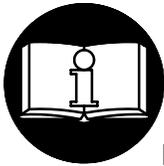


MAINTENANCE SECTION COVERING TORQUE MULTIPLIER MODULES for SERIES D FIXTURED TORQUE CONTROL WRENCHES WHEN THIS MODULE IS USED WITH AN ELECTRIC POWERED TOOL

⚠ 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 Ingersoll–Rand Series 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.

- 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.

USING THE TOOL

- Always wear eye protection when operating or performing maintenance on this tool.
- Always wear hearing protection when operating this tool.

(Continued on page 3.5–2)

NOTICE

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

Have your tool repaired by a qualified person. This electric tool is in accordance with the relevant safety requirements. Repairs should only be carried out by qualified persons using original spare parts, otherwise this may result in considerable danger to the user.

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.

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INGERSOLL-RAND®
PROFESSIONAL TOOLS

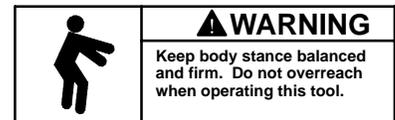
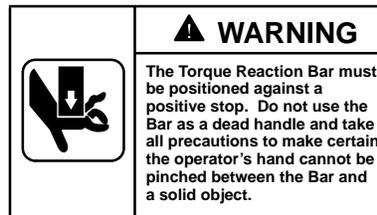
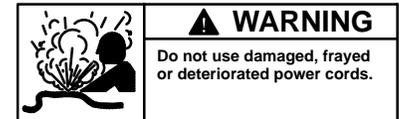
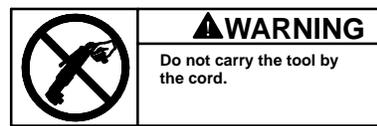
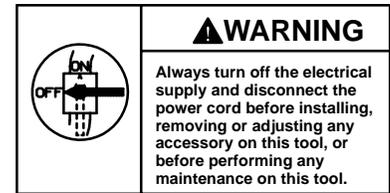
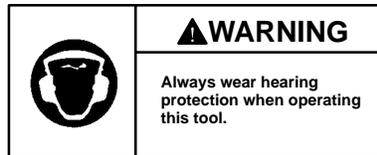
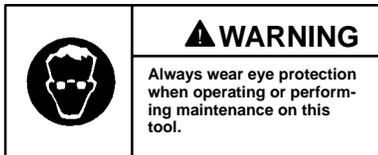


FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

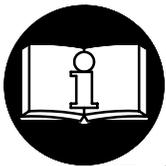
USING THE TOOL (*Continued*)

- **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.
- **Do not drop or abuse the tool.**
- **Anticipate and be alert for sudden changes in motion during start up and operation of any power 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 any tool, ALWAYS grasp a metal component of the tool while tightening or loosening the Coupling Nut or Spindle Cap. Acceptable clamping locations include, but are not limited to, the hex on the Gear Case, the Tool Hanger, the Torque Reaction Arm or any metal Mounting Plate. NEVER grasp the composite tool body or handle in vise jaws to restrain the torque of the Coupling Nut or Spindle Cap. 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 counter-clockwise direction.**
- **Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.**

WARNING LABEL IDENTIFICATION



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.

(Continued on page 3.5-4)

⚠ WARNING

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

USING THE TOOL (Continued)

- 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.
- 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 any tool, ALWAYS grasp a metal component of the tool while tightening or loosening the Coupling Nut or Spindle Cap. Acceptable clamping locations include, but are not limited to, the hex on the Gear Case, the Tool Hanger, the Torque Reaction Arm or any metal Mounting Plate. NEVER grasp the composite tool body or handle in vise jaws to restrain the torque of the Coupling Nut or Spindle Cap. 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 counter-clockwise direction.

