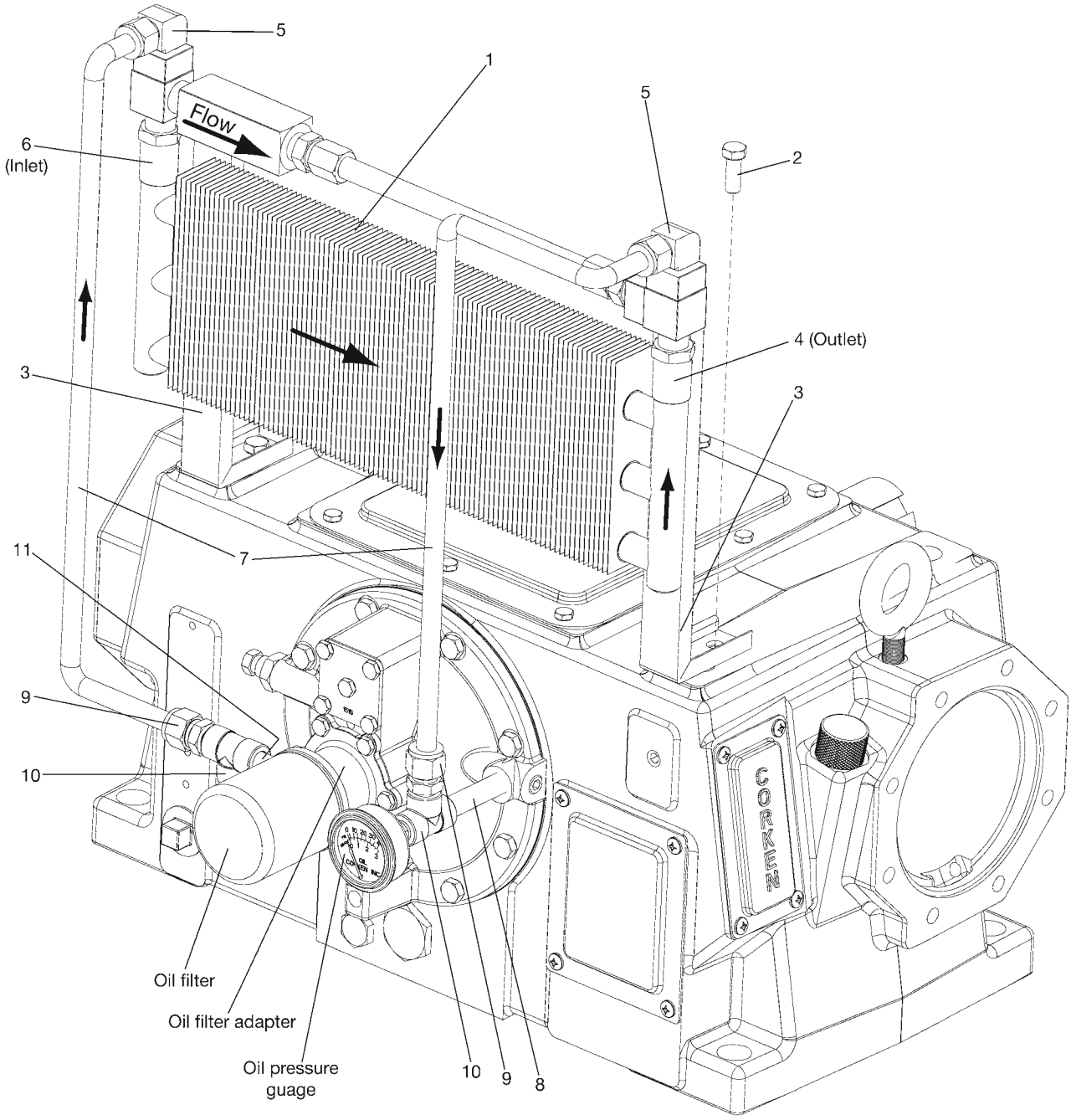
Ref No.	Part No.	Description	Qty.
1.	3639-X[d]	Lubricator assembly	1
2.	3634	Spring clip connecting link	1
3.	3633	Chain	1
4.	1399-1	Elbow (1/8" P x 1/4" T steel)	2
5.	3658-X	Divider valve assembly (two cylinders)	1
6.	1434-1	Straight connection (1/8" P x 1/4" T steel)	3
7.	R2920	1/4" steel tubing (specify length)	As req.
8.	3651-1	Female elbow (1/4" P x 1/4" T steel)	2
9.	3656	Quill-check valve	2
10.	1670-1	Straight connection (1/4" P x 1/4" T steel)	1
11.	3389	Cable tie	As req.
12.	3655	Filter	1
13.	1044	Bushing (1/4" NPT x 1/8" NPT steel)	1
14.	3607	Nipple (1/8" NPT x 1-1/2", schedule 80)	2
15.	3654	Blow out disc	1

