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Air Grinder and Die Grinder

Series G2 (Horizontal)

Maintenance Information



Save These Instructions

IR *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.

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

Lubrication

Whenever one of these Grinder or Die Grinder is disassembled for overhaul or replacement of parts, lubricate the tool as follows:

1. Always wipe the Vanes (28) with a light film of oil before inserting them into the vane slots.
2. Inject 0.5 to 1.0 cm³ of **Ingersoll Rand** No. 10 Oil into the air Inlet Assembly (1) after assembly.
3. Whenever the motor is disassembled, remove the old grease and refill the cavity behind the Rear Rotor Bearing (25) with 3/4 cm³ of **Ingersoll Rand** No. 68 Grease.

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 soft-sided 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. When grasping a tool in a vise, first place the tool housing in the provided Clamp Tool (71), then grasp outer surface of Clamp Tool in the vise to protect the housing from damage.
4. 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.
5. Do not disassemble the tool unless you have a complete set of new gaskets and O-Rings for replacement.
6. Do not press any needle bearing on hand for installation. Needle bearings are always damaged during the removal process.
4. Grasp the tool mounted in the Clamp Tool (71), in soft-sided vise jaws with the output upward. Using a 1-1/2" wrench on the flats of the Arbor Housing, unscrew and remove the Housing. This is a **left-hand thread**. Rotate the Housing **clockwise** to remove it.
5. Remove the Clamp Sleeve (41 or 48).
For G2X and G2XX models, remove the Arbor Coupling (47).
6. Using snap ring pliers, remove the Arbor Bearing Retaining Ring (46 or 57) from the Arbor Housing.
7. **For G2S models**, stand the Arbor Housing, threaded end upward, on the table of an arbor press and using a rod or piece of tubing that contacts the outer ring of the bearing, press the Front Arbor Bearing (45) from the Arbor Housing.
For G2X and G2XX models, grasp the Arbor Bearing Nut (49), pull the Arbor out of the Arbor Housing.
Continue Here for G2X and G2XX Models Only
8. **For models ending in G4**, remove the Arbor Bearing Shield (56).

Disassembly of all Models

1. **For all Collet models**, grasp the tool, mounted in the Clamp Tool (71), in soft-sided vise jaws with the Collet (59) upward. Using the Collet Body Wrench (61) on the flats of the Collet Arbor (58) and the Collet Nut Wrench (62) on the Collet Nut (60), unscrew the Collet Nut and remove the Collet.
2. **For All Wheel models** grasp the tool, mounted in the Clamp Tool (71), in soft-sided vise jaws with the Flange Nut (70) upward. Use an adjustable spanner wrench in one of the holes in the Wheel Adapter (68) and a 9/16" wrench to loosen and remove the Flange Nut (70). Remove the Wheel Flange (69) and grinding wheel.
3. Using a 5/32" hex wrench, loosen the Guard Adapter Screw (64) and pull the Guard Adapter Assembly (63) and assembled Wheel Guard (65) from the Arbor Housing (43 or 53).
9. Stand the Arbor Housing, threaded end upward, on the table of an arbor press and using a rod or piece of tubing that contacts the outer ring of the bearing, press the Front Arbor Bearing(s) (55) from the Arbor Housing.
10. Insert a 5/32" (4 mm) diameter hardened steel rod approximately 6" (150 mm) long through the crosshole in the Arbor and using a 1/2" wrench on the Arbor Bearing Nut, unscrew and remove the Nut.
11. Using an arbor press, press the Rear Arbor Bearing (51) off the Arbor.

Disassembly of the Motor

1. **For G2H models**, grasp the tool, mounted in the Clamp Tool (71), in soft sided vise jaws with the Collet Body (58) upward. Using a 1-1/2" wrench unscrew and remove the Clamp Nut (40). This is a **left-hand thread**. Rotate the Nut **clockwise** to remove it.
2. Remove the Flange clamp (35) and front Housing Cap (34) from the front of the Motor Housing Assembly (12). Remove the Front Muffler (33) if it remains in the Housing.
3. Grasp the Collet Body (58), Arbor (42) or Arbor Bearing Nut (49) and pull the assembled motor out of the Motor Housing. Remove the two Rear Rotor Bearing Spacers (26) from the bottom of the Cylinder (17).
4. Remove the Vanes (28) from the Rotor (27).
5. Grasp the Rotor in smooth sided vise jaws with the output upward.
For G2H models, using the Collet Body Wrench (61) unscrew and remove the Collet Body. Remove the Clamp Spacer (39).

