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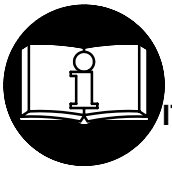
Form P7391
Edition 2
May, 1999

MAINTENANCE SECTION COVERING GEAR CASE MODULES for SERIES DEPTS PUSH–TO–START DC ELECTRIC TORQUE CONTROL WRENCHES with TRANSDUCERS

⚠ 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.**

USING THE TOOL

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

(Continued on page 3–2)

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.

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

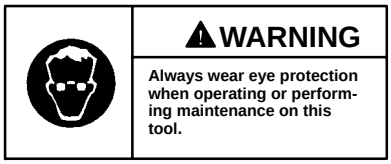
⚠ WARNING

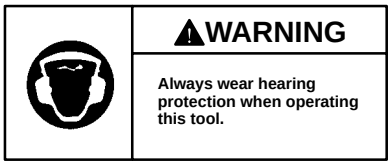
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

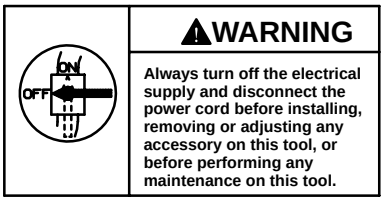
USING THE TOOL *(Continued)*

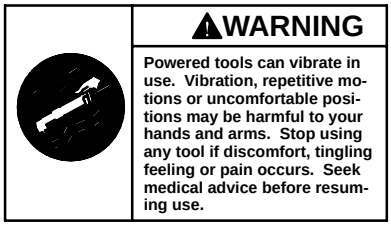
- **Consider work area environment.** Don't expose power tools and chargers to water. Keep work area well lighted. Do not use tool in explosive or flammable atmospheres.
- **Keep bystanders and children away.** Do not permit unauthorized personnel to operate this tool, or touch tool or cord.
- **Store 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.**
- **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.**
- **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.**
- **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.**
- **Series DEPTS Tools are designed to generate torque that has a reaction greater than the ability of the operator to absorb. DO NOT, under any circumstances, operate Series DEPTS Tools without a torque reaction, restraining device attached to the rear of the Tool. For information and recommendations describing suitable devices, contact Ingersoll–Rand.**
- **Do not allow the clevis fastener on Series DEPTS Tools to loosen. Movement of the tool in the clevis will create a pinch hazard to the operator and may increase wear damage to the cord and electrical connections.**
- **Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.**

