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Air Sanders and Polishers

Series HDS and TDS

Maintenance Information

Save These Instructions

Ingersoll Rand

WARNING

Always use protective eye wear when performing maintenance on a tool or operating tool.
Always turn of the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool. Failure to do so could result in injury.

Lubrication

Each time model HDS and TDS Sanders and Polishers are disassembled for maintenance, repair or replacement of parts, lubricate the tools:

1. Always wipe the Vanes (17) with a light film of oil before inserting them into the vane slots.
2. Inject 0.5 to 1.0 cc of **Ingersoll Rand** No. 10 Oil into the air Inlet Assembly (1) after assembly.
3. Moisten all O-Rings with O-Ring lubricant.

Disassembly

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Do not press any needle bearing from a part unless you have a new needle bearing on hand for installation. Needle bearings are always damaged during the removal process.
3. When grasping a tool or part in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part or tool and help prevent distortion. This is particularly true of threaded members and housings.
4. Do no 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.
5. Do not disassemble the tool unless you have a complete set of new gaskets and O-Rings for replacement.

Disassembly of Extension Assembly

1. Using the Collet Body Wrench (82) on the flats of the Collet Body (58) and the Collet Nut Wrench (81) on the Collet Nut (60), unscrew the Collet Nut and remove the Collet (59).
2. Loosen the Mounting Screw Nut (64) and slide the assembled handle off the Collet end of the Extension Housing (51).
3. Using snap ring pliers, remove the Shield Retainer (57) and slide the Spindle Bearing Shield (56) out of the Extension Housing.
4. Using a thin blade screwdriver, pry the Extension Housing Plug (52) out of the Extension Housing. Insert a 5/32" steel rod into the opening and through the hole in the Spindle (44) to prevent it from rotating and using the Collet Body Wrench, unscrew and remove the Collet Body.
5. Remove the Seal Cup Assembly (55) from the Collet body.
6. Grasp the tool in copper-covered vise jaws with the Spindle upward and using the Gear Case Adapter Wrench (83) on the flats of the Gear Case Adapter (32) and a 1-1/2" wrench on the flats of the Extension Housing, unscrew and remove the Housing. This is a **left-hand thread** and must be rotated **clockwise** to remove the Housing.

NOTICE

Some of the gears will be free to fall from the spindle gear shafts when the Housing is separated from the Adapter. Make certain they do not fall on a hard surface which could damage them.

7. **For HDS30, HDS45, TDS30 or TDS45,** remove the Spindle Planet Gears (45 or 47), Planet Gear Bearings (46), the Ring Gear (34) and the Ring Gear Clamp (43) from the motor end of the Extension Housing.
   For HDS10 or TDS15, remove the Gear head (39), Gear Head Planet Gears (40), Bearings (41), Gear Head Planet Spacer (42), Spindle Planet Gears (45 or 47), Bearings (48), Ring Gear (34) and the Ring Gear Clamp (43) from the motor end of the Extension Housing.
   For HDS60, HDS90, TDS90 or TDS120, pull the assembled Gear Frame (25) off the spline of the Spindle (44).
8. **For HDS60, HDS90, TDS90 or TDS120,** if the Spur Gears (36), Spur Gear Bearings (37) or Spur Gear Pins (38) do not need to be replaced, set the assembled Gear Frame aside. If any of the components must be replaced, proceed as follows:

NOTICE

The Spur Gear Bearings will be damaged during removal. Make certain a new set of bearings is available before attempting to disassemble the Gear Frame.

   a. Stand the assembled Gear Frame on the table of an arbor press and using a pressing plug having a diameter equal to the size of the Spur Gear Pin, press the Bearing from the Gear Frame.
   b. Push the Pin from the Spur Gear and lift the Spur Gear out of the Gear Frame.
   c. Repeat step (a) and (b) for the remaining two Spur Gears.
   d. Turn the Gear Frame end for end and press the remaining Bearings from the Gear Frame.

9. Grasp the gear end of the assembled Spindle and pull it out of the Extension Housing.
10. If the Front Bearing Spindle Seal (54) is nicked or damaged and must be replaced, remove it from the internal groove near the output end of the Extension Housing.
11. If the Front Spindle Bearing (53) must be replaced, use a bearing puller to pull the Bearing off the front end of the Spindle.
12. If the Rear Spindle Bearing (49) must be replaced, use snap ring pliers to remove the Rear Spindle Bearing Retainer (50) and using a bearing puller, pull the Bearing from the Spindle.
13. **For HDS60, HDS90, TDS90 or TDS120,** if the Rear Spindle Bearing Seal (49A) is nicked or damaged and must be replaced, remove it from the groove in the spindle shaft where the Rear Spindle Bearing was located.
14. Using the Gear Case Adapter Wrench, unscrew and remove the Gear Case Adapter. This is a **left-hand thread**; rotate the Adapter **clockwise** to remove it.
15. Remove the Clamp Sleeve (30) and if the Wick (29) must be replaced, pull it from the motor end of the spacer.