- For G2S models**, using a 5/32" diameter rod through the crosshole of the Arbor, unscrew and remove the Arbor.
- For G2X and G2XX models**, using a 1/2" wrench, unscrew and remove the Arbor Bearing Nut.
- If the Front Rotor Bearing (32) must be replaced, support the Front End Plate (29) 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 (30) and Seal Assembly (31) from the hub of the Rotor.
 - If the Rear Rotor Bearing (25) must be replaced, use snap ring pliers to remove the Rear Rotor Bearing Retainer (24).
 - Using a bearing puller, pull the Rear Rotor Bearing off the hub of the Rotor.

Disassembly of the Inlet and Throttle

- Using a 15/16" wrench or six point socket, unscrew and remove the Inlet Assembly (1).
- Remove the Inlet Seal (2), Inlet Screen and Ball Valve Spring Seat from the Inlet.
- Remove the Ball (4) and Ball Valve Spring (3) from the Cylinder Assembly (17).
- Press the Throttle Lever Pin (7) from the Rear Exhaust Diffuser (5) and remove the Lever Assembly (9).

- Remove the Rear Exhaust Diffuser from the Housing. Remove Rear Exhaust Diffuser Gasket (8), Rear Exhaust Diffuser Muffler (10) and Lever Support (6) from the Diffuser.
- If the Ball Valve Seat (16) 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.
- Remove Rear Housing Muffler (11) from the Housing.
- Push throttle Pin Assembly (18) out of Housing and remove from opening in Cylinder.
- Remove Throttle Pin O-Ring (19) from throttle Pin.

Disassembly of Motor Housing and Cylinder

- Place Cylinder, Inlet end down, on flat hard surface. Grasp Housing and pull down to separate it from the Cylinder. Pull Cylinder out of Housing.
- Remove Flow Guide Assembly (20) and Intake Cover Assembly (22) from Exhaust Seal (14).
- Remove Flow Guide O-Rings (21) from Flow Guide.
- Remove Intake Cover O-Ring (23) from Intake Cover.
- Remove Rear Cylinder O-Ring (13) and then the Exhaust Seal from the Cylinder.
- Remove Front Cylinder O-Ring (15) from the Cylinder.
- If the Throttle Bushing needs to be replaced, insert a small hooked tool into the hole in the bushing and catch the underside. Pull Bushing from Cylinder.

Assembly

General Instructions

- Always press on the **inner** ring of a ball-type bearing when installing the bearing on a shaft.
- Always press on the **outer** ring of a ball-type bearing when pressing the bearing into a bearing recess.
- Whenever grasping a tool or part in a vise, always use soft-sided vise jaws. Take extra care not to damage threads or distort housings.
- When grasping a tool in a vise, first place the tool housing in the provided Clamp Tool (71), then grasp outer surface of Clamp Tool in the vise to protect the housing from damage.
- Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
- 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.
- Apply a film of O-Ring lubricant to every O-Ring before installation.

Assembly of Motor Housing and Cylinder

- If the Throttle Bushing was removed, Properly secure the Cylinder (17) and press the Throttle Bushing into the hole on the side of the Cylinder closest to threaded opening.
- Apply O-Ring lubricant to the Front Cylinder O-Ring (15) and install onto the small end of Cylinder. Slide O-Ring past all inlet and exhaust slots, into Front O-Ring groove.
- Install Exhaust Seal (14) onto small end of Cylinder and move it all the way down over O-Ring. Line up and seat protrusion on Exhaust Seal with slot in Cylinder for proper orientation.
- Install the Rear Cylinder O-Ring (13) onto small end of Cylinder. Slide O-Ring into rear O-Ring groove in Cylinder.
- Install two Flow Guide O-Rings (21) in grooves on Flow Guide (20).
- Install Intake Cover O-Ring (23) in groove on Intake Cover (22).
- Assemble Flow Guide onto Cylinder. Be sure O-Rings are installed on the Flow Guide before assembly. For rear exhaust insert the rubber plugs on the Flow Guide into

the holes in the Exhaust Seal. For front exhaust, insert the Flow Guide tabs into the Exhaust Seal holes. There is a protrusion on the Exhaust Seal that inserts into the groove in the top of the Flow Guide. Especially, for Flow Guide without tabs, be sure this protrusion is inserted in this groove.

