16572644
Edition 3
May 2014

Air Drill

5 Series

Maintenance Information

Save These Instructions

Ingersoll Rand

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 Manuals when applicable (see under Related Documentation for form numbers).*

Lubrication

Each time a Series 5 Drill is disassembled for maintenance and repair or replacement of parts, lubricate the tool as follows:

1. Inject a few drops of **Ingersoll Rand** No. 10 Oil into each vane slot in the Rotor bore before inserting the Vanes.
2. Work enough **Ingersoll Rand** No. 23 Grease into the Front Rotor Bearing (108) and Spindle Bearing (131) to coat the balls and races; apply a heavy coat of the recommended grease into the Rear Rotor Bearing (3 and 53) before installing the motor in the Motor Housing.
3. Apply a coat of **Ingersoll Rand** No. 23 Grease to the Planet Gears (125 and 132), the planet gear shafts, the bearing surfaces on the Spindle (127) and Gear Head (124) and the teeth on the Ring Gear (121).

NOTICE

Do not pack the gear chamber with grease; excessive grease will cause a loss of power and overheating.

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 Gearing

1. Lightly clamp the Motor Housing (1 or 51) in a vise with the spindle end up.

NOTICE

Take care not to distort the motor bore.

2. Remove the Spindle Bearing Locknut (133) from the Housing and withdraw the gearing. Except for the moderate press fit of the Spindle Bearing (131) on the Spindle (127), all gearing parts are free fitting and will easily slide apart.

Disassembly of the Motor

NOTICE

All motor parts are free fitting except for the Rear End Plate (102) which is retained by the End Plate Retainer (103).

1. Withdraw the motor assembly from the Housing.
2. Remove Rear End Plate Gasket (111) from the Housing.
3. Remove End Plate Retainer and Rear End Plate (102).
4. Remove Bearing Retaining Washer (109), Front Rotor Bearing (108), Front Rotor Bearing Housing (106), Cylinder Dowel (110), Cylinder (104), Rotor (101) and Vanes (105).

Disassembly of the Throttle Mechanism for Pistol Grip Drills

1. Using a small punch, remove the Throttle Retaining Pin (60) from the Motor Housing (51) and withdraw the throttle mechanism.
2. Remove the Throttle Valve Face (55) from the Throttle Valve (54).
3. Remove the Throttle Valve from the Throttle Bushing (56) and remove the Throttle Bushing Seals (57).
   For Reversible Models, remove the Throttle Valve Seat (58F), Reverse Valve Bushing (58G) and Reverse Valve Seal Rings (58F).

NOTICE

If it is necessary to remove the Trigger (53B), a new Trigger must be installed.

Disassembly of the Throttle Mechanism for Lever Throttle Drills

1. Remove the Retainer Screw (14) and Throttle Assembly Retainer (13) and withdraw the throttle mechanism.

NOTICE

Before proceeding, place an index mark on the Throttle Valve Body (5) and Valve Knob (7) to assure their same relative position when reassembling. It is possible to change the orientation 180°. If this occurs, the Tool will not run.

2. Push the Valve Knob Retainer (9) from the Valve Knob (7) and separate the Knob from the Throttle Valve Body being careful not to lose the other throttle components.
3. Withdraw the Throttle Valve Seat (12) from the Valve Body.

Assembly

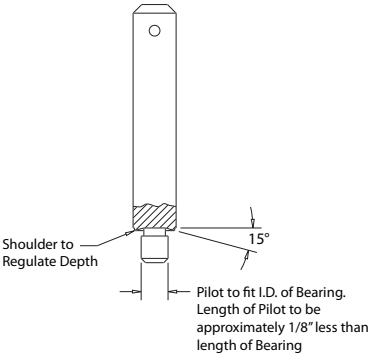
General Instructions

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. Always clean every part and wipe every part with a thin film of oil before installation.
5. Apply a film of O-ring lubricant to all O-rings before final assembly.
6. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a clean, suitable, cleaning solution and dry with a clean cloth. **Sealed or shielded bearings should**

never be cleaned. Work grease thoroughly into every open bearing 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 Throttle Mechanism for Lever Throttle Drills

1. Insert the Throttle Valve (10) followed by the small diameter end of the Throttle Valve Spring (11) into the Throttle Valve Body (5).

