



**16572612**  
Edition 2  
May 2014

## **Air Drill**

**7RAQT4 Tapper**

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# **Maintenance Information**



**Save These Instructions**

**IR** *Ingersoll Rand*<sup>®</sup>

## Product Safety Information

### WARNING

- Failure to observe the following warnings, and to avoid these potentially hazardous situations, could result in death or serious injury.
- Read and understand this and all other supplied manuals before installing, operating, repairing, maintaining, changing accessories on, or working near this product.
- Always wear eye protection when operating or performing maintenance on this tool. The grade of protection required should be assessed for each use and may include impact-resistant glasses with side shields, goggles, or a full face shield over those glasses.
- Always turn off the air supply, bleed the air pressure and disconnect the air supply hose when not in use, before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool or any accessory.

**Note:** When reading the instructions, refer to exploded diagrams in Parts Information Manual when applicable (see under Related Documentation for form number).

### Lubrication

Each time the Model 7RAQT4 Tapper is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

1. **Motor**  
Use **Ingersoll Rand** No. 10 Oil for lubricating the motor. Inject a few drops of oil into the air inlet before attaching the air hose.
2. **Bearings**  
Fill the Bearings to 50% capacity with **Ingersoll Rand** No. 28 Grease.

3. **Bevel Gear**  
Apply light coat of **Ingersoll Rand** No. 67 Grease to bevel gear.
4. **Gear Train**  
Single Reduction - Apply 4.5 - 6 cc of **Ingersoll Rand** No. 28 Grease.  
Double Reduction - Apply 6 - 7.5 cc of **Ingersoll Rand** No. 28 Grease.

### Disassembly

#### General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Whenever grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
3. Do not remove any part which is a press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.
4. Do not disassemble the tool unless you have a complete set of new gaskets and O-rings for replacement.

#### Disassembly of the Tool

1. Using two No. 7RAQT4-200 Tap Chuck Removal Wedges, remove the Tap Chuck (59).
2. Lightly grasp the handle of the Motor Housing (1) in leather-covered or copper-covered vise jaws so that the Spindle (48) is upward.

### NOTICE

**Be careful not to drop the Planet Gears on the floor.**

3. Using an adjustable wrench, grasp the flats on the Gear Case (57) and unscrew the Gear Case from the Motor Housing. Lift the Gear Case along with the gearing from the Motor Housing.
4. Remove the Motor Housing from the vise, and grasp the pinion end of the Rotor (34) in the vise. Make certain to use leather-covered or copper-covered vise jaws. Withdraw the motor from the Motor Housing.

#### Disassembly of the Gearing

1. If the Bearing Housing Spacer (43) remained with the Gear Case (57) when the tool was disassembled, slide it from the bore of the Gear Case.
2. While holding the Gear Case vertically with the Spindle (48) upward, tap the Case gently against the surface of a workbench to jar the Gear Head (44), Gear Head Planet Gears (45) and Gear Head Spacer (47) from the Gear Case.
3. Using a pair of snap-ring pliers, remove the Spindle Retainer (56) from the Spindle (48).
4. While holding the Gear Case vertically with the Spindle upward, tap the Case gently against the surface of a workbench to jar the

- Spindle (48) and Spindle Planet Gears (49) from the Gear Case.
5. Using a pair of snap-ring pliers, remove the Spindle Bearing Retainer (54) from the Gear Case.
6. Withdraw the Grease Shield (51) from the Gear Case.
7. Note that there is a Spindle Bearing Spacer (53) between the inner rings of the two Spindle Bearings (52). If the Spindle Bearings are to be removed, maneuver the Spindle Bearing Spacer so that it is off center in relation to the Spindle Bearings and so that its split ends do not show.
8. Stand the Gear Case, large end down, on the table of an arbor press and using a 1/2" (13 mm) diameter dowel, carefully press against the Spindle Bearing Spacer to remove the one Spindle Bearing and the Spacer.
9. Using snap-ring pliers, remove the Spindle Bearing Seat (55) from the Gear Case.
10. Using a sleeve that contacts the outer race of the bearing, press the second Spindle Bearing from the Gear Case.
11. If the Spindle Planet Gear Bearings (50) and Gear Head Planet Gear Bearings (46) are to be replaced, press the old bearings from their respective Planet Gears.

#### Disassembly of the Motor

1. Slide the Front Rotor Bearing Housing (41) along with the two Bearing Spring Washers (40) from the Front Rotor Bearing (39).
2. Grasp the pinion end of the Rotor in leather-covered or copper-covered vise jaws so that the Rear End Plate is upward.