- Assemble Intake Cover onto Cylinder. There is a tab on the front of the Intake Cover that inserts into the Exhaust Seal and a tab that inserts into a hole in the Cylinder for proper alignment.
- Place large end of Cylinder on flat hard surface and slide Housing (12) over Cylinder assembly. Be sure that hole in top of Housing lines up with hole in Throttle Bushing. Press down on Housing until these holes are aligned.

Assembly of the Throttle and Inlet

- If the Ball Valve Seat (16) was removed, use a 5/8" wooden dowel with a flat end to push the Seat into the Cylinder.
- Assemble Throttle Pin O-Ring (19) onto Throttle Pin (18).
- Using needle nose pliers, grasp Throttle Pin above O-Ring and insert into threaded end of Cylinder. Align Pin with holes in Cylinder and Housing and insert. Release Throttle Pin and push it the rest of the way into the hole.
- Insert the Ball (4) and then the Ball Valve Spring (3) small end first into the Cylinder opening.
- Assemble Lever Support (6) into Rear Exhaust Diffuser (5), the U shaped side of support inserted first into front of the Diffuser. Slide tabs into the slots on the Diffuser and line up the holes with the holes in the Diffuser.
- Assemble Rear Exhaust Diffuser Gasket (8) onto Rear Exhaust Diffuser and assemble Diffuser onto the Housing Assembly.
- Align hole in Lever Assembly (9) with hole in Exhaust Diffuser and press the Throttle Lever Pin (7) through Exhaust Diffuser holes.
- Push the Inlet Screen closed end leading, into the small end of the Inlet Assembly (1). After lubricating the Inlet Seal (2) with O-Ring lubricant and being careful not to nick the Seal on the threads of the Inlet, install the Seal on the Inlet. Press the Ball Valve Spring Seat small end leading into the small end of the Inlet.
- Thread the Inlet Assembly into the Cylinder and tighten it between 20 to 25 ft-lb (27.1 to 33.9 Nm) torque.

Assembly of the Motor

- If the Rear Rotor Bearing (25) was removed, stand the Rotor (27) 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 flat on the large rotor body. Press the Rear Rotor Bearing onto the hub of the Rotor.
- Install the Rear Rotor Bearing Retainer (24) in the groove on the hub of the Rotor.
- Install the Front End Plate (29), counterbored end trailing, onto the threaded hub of the Rotor. Using finger pressure, press the Front Seal Cup Assembly (31), felt end trailing, onto the end of the Front End Plate Spacer (30) 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.

NOTICE

Before performing the next step, be aware that the Front Rotor Bearing is a flush ground bearing and must be installed in a specific manner. The end of the Bearing with a stain or hash marks must be away from the Spacer.

- Stand the small hub of the Rotor on the table of an arbor press with the threaded end upward and press the Front Rotor Bearing (32) onto the hub of the Rotor.
- Grasp the assembled Rotor in soft-sided vise jaws with the threaded rotor hub upward.
- For G2H models**, place the Clamp Spacer (39) on the Front Rotor Bearing. Using finger pressure, press the Seal Assembly (31), felt end trailing, onto the rotor end of the Collet Body (58) until it contacts the shoulder. Saturate the felt with **Ingersoll Rand No. 50 Oil**.
- For G2S models**, see step 1 in Assembly of Extension Housing section before proceeding.
- Thread the Collet Body (58), Arbor (42) or Arbor Bearing Nut (49) onto the Rotor and using a torque wrench, tighten between 14 and 19 ft-lb (19.0 and 25.8 Nm) torque.
- Inject approximately 0.7 cm³ of **Ingersoll Rand No. 68 Grease** into the small recess at the bottom of the Cylinder (17). Drop the two Rear Rotor Bearing Spacers (26) into the bottom of the Cylinder.
- Wipe each Vane (28) with a light film of oil and insert Vane into each vane slot in the Rotor. Be sure that logo on Vane faces to the left inside the vane slot when looking down length of Rotor, with threaded end away.
- Grasp the output and insert the assembled Rotor into the Cylinder.
- Assemble the Front Muffler (33) into the Front Housing Cap (34). Ensure muffler is installed in the Cap and does not get pushed down into the Motor Housing.
- Assemble Front Housing Cap onto Motor Housing (12), aligning notches on Cap with notches in the Cylinder. Place Flange Clamp (35) in groove in Cap.
- For G2H models**, thread the Clamp Nut (40) onto the Cylinder and tighten to 20 to 25 ft-lb (27 to 34 Nm) torque. This is a **left-hand thread**, turn **counterclockwise** to tighten.

