



**16606105**

Edition 2

May 2014

## **Air Drill**

**551 Series**

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# **Maintenance Information**



**Save These Instructions**

**IR** *Ingersoll Rand®*

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## 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).

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## Lubrication

Before attaching the air hose, squirt several drops of Ingersoll Rand No. 50 Oil into the air inlet.

Before starting the Motor and after each four hours of operation, unless an Air Line Lubricator is used, unscrew the Oil Chamber Plug (20) and fill the chamber in the Backhead (19) with Ingersoll Rand No. 50 Oil.

Always use an air line lubricator with this tool.

We recommend Ingersoll Rand No. 16LUB16C Portable Air Line Lubricator. Its use eliminates the need for filling the oil chamber in the Backhead. Because of the high capacity of the Portable Air Line Lubricator, it requires little attention, and thereby reduces the possibility of neglect. Although the Portable Air Line Lubricator automatically oils the Throttle Valve (110), Governor Valve (12), Reverse Valve (88), and the Vanes (40) in the motor, it does not eliminate the necessity of periodically adding grease to the gear chamber and governor chamber. **Weekly, or as experience indicates,** insert a small quantity of the recommended grease into the Grease Fittings (25 and 56). Two or three strokes of a small grease gun are sufficient for the Fitting (25) in the Backhead (19); six or eight strokes for the Fitting (56) in the Gear Case (55 or 251).

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## Hose and Hose Fittings

Use 1" (25 mm) hose for connecting the Tool to the air supply. Unless the Tool is equipped for remote control, use the No. P35-46 Male Hose Nipple (1" hose to 1" male pipe) for attaching the hose to the throttle.

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## 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.

### Air Strainer

Periodically, as experience indicates, unscrew the Air Strainer Body (119) from the Air Strainer Cap (116) and wash the Air Strainer Screen (117) in a clean, suitable cleaning solution. Enter the prongs on the Screen Support (118) into one end of the Screen and insert the Screen, support end first, into the Body when assembling the Strainer.

### WARNING

Notice the arrows on Throttle Sleeve (109). These arrows indicate the direction in which the Throttle Sleeve must be turned to activate either FORWARD or REVERSE rotation of the Drill. Hold the Drill in the normal operating position with the Throttle Sleeve pointing to operator's right and with the Throttle Sleeve in his right hand. Pivot the Reverse Stop Lever (92) away from the operator. With the Reverse Stop Lever in this position, the Drill can be operated in either the FORWARD rotation or REVERSE rotation. Therefore, inadvertent movement of the Throttle Sleeve could cause a sudden change in the direction of rotation of the Drill. Pivoting the Reverse Stop Lever toward the operator prevents the REVERSE rotation of the Drill and permits the Drill to be operated in the FORWARD rotation only.

For Tools equipped with remote control, use the No. R5H-46 Male Hose Nipple (1" hose to 3/4" male pipe) for attaching the hoses to the Inlet Studs.

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## Feed Screw Cap

### NOTICE

The external thread on the Outer Feed Screw (76), Motor Housing Stud (262) or Backhead Clamp Stud (262) is left-hand; rotate the Feed Screw Cap (82), Motor Mounting Stud Cap (268) or Clamp Stud Cap (268) clockwise to remove.

## Disassembly of the Motor

1. Remove the Backhead Cap Screws (84).

### NOTICE

Do not pry the Backhead (19) from the Motor Housing (1 or 254).

2. Grasp the Oil Chamber Plug (20) in a leather-covered or copper-covered vise and pull on the Housing if the Backhead cannot be lifted off with the fingers.

### NOTICE

The Rotor (34) is tapped left-hand: rotate the Governor Assembly clockwise to remove.

## NOTICE

**Never clamp the Cylinder (39) in a vise.**

3. Grasp the Cylinder in one hand. Insert a small rod into the rotor bore and drive the hub of the Rotor (34) out of the Rear Rotor Bearing (37). Support the Front End Plate (41) and press the front hub of the Rotor out of the Front Rotor Bearing (42).

## 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 bearing should never be cleaned.** Work grease thoroughly into every open bearing before installation.

### Assembly of the Motor

1. Press the Rear Rotor Bearing (37), shielded side first, into the recess in the Rear End Plate (38), with an arbor that will contact only the outer ring of the Bearing.

## NOTICE

**Press on the inner ring of the Bearing when installing this assembly on the rear hub of the Rotor (34).**

2. Press the Front Rotor Bearing (42), shielded side first, onto the front hub of the Rotor (34) with a sleeve that will clear the Rotor Pinion (35) and contact only the inner ring of the Bearing.
3. Install the End Plate (38 or 41) on the Rotor (34), and insert a Vane (40) into each vane slot in the Rotor.
4. Place the Cylinder (39) over the Rotor and against the installed End Plate.

## NOTICE

**Make certain the Cylinder is installed properly before proceeding. Check as follows:**

There is a 3/4" (19 mm) dia. hole in each of the two cylinder flats. One hole is located about midway between the ends of the Cylinder, and the other is located relatively close to one end. When the Cylinder is properly installed, the hole nearer the end is farthest from the Rotor Pinion (35).

5. When installing the motor assembly, align the dowel holes through both End Plates (38 and 41) with the dowel hole through the Cylinder (39) and insert a 3/16" (5 mm) dia. rod at least 10" (254 mm) long through the aligned holes, allowing it to protrude from the pinion end of the motor assembly. Enter the protruding end of the rod into the dowel hole in the bottom of the motor housing bore, and slide the motor assembly squarely into the Housing.6. Draw the Backhead (19) evenly against the Backhead Gasket (18) on the face of the Motor Housing (1 or 254) by turning each Backhead Cap Screw (84) a little at a time until all are tight.

