



16573370
Edition 2
February 2014

Air Grinder

99V Series

Maintenance Information



Save These Instructions

IR *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

Each time a Series 99V Vertical Air Grinder is disassembled for maintenance and repair or replacement of parts, lubricate the tool as follows:

1. Inject approximately 1.5 cc of **Ingersoll Rand** No. 50 Oil into the Inlet Bushing (5) after assembly. **For models with a built-in oiler**, fill the chamber of the Oiler Assembly (23). After each eight hours of operation, replenish the oil supply.

2. If the Grinder is used in an extremely dirty environment, **once in each week or after each forty hours of operation**, pour a liberal amount of a clean, 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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Oiler Adjustment (for models with built-in oiler)

The built-in lubricator has been properly adjusted at the factory. If the oiler felts are clogged and must be replaced, proceed as follows:

1. Remove the grinding wheel. Remove the Cylinder Case Screws (52), the Lock Washers (51), the Cylinder Case Gasket (48), the two Motor Clamp Washers (47) and the Guard.

2. With a thin blade screwdriver, remove the Oiler Adjusting Screw (25) from the Oiler Assembly (23).
 3. Using tweezers or a piece of bent wire, remove the Oiler Felts (24) and install new ones.
 4. Replace the Oiler Adjusting Screw, installing it slightly below flush.
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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 a 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 replacements.

6. Remove the Controller Nut and unscrew the Controller Assembly (42).
7. Lift off the Rear End Plate (40) and Rotor Bearing Seal.
8. Lift off the Cylinder (36).
9. Remove the Vanes (35).
10. Withdraw the Rotor (34) followed by the Rotor Key (33).
11. Lift off the Front End Plate (31).
12. If the Front Rotor Bearing (30) is to be replaced, press it and the Arbor from the Front End Plate. Press off the Bearing from the Arbor.
13. Set the Controller on blocks in an arbor press. Using a round piece of metal fitting the inner race of the Rear Rotor Bearing, press off the Rear Rotor Bearing Cage (45).
14. Insert the Controller into the 99V60-A952 Bearing Clamp and tighten the nut on the fixture. Insert the 99V60-A951 Seal Pressing Tool in the center and press off the Controller. Release the clamp.

Disassembly of the Motor

1. Grasp the Dead Handle (27) of the Grinder in leather-covered or copper-covered vise jaws, Guard up.
2. Remove the Cylinder Case Screws (52), the Lock Washers (51), the Cylinder Case Gasket (48), the two Motor Clamp Washers (47) and the Guard.
3. Grasp the Arbor (29) in the vise and lift the Cylinder Case to expose the motor.
4. Remove the Exhaust Silencer (39).
5. **For models with a built-in oiler**, take the tool from the vise and dump the oil from its reservoir. The Oiler Assembly (23) can be pulled from the Cylinder Case, if necessary.

CAUTION

Use only the special No. 99V60-950 Controller Wrench for removing the Controller Assembly. 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.

NOTICE

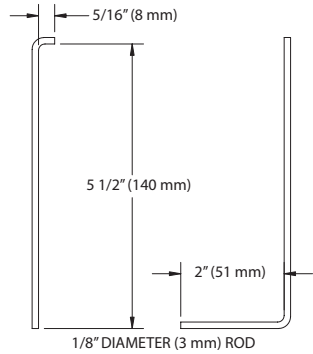
The Controller Assembly (42) has a left-hand thread and the Controller Nut (46) has a right-hand thread.

Disassembly of the Throttle and Inlet for Models without a built-in oiler

1. Place the Cylinder Case in the vise to remove the Inlet Bushing (5), Inlet Bushing Screen (5A) and the Throttle Valve Spring (6). The Bushing has an interference thread and is tightly fit.
2. Drive out the Throttle Lever Pin (14) to release the Lever Assembly (15).
3. Using a 3/32" hex wrench, reach inside the handle and remove the Valve Seat Screw (13) 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.