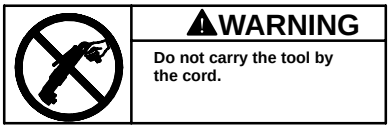
WARNING LABEL IDENTIFICATION

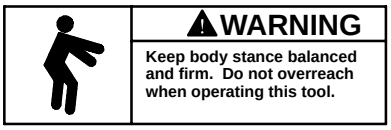








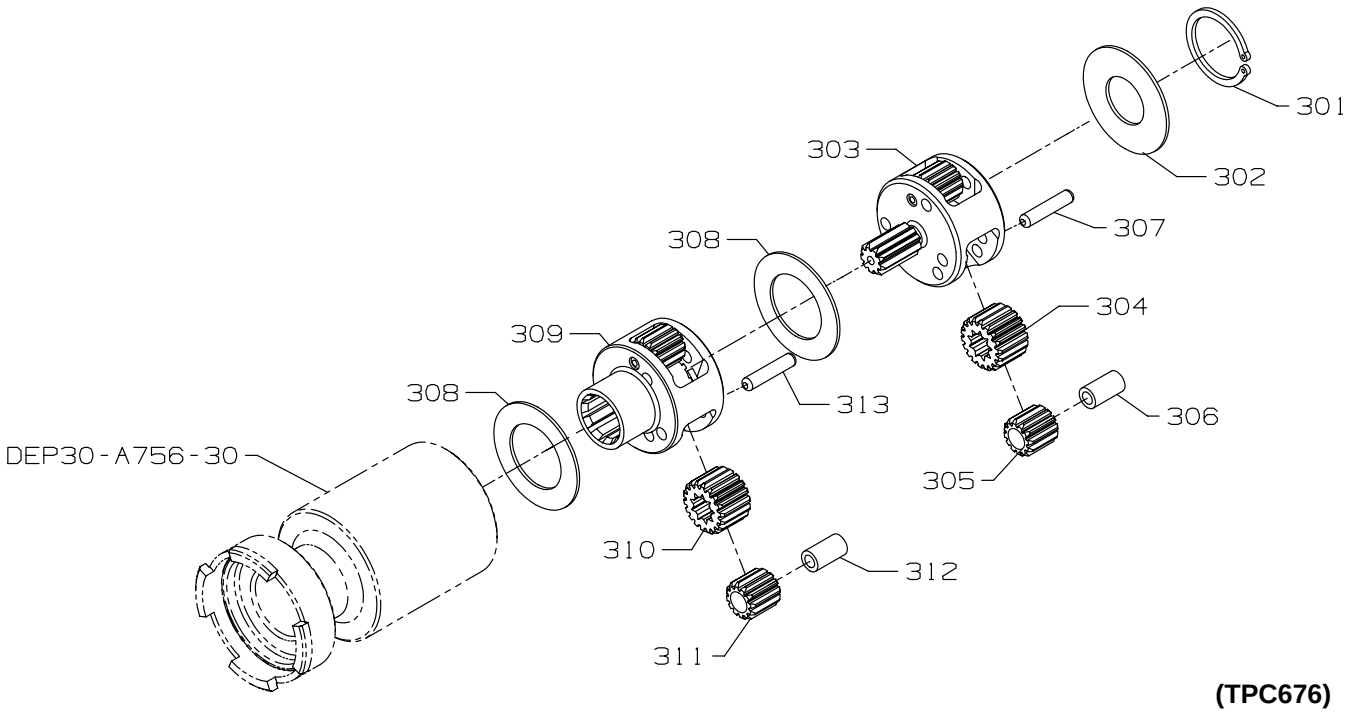




LUBRICATION

Ingersoll–Rand No. 67

Whenever a tool is disassembled for repair or replacement of parts, or as experience indicates, work 3 to 4 cc of Ingersoll–Rand No. 67 Grease into the gear train.



(TPC676)

PART NUMBER FOR ORDERING

		DEPTS9	DEPTS15	DEPTS20	DEPTS25	DEPTS30
301	Gear Seat Retainer	W22–118	W22–118	W22–118	W22–118	W22–118
302	Gear Seat	DEP30–81	DEP30–81	DEP30–81	DEP30–81	DEP30–81
	Planet Gear Frame Assembly	DEP9–A216	DEP15–A216	DEP20–A216	DEP25–A216	DEP30–A216
303	Planet Gear Frame	DEP9–216	DEP15–216	DEP20–216	DEP15–216	DEP9–216
304	Motor Pinion Gear	DEP3–17	DEP3–17	—	—	—
305	Planet Gear (3)	DEP3–10	DEP3–10	DEP5–10	DEP5–10	DEP5–10
306	Planet Gear Bearing (3)	6WTM–500	6WTM–500	6WTM–500	6WTM–500	6WTM–500
307	Planet Gear Shaft (3)	DEP30–191	DEP30–191	DEP30–191	DEP30–191	DEP30–191
308	Gear Head Spacer (2)	DEP30–80	DEP30–80	DEP30–80	DEP30–80	DEP30–80
	Spindle Planet Gear Frame Assembly	DEP3–A8	DEP15–A8	DEP20–A8	DEP15–A8	DEP5–A8
309	Planet Gear Frame	DEP3–8	DEP15–8	DEP15–8	DEP15–8	DEP3–8
310	Spindle Pinion Gear	DEP3–17	—	—	—	—
311	Spindle Planet Gear (3)	DEP3–10	DEP15–10	DEP20–10	DEP15–10	DEP5–10
312	Planet Gear Bearing (3)	6WTM–500	6WTM–500	6WTM–500	6WTM–500	6WTM–500
313	Planet Gear Shaft (3)	DEP30–191	DEP30–191	DEP30–191	DEP30–191	DEP30–191

