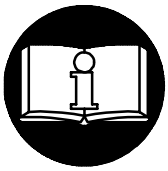
03541786

Form P7254
Edition 2
August, 1997

MAINTENANCE SECTION COVERING D1610–A147 and D1411–A147 GEARED OFFSET HEADS for SERIES D TORQUE CONTROL WRENCHES

WHEN THIS MODULE IS USED WITH AN AIR POWERED TOOL



⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

PLACING TOOL IN SERVICE

- Always operate, inspect and maintain this tool in accordance with all regulations (local, state, federal and country), that may apply to hand held/hand operated pneumatic tools.
- For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 3/8" (10 mm) inside diameter air supply hose.
- Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.
- Do not use damaged, frayed or deteriorated air hoses and fittings.
- Be sure all hoses and fittings are the correct size and are tightly secured.
- Always use clean, dry air at 90 psig maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.
- Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Do not remove any labels. Replace any damaged label.

USING THE TOOL

- Always wear eye protection when operating or performing maintenance on this tool.
- Always wear hearing protection when operating this tool.
- Keep hands, loose clothing and long hair away from rotating end of tool.
- Note the position of the reversing lever before operating the tool so as to be aware of the direction of rotation when operating the throttle.
- Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.
- Keep body stance balanced and firm. Do not overreach when operating this tool. High reaction torques can occur at or below the recommended air pressure.
- Tool shaft may continue to rotate briefly after throttle is released.
- Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.
- Use accessories recommended by Ingersoll–Rand.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- This tool is not designed for working in explosive atmospheres.
- This tool is not insulated against electric shock.

(Continued on page 8-2)

NOTICE

The use of other than genuine Ingersoll–Rand replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.

Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll–Rand Authorized Servicenter.

Refer All Communications to the Nearest Ingersoll–Rand Office or Distributor.

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

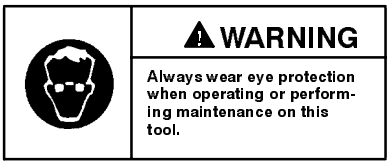
⚠ WARNING

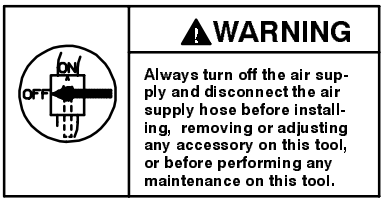
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

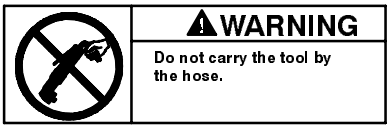
USING THE TOOL *(Continued)*

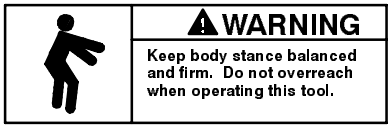
- Do not remove the Inlet Plug without first disconnecting the live air supply.
- Whenever the Angle Head is installed or repositioned, the Throttle Lever must be positioned so that reaction torque will not tend to retain the throttle in the "ON" position.
- When installing or removing the output device on a tool, ALWAYS hold the tool by the hex on the Gear Case while tightening the Coupling Nut. NEVER grasp the composite tool body or handle in vise jaws to restrain the tightening torque of the Coupling Nut. Such practice will result in damage to the tool.
- Do not use power units and gear trains that exceed the capability of the output device.
- The Tube Nut Attachment has an opening on the front side for construction and application purposes. DO NOT, under any circumstance place your fingers in this opening.
- The Torque Reaction Bar must be positioned against a positive stop. Do not use the Bar as a dead handle and take all precautions to make certain the operator's hand cannot be pinched between the Bar and a solid object.
- When operated continuously for long periods of time, Series D Nutrunners may become hot at the spindle end of the tool. Take all precautions necessary to avoid skin contact with the hot surfaces. Prolonged contact may result in burns.
- All Series D Torque Control Wrenches and Nutrunners with reverse capability have rotational arrows molded into the housing in the area of the reversing mechanism. When the direction switching device is positioned nearest the molded circular arrow with an "F" in the center, spindle rotation will be forward or clockwise direction. When the direction switching device is positioned nearest the molded circular arrow with an "R" in the center, spindle rotation will be reverse or counterclockwise direction.

