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Air Sanders

88S 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.**
- **Do not use this tool if the actual free speed exceeds the rated rpm. Check the free speed of this tool before mounting any accessories, after all tool repairs, before each job and after every 8 hours of use. Check speed with a calibrated tachometer, without the abrasive product installed.**

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

Lubrication

Whenever a Series 88S Sander is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Inject about 1.5 cc of **Ingersoll Rand** No. 50 Oil into the Inlet Bushing (4) after assembly.
2. If the Sander is used in an extremely dirty environment, **once in each week or after each forty hours of operation,** pour a liberal amount of a suitable cleaning solution into the slots in the handle. Work the throttle lever vigorously to wash the cleaning solution around, then pour the solution and accumulated dirt from the handle. Repeat this process until the cleaning solution is clean when it comes out of the handle. Immediately after flushing with the cleaning solution, inject a liberal amount of **Ingersoll Rand** No. 50 Oil in the slots and, again, work the throttle lever vigorously to lubricate the cleaned parts.

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 Sander unless you have a complete set of new gaskets and O-rings for replacement.

Disassembly of the Motor and Throttle

1. Grasp the flats of the live air handle in leather-covered or copper-covered vise jaws with the Spindle upward.
2. Remove the Cylinder Case Screws (45), the Lock Washers (44), the Motor Retaining Plate (43), Cylinder Case Gasket (42) and the two Motor Clamp Washers (41).
3. Remove the Sander from the vise.
4. Grasp the Arbor (27) in leather-covered or copper-covered vise jaws. Lift off the Cylinder Case to expose the motor.

NOTICE

Use only the special No. 88V60-950 Controller Wrench for removing the Controller Assembly (39). Do not attempt to disassemble the Controller. It is available only as a unit and is guaranteed for the life of the tool if it is not abused.

5. Remove the Controller Retaining Ring (40) and unscrew the Controller Assembly which has a **left-hand thread** that requires a **clockwise rotation** for removal.
6. Lift off the Rotor Bearing Seal (37) and the Rear End Plate (35).
7. Lift off the Cylinder (33).
8. Remove the Vanes (32).
9. Withdraw the Rotor (31) and lift out the Rotor Key (30).
10. Remove the arbor and end plate assembly from the vise. Grasp the Front End Plate (29) in one hand and tap the small diameter end of the Arbor (27) with a soft hammer to remove the End Plate.
11. If the Front Rotor Bearing (28) is to be replaced, press it from the Arbor.
12. Insert the Controller into the No. 99V60-A952 Bearing Clamp and tighten the nut on the fixture. Insert the No. 99V60-951 Seal Pressing Tool in the center and press off the Controller. Release the clamp.
13. Place the Cylinder Case in leather-covered or copper-covered vise jaws to remove the Inlet Bushing (4), Inlet Bushing Screen (5) and the Throttle Valve Spring (6). The Bushing has an interference thread and is tightly fit.
14. Drive out the Throttle Lever Pin (13) to release the Lever Assembly (14).
15. Using a 3/32" hex wrench, reach inside the handle and remove the Valve Seat Screw (12) from the Throttle Valve Seat Support Assembly (7).
16. Thread a No. 8-32 screw about 5" (127 mm) long into the throttle valve seat support in place of the removed valve seat screw. A piece of 5/32" welding rod can be threaded on one end to serve the same purpose.
17. Grasp the protruding end of the screw in a vise, and while tapping lightly on the housing or handle with a plastic hammer, pull on the housing or handle to withdraw the throttle parts.
18. The Air Strainer Screen (8) can now be removed and cleaned.

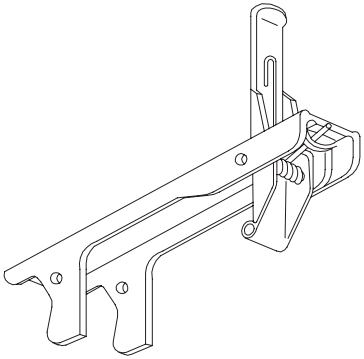
Assembly

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. 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 Throttle and Inlet

