



Form 16572570
Edition 1
September 2005

Air Drill

20L and 20SL

Maintenance Information



Save These Instructions

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WARNING

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

Always turn off air supply and disconnect air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

LUBRICATION

Each time a Model 20L, 20L-EU, 20SL or 20SL-EU Angle Drill is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

Pour approximately 3 cc of Ingersoll-Rand No. 10 Oil into the air inlet. Remove the Oil Chamber Plug (24) and fill the chamber with Ingersoll-Rand No. 10 Oil.

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, remove the Throttle Connector (11) from the Backhead (21) and using a clean, suitable cleaning solution, clean the Air Strainer Screen (21).

Disassembly of the Motor

1. Secure the Rotor Pinion (41) in leather-covered or copper-covered vise jaws and unscrew the Governor Assembly (14).

NOTICE

This is left-hand thread; turn clockwise to remove.

2. Insert a 5/16" (7 mm) rod into the hole from which the Governor Assembly was removed. Grasp the motor assembly by the Cylinder (36) in one hand (never clamp the Cylinder in a vise), and strike the end of the rod with a hammer, driving the rear hub of the Rotor (31) from the Rear Rotor Bearing (33).
3. Hold the Rotor Pinion (41) in leather-covered or copper-covered vise jaws, and with two pieces of flat

metal inserted in the vane slots, turn the Rotor to unscrew it from the Rotor Pinion.

4. Screw a 3/8"-24 thread bolt into the Rotor, support the Front End Plate (39) as close to the Rotor as possible and drive, or press on the bolt until the rotor hub is free from the Front Rotor Bearing (40).

Disassembly of the Gearing and Angle Head

1. Unscrew and remove the three Retainer Lock Screws (71) before attempting to withdraw the Bevel Pinion (50).
2. Screw a 5/16"-18 thd. bolt into the tapped end of the Bevel Pinion and pull the assembled Pinion from the Housing.
3. Press the Bevel Pinion (50) out of the Bevel Pinion Drive Gear (47) and remove the Bevel Pinion Drive Gear Key (49) before attempting to remove the Bevel Pinion Rear Bearing (51) from the Bevel Pinion. **For Model 20SL or 20SL-EU**, hand ream a new Spindle Bushing (57) with the Spindle Bushing Reamer after pressing it into the Spindle Housing (48).

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 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. Note that the Rear End Plate (34) is stamped "12-2H" while the Front End Plate (39) is unstamped. Slip the Front End Plate (39), crescent grooved side first, over the front hub on the Rotor (31).

NOTICE

The front rotor hub contains a tapered socket.

2. Press the Front Rotor Bearing (40), shielded side first, onto the rotor front hub with a sleeve that will contact only the bearing inner ring. Press the Bearing on as far as possible without binding the Front End Plate (39) against the rotor face.

NOTICE

Make sure the tapered surface on the Rotor Pinion (41) and tapered socket in the rotor hub are clean.

3. Screw the Rotor Pinion into the Rotor (31).
4. Install a Vane (35) in each vane slot in the Rotor (31) and then slip the Cylinder (36) over the Rotor, entering the short End Plate Dowel (No. R2H-74A) into the dowel hole in the Front End Plate (39).
5. Install the Rotor Bearing Spacer (32) with internally beveled end first, on the rotor rear hub.
6. Place the Rear End Plate (34) on the Cylinder (36) so that the long Cylinder Dowel (No. P25-98) protruding from the top face of the Cylinder enters the dowel hole in the Rear End Plate.
7. Press or drive the Rear Rotor Bearing (33), shielded side first, onto the rotor rear hub with a sleeve that will contact only the bearing inner ring.
8. Refer to section on **Governor Adjustment**. Then tightly screw the Governor Assembly into the Rotor (31).

Assembly of the Gearing and Angle Head

NOTICE

Install the assembled Spindle (54) with Bevel Gear (60) and Bearings (56) before installing the assembled Bevel Pinion.

Assemble the Bevel Pinion as follows:

1. Press the unshielded Bevel Pinion Front Bearing (53) onto the Bevel Pinion (50). Slide the Bearing Spacer (52) over the Bevel Pinion. Slip the Bearing Retainer (72), straight side first, over the Bearing Spacer.
2. Install the Bevel Pinion Rear Bearing (51), shielded side first.
3. Install the Bevel Pinion Drive Gear Key (49) in the keyway in the pinion shaft. Press the Bevel Pinion Drive Gear (47), recessed hub side first, onto the pinion shaft.
4. Screw a 5/16"-18 thread bolt into the tapped hole in the pinion shaft and drive, or press the Pinion with assembled parts into the Spindle Housing (48).

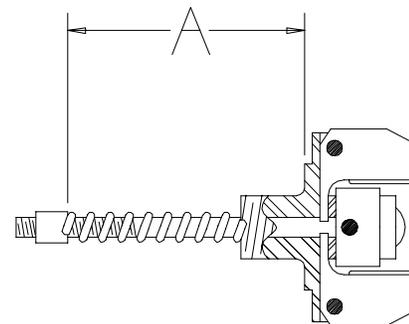
Governor Valve Bushing Replacement

1. Remove the Governor Valve Retaining Spring (28) and withdraw the Governor Valve (27). Support the large face of the Backhead (21) and press out the old Bushing (29) with a 1/2" (12 mm) diameter arbor.

2. Start the new Bushing, deep counterbored end first, into the Backhead, and press it in flush with the bottom of the large bore with a 1" (25 mm) diameter arbor.
3. Clamp the Governor Valve Bushing Reamer upright in a vise.
4. Hold the Backhead (21) squarely above the Reamer and slowly rotate it while applying a light downward pressure to feed the Reamer. Continue until the Reamer bottoms in the Bushing.
5. Screw a 3/8"-24 thread bolt into the Governor Valve (27) and check the fit of the Valve in the Bushing (29). If any binding is noted, lap the Valve to a good fit in the Bushing with fine grain lapping compound.
6. After lapping, remove all trace of the compound by washing the parts in clean kerosene.
7. Apply a few drops of light oil to the Valve, slide it into the Bushing and install the Governor Valve Retaining Spring (28) in the groove in the bushing wall.

GOVERNOR ADJUSTMENT

When installing a new Governor Assembly (14), screw the adjusting nut onto the governor stem until dimension "A" equals 1-29/32" (48.4 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:



A = 1-29/32" (48 mm)

(Dwg. TPD497)

Model	RPM at 90 psig (6.2 bar/620 kPa)
20L, 20L-EU, 20SL, 20SL-EU	310

Before starting a reassembled tool, refer to the Lubrication Instructions on page 3.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Dirty Inlet Bushing or Air Strainer Screen	Using a suitable cleaning solution in a well-ventilated area, clean the Air Strainer Screen. Allow to air dry.
	Worn or broken Vanes	Replace the complete set of Vanes.
	Worn or broken Cylinder and/or scored End Plates	Examine Cylinder and replace 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.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.



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