### CAUTION

**Make certain the End Plate Retainer (33) does not fly off the pliers when it is slipped off the hub of the Rotor.**

3. Using a pair of external snap ring pliers with just the tips of the pliers inserted between the ends of the End Plate Retainer, spread the Retainer enough to remove it from the groove in the hub of the Rotor.
4. Lift off the Rear End Plate, Cylinder (36) and Vanes (35).
5. Check the Front Rotor Bearing for damage or roughness. If replacement is necessary, support the Front End Plate (37) between two blocks of wood on the table of an arbor press, and press the Rotor from the Front Rotor Bearing.

## Disassembly of the Reverse Valve

1. Unscrew the Reverse Valve Cap (6) and remove the Reverse Valve Spring (5). If the Reverse Valve Cap Seal (7) is damaged, remove it from the recess in the Housing (1).
2. Thread a No. 8-32 thread cap screw into the top of the Reverse Valve (4) and pull the Reverse Valve from the Motor Housing.

## Disassembly of the Throttle Mechanism

### NOTICE

#### A 10 mm hexagon socket fits the Actuating Valve Bushing (11).

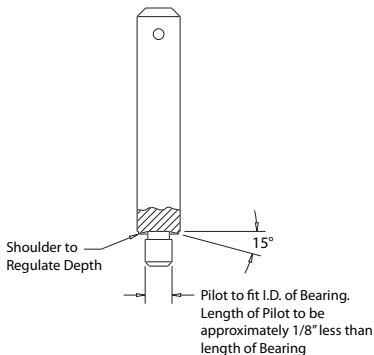
1. Unscrew the Actuating Valve Bushing from the Motor Housing (1), and remove the entire Actuating Valve Assembly and Actuating Valve Spring (15).

## Assembly

### General Instructions

1. Always press on the **inner** ring of a ball-type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball-type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws. Take extra care with threaded parts and housings.
4. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a suitable cleaning solution and dry with a clean cloth. **Sealed or shielded bearing should never be cleaned.** Workgrease thoroughly into every open bearing before installation.
6. Apply a film of O-ring lubricant to all O-rings before installation.
7. Unless otherwise noted, always press on the stamped end of a needle bearing when installing the needle bearing in a recess. Use a bearing inserting tool similar to the one shown in Dwg. TPD786.

### Needle Bearing Inserting Tool



(Dwg. TPD786)

### Assembly of the Pistol Grip Motor Housing

1. If the Rear Rotor Bearing (3) was removed, install a new bearing.
2. Place the Bearing Ejecting Nut (2) in the small recess at the bottom of the bore in the Motor Housing (1).
3. Using a bearing inserting tool that has a pilot to fit the inside of the Bearing, and a shoulder that contacts the outer radius on

### NOTICE

#### A 10 mm hexagon socket fits the Actuating Valve Cap (14).

2. Unscrew the Actuating Valve Cap.
3. Unscrew the Inlet Bushing (26) and remove the Inlet Bushing Spacer (25), Air Strainer Screen (27), Muffler Assembly (23), Muffler Element (24A), Throttle Valve Spring (22) and Throttle Valve (19).
4. Withdraw the Trigger Assembly.
5. If the Throttle Valve Seat (20) and Throttle Valve Seat Support (21) are to be replaced, withdraw them from the handle with a stiff wire hook.

### Disassembly of the Pistol Grip Motor Housing

1. Grasp the handle of the Motor Housing (1) in leather-covered or copper-covered vise jaws.
2. If the Rear Rotor Bearing (3) is to be replaced, remove the old Bearing by threading a No. 10-24 thread cap screw into the Bearing Ejecting Nut (2) and jack the Bearing from the Housing.

the bearing shell, press the Rear Rotor Bearing, **stamped end trailing**, into the bearing recess of the Motor Housing until it is about 0.010" (0.25 mm) below flush. Inject 0.5 cc of grease into the Bearing.

### Assembly of the Throttle Mechanism

1. The Actuating Valve (9) can be assembled in either side of the Motor Housing (1), depending upon operator preference.

### NOTICE

#### A 10 mm hexagon socket will fit the Actuating Valve Cap (14).

2. Install the Actuating Valve Cap Seal (16) on the Actuating Valve Cap and thread the Cap into the side of the Motor Housing. Tighten it to 4 to 6 ft-lb (5.4 to 8 Nm) of torque.
3. Install the Valve Bushing Seal (12) on the Actuating Valve Bushing (11).
4. Install the Actuating Valve Face (10) in the groove on the Actuating Valve (9), and insert the small end of the Actuating Valve into the threaded end of the Bushing until it protrudes from the opposite end.
5. Press the Actuating Valve Button (13) on the small diameter of the Actuating Valve (9).
6. Place the Actuating Valve (15) in the cross-bore of the Motor Housing so that it enters the recess in the Actuating Valve Cap.