1. Assemble the Valve Seat Support parts (7, 8, 9, 10, 11 and 12). Tighten the Valve Seat Screw to 12 in-lb (1.4 Nm) torque.
2. Insert the assembly into the handle, large diameter first. Position a punch against the flat of the screw head and tap it with a hammer until the assembly is firmly seated.
3. Apply O-ring lubricant to the Seals (3). Fit the seals to the Throttle Valve (2) and push the assembly, small diameter first, into the handle until it seats firmly.
4. Assemble the Locking Lever Assembly (14) as illustrated below:



(Dwg. TPD563)

5. Align the holes in the Lever Assembly with the slots in the Cylinder Case. With a soft face hammer, tap the Throttle Lever Pin (13) through the Lever Assembly. File off any sharp edges. Operate the mechanism internally by hand to assure operation.
6. Insert the Throttle Valve Spring (6) small end first.
7. Clean the face of the Inlet Bushing and the Inlet Bushing Screen (5) with a suitable cleaning solution and allow to air dry. Insert the parts into the live air handle. Grasping the flats of the Cylinder Case with a wrench, tighten to 35 to 45 ft-lb (47 to 61 Nm) torque.

Assembly of the Motor

1. Using an arbor press against the inner race of the bearing, install the Front Rotor Bearing (28) onto the Arbor (27).
2. Inspect the Front End Plate (29) for nicks or burrs. If replacement is necessary, wipe the part with oil. Press the Front Rotor Bearing into the Front End Plate.
3. Hold the Arbor in leather-covered or copper-covered vise jaws. Insert the Rotor Key (30) into the slot of the Rotor (31). The Rotor has a staked keyway on one end. Place that end up, over the Arbor. Apply a light film of the recommended oil to each Vane (32) and insert one Vane, straight edge out, into each slot in the Rotor. If any new Vanes are required, replace the entire set.
4. Place the Cylinder over the Rotor aligning the Cylinder Dowel hole with the alignment hole in the Front End Plate (29), and with the kidney port to the right of the dowel hole.
5. Apply the Rear End Plate (35) with the kidney port to the right of the dowel hole.

NOTICE

Take all measurements 30 degrees to the left of the dowel hole when facing the hub side of the Seal. Install the Rotor Bearing Seal hub down.

NOTICE

If the Controller Assembly (37) needs to be replaced, you must also replace the Rotor Bearing Seal Assembly (38) which consists of a rear rotor bearing and a rotor bearing seal. If either the rear rotor bearing or rotor bearing seal needs to be replaced, BOTH must be replaced with a new bearing and seal. DO NOT MIX OLD AND NEW PARTS.

6. Check the outside diameter and large inside diameter of the Rotor Bearing Seal (38) for wear. If the outside diameter is worn to 1.176" (29.88 mm) or smaller, and/or the large inside diameter is worn to 0.910" (23.12 mm) or larger, install a new Rotor Bearing Seal.
7. Align the Rear End Plate (35), cavity and pin up, with the larger hole in the Rotor Bearing Seal.
8. Press the Rear Rotor Bearing Seal Assembly onto the hub of the Controller.

NOTICE

Use only the special 88V60-950 Controller Wrench for installing the Controller Assembly.

⚠ WARNING

Tighten the Controller between 14 and 16 ft-lb (19.0 and 21.7 Nm) torque. Do not exceed 16 ft-lb. The Controller may be damaged if this torque is exceeded.

Always check the free speed of a Sander after it has been reassembled and before it is put back into service. Refer to the Test and Inspection Procedure.

Never use a Sander which runs in excess of the maximum speed listed in the Test and Inspection Procedure.

9. Thread the Controller Assembly onto the end of the Arbor. Rotate the Controller clockwise since this is a left-hand thread.
10. Install the Controller Retaining Ring (40) onto the Arbor with the concave face closest to the Controller.
11. Place the live air handle in leather-covered or copper-covered vise jaws, Cylinder Case Assembly up. Lightly dampen the Rear End Plate Gasket (36) with oil. Line the hole in the Gasket with the hole in the Cylinder Case, and align the notch in the Gasket with the notch in the motor seat.
12. With an assembly dowel, line up the motor in the Cylinder Case. Remove the assembly dowel and insert the Cylinder Dowel (34).
13. Install the two Motor Clamp Washers (41) concave or dish side **up**.
14. Apply the Cylinder Case Gasket (42), the Motor Retaining Plate (43), the Cylinder Case Screw Lock Washers (45) and the five Screws (46). Slightly tighten opposite screws, make sure the arbor is free, and tighten all screws to 14 ft-lb (19 Nm) torque.
15. Rotate the Arbor manually to make certain it is free.
16. The Dead Handle (25) may be adjusted to two positions. Insert a 5" (127 mm) long 3/16" hex wrench into the elongated slot in the end of the Dead Handle and loosen the screw securing the Handle to the Cylinder Case. Rotate the Handle 1805 and tighten the screw to 18 ft-lb (24.4 Nm) torque.
17. Install the Exhaust Deflector (20) and Screws (21).