Assembly of the Extension Housing on G2X, G2XX and G2S Models.

- For G2S models**, if the Front Arbor Bearing (45) must be replaced proceed as follows:
 - Place the Clamp Sleeve (41) on the table of an arbor press and install the large end of the Arbor Housing (43) on the Clamp Sleeve.

b. Slide the Front Arbor Bearing onto the threaded hub of the Arbor (42) and insert the Arbor, bearing end trailing, into the Housing. Make certain the end of the Arbor rests on the arbor press table and the Bearing is aligned with the bore in the Housing.

- Install the small piece of the LE2-950 Bearing Inserting Tool over the Arbor and press the Bearing into the Housing until it stops against the shoulder of the Arbor.
 - Remove the Arbor from the Housing and Bearing but keep the parts together so that the same parts are installed together. Do not mix and match Arbors with Bearings and Housings or Clamp Sleeves.
- For G2X and G2XX models**, if the Rear Arbor Bearing (51) was removed, proceed as follows:
 - Stand the larger piece of the LE2-950 Bearing Inserting Tool on the table of an arbor press.
 - Place the Rear Arbor Bearing on the surface of the Inserting Tool and align the central opening of the Bearing with the central opening of the Inserting Tool.
 - The large body of the Arbor (52) has an annular groove between the crosshole and one threaded end. Press that end of the Arbor into the Bearing until the shoulder of the Arbor stops against the Bearing.
 - If the Front Arbor Bearing (55) was removed from the Arbor Housing (53), proceed as follows:
 - If the Rear Arbor Bearing was not removed from the Arbor, insert a 5/32" (4 mm) hardened steel rod approximately 6" (150 mm) long through the crosshole and using a 1/2" wrench, unscrew and remove the Arbor Bearing Nut (49) from the Arbor. **Do not remove the Bearing.**
 - Stand the larger piece of the No. LE2-950 Bearing Inserting Tool on the table of an arbor press and insert the Arbor, Rear Arbor Bearing end leading, into the central opening of the piece until the Bearing stops against the top of the Inserting Tool.
 - Install the Arbor Housing, threaded end first, over the Arbor until it stops against the Bearing and pilots on the Bearing Inserting Tool.
 - Position the Front Arbor Bearing on the Arbor and using the smaller piece of the No. LE2-950 Bearing Inserting Tool as a pressing tool and pilot, press the Bearing onto the Arbor until it stops against the arbor shoulder. Repeat for the second Bearing on **G2XX models**.
 - Insert a 5/32" (4 mm) hardened steel rod approximately 6" (150 mm) long through the crosshole and using a 1/2" wrench, thread the Arbor Bearing Nut onto the Arbor against the Rear Arbor Bearing. Tighten the Nut between 14 and 19 ft-lb (19 and 26 Nm) torque.
 - Lubricate the Arbor Coupling (47) with approximately 1 cc of **Ingersoll Rand No. 68 Grease** and position the Coupling over the Arbor Bearing Nut (49) attached to the rotor.
 - For models ending in G4**, install the Arbor Bearing Shield (56) in the Housing against the Bearing.
 - For all models**, using snap ring pliers, install the Arbor Bearing Retaining Ring (46 or 57) in the Arbor Housing.
 - Position the Clamp Sleeve (41 or 48) over the Arbor or Arbor Coupling against the Front Rotor Bearing.
 - For G2X and G2XX models**, align the rear Arbor Bearing Nut with the hex in the Arbor Coupling and thread the Arbor Housing onto the Cylinder.
For G2S models, align the hole in the Bearing with the Arbor and thread the Arbor Housing onto the Cylinder. For both, tighten the joint between 20 and 25 ft-lb (27 and 34 Nm) torque. This is a **left-hand thread**. Turn **counterclockwise** to tighten.
 - For models ending in G4**, using finger pressure, press the Seal Assembly (31), felt end trailing, onto the rotor end of the Collet Body (58) until it contacts the shoulder. Saturate the felt with **Ingersoll Rand No. 50 Oil**. Insert a 5/32" (4 mm) hardened steel rod approximately 6"