### NOTICE

#### A 10 mm hexagon socket will fit the Actuating Valve Bushing.

7. Take the assembled Actuating Valve and Bushing, and thread the Bushing into the cross-bore so that the end of the Actuating Valve enters the bore of the Spring. Work the Actuating Valve a few times to see that it functions smoothly. Tighten the Actuating Valve Bushing to 4 to 6 ft-lb (5.4 to 8 Nm) of torque.
8. Change the position of the Motor Housing in the vise so that the handle is vertical and the entrance to the handle upward.

### NOTICE

**The Throttle Valve Seat is symmetrical. If one side appears worn, turn the Seat over so that the good side will face the Throttle Valve (19).**

9. Insert the Throttle Valve Seat Support (21) into the tapped bore of the handle and follow it with the Throttle Valve Seats. Push them into place with a 1/2" (13 mm) dowel.
10. Install the assembled Trigger (17) and Trigger Pin in the trigger bushing.
11. Installation of the Throttle Valve is sometimes a bit tricky due to the smallness of the Valve and the depth of the bore in which

it is located. The difficult part is in holding the Valve while inserting the long end of the valve stem through the hole in the trigger stem. Although the Valve can be held with a push-button mechanical drafting pencil or a wooden dowel, one of the easiest ways to hold it is by using a common wooden pencil with rubber eraser. Insert the short end of the valve stem into the rubber eraser full depth; then back it out far enough so that the Valve is just nicely supported. Insert the Valve into the bore of the handle so that the long end of the stem enters the hole in the Trigger Stem. Pull outward on the Trigger to hold the Valve while removing the pencil.

- Place the Air Strainer Screen (27), closed end first, inside the large end coil of the Throttle Valve Spring (22).
- Insert the Throttle Valve Spring and Screen, small coil first, into the handle so that the slip-ring encircles the end of the Throttle Valve.
- Moisten the Muffler O-ring (24) with O-ring lubricant, and slip it over the perforated baffle of the Muffler (23).
- Place the Muffler on the face of the handle so that the perforated baffle extends into the handle.
- Slide the Inlet Bushing Spacer (25) over the threaded end of the Inlet Bushing (26), and install the Inlet Bushing in the handle. Tighten it to 25 ft-lb (34 Nm) of torque.

### Assembly of the Reverse Valve

- Grasp the handle in leather-covered or copper-covered vise jaws so that the bore of the Motor Housing is horizontal.
- Slide the Reverse Valve (4), tapped end trailing, into the reverse valve bushing.
- Place the Reverse Valve Spring (5) on top of the Reverse Valve.
- If the Reverse Valve Cap Seal (7) was removed, carefully snap a new Seal in place on the rim of the reverse valve bushing.
- Install the Reverse Valve Cap (6). Tighten it to 7 to 9 ft-lb (9.5 to 12 Nm) of torque.

### Assembly of the Motor

- Slide the Front End Plate (37), flat side first, over the splined end of the Rotor (34).
- Using a sleeve that contacts only the inner ring of the Front Rotor Bearing (39), press the Bearing onto the splined hub of the Rotor until it seats against the Front End Plate.
- The clearance between the Front End Plate and Rotor is critical. While holding the Front End Plate, gently tap the splined end of the Rotor with a plastic hammer until you can insert a 0.001" feeler gauge or shim between the face of the Rotor and End Plate.
- Grasp the splined end of the Rotor in leather-covered or copper-covered vise jaws so that the short hub of the Rotor is upward.
- Place the Cylinder (36) down over the Rotor and against the Front End Plate. The exhaust holes perpendicular to the cylinder axis **MUST** be at the five o'clock position when looking down through the Cylinder at the Front End Plate.
- Wipe each Vane (35) with a light film of the recommended oil and place a Vane in each slot in the Motor. Make certain the vane slots are clean.
- Place the Rear End Plate (32), flat side first, over the short hub of the Rotor.

### NOTICE

**Make certain the Retainer does not fly off the pliers as you slip it on the hub of the Rotor.**

- Install the Rear End Plate Retainer (33) in the groove on the hub of the Rotor.

### Assembly of the Gearing

- Using snap-ring pliers, install the Spindle Bearing Seat (55) in the groove nearest the small end of the Gear Case (57).
- Using a sleeve that contacts the outer ring of the bearing, press the Spindle Bearing (52) in the Gear Case until it contacts the Spindle Bearing Seat.
- Place the Grease Shield (51), flange side first, against the Spindle Bearing.

- Using snap-ring pliers, install the Spindle Bearing Retainer (54) in the groove in the Gear Case adjacent to the Grease Shield. Stand the Gear Case on the table of an arbor press with the small end upward.
- Place the Spindle Bearing Spacer (53) on the inner ring of the Spindle Bearing that has already been pressed into the Gear Case.

