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Air Grinder and Die Grinders

CD and CX Series

Maintenance Information

Save These Instructions

Ingersoll-Rand

⚠ 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.

LUBRICATION

Whenever one of these Grinders is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Always wipe the Vanes (13) 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.

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. 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.
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.
5. 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.

Disassembly of the Motor

Steps common to ALL CD collet models

1. Using one Collet Wrench (26A) to hold the Collet Body (23) from turning, use the other Collet Wrench to unscrew and remove the Collet Nut (26).
2. Remove the Nosepiece (25) and the Collet (24).
3. Grasp the tool in copper–covered or leather–covered vise jaws with the spindle upward and using a 1–3/16" wrench, unscrew and remove the Clamp Nut (22). This is a **left–hand thread** and must be rotated **clockwise.**
4. Remove the Clamp Spacer (21) and the Flange Clamp (20).
5. Pull the Flange (19) and Flow Ring (18) off the front of the Motor Housing (5).
6. Grasp the Collet Body and pull the assembled motor out of the Motor Housing. Remove the Motor Housing from the vise and remove the two Rear Rotor Bearing Spacers (10) from the bottom of the Housing.
7. Remove the Vanes (13) from the Rotor (12).
8. Grasp the Rotor in copper–covered or leather–covered vise jaws with the Collet Body upward. Using the Collet Body Wrench, unscrew and remove the Collet Body.

Steps common to ALL CD wheel models

1. Using an adjustable spanner wrench in one of the holes in the Straight Wheel Adapter (41) and a 9/16" wrench on the Flange Nut (43), unscrew and remove the Flange Nut.
2. Remove the Wheel Flange (42) and the grinding wheel.
3. Grasp the tool in copper–covered or leather–covered vise jaws with the spindle upward and using the Clamp Nut Wrench (44), unscrew the Clamp Nut (35). This is a **left–hand thread** and must be rotated **clockwise**.
4. Grasp the Wheel Guard (38) and pull the assembled motor out of the Motor Housing (5). Remove the Motor Housing from the vise and remove the two Rear Rotor Bearing Spacers (10) from the bottom of the Housing.
5. Remove the Vanes (13) from the Rotor (12).
6. Grasp the Rotor in copper–covered or leather–covered vise jaws with the Wheel Guard upward. Using an adjustable spanner wrench, unscrew and remove the Wheel Adapter (41).
7. Using a 9/16" hex wrench, loosen the Guard Adapter Screw (37) and remove the Guard Adapter Assembly (36) from the Clamp Nut.
8. Remove the Flange Clamp (20) and pull the Flange (19) and Flow Ring (18) off the front of the Motor Housing.

Steps common to ALL CX wheel models

1. Using one Collet Wrench (26A) to hold the Extension Arbor (31) from turning, use the other Collet Wrench to unscrew and remove the Collet Nut (26).
2. Remove the Nosepiece (25) and the Collet (24).
3. Grasp the tool in copper–covered or leather–covered vise jaws with the spindle upward and using a 1–3/16" wrench, unscrew and remove the Arbor Housing (32). This is a **left–hand thread** and must be rotated **clockwise.**
4. Remove the Clamp Sleeve (28) and Arbor Coupling (27).

5. Using one Collet Wrench to hold the Extension Arbor (31) and a 7/16" socket, unscrew the Arbor Bearing Nut (30).
6. Grasp the collet end of the Arbor and pull it from the Arbor Housing Assembly (32) being careful not to allow the Rear Arbor Bearing (29) to fall from the Housing. Remove the Bearing from the Housing.
7. If the Front Arbor Bearing (33) must be replaced, press it from the Arbor Housing.
8. Pull the Flange (19) and Flow Ring (18) off the front of the Motor Housing (5).
9. Grasp the Arbor Bearing Nut on the rotor shaft and pull the assembled motor out of the Motor Housing. Remove the Motor Housing from the vise and remove the two Rear Rotor Bearing Spacers (10) from the bottom of the Housing.
10. Remove the Vanes (13) from the Rotor (12).
11. Grasp the Rotor in copper–covered or leather–covered vise jaws with the Arbor Bearing Nut upward. Using a 7/16" wrench, unscrew and remove the Arbor Bearing Nut.