Ref No.	Part No.	Description	Qty.
16.	2609	Tee (1/8" NPT steel)	1
17.	7101-037NC01A	Hex nut (3/8" - 16)	4
18.	7206-037A	Lockwasher (3/8")	4
19.	3636	Driven sprocket	1
20.	7006-025NC100A	Set screw (1/4" - 20 x 1" socket head)	1
21.	1669-1[a]	Elbow (1/4" P x 1/4" T steel)	2
22.	1449-1X[a]	Quill assembly	2
23.	2010	Flange gasket	1
24.	7002-010NC200A	Socket head (10-24 x 2")	4
25.	2709[b]	Back check valve	2
26.	3668-X[c]	Divider valve assembly (single cylinder)	1
27.	7201-037A	Washer (3/8")	4

[a]Except 2-3/4" cylinder
[b]2-3/4" cylinder only
[c]Single cylinder units only
[d]Optional

CAUTION: Always relieve pressure in the unit before attempting any repairs.

Appendix D—3870-X1 External Oil Cooler Assembly Details for HG600/THG600 Series



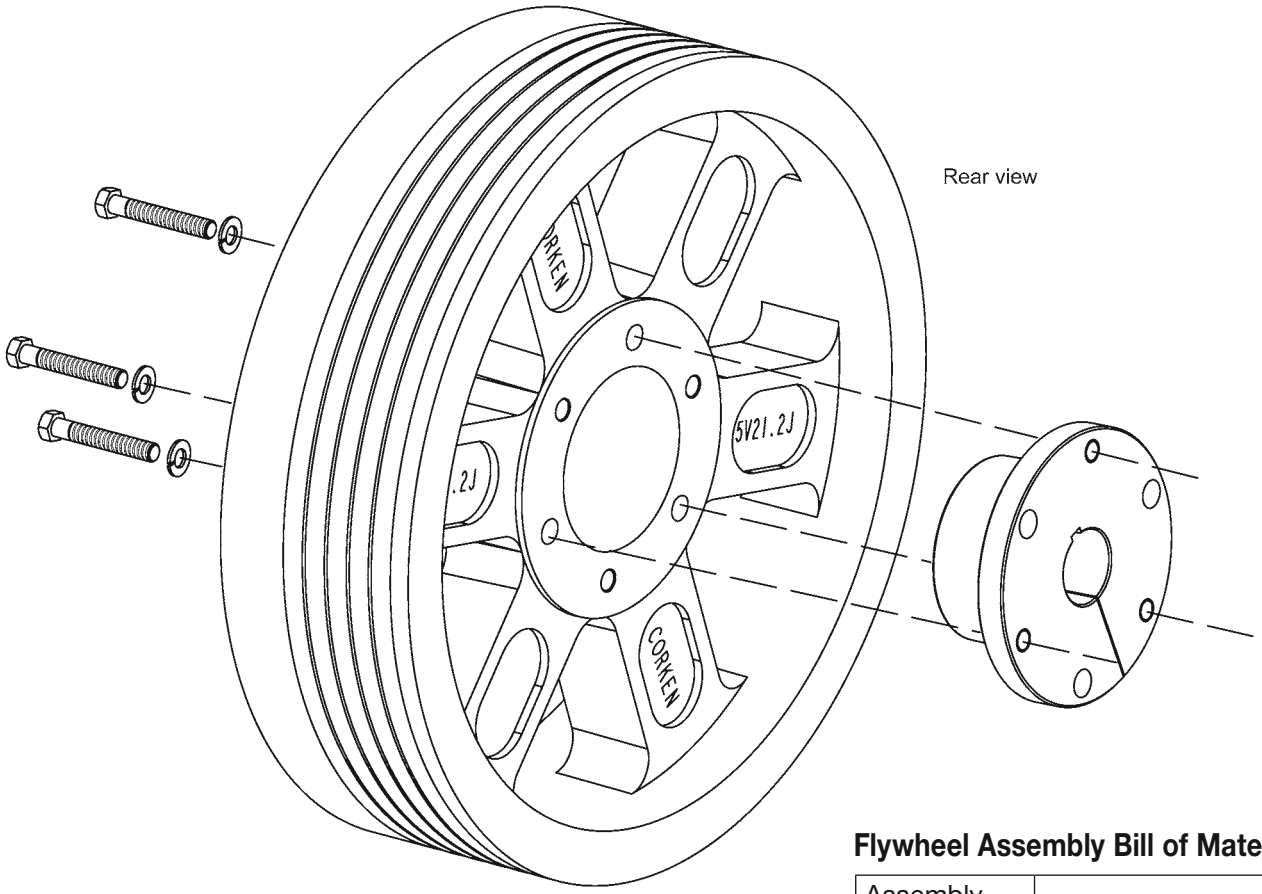
3870-X1 External Oil Cooler Assembly Bill of Materials