GEAR IDENTIFICATION CHART

PART NUMBER	PART NAME	ILLUS. NO.	NUMBER OF TEETH	
			EXTERNAL	INTERNAL
DEP3–17	Rotor Pinion	304 & 310	18	9
DEP3–8	Planet Gear Frame	309	—	10⊕
DEP15–8	Planet Gear Frame	309	—	10⊕
DEP9–216	Planet Gear Frame	303	9	—
DEP15–216	Planet Gear Frame	303	12	—
DEP20–216	Planet Gear Frame	303	15	—
DEP3–10	Planet Gear	305 & 311	12	—
DEP5–10	Planet Gear	305 & 311	16	—
DEP15–10	Planet Gear	311	14	—
DEP20–10	Planet Gear	311	13	—

⊕ Gear Frame DEP3–8 can be distinguished from Gear Frame DEP15–8 by the internal spline. DEP3–8 has a spline the full length of the central opening while DEP15–8 has a spline only in the hub side of the central opening.

Disassembly of the Gearing

1. **For models with Quick Change Spindles**, use a pointed probe to compress the Retaining Sleeve Spring while using another pointed probe to spiral the Spring Sleeve Retainer out of the Bit Retaining Sleeve. Remove the Spring, Sleeve and Bit Retaining Ball from the Quick Change Spindle.
2. Using a spanner wrench or Grip Retainer Wrench (Part No. DEPTS30–26), unscrew and remove the Grip Retainer from the front of the tool.
3. Pull the Grip off the spindle end of the tool.
4. Using a 1–3/16" open–end wrench, unscrew and remove the Spindle Cap Assembly.
5. Pull the assembled Spindle, Spindle Return Spring, Push Rod and Drive Spindle Assembly off the front of the Transducer.
6. Unplug the motor lead connection that is accessible through the slot in the top of the motor unit.
7. Push the transducer connector inward to clear the housing and slide the Transducer out of the spindle end of the power unit. Do not pinch the wire leads between the Transducer and the housing.
8. Using snap ring pliers, remove the Gear Seat Retainer (301) from the motor end of the transducer housing.
9. Remove the Gear Seat (302) and slide the complete gear train out of the transducer housing.

NOTICE

Before disassembling the Planet Gear Frame Assembly or Spindle Planet Gear Frame Assembly, note that only three of the six shaft holes in each Gear Frame are used. These six holes are used to make two distinct sets of three hole gear patterns. Looking at the gear frames from the motor end, three holes have pin punch marks at approximately ten o'clock relative to the holes while the other three holes have no marks. When assembling a gear frame, all shafts will be installed in all holes with the mark or all holes without the mark. Do not install some shafts in holes with the mark and some in holes without the mark on the same gear frame. It is also possible that within the same tool the Planet Gear Frame Assembly will have shafts in the holes with the marks while the Spindle Planet Gear Frame Assembly will have the shafts in the holes without the marks. MAKE A NOTE OF WHICH SHAFT HOLE SERIES TO USE IN THE GEAR FRAME BEFORE DISASSEMBLING IT.

10. Place the assembled Planet Gear Frame (303) on blocks with clearance for the Planet Gear Shafts (307) on the table of an arbor press with the spline hub upward and press the three Shafts from the Gear Frame.
11. Remove the Planet Gears (305), Planet Gear Bearings (306) and Motor Pinion Gear (304) if one is included in the assembly.
12. Place the assembled Spindle Planet Gear Frame (309) on blocks with clearance for the Planet Gear Shafts (313) on the table of an arbor press with the internal spline hub upward and press the three Shafts from the Gear Frame.
13. Remove the Planet Gears (311), Planet Gear Bearings (312) and Spindle Pinion Gear (310) if one is included in the assembly.