NOTICE

Make certain the Valve Knob Seal (8) is undamaged and in place between the Knob and Valve Body.

2. Insert the Valve Knob (7) into the Throttle Valve Body and retain it using the Valve Knob Retainer (9).
3. Examine the Throttle Valve Seals (6) and replace them if they are worn or damaged. Apply a film of O-ring lubricant to the O-rings before assembly.
4. Insert the assembled throttle mechanism into the Motor Housing and retain the mechanism using the Throttle Assembly Retainer (13) and Retainer Screw (14).

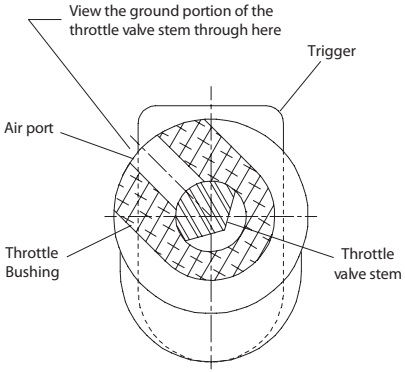
Assembly of the Throttle Mechanism for Pistol Grip Drill

NOTICE

If it becomes necessary to remove the Trigger (53B), a new Trigger must be installed. The orientation of the Valve and Trigger is important for maintaining optimum performance.

1. Install the Throttle Bushing Seat (58) in the Housing (51).
2. Install the Throttle Valve Face (55) in the groove in the Throttle Valve (54) and apply a thin coat of O-ring lubricant.
3. Examine the Throttle Valve to identify a ground arc on the Valve shaft near the Throttle Valve Face. Two unground flat faces connect with the arc.
4. Slide the Throttle Valve, barbed end first, into the round end of the Throttle Bushing Assembly (56) or Reverse Valve Assembly (58B) and locate the drilled hole in the outside diameter of the Bushing.
5. View the Throttle Valve stem through the drilled hole. Rotate the Throttle Valve until the ground arc fills the view through the drilled hole. Maintain this relative positioning and stand the partially assembled throttle on the workbench with the Throttle Valve Face down.
6. Align the flat on the top of the Trigger with the flat on the top of the Bushing, keeping the alignment as in Step 5 above, and press the Trigger onto the exposed barbed end of the Valve.

Recheck the alignment of the Valve, Trigger and Bushing. When the parts are properly positioned, the flat on the Bushing and the flat o the top of the Trigger should align when the ground arc is seen through the port in the side of the Bushing. Refer to (Dwg. TPD602)



Cross section through throttle valve bushing and throttle valve showing relative position of air port and valve stem

7. When inserting the assembled Throttle into the Motor Housing, align the flat on the Trigger with the flat on the Bushing and insert the assembly into the throttle hole with the flats closest to the body of the Housing.
8. Retain the throttle mechanism in the Housing using the Throttle Retaining Pin (60).

