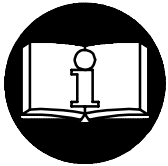


MAINTENANCE SECTION COVERING GEAR CASE MODULES for SERIES DEF120 DC ELECTRIC TORQUE CONTROL WRENCHES with TRANSDUCERS



⚠ 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 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.

(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.

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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.**
- **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


	<p>▲ WARNING</p> <p>Always wear eye protection when operating or performing maintenance on this tool.</p>
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	<p>▲ WARNING</p> <p>Always wear hearing protection when operating this tool.</p>
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	<p>▲ WARNING</p> <p>Always turn off the electrical supply and disconnect the power cord before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.</p>
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	<p>▲ WARNING</p> <p>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.</p>
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	<p>▲ WARNING</p> <p>Do not carry the tool by the cord.</p>
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	<p>▲ WARNING</p> <p>Do not use damaged, frayed or deteriorated power cords.</p>
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	<p>▲ WARNING</p> <p>INDOOR USE ONLY.</p>
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	<p>▲ WARNING</p> <p>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.</p>
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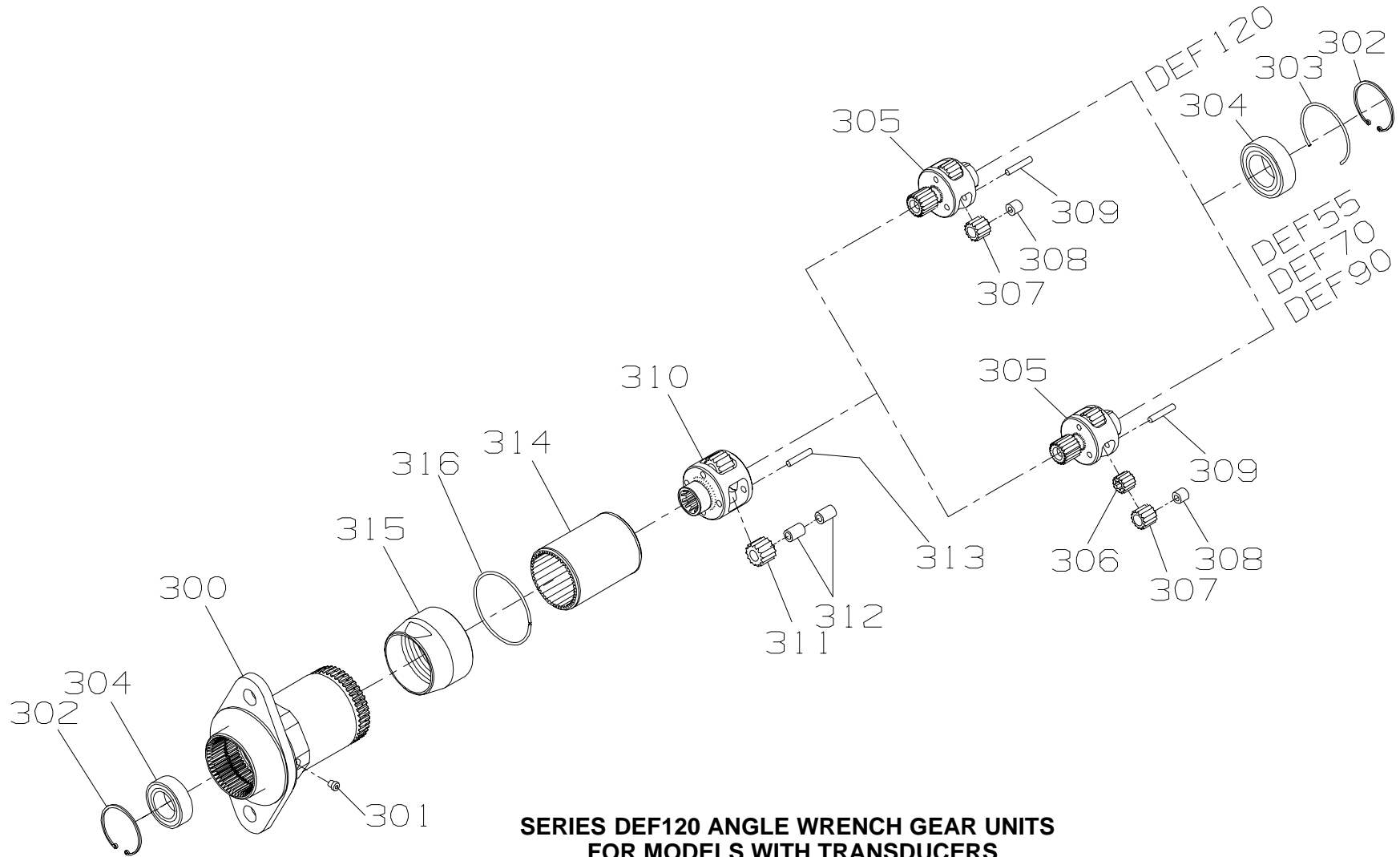
	<p>▲ WARNING</p> <p>Keep body stance balanced and firm. Do not overreach when operating this tool.</p>
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LUBRICATION