Assembly of the Gearing

1. Insert the hub of the Spindle Planet Gear Frame (309) into a block of steel with clearance for the hub and place the block on the table of an arbor press with the Gear Frame upward.
2. Slide a Planet Gear Bearing (312) into each of the Planet Gears (311).
3. Position one of the Bearing and Gear assemblies in the Gear Frame making certain that the central opening of the Bearing is aligned with the proper marked or unmarked shaft hole. Press the Planet Gear Shaft (313) into the Gear Frame to secure the Gear and Bearing.
4. Position the second Bearing and Gear assembly in the Gear Frame and likewise secure it by pressing the Shaft into the Gear Frame.
5. **If the Spindle Planet Gear Frame Assembly has a Spindle Pinion Gear (310)**, insert it into the Gear Frame making certain the teeth of the Pinion mesh with the teeth of the installed Planet Gears. **The Pinion Gear cannot be inserted after the third Bearing and Gear Assembly is installed in the Gear Frame.**
6. Position the third Bearing and Gear assembly in the Gear Frame making certain the teeth mesh properly, and secure the entire assembly by pressing the last Planet Gear Shaft into the Gear Frame.
7. Insert the hub of the Planet Gear Frame (303) into a block of steel with clearance for the hub and place the block on the table of an arbor press with the Gear Frame upward.
8. Slide a Planet Gear Bearing (306) into each of the Planet Gears (305).

9. Position one of the Bearing and Gear assemblies in the Gear Frame making certain that the central opening of the Bearing is aligned with the proper marked or unmarked shaft hole. Press the Planet Gear Shaft (307) into the Gear Frame to secure the Gear and Bearing.
10. Position the second Bearing and Gear assembly in the Gear Frame and likewise secure it by pressing the Shaft into the Gear Frame.
11. **If the Planet Gear Frame Assembly has a Motor Pinion Gear (304)**, insert it into the Gear Frame making certain the teeth of the Pinion mesh with the teeth of the installed Planet Gears. **The Pinion Gear cannot be inserted after the third Bearing and Gear Assembly is installed in the Gear Frame.**
12. Position the third Bearing and Gear assembly in the Gear Frame making certain the teeth mesh properly, and secure the entire assembly by pressing the last Planet Gear Shaft into the Gear Frame.
13. Having assembled the Planetary Gear Frames, grasp the Transducer and insert a Gear Head Spacer (308) into the motor end of the Transducer followed by the Spindle Planet Gear Frame Assembly, hub end leading.
14. Insert the second Gear Head Spacer followed by the Planet Gear Frame Assembly, spline shaft leading.
15. Insert the Gear Seat (302) and contain the gearing in the Transducer by installing the Gear Seat Retainer (301) using snap ring pliers.
16. Insert the Transducer, gear case end leading and being careful not to damage the electrical leads, into the power unit housing.
17. Plug the transducer connector into the motor leads, work the wires into the clearance area and rotate the Transducer a quarter turn to lock it into position in the housing.
18. Install the Drive Spindle Assembly, bearing end leading, into the front of the Transducer.
19. Insert the Spindle Return Spring and Push Rod into the central opening in the Drive Spindle Assembly. Make certain the Push Rod is inserted as far as it can enter the motor assembly.
20. Insert the Spindle into the Spindle Cap Assembly and thread the Assembly, output end trailing, onto the motor. Make certain the Push Rod enters the opening in the Push Rod Adjustment Screw located inside the Spindle.
21. Tighten the Spindle Cap Assembly between 20 and 25 ft–lb. (27 and 34 Nm) torque.
22. Install the Grip, large opening leading, over the Spindle Cap Assembly against the motor.
23. Thread the Grip Retainer onto the front of the tool, and using a spanner wrench or the Grip Retainer Wrench, tighten the Retainer between 10 and 15 ft–lb. (13.6 and 20.3 Nm) torque.
24. **For models with Quick Change Spindles**, insert the Bit Retaining Ball into the hole in the Spindle and slide the Bit Retaining Sleeve onto the Spindle to retain the Ball. Install the Retaining Sleeve Spring and capture the assembly by installing the Spring Sleeve Retainer.

⚠ WARNING

In the following procedure, make certain the tool is held by a fixture before attempting to start it. Failure to do so may result in injury.

25. Test the tool for acceptable starting after reassembling it. It may be necessary to adjust the Push Rod travel to achieve proper starting. Make travel adjustments by turning the Push Rod Adjustment Screw, which is located inside the motor end of the Spindle, clockwise or counterclockwise.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Gear case gets hot	Excessive grease	Clean and inspect the transducer gear case and gearing parts and lubricate as instructed in the assembly instructions.
	Worn or damaged parts	Clean and inspect the transducer gear case and gearing. Replace worn or broken components.
	Gear Shafts not pressed flush with Gear Frame	Press Shafts flush with surface.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.