Test And Inspection Procedure

WARNING

Disconnect the sander from the air supply hose or shut off air to the tool and bleed the air from the line before proceeding with the Test and Inspection Procedure.

Run the performance tests at 90 psig (6.2 bar/620 kPa) air pressure at the inlet of the tool with an eight foot length of 3/4" (19 mm) diameter air supply hose.

1. Without a sanding pad on the tool, operate the Sander with the Throttle Lever fully actuated and check the free speed by applying a hand-held tachometer to the spindle end. Record the Sander serial number, date of test and actual free speed in a permanent file. The minimum and maximum allowable free speeds are as follows:

Model	Stamped	Free Speed, rpm	
		Min.	Max.
88S45	4500	4300	4550
88S60	6000	5650	6050

2. Attach the power test adapter to the spindle and test the 88S45 using a 4F Test Fan and test the 88S60 using an R3 Fan. The minimum allowable speed for 88S45 is 3 000 rpm; for 88S60, it is 4 700 rpm.
3. There must be no objectionable leaks in any non exhaust area. The Throttle must not leak when it is closed.
4. There must be no leaks past the closed Throttle that will run the motor.
5. The Sander must start smoothly when the Throttle Lever is actuated and must shut off completely when the Throttle Lever is released.
6. The Sander must be equipped with a spring-loaded window style Lock (15). The Lock must return to the locked position when the Throttle Lever is released and must prevent operation of the Throttle.
7. The tool must run smoothly without noticeable vibration or unusual sound.
8. The Arbor (27) must turn freely with no evidence of brinnelled bearings.
9. The threads on the Arbor must be free of nicks and damage.
10. The Nameplate must be legible, in place and securely fastened. Make replacement if necessary.

Troubleshooting Guide

Trouble	Probable Cause	Solution
Low power or low free speed	Low air pressure at the Inlet	Check the air pressure at the Inlet. The pressure must not exceed 90 psig (6.2 bar/620 kPa).
	Plugged Inlet Bushing Screen	Clean the Screen in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it. **WARNING** **Never operate a Sander without an Inlet Screen. Ingestion of dirt into the Sander can, in some cases, cause an unsafe condition.**
	Worn or broken Vanes	Replace a **complete** set of Vanes.
	Worn or broken Cylinder	Replace the Cylinder if it is worn or broken or if the bore is scored or wavy.
	Improper lubrication or dirt build-up in the motor	Lubricate the Sander as instructed in **LUBRICATION SPECIFICATION**. If lubrication does not result in satisfactory operation, disassemble the motor and inspect and clean all parts.
Rough operation	Worn or broken Rear Rotor Bearing or Front Rotor Bearing	Examine each Bearing. Replace the Rear Rotor Bearing Seal Assembly if worn or damaged or replace the Front Rotor Bearing.
	Worn Rotor Key	Replace the Key. Check the Arbor and Rotor for key slot wear and replace if necessary.
	Bent Arbor	Mount the Arbor on centers. Check the bearing diameter runout with an indicator. Replace the Arbor if runout exceeds 0.002" Total Indicator Reading.
Scoring	Improper assembly	Make certain that all motor parts are properly aligned prior to clamping the motor assembly.
	Rotor Bearing Seal misalignment	Loosen the Cylinder Case Screws. Rotate the Spindle by hand to align the Seal. Re-tighten the Screws to 14 ft-lb (19 Nm) torque. The Spindle must rotate freely.
Air leaks	Worn Valve Seat or Valve Seat Washer	Replace worn parts.
	Worn Throttle Valve Seals	Replace both Seals.

Related Documentation

For additional information refer to:
Product Safety Information Manual 04580387.
Product Information Manual 80152861 and 80152879.
Parts Information Manual 16573909.

Manuals can be downloaded from ingersollrandproducts.com

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