Disassembly of the Throttle and Inlet for Models with a built-in oiler

1. Place the Cylinder Case in the vise to remove the Inlet Bushing (5) and Inlet Bushing Screen (5A).
2. Drive out the Throttle Lever Pin (14) to release the Lever Assembly (15).
3. Remove the Throttle Valve Spring (6) and release the Throttle Valve (2) by tapping the end of the handle with a soft hammer.
4. Bend a piece of 1/8" diameter rod as shown in Drawing TPD548. Insert this "puller" into the screw head and withdraw the Throttle Valve Seat Support Assembly (7) by hand, or with lever-wrench pliers, using a prying action if needed.



(Dwg. TPD548)

5. Remove the Valve Seat Screw (13), Valve Seat (10), Valve Seat Washer (11), Lock Washer (12) and Valve Seat Cap (9). The Air Strainer Screen (8) may now be removed.

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 or 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 Throttle and Inlet

NOTICE

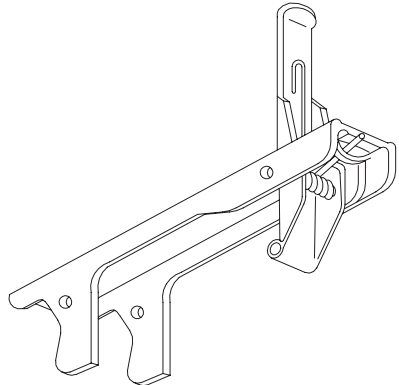
Thoroughly clean and lubricate all Throttle Valve components before assembling the tool. Lubricate with Ingersoll Rand Light Oil No. 10.

1. Grasp the Dead Handle in leather-covered or copper-covered vise jaws with the live air handle upward.
2. Assemble the Valve Seat Support parts.
3. 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.
4. Apply O-ring lubricant to the Seals (3) or (3 and 4). 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.

5. Assemble the Lever Assembly (15) as illustrated below.



Locking Lever Assembly

(Dwg. TPD563)

6. Align the holes in the Lever Assembly with the slots in the Cylinder Case. With a soft face hammer, tap the Throttle Lever Pin (14) through the Lever Assembly. File off any sharp edges. Operate the mechanism internally by hand to assure operation.
7. Insert the Throttle Valve Spring (6), small end first.
8. Clean the face of the Inlet Bushing (5) and the Inlet Bushing Screen (5A) using a 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 the Bushing between 35 and 45 ft-lb. (47 and 61 Nm) torque.

Assembly of the Motor

1. Using an arbor press against the inner race of the bearing, install the Front Rotor Bearing (30) onto the Arbor (29).
2. Inspect the Front End Plate (31) for nicks or burrs. Press the arbor bearing into the front end plate.
3. With the Arbor held firmly in vise jaws, place the Rotor Key (33) in the slot of the Rotor (34).

NOTICE

The Rotor should slip fit over the Arbor. If tightness is detected, lightly polish one long side of the Key using fine emery cloth on a hard, flat surface. Replace the Key with the polished side toward the Arbor.

- The Rotor is counter-bored on one end. Place that end over the Arbor. Apply a light film of **Ingersoll Rand** No. 50 Oil to each Vane (35) and insert one vane, straight end out, into each slot in the Rotor. If any new Vanes are required, replace the entire set.
- Place the Cylinder Assembly (36) over the Rotor matching the End Plate Dowel (short dowel) (37) to the alignment hole in the Front End Plate (31).

NOTICE

If the Controller Assembly (42) needs to be replaced, you must also replace the Rotor Bearing Seal Assembly (43) which consists of the Rear Rotor Bearing and 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.

- Clean the Rotor Bearing Seal (43) and measure the outside diameter and large inside diameter. If the outside diameter is worn to 1.1764" (29.88/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.

NOTICE

Take all measurements 90 degrees to the left of the dowel hole when facing the hub side of the Seal.

