



**16573362**  
Edition 1  
May 2008

## **Air Grinder** **Series 88V**

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# **Maintenance Information**



Save These Instructions

 **Ingersoll Rand**

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**WARNING**

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

**Always turn off 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.**

**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

Whenever a Series 88V Grinder 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 Grinder is used in an extremely dirty environment, **once 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, and 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.

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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.

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 End Plate (29) in one hand and tap the small diameter end of the arbor 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.

#### Disassembly of the Motor and Throttle

1. Grasp the flats of the live air handle in leather-covered or copper-covered vise jaws, Guard up.
2. Remove the Cylinder Case Screws (46), the Lock Washers (45), the Guard, Cylinder Case Gasket (42) and two Motor Clamp Washers (41).
3. Remove the Grinder from the vise.
4. Grasp the Arbor (27) in the vise. Lift off the Cylinder Case to expose the motor.

#### Disassembly of the Throttle and Inlet

1. Place the Cylinder Case in the vise 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.
2. Drive out the Throttle Lever Pin (13) to release the Lever Assembly (14).
3. 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).
4. 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.
5. 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.
6. The Air Strainer Screen (8) can now be removed and cleaned.

**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 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 (38) and the Rear End Plate (35).
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### 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 in 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

**NOTICE**

**Thoroughly clean and lubricate all Throttle Valve components before assembling the tool. Lubricate with Ingersoll Rand No. 10 Oil.**

1. Grasp the Dead Handle in leather-covered or copper-covered vise jaws with the live air handle upward.

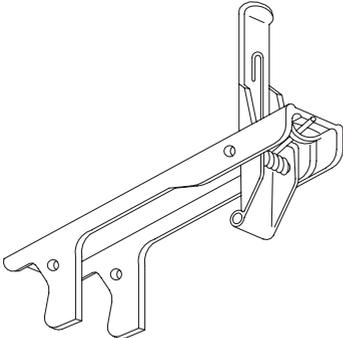
- Assemble the valve seat support parts.
- Insert the Support Assembly (7) into the handle, large diameter first. Locate a punch on the flat of the screw head and tap it with a hammer until the Assembly is firmly seated.
- Apply O-ring lubricant to the Seals (3). Fit the seals to the Throttle Valve (2) and push the assembly, small diameter first, into the handle until it seats firmly.

**NOTICE**

**If Lever Assembly being serviced does not have the window-type lever, install a complete new Lever Assembly.**

- Assemble the Lever Assembly (14) as illustrated below.

**Locking Lever Assembly**



(Dwg. TPD563)

- 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.
- Insert Throttle Valve Spring (6), small end first.
- Clean the face of the Inlet Bushing (4) and the Inlet Bushing Screen (5) using a clean, suitable, cleaning solution, and dry them. Insert the Screen and Bushing in the end of the Cylinder Case by grasping the flats with a wrench. Tighten to 35 to 45 ft-lb (47 to 61 Nm) torque.

**Assembly of the Motor**

- Using an arbor press against the inner race of the bearing, install the Front Rotor Bearing (28) onto the Arbor (27).
- Inspect the Front End Plate (29) for nicks or burrs. If replacement is necessary, wipe the part with oil. Press the Arbor Bearing into the Front End Plate.
- Hold the Arbor in leather-covered or copper-covered vise jaws. Insert the Rotor Key (30) in 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.
- Place the Cylinder over the Rotor matching the Cylinder Dowel hole to the alignment hole in the Front End Plate (29), with the kidney port to the right of the dowel hole.
- 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**

**Prior to tool assembly, carefully inspect the Controller Assembly for nicks, gouges or dents. Replace it with a new Controller Assembly if necessary. Test free speed before applying a grinding wheel.**

**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.**

- Check the outside diameter and large inside diameter of the Rotor Bearing Seal (38) for wear. If the outside diameter is worn to 1.1764" (29.881 mm) or smaller, and/or the large inside diameter is worn to 0.9103" (23.122 mm) or larger, install a new Rotor Bearing Seal.
- Align the Rear End Plate (35), cavity and pin up, with the larger hole in the Rotor Bearing Seal.
- Press the Rotor Bearing Seal Assembly onto the hub of the Controller.
- Slip the Controller Assembly over the arbor. Rotate the Controller counterclockwise since this is a left-hand thread.