Disassembly of the Motor

1. Pull the Flange (23) and Flow Ring (22) off the front of the Motor Housing (9).
2. Grasp the Rotor Pinion (28) and pull the assembled Motor out of the Motor Housing. Remove the two Rear Rotor Bearing Spacers (14) from the bottom of the Housing.
3. Remove the Vanes (17) from the Rotor (16).
4. Grasp the Rotor in copper-covered vise jaws with the Rotor Pinion upward. Using a 1/2" wrench, unscrew and remove the Pinion.
5. If the Front Rotor Bearing (21) must be replaced, support the Front End Plate (18) between two blocks on the table of an arbor press. Place the blocks as close to the body of the Rotor as possible and press the Rotor from Bearing and End Plate. Remove the Front End Plate Spacer (19) and Front Seal Cup Assembly (20) from the hub of the Rotor.
6. If the Rear Rotor Bearing (13) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (15).
7. Using a bearing puller, pull the Rear Rotor Bearing off the hub of the Rotor.

Disassembly of the Inlet and Throttle

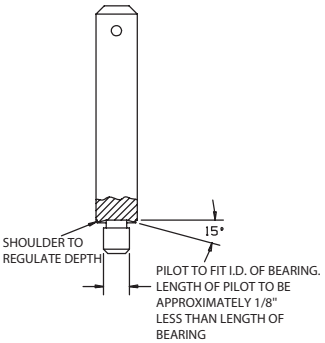
1. Using a 15/16" wrench or six point socket, unscrew and remove the Inlet Assembly (1).
2. Remove the Inlet Seal (3) and Inlet Screen (2) from the Inlet.
3. Remove the Throttle Valve Spring Seat (4), Throttle Valve Spring (5) and Throttle Valve (6) from the Motor Housing (9).
4. If the Throttle Valve Seat (7) must be replaced, insert a hooked tool through the central opening of the Seat and catching the underside of the Seat, pull it from the Housing.
5. **For TDS Models,** if the Throttle Valve Case (7A) must be replaced, insert two hooked tools through the central opening of the Case approximately 180 degrees apart and pull it from the Housing.
6. Press the Throttle Lever Pin (11) from the Housing and remove the Throttle Lever (10). Remove the Throttle Valve Plunger (12).

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 not to damage threads or distort housings.
4. 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 **clean** solvent and dry with a clean cloth. **Sealed or shielded bearings should not be cleaned**. Work grease into every open bearing before installation.
6. Apply a film of O-Ring lubricant to every O-Ring before installation.
7. Unless otherwise noted, always press on the stamped end of a needle bearing when installing a needle bearing into recess. Use a bearing inserting tool similar to the one shown below.

Needle Bearing Inserting Tool



(Dwg. TPD786)

Assembly of the Throttle and Inlet

1. Insert the Throttle Valve Plunger (12) into the Motor Housing (9).
2. Position the Throttle Lever (10) on the Motor Housing and using an arbor press, press the Throttle Lever Pin (11) into the Housing and Lever. The Lever will retain the Plunger in the Housing.
3. **For TDS Models,** if the Throttle Valve Case (7A) was removed, lubricate the outside and the throttle stem end of the Case with O-Ring lubricant. Using a wooden dowel, push the Case, open end trailing, into the Motor Housing.
4. If the Throttle Valve Seat (7) was removed, use a 5/8" wooden dowel with a flat end to push the Seat into the Motor Housing.
5. Push the small end of the Throttle Valve Spring (5) onto the end of the Throttle Valve (6) with the short stem until the Spring snaps into position around the hub and remains there. Install the dish end of the Throttle Valve Spring Seat (4) onto the large end of the Throttle Valve Spring.
6. Holding the Housing with the Lever downward, make sure the Plunger is out of the way and insert the assembled Throttle Valve, long stem end leading, into the housing recess.
7. Push the Inlet Screen (2), closed end leading, into the bushing of the Inlet Assembly (1). After moistening the Inlet Seal (3) with O-Ring lubricant and being careful not to nick the Seal on the threads of the Inlet, install the Seal on the Inlet.
8. Thread the Inlet Assembly into the Housing and tighten it between 20 to 25 ft.-lb. (27.1 to 33.9 Nm) torque.