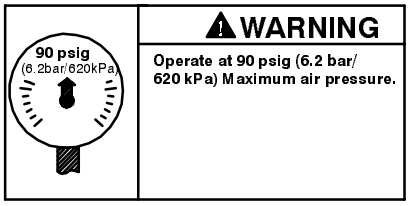
WARNING LABEL IDENTIFICATION

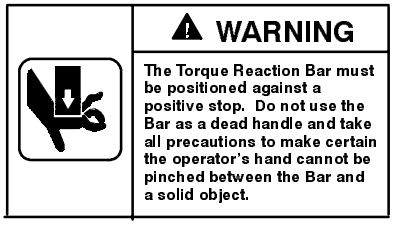






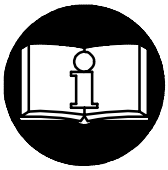






WHEN THIS MODULE IS USED WITH AN ELECTRIC POWERED TOOL

⚠ WARNING



IMPORTANT SAFETY INFORMATION ENCLOSED.
READ ALL THESE INSTRUCTIONS BEFORE PLACING TOOL IN SERVICE OR OPERATING THIS TOOL AND SAVE THESE INSTRUCTIONS.
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

Disconnect the Power Cord from the receptacle before performing any maintenance on this tool.

This symbol is to alert the user and service personnel to the presence of uninsulated dangerous voltage that will cause a risk of electric shock.

This symbol is to alert the user and service personnel to the presence of important operating instructions that must be read and understood to prevent personal injury, electrical shock or damage to the equipment.

WHEN USING ELECTRIC TOOLS, BASIC SAFETY PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK AND PERSONAL INJURY, INCLUDING THE FOLLOWING.

PLACING TOOL IN SERVICE

- **Use only with Series TMAD Controllers.**
- **Always operate, inspect and maintain this tool in accordance with all regulations (local, state, federal and country), that may apply to hand held/hand operated electric tools.**
- **Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Power tools can vibrate in use. Vibration, repetitive motions, or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.**
- **Guard Against Electric Shock.** Prevent body contact with earthed or grounded surfaces. For example; pipes, radiators, ranges, refrigerator enclosures.
- **Don't abuse Cord.** Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.
- **Keep work area clean.** Cluttered areas and benches invite injuries.
- **Consider work area environment.** Don't expose power tools and chargers to water. Keep work area well lighted. Do not use tool in explosive or flammable atmospheres.
- **Keep bystanders and children away.** Do not permit unauthorized personnel to operate this tool, or touch tool or cord.
- **Store idle tools.** When not in use, tools should be stored in a dry, high or locked up place, out of reach of children.
- **Don't force tool.** It will do the job better and more safely at the rate for which it was intended.
- **Use the right tool.** Do not force a small tool or attachment to do the job of a heavy-duty tool.
- **Do not use a tool for a purpose for which it is not intended.** Example: Do not use a screwdriver as a drill.
- **Dress properly.** Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and non-skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.
- **Secure work.** Use clamps or a vise to hold work. Operators often need both hands to perform job functions.
- **Don't overreach.** Keep proper footing, balance, and a firm grip on the tool at all times.
- **Maintain tools with care.** Keep tools clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility. Inspect extension cords periodically and replace if damaged. Keep handles dry, clean, and free from oil and grease.
- **Remove adjusting keys and wrenches.** Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.
- **Avoid unintentional starting.** Don't carry tool with finger on switch.