WARNING LABEL IDENTIFICATION

	⚠ WARNING Always wear eye protection when operating or performing maintenance on this tool.
---	---

	⚠ WARNING Always wear hearing protection when operating this tool.
---	--

	⚠ WARNING 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.
---	---

	⚠ WARNING 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.
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	⚠ WARNING Do not carry the tool by the hose.
---	--

	⚠ WARNING Do not use damaged, frayed or deteriorated air hoses and fittings.
---	--

	⚠ WARNING Keep body stance balanced and firm. Do not overreach when operating this tool.
---	--

	⚠ WARNING Operate at 90 psig (6.2 bar/ 620 kPa) Maximum air pressure.
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	⚠ WARNING 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.
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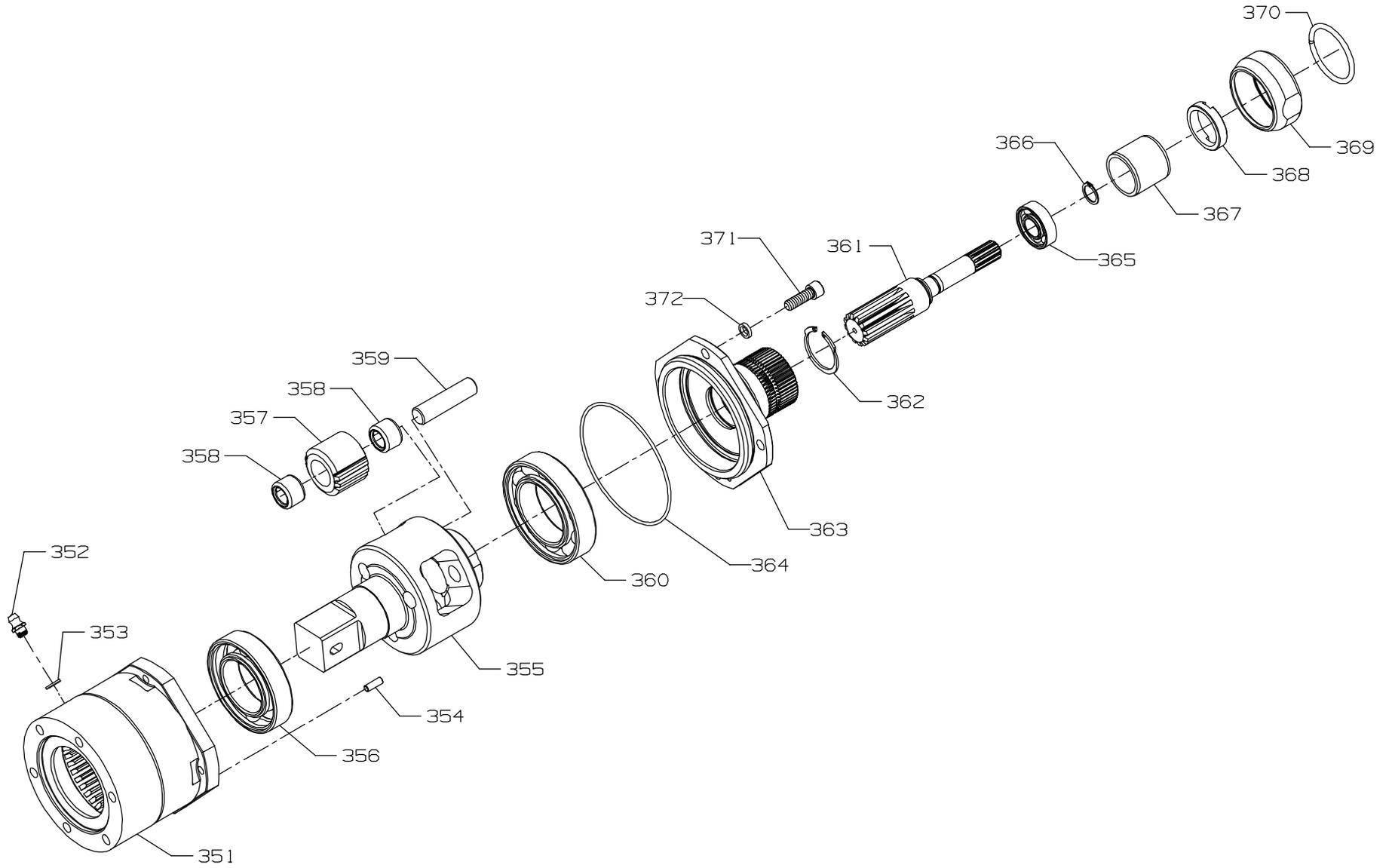
LUBRICATION



Ingersoll–Rand No. 67

After each 50,000 cycles, or one month of operation, inject 5 cc of Ingersoll–Rand No. 67 Grease into the Grease Fitting (352) in the Torque Multiplier Assembly.