### CAUTION

**Do not press the second Spindle Bearing too far. Press it in only far enough so that its inner ring contacts the Spindle Bearing Spacer.**

- Using a sleeve that contacts the outer ring of the bearing, carefully press the second Spindle Bearing into the Gear Case until it contacts the Spindle Bearing Spacer.
- Insert the Spindle (48), tapered end first, into the threaded end of the Gear Case (57) and through the bore of both Spindle Bearings and the Spindle Bearing Spacer.
- Using snap-ring pliers, install the Spindle Retainer (56) in the groove on the Spindle.

### NOTICE

**Always press against the stamped end of the Bearing.**

- If the Spindle Planet Gear Bearings (50) or the Gear Head Planet Gear Bearings (46) were removed from their respective Planet Gears, press in new Planet Gear Bearings using a bearing inserting tool that has a pilot that fits the bore of the Bearing and a shoulder that contacts the outer radius of the Bearing. Press all Bearings flush or slightly below flush with the face of their respective Planet Gear. Work some grease into each Bearing.
- Work some of the recommended grease into the gear teeth inside the Gear Case.
- Place a Spindle Planet Gear (49) on each planet gear shaft.
- Place the Gear Head Spacer (47) inside the Gear Case against the face of the Spindle Planet Gears.
- Work some grease into the gear teeth on the Gear Head (44) and insert the Gear Head, pinion end first, in the Gear Case so that it meshes with the Spindle Planet Gears.
- Place a Gear Head Planet Gear (45) on each planet gear shaft.
- Insert the Bearing Housing Spacer (43) in the Gear Case so that it seats against the internal gear teeth.

### Assembly of the Tool

- Position the Rear End Plate Gasket (31) in the bottom of the bore of the Motor Housing (1) so that the dowel hole and air inlet ports in the Gasket align with those in the Motor Housing.
- Using an assembly dowel 3/32" x 10" (2.3 mm x 254 mm), align the dowel groove in the Front End Plate (37), Cylinder (36) and Rear End Plate (32). Place the assembly rod in the aligned grooves so that about 3" (75 mm) of the rod extends beyond the Rear End Plate. Insert the extension into the dowel hole in the Motor Housing and slide the motor into the Motor Housing until it seats.
- Withdraw the assembly dowel and insert the Cylinder Dowel (38). When properly positioned, the Cylinder Dowel should be slightly below the surface of the Front End Plate.
- Place the two Bearing Spring Washers (40) inside the Front Rotor Bearing Housing (41).
- Slide the Front Rotor Bearing Housing over the Front Rotor Bearing.
- Thread the assembled Gear Case (57) onto the Motor Housing, and tighten it to 40 ft-lb (54 Nm) of torque. Run the motor at reduced air pressure while tightening the Gear Case. Listen to make certain there is non scoring.
- Wipe the tapered section of the Spindle (48) and Tap Chuck (59) clean and dry, and install the Tap Chuck on the Spindle.

## Troubleshooting Guide

Trouble	Probable Cause	Solution
Loss of Power	Low air pressure	Check air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet.
	Plugged Air Strainer Screen or Inlet Screen	Clean the Air Strainer or Inlet Screen in a clean, suitable, cleaning solution. If the Screen cannot be cleaned, replace it.
	Clogged Muffler or Exhaust Silencer	Clean the Muffler Element in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the <b>complete</b> set of Vanes.
	Damaged Rear End Plate Gasket	Install a new Rear End Plate Gasket.
	Worn or broken Cylinder	Replace the Cylinder if it is cracked or if the bore appears wavy or scored.
	Improper lubrication or dirt build-up	Clean the Motor Unit parts and lubricate as instructed.
Leaky Throttle Valve	Worn Throttle Valve and/or Throttle Valve Seat	Install a new Throttle Valve and/or a Throttle Valve Seat.
	Dirt accumulation on Throttle Valve and/or Throttle Valve Seat	Pour about 3 cc of a clean, suitable, cleaning solution in the air inlet and operate the tool Valve for about 30 seconds. Immediately pour 3 cc of the recommended oil in the air inlet and operate the tool for 30 seconds to lubricate all the cleaned parts.
Tool will not function in reverse	Contamination in air-thrown Reverse Valve chamber	Clean all reverse valve parts in a clean, suitable, cleaning solution.
	Damaged parts	Replace any parts that are damaged or worn.

### Related Documentation

For additional information refer to:

Product Safety Information Manual 04580353.

Product Information Manual 16572273.

Parts Information Manual 16572810.

Manuals can be downloaded from [ingersollrandproducts.com](http://ingersollrandproducts.com)





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