(Continued on page 8-4)

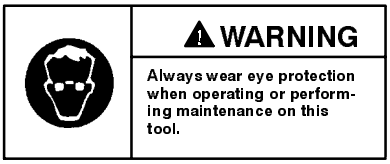
⚠ WARNING

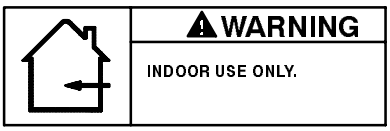
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

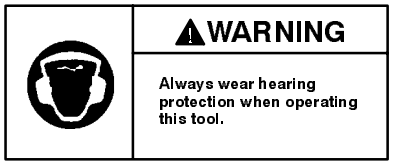
USING THE TOOL *(Continued)*

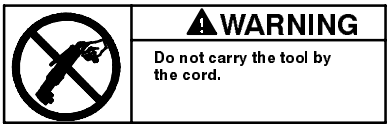
- **Do not drop or abuse the tool.**
- **Whenever a tool is not being used, position the Power Switch to the "OFF" position and unplug the power cord.**
- **Stay alert.** Watch what you are doing. Use common sense. Do not operate tool when you are tired.
- **Check damaged parts.** Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this operation manual.
- **Have defective switches replaced by an authorized service center.**
- **Do not use the tool if the switch does not turn it on and off.**
- **Whenever the Angle Head is installed or repositioned, the Throttle Lever must be positioned so that reaction torque will not tend to retain the throttle in the "ON" position.**
- **When installing or removing the output device on a tool, ALWAYS hold the tool by the hex on the Gear Case while tightening the Coupling Nut. NEVER grasp the composite tool body or handle in vise jaws to restrain the tightening torque of the Coupling Nut. Such practice will result in damage to the tool.**
- **Do not use power units and gear trains that exceed the capability of the output device.**
- **The Tube Nut Attachment has an opening on the front side for construction and application purposes. DO NOT, under any circumstance place your fingers in this opening.**
- **The Torque Reaction Bar must be positioned against a positive stop. Do not use the Bar as a dead handle and take all precautions to make certain the operator's hand cannot be pinched between the Bar and a solid object.**
- **When operated continuously for long periods of time, Series D Nutrunners may become hot at the spindle end of the tool. Take all precautions necessary to avoid skin contact with the hot surfaces. Prolonged contact may result in burns.**
- **All Series D Torque Control Wrenches and Nutrunners with reverse capability have rotational arrows molded into the housing in the area of the reversing mechanism. When the direction switching device is positioned nearest the molded circular arrow with an "F" in the center, spindle rotation will be forward or clockwise direction. When the direction switching device is positioned nearest the molded circular arrow with an "R" in the center, spindle rotation will be reverse or counterclockwise direction.**