3.5-6



(Dwg. TPC674)



PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

	Torque Multiplier Assembly		359	Spindle Planet Gear Shaft (3)	R4801U-191
	with 1" square drive	ATM50-M37	360	Spindle Rear Bearing	R4800-97
	with 3/4" square drive	ATM5012-M37	361	Drive Pinion	ATM50-216
	with spline drive	ATM50S-M37	362	Pinion Bearing Front Retainer	D1610-118
351	Multiplier Gear Case	ATM50-37	363	Gear Case Cover	ATM50-378
352	Gear Case Grease Fitting	R1-188	364	Gear Case Cover Seal	ATM50-283
353	Grease Fitting Washer	R3-92A	365	Pinion Bearing	8SA32-593
354	Gear Case Cover Alignment Pin	77A-31	366	Pinion Bearing Rear Retainer	N44-6
355	Spindle		367	Pinion Bearing Spacer	ATM50-382
	1" square drive	R4801U-208	368	Spacer Retaining Cap	8SA32-531
	3/4" square drive	R4801U-8	369	Coupling Nut	DAA4-27
	spline drive	VSM-5477	370	Coupling Nut Retainer	DAA4-29
356	Spindle Front Bearing		371	Gear Case Cover Cap Screw (4)	R0H-354
	for square drive	MR-988	372	Lock Washer (4)	8U-58
	for spline drive	VSM-5433			
357	Spindle Planet Gear (3)	R4801U-9			
358	Spindle Planet Gear Bearing (2 for each Gear)	R4801U-510			

MAINTENANCE SECTION

Disassembly of the Torque Multiplier

1. Using a hex wrench, remove the six Mounting Cap Screws and Lock Washers on the spindle side of the mounting plate and slide the assembled tool out of the mounting plate and spindle.
2. Using a wrench on the flats of the Coupling Nut (369), loosen the Coupling Nut and pull the assembled Torque Multiplier off the power unit Gear Case.
3. Using a hex wrench, remove the four Gear Case Cover Cap Screws (371) and Lock Washers (372).
4. Grasp the Coupling Nut and stem of the Gear Case Cover (363) and pull the assembled Drive Pinion (361) out of the Multiplier Gear Case (351).
5. Remove the Gear Case Cover Seal (364) from the large hub of the Gear Case Cover.

NOTICE

The following step removes a part with a left-hand thread. Rotate the wrench clockwise to remove the part.

6. Using a spanner wrench, unscrew and remove the Spacer Retaining Cap (368).
7. Grasp the small spline end of the Drive Pinion (361) and pull the assembled Pinion along with the Pinion Bearing Spacer (367) out of the small end of the Gear Case Cover.
8. If the Pinion Bearing (365) must be replaced, use snap ring pliers to remove the Pinion Bearing Rear Retainer (366) and slide the Bearing off the shaft of the Drive Pinion.
9. Push on the output end of the Spindle (355) to remove the assembly from the Gear Case.
10. Using a bearing puller, pull the Spindle Rear Bearing (360) off the rear hub of the Spindle.
11. Using a bearing puller, pull the Spindle Front Bearing (356) off the front hub of the Spindle.

NOTICE

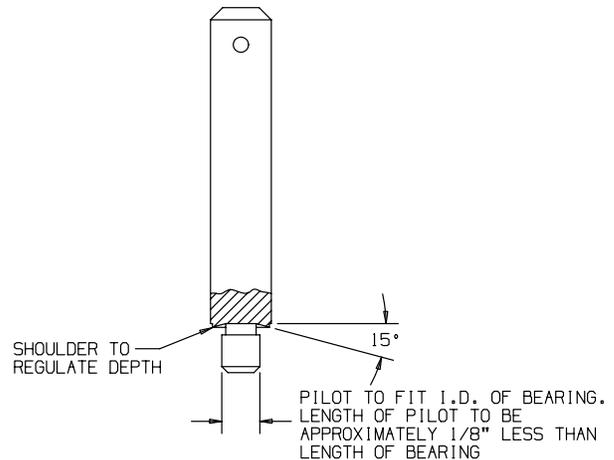
In the following step, the holes in the Spindle for the Spindle Planet Gear Shafts (359) are tapered. The Shafts must be pressed out from the square drive end of the Spindle.