Ingersoll-Rand No. 67

After each 250,000 cycles, or four months of operation or as experience indicates, inject 3 to 4 cc of Ingersoll-Rand No. 67 Grease into the Grease Fitting (301) in the Gear Case Assembly (300).



**SERIES DEF120 ANGLE WRENCH GEAR UNITS
FOR MODELS WITH TRANSDUCERS**

(Dwg. TPC666)



PART NUMBER FOR ORDERING



+ 300	Gear Case Module	DEF55-M37	DEF70-M37	DEF90-M37	DEF120-M37
301	Gear Case Assembly	DEF120-B37	DEF120-B37	DEF120-B37	DEF120-B37
302	Grease Fitting	D0F9-879	D0F9-879	D0F9-879	D0F9-879
303	Retainer Snap Ring (2)	W64-118	W64-118	W64-118	W64-118
304	Ring Gear Retainer	DEA120-29	DEA120-29	DEA120-29	DEA120-29
305	Bearing (2)	R38P-606	R38P-606	R38P-606	R38P-606
306	Planet Gear Frame Assembly	DEA55-A216	DEA70-A216	DEA90-A216	DEA120-A216
307	Rotor Pinion	DEA55-17	DEA55-17	DEA55-17	----
308	Planet Gear Assembly	DEA55-A9	DEA55-A9	DEA55-A9	DEA120-A9
309	Planet Gear (3)	DEA55-9	DEA55-9	DEA55-9	DEA120-9
310	Bearing (3)	WFS182-654	WFS182-654	WFS182-654	WFS182-654
311	Shaft (3)	8SL-191	8SL-191	8SL-191	8SL-191
312	Planet Gear Spindle Assembly	DEA120-A8	DEA70-A8	DEA90-A8	DEA120-A8
313	Planet Gear Assembly	DEA120-A10	DEA70-A10	DEA90-A10	DEA120-A10
314	Planet Gear (4 for DEF55-M37 and DEF120-M37; 3 for all others)	DEA120-10	DEA70-10	DEA90-10	DEA120-10
315	Bearing (2 for each Gear)	W22-654	W22-654	W22-654	W22-654
316	Shaft (4 for DEF55-M37 and DEF120-M37; 3 for all others)	9SL-191	9SL-191	9SL-191	9SL-191
317	Ring Gear	DEA120-406	DEA120-406	DEA120-406	DEA120-406
318	Coupling Nut	DEF120-43	DEF120-43	DEF120-43	DEF120-43
319	Coupling Nut Retaining Ring	DEF120-29	DEF120-29	DEF120-29	DEF120-29

+ To assure proper gear placement, refer to **Gear Identification Chart** on page 3-4.

GEAR IDENTIFICATION CHART

PART NUMBER	PART NAME	ILLUSTRATION NUMBER	NUMBER OF TEETH	
			EXTERNAL	INTERNAL
DEA55-17	Rotor Pinion	306	19	9
DEA55-9	Planet Gear	307	16 +	—
DEA120-9	Planet Gear	307	20	—
DEA55-A216	Gear Frame	305	19 #	—
DEA70-A216	Gear Frame	305	17	—
DEA90-A216	Gear Frame	305	12	—
DEA120-A216	Gear Frame	305	19 #	—
DEA70-10	Planet Gear	311	17	—
DEA90-10	Planet Gear	311	19	—
DEA120-10	Planet Gear	311	16 +	—

+ Planet Gear DEA55-9 can be distinguished from Planet Gear DEA120-10 by the full length gear teeth.

Gear Frame DEA55-A216 can be distinguished from Gear Frame DEA120-A216 by the larger diameter Planet Gear Shaft mounting circle.