Assembly of the Motor

1. If the Rear Rotor Bearing (13) was removed, stand the Rotor (16) upright on the table of an arbor press with the threaded end downward. Place the threaded rotor hub into a hole drilled into a flat, smooth block so that the Rotor rests against the large rotor body. Press the Rear Rotor Bearing onto the hub of the Rotor.
2. Install the Rear Rotor Bearing Retainer (15) in the groove on the hub of the Rotor.
3. Install the Front End Plate (18), counterbored end trailing, onto the threaded hub of the Rotor. Using finger pressure, press the Front Seal Cup Assembly (20), felt end trailing, onto the end of the Front End Plate Spacer

(19) that is opposite the large internal bevel. Continue pressing until the felt end is flush with the end of the spacer. Saturate the felt with **Ingersoll Rand** No. 50 Oil. Place the assembled Spacer, Seal Assembly trailing, onto the threaded hub of the Rotor. Make sure the Seal Assembly enters the recess in the Front End Plate.

4. Stand the small hub of Rotor on the table of an arbor press with the threaded end upward and press the Front Rotor Bearing (21) onto the hub of the Rotor.

NOTICE

The Front Rotor Bearing is a flush ground bearing and must be installed in a specific manner. The end of the Bearing with a black stain or hash marks must be away from the Spacer.

5. Grasp the assembled Rotor in copper-covered vise jaws with the threaded rotor hub upward.
6. Thread the Rotor Pinion (28) onto the Rotor and using a torque wrench, tighten the Pinion between 14 and 19 ft.-lb. (19.0 and 25.8 Nm) torque.
7. Inject approximately 1/2 cc of **Ingersoll Rand** No. 68 Grease into the small recess at the bottom of the motor housing bore. Drop the two Rear Rotor Bearing Spacers (14) into the bottom of the motor housing bore.
8. Wipe each Vane (17) with a light film of oil and insert a Vane into each vane slot in the Rotor.
9. Grasp the Rotor Pinion and insert the assembled Rotor into the Motor Housing (9).
10. Assemble the Flow Ring (22) with the Flange (23) before installing the Flange on the Housing. Mate the Flow Ring to the end of the Flange without perforations. The positioning of the Flow Ring is dictated by the desired exhaust. To set the tool exhaust, proceed as follows:
    a. **For front exhaust tools,** align the notched projection on the edge of the Flow ring with the letter "F" on the Housing.
    b. **For rear exhaust tools,** align the notched projection on the edge of the Flow ring with the letter "R" on the Housing.
11. Carefully install the assembled Flange, Flow Ring leading, onto the front of the Motor Housing. Make certain the Ring properly engages the Housing.

Assembly of the Extension Housing

1. Form the Wick (29) into a circle and insert it into one end of the Clamp Sleeve (30) and push it against the Wick Retaining Ring (31). Saturate the Wick with approximately 1.5 cc of **Ingersoll Rand** No. 63 Oil. **Do not substitute any other oil.**
2. Install the Clamp Sleeve over the Rotor Pinion (28), Wick end first, against the Front Rotor Bearing (21).
3. **For HDS60, HDS90, TDS90 or TDS120,** apply a thin coat of O-Ring lubricant to the Rear Spindle Bearing Seal (49A) and install it in the annular groove on the Spindle (44).
4. **For HDS10, HDS30, HDS45, TDS15, TDS30 or TDS45,** using a block with clearance for the gear pins, stand the Spindle (44) on the table of an arbor press with the Collet end upward. With the seal end of the Rear Spindle Bearing (49) trailing, press the Bearing onto the large hub of the Spindle.
   For HDS60, HDS90, TDS90 or TDS120, slide the Rear Spindle Bearing (49) onto the shaft of the Spindle until it covers the Seal. Use care not to damage the Seal when sliding the Bearing over it.
5. Using snap ring pliers, install the Rear Spindle Bearing Retainer (50).
6. Using a block with clearance for the gear pins or shaft spline, stand the Spindle on the table of an arbor press with the collet end upward. With the seal end trailing, press the Front Spindle Bearing (53) onto the shaft of the Spindle until it stops against the shoulder.
7. Install the Ring Gear Clamp (43) at the bottom of the large opening in the gearing end of the Extension Housing.
8. Moisten the Front Bearing Spindle Seal (54) with O-Ring lubricant and install it in the second internal groove inward from the collet end of the Extension Housing.
9. Insert the assembled Spindle, small end leading, into the large end of the Extension Housing until the Rear Spindle Bearing seats in the housing recess.

CAUTION

Maker certain the Front Spindle Bearing Seal is not forced out of the groove or damaged during installation of the Spindle.