12. With the short hub of the Spindle on the table of an arbor press, press the three Spindle Planet Gear Shafts from the body of the Spindle.
13. Remove the three Spindle Planet Gears (357) from the Spindle and if the Spindle Planet Gear Bearings (358) must be replaced, press them from the Planet Gears. Make certain you have another set of Bearings available as replacements. Needle bearings are always damaged during the removal process.

Assembly of the Torque Multiplier

1. If the Spindle Planet Gear Bearings (358) were removed, use a needle bearing inserting tool as shown in Drawing TPD786 to press a new Bearing into each end of the Spindle Planet Gear (357). Press each Bearing into the Gear until it is flush with the end face of the Gear. **Do not** use one Bearing to press the other Bearing into the same side of the Gear.

NEEDLE BEARING INSERTING TOOL



(Dwg. TPD786)

NOTICE

In the following step, the holes in the body of the Spindle (355) for the Spindle Planet Gear Shafts (359) are tapered. The Shafts must be pressed in at the end of the Spindle that is opposite to the square drive.

2. Support the large body of the Spindle on the table of an arbor press with the output end of the Spindle downward. Insert the assembled Spindle Planet Gears into the body of the Spindle and press the Spindle Planet Gear Shafts into the Spindle and through the Gears and Bearings.
3. Rotate the Spindle 180° and using a piece of tubing that clears the output end of the shaft and bears on the bearing inner race, press the Spindle Front Bearing (356), onto the hub of the Spindle.

MAINTENANCE SECTION

4. Again rotate the Spindle 180° and with the output end of the Spindle on the table of an arbor press, press the Spindle Rear Bearing (360), onto the short hub of the Spindle.
5. If the Pinion Bearing (365) was removed, slide it onto the small end of the Drive Pinion until it stops against the shaft shoulder.
6. Using snap ring pliers, install the Pinion Bearing Rear Retainer (366) in the groove on the shaft of the Drive Pinion to keep the Bearing in position.
7. Insert the Drive Pinion, large spline end leading, into the small opening end of the Gear Case Cover (363) until the Pinion Bearing stops against the Pinion Bearing Front Retainer (362).
8. Insert the Pinion Bearing Spacer (367) into the small end of the Gear Case Cover against the outer race of the Pinion Bearing.
9. Apply Perma-Lok # MM-115* to the threads of the Spacer Retaining Cap (368) and thread the Cap into the Housing Cover against the Pinion Bearing Spacer. Tighten the Cap between 20 and 25 ft-lb. (27.2 and 34.0 Nm) torque.
10. Moisten the Gear Case Cover Seal (364) with o-ring lubricant and install the Seal on the large hub of the Gear Case Cover.
11. Apply approximately 5 cc of Ingersoll-Rand No. 67 Grease to the gears, shafts and bearings of the Spindle and insert the assembled Spindle, square or spline leading, into the open end of the Gear Case (351).
12. Align the Gear Case Cover alignment Pin (354) with the hole in the Gear Case Cover while meshing the spline of the Pinion Driver that protrudes from the large end of the Gear Case Cover with the gearing of the Spindle. Bring the large hub of the Cover against the Gear Case. Install the four Gear Case Cover Cap Screws (371) and Lock Washers (372) to secure the Cover to the Gear Case. Tighten the Screws between 60 and 65 in-lb. (7.4 and 8.8 Nm) torque.
13. Apply Vibra-Tite** to the threads of the Coupling Nut (369) and allow it to cure. Thread the Coupling Nut onto the Gear Case of the Tool and tighten the joint between 50 and 60 ft-lb. (68 and 81 Nm) torque.
14. Insert the Spindle of the Torque Multiplier through the mounting plate and attach output spindle with the mounting screws.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Multiplier Gear Case gets hot	Excessive grease	Clean and inspect the Multiplier Gear Case and gearing parts and lubricate as instructed in the assembly instructions.
	Worn or damaged parts	Clean and inspect the Multiplier Gear Case and gearing. Replace worn or broken components.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

* Product of National Starch and Chemical Corporation.

** Product of N. D. Industries.

NOTES

NOTES