MAINTENANCE SECTION

Disassembly of the Gear Case

1. Carefully grip the flats on the Gear Case (300) with a wrench.
2. Carefully grip the flats on the the Coupling Nut (315) with a second wrench and turn the two wrenches in opposite directions to loosen the joint between the Gear Case and the Power Unit.
3. If the Coupling Nut is damaged or must be removed, spread the Coupling Nut Retaining Ring (316) and remove it from the groove in the Gear Case. Slide the Coupling Nut off the Gear Case.
4. Using snap ring pliers, remove the Retainer Snap Ring (302) from inside the motor end of the Gear Case.
5. Remove the Planet Gear Frame Assembly (305) from the Gear Case (300). Press the Bearing (304) off the Gear Frame Assembly.
For DEF55, DEF70 and DEF90 modules, press out the Gear Shafts (309) and remove the Planet Gears (307), Bearings (308) and Rotor Pinion (306).
For DEF120 modules, press out the Gear Shafts (309) and remove the Planet Gears (307) and Bearings (308).
6. With the motor end of the Gear Case standing on the table of an arbor press, carefully press the Planet Gear Spindle Assembly (310) out of the Gear Case Bearing (304). Press out the Gear Shafts (313) and remove the Planet Gears (311) and Bearings (312).
7. Work a pointed probe under the Ring Gear Retainer (303), spiral it out of the Gear Case and Slide the Ring Gear (315) out.
8. Using snap ring pliers, remove the Retainer Snap Ring (302) from inside the threaded end of the Gear Case then remove the Bearing (304).

Assembly of the Gear Case.

1. Position the Planet Gear Spindle (310) on the table of an arbor press with the smaller end down. Install the Bearings (312) and Planet Gears (311) in the Spindle and press in the Gear Shafts (313).
2. Wipe 3 to 4 cc of Ingersoll–Rand No. 67 Grease on the gears.
3. Support the larger end of the Planet Gear Spindle Assembly (310) on a steel rod long enough to keep the Gear Case (300) from contacting the table of an arbor press. Position the Gear Case, flange end upward, on the Spindle. Press the Gear Case Bearing (304) onto the shaft of the Planet Gear Spindle until it enters the Gear Case and bottoms against the Spindle. Using snap ring pliers, install the Retainer Snap Ring (302) in the internal groove on the threaded end of the Gear Case.

4. Lightly coat the ends and outside diameter of the Ring Gear with Ingersoll–Rand No. 67 Grease. Slide the Ring Gear (315) into the motor end of the Gear Case, align the Ring Gear so that the Ring Gear teeth and the Planet Gear teeth mesh properly and continue sliding the Ring Gear until it stops against the shoulder in the Gear Case.
5. Install the Ring Gear Retainer (303) in the groove inside the motor end of the Gear Case to secure the Ring Gear.
6. Position the Planet Gear Frame (305) on the table of an arbor press with the splined end down.
For DEF55, DEF70 and DEF90 modules, install the Rotor Pinion (306), Planet Gears (307), and Bearings (308) in the Planet Gear Frame and press in the Gear Shafts (309). The Rotor Pinion **must** be in place before the three Planet Gears are installed.
For DEF120 modules, install the Bearings (308) and Planet Gears (307) in the frame and press in the Gear Shafts (309).
7. Wipe 3 to 4 cc of Ingersoll–Rand No. 67 Grease on the gears.
8. Press the Gear Frame Bearing (304) onto the Planet Gear frame.
9. Install the Planet Gear Frame Assembly (305) in the Gear Case (300) making certain that the teeth of the Gears in the Planet Gear Frame Assembly mesh with the teeth of the Ring Gear. Make sure that the teeth on the end of the Planet Gear Frame mesh with the teeth of the gears in the Planet Gear Spindle.
10. Using snap ring pliers, install the Retainer Snap Ring (302) in the internal groove on the motor end of the Ring Gear. Mesh the teeth on the external spline on the Gear Case with the internal spline in the Coupling Nut. The Ring Gear must mesh with the Transducer's external gear. The Gear Frame must mesh with the Rotor Pinion Driver. It may be necessary to rotate the Spindle at the threaded end of the Gear Case to aid in assembly.
11. If the Coupling Nut (315) was removed, slide the Coupling Nut, threaded end trailing, onto the spline end of the Gear Case. Install the Coupling Nut Retaining Ring (316) in the groove near the gear case spline.
12. When attaching the Gear Case to the power unit, tighten the Coupling Nut between 50 and 60 ft–lb (68 and 81 Nm) torque.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Gear Case gets hot	Excessive grease	Clean and inspect the Gear Case and gearing parts and lubricate as instructed on front page.
	Worn or damaged parts	Clean and inspect the Gear Case and gearing. Replace worn or broken components.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