Steps common to ALL models

1. If the Front Rotor Bearing (17) must be replaced, support the Front End Plate (14) 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 the Bearing and End Plate. Remove the Front End Plate Spacer (15) and Front Seal Cup (16) from the hub of the Rotor.
2. If the Rear Rotor Bearing (9) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (11).
3. Using a bearing puller, pull the Rear Rotor Bearing off the hub of the Rotor.

Disassembly of the Inlet and Throttle

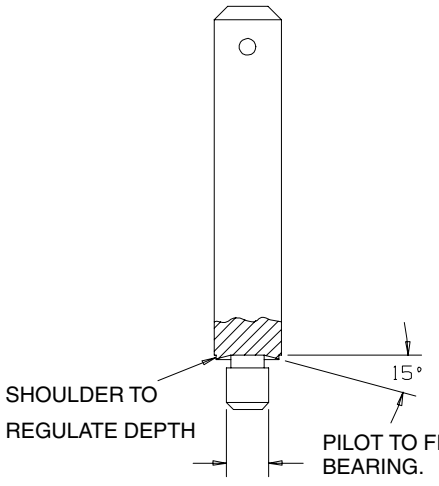
1. Using a 3/4" wrench, unscrew and remove the Inlet Assembly (1).
2. Remove the Inlet Seal (3) and Inlet Screen (2) from the Inlet.
3. Remove the Throttle Valve Spring Seat (4A), Throttle Valve Spring (4B) and Throttle Valve (4C) from the Motor Housing (5).
4. If the Throttle Valve Seat (4D) must be 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. If the Throttle Valve Case (4) must be replaced, insert two hooked tools through the central opening of the Case approximately 180 degrees apart and, catching the underside of the Case, pull it from the Housing.
6. Press the Throttle Lever Pin (7) from the Housing and remove the Throttle Lever (6). Remove the Throttle Valve Plunger (8).

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 solution 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 a recess. Use a bearing inserting tool similar to the one shown in Dwg. TPD786.

Needle Bearing Inserting Tool



(Dwg. TPD786)

Assembly of the Throttle and Inlet

1. Insert the Throttle Valve Plunger (8) into the Motor Housing (5).
2. Position the Throttle Lever (6) on the Motor Housing and using an arbor press, press the Throttle Lever Pin (7) into the Housing and Lever. The Lever will retain the Plunger in the Housing.
3. If the Throttle Valve Case (4) 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 (4D) 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 (4B) onto the end of the Throttle Valve (4C) 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 (4A) 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

Steps common to ALL models

NOTICE

When installing a Rear Rotor Bearing, press the Rotor Bearing onto the shaft with the shielded side of the Bearing leading (shield toward the Rotor).

1. If the Rear Rotor Bearing (9) was removed, stand the Rotor (12) upright on the table of an arbor press with the threaded end downward. Make sure the threaded end passes through a hole drilled in a 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 (11) in the groove on the hub of the Rotor.
3. Install the Front End Plate (14), counterbored end trailing, onto the threaded hub of the Rotor. Press the Front Seal Cup (16), dish end trailing, onto the end of the Front End Plate Spacer (15) that has the central hole beveled. Continue pressing until the dish end is flush with the end of the Spacer. Place the assembled Spacer, Seal Cup trailing, onto the threaded hub of the Rotor. Make sure the Seal Cup enters the recess in the Front End Plate.

NOTICE

Be aware that in the next step, the Front Rotor Bearing is a double 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.

4. Stand the Rotor on the table of an arbor press with the threaded end upward and press the Front Rotor Bearing (17) onto the hub of the Rotor.
5. Grasp the assembled Rotor in copper–covered or leather–covered vise jaws with the threaded rotor hub upward.
6. Inject approximately 3/4 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 (10) into the bottom of the motor housing bore.
7. Assemble the Flow Ring (18) with the Flange (19) 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.
8. Install the assembled Flange, Flow Ring leading, onto the front of the Motor Housing.
9. Position the Flange Clamp (20) against the Flange.