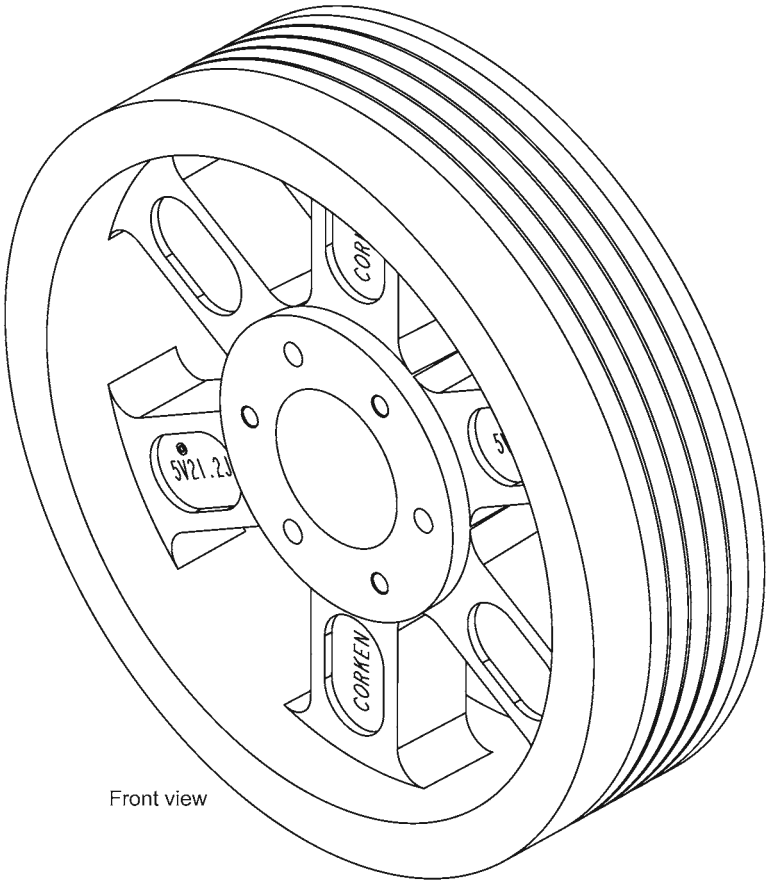
Ref No.	Part No.	Description	Qty.
1.	3870	External oil cooler	1
2.	7001-037NC075A	Hex HD 3/8-16 X 3/4", GR 5	4
3.	3688	External oil cooler bracket	2
4.	2817	Decal (out)	1
5.	2322-1	Tube elbow - 1/2T X 1/2P steel	2
6.	2814	Decal (in)	1
7.	R 3433	Tube - 1/2 X .035 SAE J525	Specify

Ref No.	Part No.	Description	Qty.
8.	2021	Nipple - 1/4 X 2-1/2", SCH 80	1
9.	3912-1	Tube str conn - 1/2T X 1/4P ST	2
10.	2063	Tee - 1/4" NPT 2000 LB A105	2
11.	2228	Nipple - 1/4" x 1-1/4", SCH 80	1
Not shown	2590[a]	Pipe plug - 1/8 NPT flush	1

[a] *Must be installed in the center hole on the backside of the oil filter adapter. See reference #29 on page 80 for details on the backside of the oil filter adapter (part #4222).*

Appendix D—Flywheel Assembly Details for HG600/THG600 Series





Flywheel Assembly Bill of Materials

Assembly Number	Assembly Name
3852-X	Flywheel assembly (flywheel, hub, and three bolts and washers)
3852	Flywheel: 21.2" O.D., 5 groove
H J-2.125	Hub with three bolts and lockwashers

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