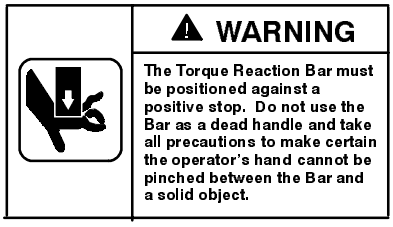
WARNING LABEL IDENTIFICATION

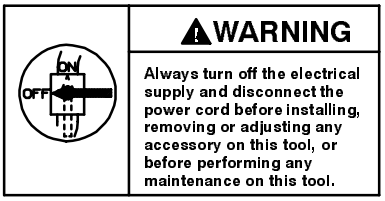


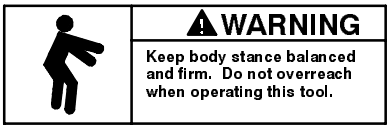












LUBRICATION

Ingersoll–Rand No. 28

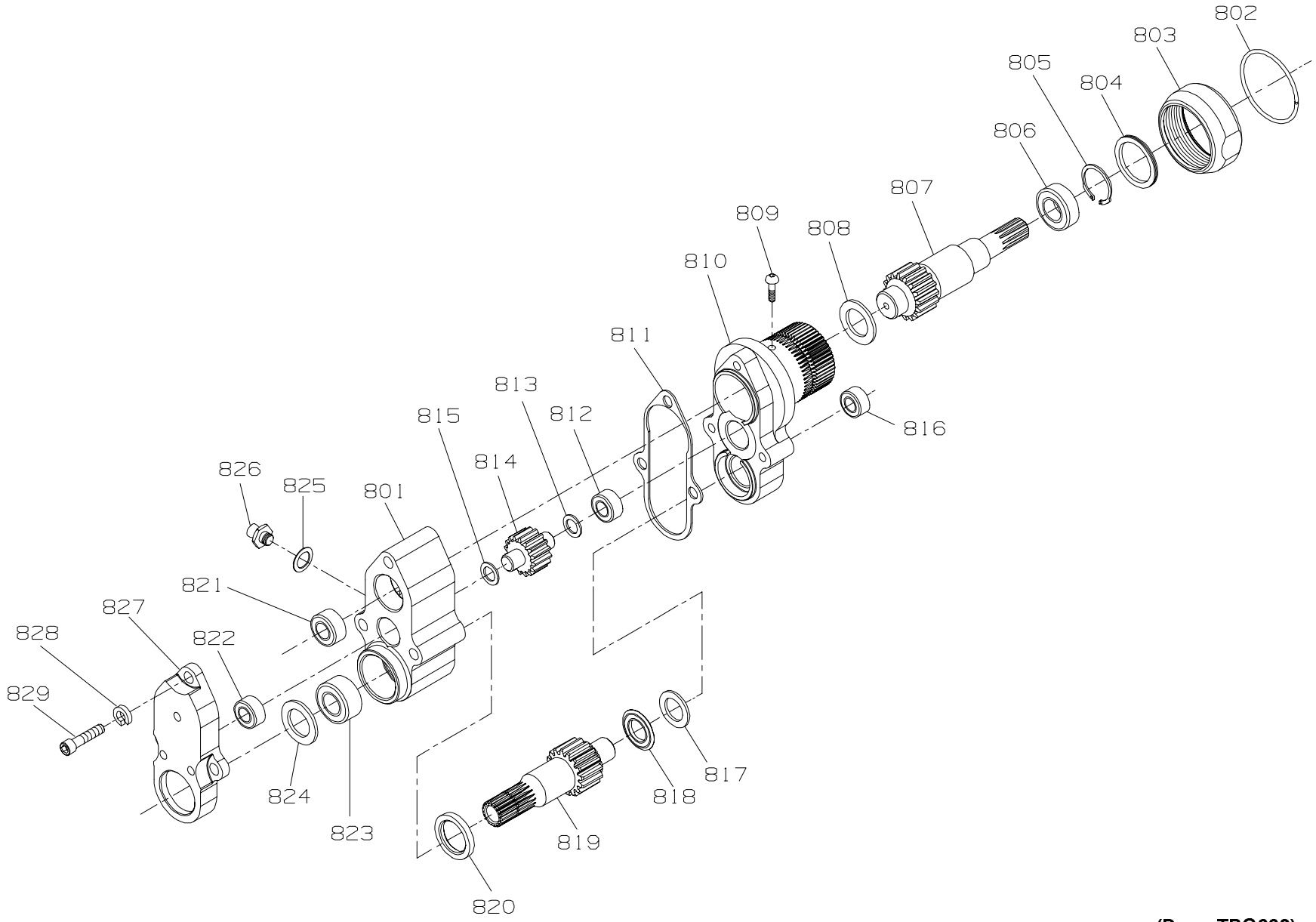
Whenever an Offset Head is disassembled for overhaul or replacement of parts, lubricate all parts lightly with Ingersoll–Rand No. 28 grease.

After each 40 hours of operation, inject 0.5 cc of Ingersoll–Rand No. 28 grease into the grease fitting.

⚠ WARNING

Do not grease excessively. Too much lubricant will result in overheating.
Grease leakage from the Spindle end is an indication of excessive lubrication.