Assembly of the Motor

1. Slip the Rear End Plate (102) on the rear hub of the Rotor (101) and install the Retainer (103) in the groove.
2. Hold the Rotor vertically and clamp the short hub in leather-covered or copper-covered vise jaws.
3. Insert a Vane (105) in each slot.
4. Place the Cylinder (104), front end up, over the Rotor and onto the Rear End Plate. To determine which end of the Cylinder is the front end, hold the Cylinder horizontally, facing one end. Position the external groove for the Dowel (110) at the top as shown in the illustration. If the airports through the cylinder wall are in the bottom right quadrant, you are facing the front of the Cylinder. When assembling the motor, be sure to properly install the Cylinder. The motor will not operate properly if the Cylinder is inverted.
5. Slip the Front End Plate (106) over the rotor shaft. Press the Front Rotor Bearing (105) into the Bearing Housing (107) with the sealed face of the Bearing flush with one face of the Housing. Slide the Bearing and Housing, sealed side first, followed by the Retaining Washer (109), onto the shaft.
6. Enter the Rear End Plate Gasket (111) into the Motor Housing (1 or 51), positioning the Gasket smoothly on the backbore so that the dowel notch in the Gasket aligns with the dowel hole in the Housing.
7. Obtain a stiff steel rod 3/32" (2.3 mm) diameter and approximately 10" (254 mm) long to use as an assembly dowel.
8. Align the dowel groove in the Rear End Plate, Cylinder and Front End Plate with the dowel hole through the Rotor Bearing Housing and insert the rod.
9. Enter the end of the assembly dowel in the dowel hole and slide the motor assembly into the Housing. This is a sliding fit and if proper alignment is maintained, the assembly will enter under only slight finger pressure. Do not drive or otherwise force the motor into position.
10. Replace the assembly dowel with the Cylinder Dowel.

NOTICE

Make sure the Cylinder Dowel is entered into and remains in the dowel hole in the Housing. When in proper position, approximately 3/32" (2.3 mm) of the Dowel protrudes from the face of the Bearing Housing. If it is not in the hole, it will protrude approximately 7/32" (5.5 mm).

Assembly of the Gearing

1. Work the Slinger Ring (128), large end first, over the Spindle shaft and against the Gear Frame race. Follow with the Seal (129) and the Grease Shield (130).
2. Install the Spindle Bearing (131) over the Spindle shaft. Firmly support the Spindle (127) and press, do not drive, the Bearing into position using an arbor that will contact only the inner ring of the Bearing.
3. Slide the Ring Gear (121) into the Motor Housing (1 or 51), making sure the Cylinder Dowel (110) enters one of the notches in the end of the Gear. Check this engagement by trying to rotate the Gear by hand.
4. **For H, J or N ratio,** slide the Rotor Pinion Spacer (122) followed by the Rotor Pinion (123) onto the spline shaft on the Rotor (101).
5. **For N ratio,** slide a Gear Head Planet Gear (125) (13 teeth) onto each of the three gear shafts on the Gear Head (124). Enter the assembly into the Ring Gear (121) and slide it into engagement with the Rotor Pinion. Slip the Gear Head Spacer (126) over the spline on the Gear Head.

NOTICE

For N ratio, a Gear Head Planet Gear (125) has 13 teeth and a Spindle Planet Gear (132) has 14 teeth. Do not mix, mismatch or switch locations with these small gears when reassembling a tool.

6. **For H, J, K, L or N ratio,** slide a Spindle Planet Gear onto each of the three gear shafts on the Spindle (127) and slide the assembly into the Ring Gear and into engagement with the Rotor Pinion or Gear Head.
7. Clean the threads on the Spindle Bearing Locknut (133) and Motor Housing (1 or 51) to remove all grease and oil.
8. Apply film of Vibra-Tite®** VC3 to the threads of the Motor Housing (1 or 51).
9. With the Locknut hand tight, connect the air hose to the Inlet (18 or 66) and operate the Drill to check for smooth operation.
10. Clamp the Tool in a vise, taking care not to damage the Housing and tighten the Locknut a minimum torque of 25 ft-lb (33 Nm).
11. Install Drill Chuck Spacer (134) on Spindle.
12. Thread Drill Chuck onto Spindle and tighten.

** Registered trademark of ND industries

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 **complete** 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.
Gear Case gets hot	Excessive grease	Clean and inspect the Gear Case and gearing parts and lubricate as instructed.
	Worn or damaged parts	Clean and inspect the Gear Case and gearing. Replace worn or broken components.

Related Documentation

For additional information refer to:
Product Safety Information Manual 04580353.
Product Information Manual 16572166.
Parts Information Manual 16572786.

Manuals can be downloaded from ingersollrandproducts.com

Notes:

Notes:

Notes:

ingersollrandproducts.com