- (150 mm) long through the arbor crosshole. Thread the Collet Body onto the Arbor and using a torque wrench, tighten the joint between 14 and 19 ft-lb (19 and 26 Nm) torque.
- For models ending in H63 and H64, insert a 5/32" (4 mm) hardened steel rod approximately 6" (150 mm) long through the arbor crosshole. Using an adjustable spanner wrench, tighten the Wheel Adapter (68) between 14 and 19 ft-lb (19 and 26 Nm) torque.
 - Remove the rod and install the Arbor Housing Plug (44 or 54).
 - Position the Guard Adapter Assembly recessed surface leading, on the front end of the Arbor Housing, flush with the end of the Housing and using a 9/64" hex wrench, tighten the Wheel Guard Adapter Screw (64) to 7.5 to 8 ft-lb (10.2 to 10.8 Nm) torque.
 - Install in order the wheel, Wheel Flange (69) and Flange Nut (70).
 - Use an adjustable spanner wrench inserted into one of the holes in the Wheel Adapter to hold the Adapter from turning. Using a 9/16" wrench on the Flange Nut, tighten the Nut securely.

Assembly Instructions for All Collet Models

- Install the Collet (59) into the end of the Arbor.
- Using the Collet Body Wrench (61) to hold the Arbor, thread the Collet Nut (60) onto the Arbor.

Assembly Instructions for All Wheel Models

- Position the Wheel Guard (65) against the flat face of the Guard Adapter Assembly (63) and using a 1/8" hex wrench, install the three Guard Mounting Screws (66) and Lock Washers (67). Tighten the Screws to 5.5 to 6 ft-lb (7.4 to 8.1 Nm) torque.

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 Inlet and remove Exhaust Diffuser to replace Mufflers for Rear Exhaust. Disassemble Front Clamp Nut and remove Front Cap for Front Exhaust. Ensure muffler is in Front Cap and not pushed down into Motor Housing.
	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.
	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 Assembly dragging against the shield of the Front Rotor Bearing	Reposition the Front Seal Cup Assembly.
Excessive runout	Bent Rotor Hub.	Replace the Rotor.
	Loose Collet Nut.	Tighten the Collet Nut until snug.
	Worn or damaged Collet, Collet Nut or Nosepiece.	Replace the damaged component and retest.
	Bent, worn or broken Extension Arbor on G2X, G2XX and G2S 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 G2X, G2XX or G2S 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.

Trouble	Probable Cause	Solution
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 Guide.	Reverse the Flow Guide inside 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 installation 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.
Rough operation/vibration	Improper lubrication or dirt buildup.	Disassemble the Tool and clean in a suitable cleaning solution. Assemble the Tool and inject 3 cm ³ of the recommended oil into the Inlet and run the tool 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 Plate Spacer Front Seal Cup Assembly and Rear Rotor Bearing Spacers and replace any damaged parts. If the rear end plate is damaged, replace the Rotor.
	Worn or broken Rear Arbor Bearing in G2X or G2XX models or Front Arbor Bearing in G2X, G2XX or G2S models.	Replace the worn or broken Bearing.
	Dirt contaminated Front Arbor Bearing in G2X, G2XX or G2S models.	Replace the Bearing
	Bent, worn or broken Extension Arbor on G2X, G2XX and G2S 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.

Related Documentation

For additional information refer to:

Air Grinder Product Safety Information Manual Form 04584959.

Air Die Grinder Safety Information Form 04580288.

Product Information Manual Form 04581211, Form 04581799 and Form 04581203.

Parts Information Manual Form 04581229.

Manuals can be downloaded from www.irtools.com.

Notes

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