D1610–A147 GEARED OFFSET HEAD



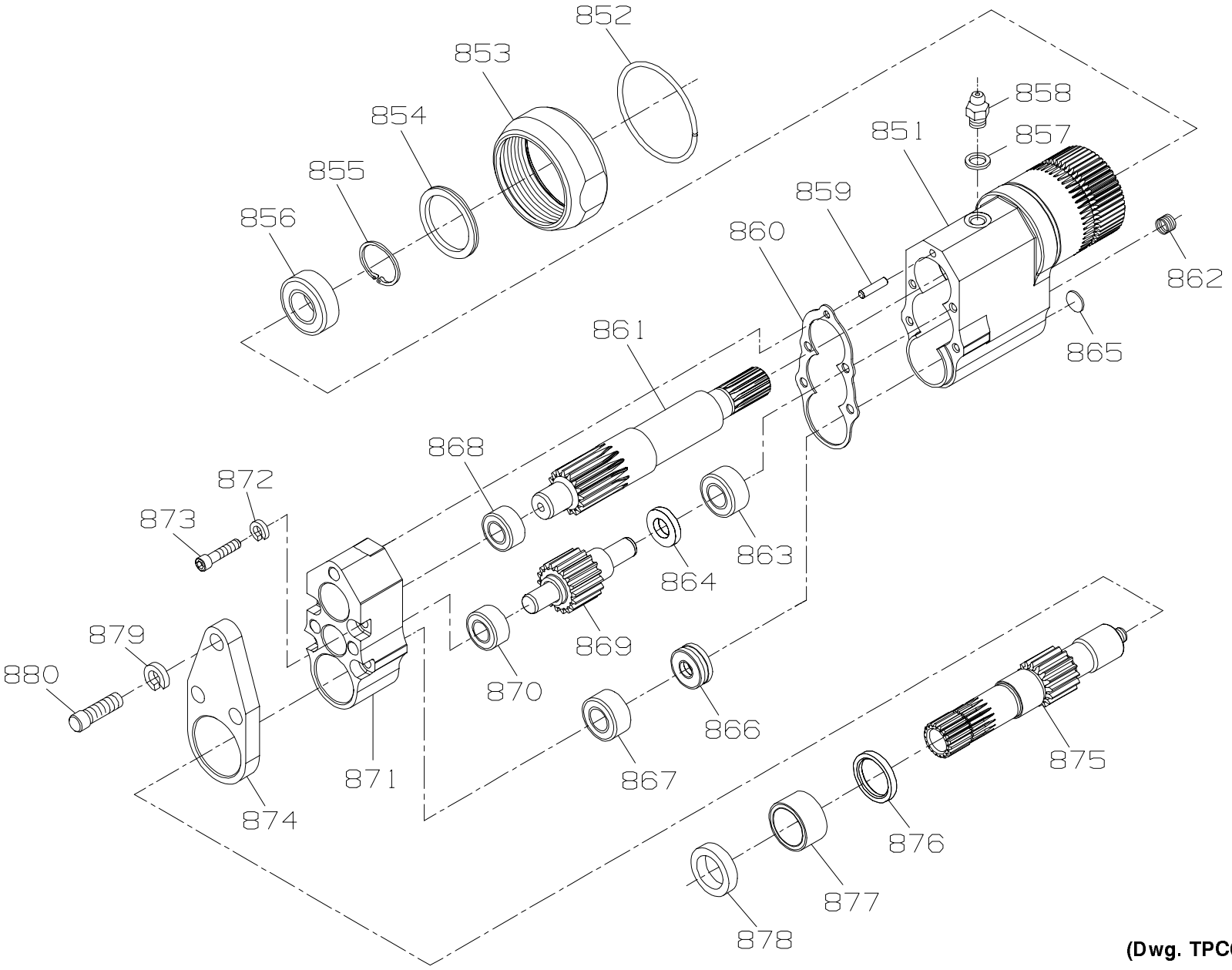
(Dwg. TPC663)

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
	Geared Offset Head	D1610–A147	• 816	Bearing	R1610–793
801	Gear Housing	D1610–147	817	Washer	D1610–701
802	Retainer	DAA4–29	• 818	Bearing	R1610–105
803	Coupling Nut	DAA4–27	819	Spindle Drive	D1610–591
804	Cap	8SA32–531	820	Washer	R1610–706
805	Retainer	D1610–118	• 821	Bearing	R1610–601
• 806	Bearing	8SA32–593	• 822	Bearing	R1610–535
807	Drive Gear	D1610–756	• 823	Bearing	R1610–593
808	Washer	R1610–707	• 824	Seal	R1610–271
809	Screw	99V60–200	825	Washer	R3–92A
810	Housing Cover	D1610–378	826	Grease Fitting	R1–188
811	Gasket	D1610–592	827	Extension Adapter	D1610–65
• 812	Bearing	H54U–535	828	Lockwasher (3)	8U–58
813	Washer	R1610–332	829	Cap Screw (3)	518–104
814	Gear	D1610–82	*	Offset Spindle Retaining Ring	RX3–729
815	Washer	R1610–332			

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four units in service.