10. **For HDS60, HDS90, TDS90 or TDS120,** if the Gear Frame (35) was disassembled, proceed as follows:
    a. Stand the Gear Frame on the table of an arbor press with the notched face upward.
    b. Using a needle bearing inserting tool, press a Spur Gear Bearing (37), marked end trailing, into each of the three holes in the Gear Frame until the trailing end of the Bearing is flush with the counterbored face. Turn the Gear Frame end for end.
    c. Position a Spur Gear (36) in the Gear Frame with the small end of the Gear **toward** the notched face with the Bearings pressed into position.
    d. Insert a Spur Gear Pin (38) through the hole in the Gear Frame and in the Spur Gear and Spur Gear Bearing.
    e. Press a Spur Gear Bearing into the gear frame hole around the Pin until the marked end of the Bearing is flush with the counterbored face on the Gear Frame.
    f. Repeat steps (c), (d) and (e) with the remaining Spur Gears.
11. **For HDS10, HDS30, HDS45, TDS15, TDS30 or TDS45,** slide the Ring Gear (34) into the large end of the Extension Housing. Coat the teeth of the Ring Gear and the three Spindle Planet Gears (45 or 47) with approximately 2 cc of **Ingersoll Rand** No. 68 Grease and install the Gears with their Bearings (46 or 48) on the spindle gear shafts. The planet gear teeth must mesh with the ring gear teeth.
    For HDS60, HDS90, TDS90 or TDS120, coat the gear train with approximately 2 cc of **Ingersoll Rand** No. 68 Grease and slide the assembled Gear Frame, notched face leading, into the Housing against the Rear Spindle Bearing. The Gear Frame must engage the spline of the Spindle and force the Bearing to the bottom of the bearing recess.
12. **For HDS10 or TDS15,** insert the Gear Head Spacer (42) into the Extension Housing against the Spindle Planet Gears. Insert the Gear Head (39), spline shaft leading, into the Housing. Make certain the spline passes through the Spacer and engages the teeth of the Gears. Grease the Gear Head Planet Gears (40) and Bearings (41) and install them on the shafts of the Gear Head. Make certain the Teeth of the Gears and the Ring Gear mesh.
13. Install the Flange Clamp (24) on the small hub of the Gear Case Adapter (32) and thread the Adapter, clamp end leading, into the Motor Housing (9). This is a **left-hand thread;** rotate the Adapter **counterclockwise** to tighten it. Tighten the Adapter between 20 and 25 ft.-lb. (27.1 and 33.9 Nm) torque.
14. Holding the assembled Extension Housing horizontally in one hand and the assembled Motor Housing in the other hand, insert the teeth of the Rotor Pinion with the teeth of the three Planet Gears and thread the housings together. This is a **left-hand thread;** thread the housings

counterclockwise to tighten them. Tighten the joint between 20 and 25 ft.-lb. (27.1 and 33.9 Nm) torque.
15. Using finger pressure, press the Seal Cup Assembly (55), felt end trailing, onto the rotor end of the Collet Body (58). Press the Cup Assembly to the shoulder of the Collet Body. Saturate the felt with **Ingersoll Rand** No. 50 Oil.
16. Insert a 5/32" pin through the opening in the Extension Housing and the cross hole in the Spindle to keep the Spindle from rotating. Thread the Collet Body and Seal Cup Assembly onto the Spindle and tighten it between 14 and 19 ft.-lb. (19 and 26 Nm) torque. Install the Extension Housing Plug (52).
17. Slide the Spindle Bearing Shield (56), large opening first, over the Collet Body and into the Extension Housing. Using snap ring pliers, install the Shield Retainer (57) in the internal groove in the Extension Housing.
18. Slide the Handle Clamp (61) with the assembled handle onto the Extension Housing and position the handle in the most comfortable position. Tighten the Mounting Screw Nut (64) between 10 and 12 ft.-lb. (13.5 and 16.3 Nm) torque.
19. Insert the Collet (59) into the Collet Body and thread the Collet Nut (60) onto the Collet Body.
20. Use the Collet Body Wrench (82) on the flats of the Collet Body and the Collet Nut Wrench (81) on the Collet Nut to tighten the Collet Nut.