Steps common to ALL CX collet models

1. Thread the Arbor Bearing Nut (30) onto the Rotor (12) and using a torque wrench, tighten the Nut between 14 and 19 ft–lb (19 and 26 Nm) torque.
2. Wipe each Vane (13) with a light film of oil and insert a Vane into each vane slot in the Rotor.
3. Grasp the Arbor Bearing Nut and insert the assembled Rotor into the Motor Housing (5).
4. Grasp the Motor Housing in copper–covered or leather–covered vise jaws with the Arbor Bearing Nut upward. Do not distort the Housing.

5. Lubricate the Arbor Coupling with approximately 1 cc of Ingersoll–Rand No. 68 Grease and position the Coupling over the Arbor Bearing Nut. Position the Clamp Sleeve (28) over the Arbor Coupling against the Front Rotor Bearing.
6. If the Front Arbor Bearing (33) was removed, stand the Arbor Housing (32) on the table of an arbor press with the small end upward. Using a bearing inserting tool similar to the one shown on page 10 and with the bearing identification marks trailing, press the Front Arbor Bearing into the Housing until the trailing end of the Bearing is between 0.135" and 0.145" (3.4 and 3.7 mm) below the edge of the Housing. Work approximately 0.5 cc of Ingersoll–Rand No. 68 Grease into the needle roller cage element of the Bearing.
7. Insert the Extension Arbor (31), collet end trailing, through the Front Arbor Bearing from the collet end of of the Arbor Housing.
8. Place the Rear Arbor Bearing (29) on the arbor hub inside the rear of the Housing. Thread the Arbor Bearing Nut, threaded end trailing, onto the rear of the Extension Arbor. Using a socket on the Arbor Bearing Nut and a torque wrench on the Collet Body, tighten the joint between 14 and 19 ft–lb (19 and 26 Nm) torque.
9. Thread the Arbor Housing onto the Motor Housing and tighten the joint between 20 and 25 ft–lb (27 and 34 Nm) torque. This is a **left–hand thread**. Turn **counterclockwise** to tighten.
10. Insert the Collet (24) into the Extension Arbor (31) and slide the Nosepiece (25) over the Collet. Thread the Collet Nut (26) onto the Arbor and use the two Collet Wrenches (26A) to tighten the Nut to the Arbor.

Steps common to ALL CD Wheel models

1. Position the Guard Adapter Assembly (36) on the long hub of the Clamp Nut (35) and, using a 9/64" hex wrench on the Guard Adapter Screw (37), snug the Assembly onto the Clamp Nut.
2. If the Wheel Guard (38) was removed from the Guard Adapter Assembly, attach the Guard using the three Wheel Guard Mounting Screw (39) and Washers (40). Tighten the Screws between 2 and 2–3/4 ft–lb (2.7 and 3.7 Nm) torque.
3. Position the assembled Guard Adapter over the threaded rotor hub in the vise and insert the Straight Wheel Adapter (41) through the Clamp Nut and thread it onto the threaded rotor hub. Tighten the Wheel Adapter between 14 and 19 ft–lb (19 and 26 Nm) torque.
4. Wipe each Vane (13) with a light film of oil and insert a Vane into each vane slot in the Rotor.
5. Grasp the Wheel Guard and insert the assembled Rotor into the Motor Housing (5).
6. Grasp the Motor Housing in copper–covered or leather–covered vise jaws with the Wheel Guard upward. Do not distort the Housing.
7. Thread the Clamp Nut (35) onto the Motor Housing and tighten the joint between 20 and 25 ft–lb (27 and 34 Nm) torque. This is a **left–hand thread.** Turn **counterclockwise** to tighten.
8. After positioning the Guard to the proper position, tighten the Guard Adapter Screw between 2 and 2–3/4 ft–lb (2.7 and 3.7 Nm) torque.
9. Install a wheel, the Wheel Flange (42) and Flange Nut (43) on the Wheel Adapter. Use an adjustable spanner wrench on the Adapter and a 9/16" wrench on the Flange Nut to tighten the Nut.