D1411–A147 GEARED OFFSET HEAD



(Dwg. TPC664)

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
	Gear Offset Head	D1411-A147	• 866	Bearing	R1410-105
851	Gear Housing	D1411-147	• 867	Bearing	R1410-593
852	Retainer	DAA4-29	• 868	Bearing	H54U-535
853	Coupling Nut	DAA4-27	869	Gear	D1411-82
854	Cap	8SA32-531	• 870	Bearing	R1410-501
855	Retainer	N44-6	871	Housing Cover	D1411-378
• 856	Bearing	8SA32-593	872	Lockwasher (4)	34U-351
857	Washer	R3-92A	873	Cap Screw (4)	R1410-634
858	Grease Fitting	R1-188	874	Spacer	D1410-65
859	Pin	504-667	875	Spindle Drive	D1411-591
860	Gasket	R1410-592	876	Washer	D1411-706
861	Drive Gear	D1411-756	• 877	Bearing	R1411-593
862	Plug	4S3-669	• 878	Seal	R1410-271
• 863	Bearing	R1410-501	879	Lockwasher (3)	8U-58
864	Washer	R1410-382	880	Cap Screw (3)	5080-638
865	Cap	8SA32-110	*	Offset Spindle Retaining Ring	RX3-729

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four units in service.

DISASSEMBLY

NOTICE

Whenever an Offset Head is disassembled for overhaul or replacement of parts, lubricate all parts lightly with Ingersoll-Rand No. 28 grease.

Disassembly of Model D1610 Geared Offset Head

1. Carefully grasp the flats on the Gear Case Assembly in a Vise with copper or leather-covered jaws so that the Geared Offset Head is facing downward.
2. Using a wrench on the flats of Coupling Nut (803), loosen the Coupling Nut from the Gear Case. Remove the tool from the Vise. Unscrew the Coupling Nut and separate the Geared Offset Head from the Gear Case.
3. Carefully grasp the Gear Offset Head in copper or leather-covered Vise jaws with Drive Gear (807) facing upward.

NOTICE

In the following step, the Spindle Bearing Cap has a left-hand thread.

4. Loosen and remove Spindle Bearing Cap (804) from Housing Cover (810).
5. Use a 5/32 Hex Wrench to loosen and remove Screw (809).
6. Slide Coupling Nut (803) back and remove Retainer (802) from The Housing Cover. Slide the Coupling Nut off the Housing Cover.
7. Use Snap Ring Pliers to remove Retainer (805) from the Housing Cover.
8. Tip the Housing Cover and pull Drive Gear (807) free of the Housing Cover.
9. Bearing (806) and Washer (808) may now be removed from the Drive Gear.
10. Use a 3/16 Hex Wrench to loosen and remove Cap Screws (829) and Lockwashers (828). When the Cap Screws are removed the Housing will separate into four pieces: Gear Housing (801), Housing Cover (810), Gasket (811), and Extension Adapter (827).
11. Pull Idler Gear (814), Washer (813) and Washer (815) out of the Gear Housing. Remove the Washers from the Idler Gear Shaft.
12. Pull Spindle Drive (819), Washer (817), Bearing (818) and Washer (820) out of the Gear Housing. Remove Washers and Bearing from the Spindle Drive.
13. Place the flat side of Housing Cover (810) on a wooden block on an Arbor Press table with the Splined Hub end away from you. Use a round metal rod and the Press to remove Bearing (812) from the center hole in the Housing Cover.
14. Turn the Housing Cover 180 degrees to position it on the wooden block flat side up. Use a round metal rod and the Press to remove Bearing (816) from the bottom hole in the Housing Cover.
15. Place Gear Housing (801) flat side up on the wooden block. Use a round metal rod and the Press to remove Bearing (821),Bearing (822), Bearing (823), and Seal (824) from the Gear Housing.
16. Remove Grease Fitting (826) and Washer (825) from the Gear Housing.