- Align the Rear End Plate (40), cavity and pin up, with the larger hole in the Rotor Bearing Seal.
- Press the Rear Rotor Bearing onto the Controller Assembly (42). Press the Controller Assembly into the Bearing Cage (45) to within 1/8" of seating.
- Apply a film of light grease to the inside diameter and outside diameter of the Rotor Bearing Seal and align the Seal with both cylinder dowel pins.

NOTICE

Use only the special No. 99V60-950 Controller Wrench for installing the Controller Assembly. Tighten to 10 ft-lb (13.6 Nm) torque.

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.

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.

NOTICE

The Controller has a left-hand thread.

- Slip the Controller Assembly over the arbor aligning the Dowel Pin hole with the Cylinder Dowel (38).
- Apply the Controller Retaining Nut (46) and tighten to 6ft-lb (8.1 Nm) torque for 99V85 Models, 9 ft-lb (12.2 Nm) for all other models. Lightly tap both ends of the Arbor (29). The Arbor and Rotor (34) must turn freely when manually rotated, and the Cylinder (36) must have some play between the end plates.
- Hold the Cylinder Case in a vise with the motor bore upward by gently clamping the Dead Handle (27).
- Dampen the Rear End Plate Gasket (41) with **Ingersoll Rand** No. 50 Oil, align it with the hole in the motor seat and place the Gasket in the Cylinder Case.
- Center the long boss on the face of the Front End Plate (31) with the alignment mark on the face of the Cylinder Case and insert the motor into the bore approximately 1/2" (13 mm).
- Wrap the Exhaust Silencer (39) around the Cylinder with the felt end over the exhaust ports in the Cylinder.
- Slide the motor into the motor bore.

NOTICE

It may be necessary to slightly rotate the motor to fully seat it in the Cylinder Case bore.

- Insert the two Motor Clamp Washers (47), beveled side down.
- For models with built-in oilers, if the Oiler Assembly (23) was removed from the Cylinder Case, apply the Oiler Body Seal (26) to the lip of the Oiler Assembly (23), insert the Oiler Felts (24) and tighten the Oiler Adjusting Screw (25). Seat the assembly in the cavity of the Cylinder Case and fill the Oiler with the recommended oil.
- Apply the Cylinder Case Gasket (48), the proper Guard (49 or 50), the Cylinder Case Screw Lock Washers (51) and the four Screws (52). Slightly tighten opposite screws, make sure the arbor is free and then tighten all screws to 14 ft-lb (19 Nm) torque.
- Again, make certain the Arbor is free.
- The Dead Handle (27) can be adjusted to two positions. For models without a built-in oiler, 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. For models with a built-in oiler, loosen the Dead Handle Screw (28), change the position of the Dead Handle and tighten the Screw to 9 ft-lb. (12.2 Nm) torque.

- 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	
		Minimum	Maximum
99V45	4500	4300	4550
99V60	6000	5650	6050
99V77	7700	7250	7750
99V85	8500	7950	8550


- 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	
99V45	3.80	5.15	3300
99V60	3.50	4.75	4400
99V77	3.10	4.20	5500
99V85	3.10	4.20	5500

- 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 brinelled 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	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 Screen	Clean the Screen in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.  WARNING Never operate a Grinder without an Inlet Screen. Ingestion of dirt into the Grinder 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 Grinder 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. Retighten 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.
	Worn Cylinder Case Gasket	Replace the Gasket.
	Oiler Plug and Oiler Plug Washer not tight	Tighten the Plug. If the problem persists, replace the Washer.
	Distorted face on Cylinder Case	Polish lightly to remove high spots. If the Grinder has been dropped and the Cylinder Case is damaged, replace with a new Cylinder Case Assembly.

Related Documentation

For additional information refer to:
 Product Safety Information Manual 04584959.
 Product Information Manual 16573222 and 16576092.
 Parts Information Manual 16573313.
 Manuals can be downloaded from ingersollrandproducts.com

Notes:

Notes:

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