Troubleshooting Guide

Trouble	Probable Cause	Solution
Low power or low free speed	Insufficient air pressure	Check air line pressure at the Inlet of the Tool. It must be 90 psig (6.2 bar/620 kPa).
	Clogged muffler elements	Disassemble the Tool and agitate bare Motor Housing and Flange in clean kerosene. Back flush muffler elements by blowing into the exhaust ports with an air gun until all contaminants and obstructions are removed. If elements cannot be cleaned, replace the Motor Housing and/or the Flange.
	Plugged Inlet Screen (2)	Clean the Inlet Screen with a stream of air or replace the Screen.
	Worn or broken Vanes (17)	Install a **complete** set of new Vanes.
	Loose Extension Housing (51) or Gear Case Adapter (32)	Tighten the Housing or Adapter to 20 to 25 ft.-lb. (27 to 34 Nm) torque.
	Worn or broken Motor Housing (9)	Replace the Motor Housing.
	Internal air leakage in the Motor Housing indicated by high air consumption/low speed.	Replace the Motor Housing.
	Grit buildup under the Throttle Lever (10) restricting full Throttle Valve Plunger (12) movement.	Remove the Throttle Lever and clean the groove in the Motor Housing.
	Bent stem on Throttle Valve (6)	Replace the Throttle Valve.
	Front Seal Cup Assembly (20) dragging against the shield of the Front Rotor Bearing (21)	Reposition the Front Seal Cup Assembly.
Rough operation / vibration	Improper lubrication or dirt buildup	Inject 3 cc of clean kerosene into the Inlet, operate the Tool for 30 seconds and **immediately** inject 3 cc of the recommended oil into the Inlet and run the Sander long enough to coat the internal parts with the oil.
	Worn or broken Rear Rotor Bearing (13) or Front Rotor Bearing	Replace the worn or broken Bearings. Examine the Front End Plate (18), Front End Plate Spacer (19), Front Seal Cup Assembly (20) and Rear Rotor Bearing Spacers (14) and replace any damaged parts. If the attached rotor plate is damaged, replace the Rotor (16).
	Worn or broken Rear Spindle Bearing (49) or Front Spindle Bearing (53)	Replace the Bearings.
	Dirt contaminated Front Spindle Bearing	Replace the Bearing.
	Worn, bent or broken Spindle (44)	Replace the Spindle if, when mounted between centers, the runout on the spindle body exceeds 0.002" T.I.R. or 0.0005" T.I.R. on the bearing mounting diameters.
Excessive runout	Loose Collet Nut (60)	Tighten the Collet Nut until snug.
	Worn or damaged Collet (59), Collet Nut or Collet Body (58)	Replace the damaged component and retest.
	Bent, worn or broken Spindle	Replace the Spindle if, when mounted between centers, the runout on the spindle body exceeds 0.002" T.I.R. or 0.0005" T.I.R. on the bearing mounting diameters.
	Worn or damaged Front Spindle Bearing	Replace the Front Spindle Bearing.

Trouble	Probable Cause	Solution
Scoring	Worn Front End Plate Spacer (19) or Front End Plate (18)	Install a new Front End Plate Spacer and Front End Plate.
	Worn Front Rotor Bearing	Install a new Font Rotor Bearing.
Leaky Throttle Valve	Dirt accumulation on Throttle Valve (6) or Throttle Valve Seat (7)	Inject 3 cc of clean kerosene into the Inlet, operate the Tool for 30 seconds and **immediately** inject 3 cc of the recommended oil into the Inlet and run the Tool long enough to coat the internal parts with the oil.
	Worn Throttle Valve or Throttle Valve Seat	Replace the Throttle Valve and/or Throttle Valve Seat.
Exhaust at wrong direction	Incorrect orientation of the Flow Ring (22)	Reverse the face of the Flow Ring against the Motor Housing.
Front Rotor Bearing runs hot	Incorrect installation of the Front Seal Cup Assembly	Reposition the Front Seal Cup Assembly flush with the face of the Front End Plate Spacer.
	Front End Plate Spacer rubbing the bore of the Front End Plate	Replace the Front End Plate and Front End Plate Spacer combination.
	Incorrect Front Rotor Bearing orientation	If a black stain or black hashmarks are not visible on the face of the Bearing when it is assembled with the End Plate and Rotor, the Bearing is installed backwards. If possible, remove the Bearing and install it correctly or replace the Bearing.
Slow tool idle	Bent or leaky Throttle Valve	Replace the Throttle Valve.
Air leakage around Flow Ring	Damaged, mutilated or missing Flange Clamp (24)	Replace the Flange Clamp.
	Damaged Flow Ring	Replace the Flow Ring.

Related Documentation

For additional information refer to:
Rotary Air Sander, Polisher or Buffer Product Safety Information Manual Form 04580387.
Rotary Air Sander, Polisher or Buffer Product Information Manual Form 80221021.
Rotary Air Sander, Polisher or Buffer Parts List Manual Form 16573925.

Manuals can be downloaded from www.irtools.com

Notes

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