Disassembly of Model D1411 Geared Offset Head

1. Carefully grasp the flats on the Gear Case Assembly in a Vise with copper or leather-covered jaws so that the Geared Offset Head is facing downward.
2. Using a wrench on the flats of Coupling Nut (853), loosen the Coupling Nut from the Gear Case. Remove the tool from the Vise. Unscrew the Coupling Nut and separate the Geared Offset Head from the Gear Case.
3. Carefully grasp the Geared Offset Head in copper or leather-covered Vise with the Drive Gear (861) facing upward.

NOTICE

In the following step, the Spindle Bearing Cap has a left-hand thread.

4. Loosen and remove Spindle Bearing Cap (854) from Gear Housing (851).
5. Slide Coupling Nut (853) back and remove Retainer (852) from The Housing. Slip the Coupling Nut off the Housing.
6. Use Snap Ring Pliers to remove Retainer (855) from the Housing.
7. Use a 3/16 Hex Wrench to loosen and remove Cap Screws (880) and Lockwashers (879). When the Cap Screws are removed the Spacer (876) will be detached from the Gear Housing.
8. Pull Drive Gear (861), and Bearing (856) out of the Gear Housing.
9. The Bearing may now be removed from the Drive Gear.
10. Pull Spindle Drive (875), Bearing (877), Seal (878), and Washer (876) out of the Gear Housing.
11. The Bearing, Seal, and Washer may now be removed from the Spindle Drive.
12. Use a 3/16 Hex Wrench to loosen and remove Cap Screws (873) and Lockwashers (872). When the Cap Screws are removed the Housing Cover (871) can be separated from the Gear Housing by pulling the Housing Cover away from the Housing and off Pin (859). Remove Gasket (860).

13. Place the Housing Cover on a wooden block on an Arbor Press table with the end having the four mounting screw recesses facing up. Use a round metal rod or a bearing insertion tool, press Bearing (868) and Bearing (870) out of the Housing Cover.
14. Pull Idler Gear (869) and Washer (864) out of the Gear Housing. Remove the Washer from the Idler Gear Shaft.
15. Place Gear Housing (851) on the wooden block with the Splined Hub end down. Use a round metal rod and the Press to remove Cap (865) from the Gear Housing.
16. Rotate the Gear Housing 180 degrees to position it on the wooden block flat side down. Use a 3/16 Hex Wrench to loosen and remove Plug (862) then, use a round metal rod and the Press to remove Bearing (863), Bearing (866), and Bearing (867) from the Gear Housing.
17. Remove Grease Fitting (858) and Washer (857) from the Gear Housing.

ASSEMBLY

Assembly of Model D1610 Geared Offset Head

1. Lubricate all parts lightly with Ingersoll–Rand No. 28 grease.
2. Place the flat side of Gear Housing (801) on a wooden block on an Arbor Press table and press Bearing (821), Bearing (822), Bearing (823), and Seal (824) into the Gear Housing.
3. Place Washer (825) over the threaded shaft of Grease Fitting (826) and install the Grease Fitting in the Gear Housing. Set the assembled Gear Housing aside until needed.
4. Place the flat side of Housing Cover (810) on the wooden block with the Splined Hub end away from you and press Bearing (816) into the bottom hole in the Housing Cover.
5. Turn the Housing Cover 180 degrees to position it on the wooden block flat side up. Use a round metal rod and the Press to install Bearing (812) against the shoulder in the center hole in the Housing Cover.
6. Grasp the Housing Cover from the flat side and slip Coupling Nut (803) over the splined end of the Housing Cover. Use snap ring pliers to install Retainer (802) in the groove of the spline.
7. Use a 5/32 Hex Wrench to tighten Screw (809) into the Housing Cover. Tighten between 12 and 18 in–lb (1.4 and 2.0 Nm) torque.
8. Slide the Bearing (818) and Washer (817) onto Spindle Drive (819) and insert the Spindle Drive into the Bearing in the lower hole in the Housing Cover. Place the Washer (820) on the Spindle Drive.
9. Slide Washer (813) onto the shaft of Idler Gear (814). Insert the idler gear shaft into the Bearing in the center hole in the Housing Cover. Slide Washer (815) onto the gear shaft.
10. Set Gasket (811) in position against the Housing Cover. Align and assemble the Gear Housing with the Housing Cover.
11. Position the Extension Adapter (827) against the Housing Cover and fasten the Housing Cover, Gear Housing and Adapter together using the Cap Screws (829) and Lock Washers (828). Tighten the Cap Screws between 12 and 18 in–lb (1.4 and 2.0 Nm) torque.
12. Press Bearing (806) on Drive Gear (807) with the ground surface of the Bearing facing the Drive Gear. Press against the painted surface of the Bearing.
13. Slide Washer (808) onto the Drive Gear and insert the Drive Gear into the Housing Cover.
14. Carefully grasp the Geared Offset Head in copper or leather–covered Vise jaws with drive end facing upward.
15. Install Retainer (805) in the Housing Cover using Snap Ring Pliers.