### Disassembly of the Throttle

1. Remove the Throttle Body Setscrew (95) from the Motor Housing before withdrawing the Throttle Body (100).

### Disassembly of the Gearing

1. Unscrew the three Planet Gear Frame Setscrews (48) from the Planet Gear Frame (47) before attempting to press the Spindle (44 or 250) out of the Planet Gear Frame.

### Assembly of the Throttle

1. Install the Throttle Sector (97) onto the Throttle Body, and press the Body into the Motor Housing until the Throttle Body Setscrew holes are aligned.
2. Align the tooth of the Throttle Sector marked with an arrow with the tooth space of the Reverse Valve Sector (89) marked "X" and mesh the two Sectors.

### Assembly of the Gearing

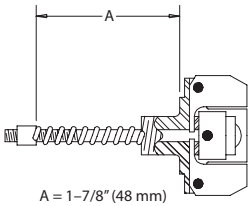
1. Tighten the Screws after assembling the Gear Frame on the Spindle.
2. Note the stamping "THRUST HERE" on one side of the Spindle Thrust Bearing (69). Install the Bearing, stamped side first, in the bearing recess in the Motor Housing (1 or 254).
3. Install an Intermediate Gear Bearing (75) at each end of the Intermediate Gear (74). Mesh the large gear on the compound Intermediate Gear with the Rotor Pinion (35) and install the Bearing in this end of the Intermediate Gear Bearing Stud (3) in the Motor Housing (1 or 254).
4. Apply the Gear Case (55) to the Motor Housing.
5. Coat one face of the Spindle Thrust Bearing Spacer (70) with grease and center it on the Spindle Thrust Bearing (69) in the Motor Housing. The grease will hold it in position on the Bearing during assembly.
6. Place the Spindle Gear (73), large end first, in the Gear Case, meshing the large gear with the small gear of the compound Intermediate Gear, and centering it on the Bearing Spacer.
7. Coat the spiral-grooved portion of the Spindle (44 or 250) with grease and insert it through the Spindle Gear, Spindle Bearing Spacer and into the Spindle Thrust Bearing, meshing the Planet Gear (49) contained in the Planet Gear Frame (47) on the Spindle with the small gear on the compound Spindle Gear.
8. Mesh the Internal Gear (72) contained in the Gear Case Cover (59 or 253) with the Planet Gears and apply the Gear Case Cover to the Gear Case.

Governor Adjustment

NOTICE

The Governor has a left-hand thread. Turn clockwise to remove from Rotor and counterclockwise to install in Rotor.

When installing a new Governor, screw the governor adjusting nut onto the governor stem until dimension "A" equals 1-7/8" (48 mm). This will usually result in the proper governed free speed. However, this is only an approximate setting. Further adjustment may be necessary. Screw the Nut further onto the Stem to increase the speed; back it off to decrease the speed. The correct governed free speed of the various sizes at the Spindle is:



(Dwg. TPD497)  
Before starting a reassembled tool, refer to the Lubrication Section.

| Model          | RPM at 90 psig<br>(6.2 bar/620 kPa) |
|----------------|-------------------------------------|
| 551SM, 551SM51 | 120                                 |
| 551S0, 551S051 | 77                                  |

Maintenance Tools

| Tool Name                          | Operation                                                                                                                   | Tool Number for Ordering |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Spindle Packing Nut Spanner Wrench | Removing or installing the Spindle PackingNut (60) on the Gear Case Cover (59) of Models 551SM, 551SM51, 551S0 and 551S051. | R4-122                   |
| Grease Gun                         | Lubrication                                                                                                                 | P25-228                  |

Troubleshooting Guide

| Trouble                         | Probable Cause                                           | Solution                                                                                                                                                         |
|---------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Loss of power or low free speed | Dirty Inlet Bushing or Air Strainer Screen               | Using a clean, suitable, cleaning solution in a well-ventilated area, clean the Air Strainer Screen. Allow to air dry.                                           |
|                                 | Worn or broken Vanes                                     | Replace the <b>complete</b> set of Vanes.                                                                                                                        |
|                                 | Worn or broken Cylinder and/or scored End Plates         | Examine Cylinder and replace it if it is worn or broken or if bore is scored or wavy. Replace End Plates if they are Low power scored.                           |
|                                 | Dirty motor parts                                        | Disassemble the tool and clean all parts with a clean, suitable, cleaning solution, in a well-ventilated area. Reassemble the tool as instructed in this manual. |
| Motor will not run              | Incorrect assembly of motor                              | Disassemble motor, replace worn or broken parts and reassemble as instructed.                                                                                    |
| Rough Operation                 | Worn or broken Rear Rotor Bearing or Front Rotor Bearing | Examine each bearing. Replace if worn or damaged.                                                                                                                |
|                                 | Worn or broken Gear teeth                                | Check for a worn or broken gearing or if a replacement is necessary.                                                                                             |
| Air leaks                       | Worn Throttle Valve Face or Throttle Valve Face Cap      | Replace worn parts.                                                                                                                                              |
|                                 | Oil Chamber Plug worn or not tight                       | Tighten the Plug. If the problem persists, replace the Plug.                                                                                                     |

Related Documentation

For additional information refer to:  
Product Safety Information Manual 04581450.  
Product Information Manual 03524410.  
Parts Information Manual 16606097.  
Manuals can be downloaded from [ingersollrandproducts.com](http://ingersollrandproducts.com)

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