Steps common to ALL CD collet models

1. Thread the Collet Body (23) onto the Rotor (12) and using a torque wrench, tighten the Collet Body between 14 and 19 ft–lb (19 and 26 Nm) torque.
2. Wipe each Vane (13) with a light film of oil and insert a Vane into each vane slot in the Rotor.
3. Grasp the Collet Arbor and insert the assembled Rotor into the Motor Housing (5).
4. Grasp the Motor Housing in copper–covered or leather–covered vise jaws with the Collet Body upward. Do not distort the Housing.
5. Thread the Clamp Nut (22) onto the Motor Housing and tighten the joint between 20 and 25 ft–lb (27 and 34 Nm) torque. This is a **left–hand thread**. Turn **counterclockwise** to tighten.
6. Insert the Collet (24) into the Collet Body and slide the Nosepiece (25) over the Collet. Thread the Collet Nut (26) onto the Collet Body and use the two Collet Wrenches (26A) to tighten the Nut to the Collet Body.

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 suitable cleaning solution. If elements cannot be cleaned, replace the Motor Housing and/or the Flange.
	Plugged Inlet Screen	Clean the Inlet Screen with a clean, suitable cleaning solution or replace the Screen.
	Worn or broken Vanes	Install a **complete** set of new Vanes.
	Loose Clamp Nut or Arbor Housing	Tighten the Nut or Housing between 20 and 25 ft–lb (27 and 34 Nm) torque.
	Worn or broken Motor Housing	Replace the Motor Housing.
	Internal air leakage in the Motor Housing indicated by high air consumption/low speed or air leaking out the front and rear exhaust simultaneously.	Replace the Motor Housing.
	Grit buildup under the Throttle Lever restricting full Throttle Valve Plunger movement	Remove the Throttle Lever and clean the groove in the Motor Housing.
	Bent stem on Throttle Valve	Replace the Throttle Valve.
	Front Seal Cup dragging against the shield of the Front Rotor Bearing	Re–position the Front Seal Cup.
Excessive runout	Bent rotor hub	Replace the Rotor.
	Loose Collet Nut	Tighten the Collet Nut until snug.
	Worn or damaged Collet or Collet Nut	Replace the damaged component and re–test.
	Worn or damaged Front Rotor Bearing	Replace the Front Rotor Bearing.
	Bent, worn or broken Extension Arbor on CX models	Replace the Extension Arbor if, when mounted between centers, the runout on the arbor body exceeds 0.002" T.I.R. or 0.0005" T.I.R. on the bearing mounting diameters.
	Worn or damaged Front Arbor Bearing on CX models	Replace the Front Arbor Bearing.
Scoring of End Plate	Worn Front End Plate Spacer or Front End Plate	Install a new Front End Plate Spacer and Front End Plate.
	Worn Front Rotor Bearing	Install a new Front Rotor Bearing
Leaky Throttle Valve	Dirt accumulation on Throttle Valve or Throttle Valve Seat	Disassemble, inspect and clean parts.
	Worn Throttle Valve or Throttle Valve Seat	Replace the Throttle Valve and/or Throttle Valve Seat.
	Excessive dirt build–up beneath the Throttle Lever	Clean out the slot area.
	Bent Throttle Valve Plunger	Replace the Plunger.
Exhausts at wrong direction	Incorrect orientation of the Flow Ring	Reverse the face of the Flow Ring against the Motor Housing.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Front Rotor Bearing runs hot	Incorrect installation of the Front Seal Cup	Reposition the Front Seal Cup 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 installation orientation	If a black stain or black hash–marks 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	Replace the Flange Clamp.
	Damaged Flow Ring	Replace the Flow Ring.
Rough Operation/Vibration	Improper lubrication or dirt build up	Disassemble the tool and clean it in a clean, suitable cleaning solution. Assemble the tool and inject 3 cc of the recommended oil into the Inlet and run the Grinder long enough to coat the internal parts with the oil.
	Worn or broken Rear Rotor Bearing or Front Rotor Bearing	Replace the worn or broken Bearings. Examine the Front End Plate, Front End Spacer, Front Seal Cup and Rear Rotor Bearing Spacers and replace any damaged parts. If the rear end plate is damaged, replace the Rotor.
	Worn or broken Rear or Front Arbor Bearing in CX models	Replace the worn or broken Bearing.
	Dirt contaminated Front Arbor Bearing in CX models	Replace the Bearing.
	Bent, worn or broken Extension Arbor on CX models	Replace the Extension Arbor if, when mounted between centers, the runout on the arbor body exceeds 0.002” T.I.R. or 0.0005” T.I.R. on the bearing mounting diameters.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

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