NOTICE

In the following step, the Spindle Bearing Cap has a left–hand thread.

15. Apply Perma–Loc LH050 Pipe Sealant* to the first two threads of Cap (804) and screw the Cap into the Housing Cover. Tighten the Cap between 60 and 65 in–lb (6.75 and 7.35 Nm) torque.

Assembly of Model D1411 Geared Offset Head

1. Lubricate all parts lightly with Ingersoll–Rand No. 28 grease.
2. Place Housing Cover (871) on a wooden block on an Arbor Press table with the end having the four mounting screw recesses facing down. Using a round metal rod or a bearing insertion tool and the Press, install Bearing (868), Bearing (870), and Bearing (877) into of the Housing Cover. Set the Housing Cover aside until needed.
3. Press the Bearing (856), stained side trailing, onto the hub at the spline end of the Drive Gear (861).
4. Secure the Bearing to the Drive Gear using snap ring pliers to install the Retainer (855) in the groove on the shaft of the gear.
5. Position the Gear Housing (851) on a wooden block with the spline hub downward. Using bearing inserting tools, press Bearing (863), Bearing (866) and Bearing (867) into the Gear Housing.

* Product of National Starch and Chemical Corporation.

6. Press Pin (859) into the Gear Housing.
7. Insert the Drive Gear, bearing end trailing, into the central opening of the Gear Housing. Insert it from the end having the large splined hub.

NOTICE

In the following step, the Spindle Bearing Cap has a left-hand thread.

8. Apply Perma-Loc LH050 Pipe Sealant to the first two threads of Cap (854) and screw the Cap into the Gear Housing. Tighten the Cap between 60 and 65 in-lb (6.75 and 7.35 Nm) torque.
9. Insert Washer (864), Idler Gear (869), and Spindle Drive (877) into the Gear Housing making certain that the gear teeth are properly meshed.
10. Place the Housing Cover (871) over the Spindle Drive and slide it into position just short of the point where the gears on the Spindle Drive mesh with the Idler gears.
11. Place Gasket (860) on the Gear Housing flange.
12. Carefully join the Gear Housing and the Housing Cover making certain that the shafts protruding from the Gear Housing are properly aligned with the Bearings in the Housing Cover. The Pin in the Gear Housing must align with the locating hole in the Housing Cover.
13. Fasten the Gear Housing to the Housing Cover using four Cap Screws (873) and four Lockwashers (872). Tighten the Cap Screws between 12 and 18 in-lb (1.4 and 2.0 Nm) torque.
14. Fasten Spacer (874) to the Housing Cover using three Cap Screws (880) and three Lockwashers (879). Tighten the Cap Screws between 12 and 18 in-lb (1.4 and 2.0 Nm) torque.
15. Place Washer (857) over the threaded shaft of Grease Fitting (858) and install the Grease Fitting in the Gear Housing. Set the assembled Gear Housing aside until needed.
16. Carefully grasp the Geared Offset Head in copper or leather-covered Vise jaws with the large spline end facing upward. Slip Coupling Nut (853) over the splined end of the Gear Housing. Install Retainer (852) in the groove on the splined end of the Gear Housing.
17. Install Plug (862) and Cap (865) in the Gear Housing.
18. Press Seal (878) onto the Spindle Drive and down into the Housing Cover.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.