**NOTICE**

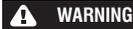
**Use only the special No. 88V60-950 Controller Wrench for applying the assembly.**

**WARNING**

**Tighten the Controller to 14 to 16 ft-lb (19.0 to 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 Grinder after it has been reassembled and before it is put back into service. Refer to the Test and Inspection Procedure. Never use a Grinder which runs in excess of the maximum speed listed in the Test and Inspection Procedure.**

- Install the Controller Retaining Ring (40), concave face closest to the Controller.
- Place the lever handle in leather-covered or copper-covered vise jaws, open end of the Cylinder Case Assembly up. Lightly dampen the Rear End Plate Gasket (36) with oil and line it up with the hole in the Cylinder Case so that the notch in the Gasket matches the Cylinder Case.
- With an assembly dowel, line up the motor in the Cylinder Case. Remove the assembly dowel and insert the Cylinder Dowel (34).
- Install the two Motor Clamp Washers (41) concave or dish side up.
- Apply the Cylinder Case Gasket (42), the proper Guard (43 or 44), the Cylinder Case Screw Lock Washers (45) and the five Screws (46). Slightly tighten opposite screws, make sure the arbor is free, then tighten all screws to 14 ft-lb (19 Nm) torque.
- Again make certain the Arbor is free.
- 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 180° and tighten the screw to 18 ft-lb (24.4 Nm) torque.

## Test and Inspection Procedure



### WARNING

**Disconnect the Grinder from the air supply hose or shut off air to the tool 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 (2.44 m) length of 3/4" (19 mm) diameter air supply hose.

- Without a wheel on the tool, operate the Grinder with the Throttle Lever fully depressed and check the free speed by applying a hand-held tachometer to the spindle end. The minimum and maximum allowable free speeds are as follows:

Model	Stamped	Free Speed, rpm	
		Min.	Max.
88V60	6000	5650	6050
88V77	7700	7250	7750

- Test the Grinder motor for power to determine these minimum performance levels. The Throttle Lever must not be actuated repeatedly during the test. Depress the Lever and hold it in the open position until the test is complete.

Model	Torque		Speed rpm
	ft-lb	Nm	
88V60	1.89	2.6	5000
88V77	1.65	2.2	6000
88V85	1.60	2.2	6500

- There must be no objectionable leaks in any non-exhaust area. The Throttle must not leak when it is closed.
- There must be no leaks past the closed Throttle that will run the motor.
- The Grinder must start smoothly when the Throttle Lever is depressed and must shut off completely when the Throttle Lever is released.
- The Grinder must be equipped with a spring-loaded window style Lever Lock (15). The Lever Lock must return to the locked position when the Throttle Lever is released.
- The tool must run smoothly without noticeable vibration or unusual sound.
- The Arbor (27) must turn freely with no evidence of brinnelled bearings.
- The threads on the arbor must be free of nicks and damage.
- 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	Insufficient air pressure at the inlet	Check air line pressure at the Inlet of the Tool. It must be 90 psig (6.2 bar/620 kPa).
	Plugged Screens	Clean the Inlet Bushing Screen in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.  <b>WARNING</b>  <b>Never operate a Grinder without an Inlet Screen. Ingestion of dirt into the Grinder can, in some cases, cause an unsafe condition.</b>
	Worn or broken Vanes	Install a <b>complete</b> set of new Vanes.
	Worn or broken Cylinder	Replace the Cylinder if it appears cracked or if the bore is wavy or scored.
	Improper lubrication or dirt build-up in the motor	Lubricate the Grinder as instructed in <b>LUBRICATION SPECIFICATION</b> . 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 bearing diameter runout with an indicator. Replace the Arbor if runout exceeds .0002" (0.051 mm) 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. Tighten the screws to 14 ft-lb (19 Nm) torque. Spindle must rotate freely.
Air leaks	Worn Valve Seat or Valve Seat Washer	Replace worn parts.
	Worn Throttle Valve Seals	Replace both Seals.
	Worn Cylinder Case Gasket between the Cylinder Case and the Guard	Replace the Gasket.
	Distorted face on the Cylinder	Polish lightly using fine emery cloth on a flat metal plate to remove high spots. If the tool has been dropped and the Cylinder Case is damaged, replace it with a new Cylinder Case Assembly.

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## **Related Documentation**

For additional information refer to:

Product Safety Information Manual 04584959.

Product Information Manual 16573222 and 16576092.

Parts Information Manual 16573305.

Manuals can be downloaded from [www.irtools.com](http://www.irtools.com).

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**Notes:**

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