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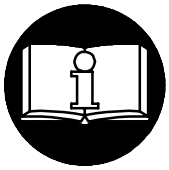
OPERATION AND MAINTENANCE MANUAL FOR MODELS 728JA1, 728J6K, 728LA2, 728L6K, 728NA3 AND 728N8K DRILLS

NOTICE

Series 728 Drills are designed for general purpose use in most maintenance applications. Ingersoll–Rand is not responsible for customer modification of tools for applications on which Ingersoll–Rand was not consulted.



⚠ WARNING

**IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

PLACING TOOL IN SERVICE

- **Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).**
- **For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 1/4" (6 mm) inside diameter air supply hose.**
- **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.**
- **Do not use damaged, frayed or deteriorated air hoses and fittings.**
- **Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.**
- **Always use clean, dry air at 90 psig maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.**
- **Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.**
- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Always wear hearing protection when operating this tool.**
- **Keep hands, loose clothing and long hair away from rotating end of tool.**
- **Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.**
- **Keep body stance balanced and firm. Do not overreach when operating this tool. High reaction torques can occur at or below the recommended air pressure.**
- **Tool accessory may continue to rotate briefly after throttle is released.**
- **Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.**
- **Use accessories recommended by Ingersoll–Rand.**
- **Always use a Dead Handle with Model 728NA3 and 728N8K.**
- **This tool is not designed for working in explosive atmospheres.**
- **This tool is not insulated against electric shock.**

NOTICE

The use of other than genuine Ingersoll–Rand replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.

Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll–Rand Authorized Servicenter.

Refer All Communications to the Nearest Ingersoll–Rand Office or Distributor.

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

WARNING LABEL IDENTIFICATION

⚠ WARNING

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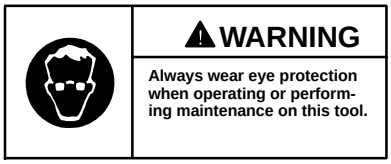
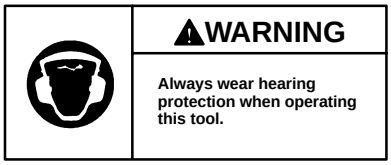
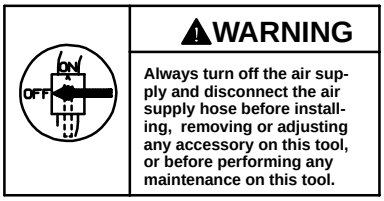
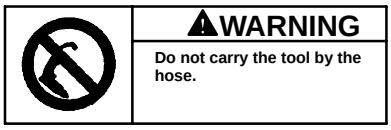
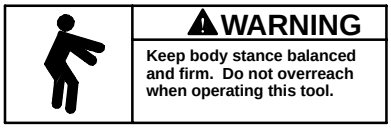
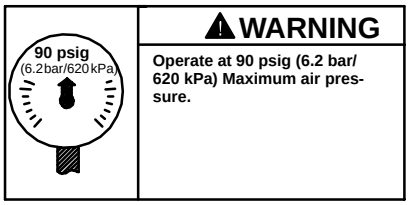












PLACING TOOL IN SERVICE

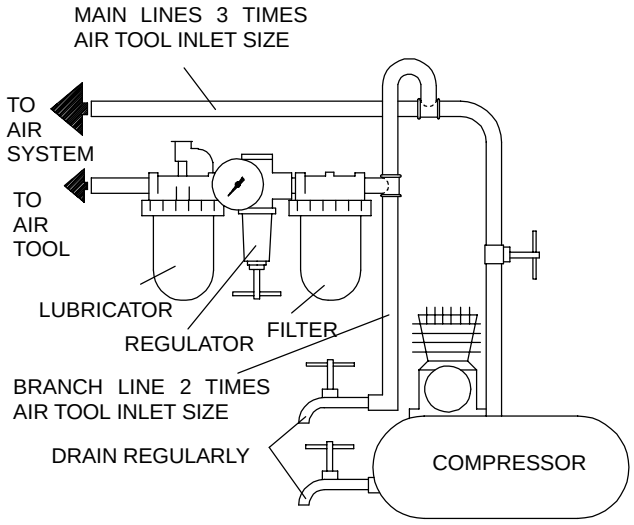
LUBRICATION

Ingersoll–Rand No. 10 **Ingersoll–Rand No. 28**

Always use of an air line lubricator with these tools.
We recommend the following Filter–Lubricator–Regulator Unit:

For USA – No. C18–03–FKG0–28

After each two or three hours of operation, unless an air line lubricator is used, disconnect the air hose and insert 3 or 4 drops of Ingersoll–Rand No. 10 Oil into the air inlet.

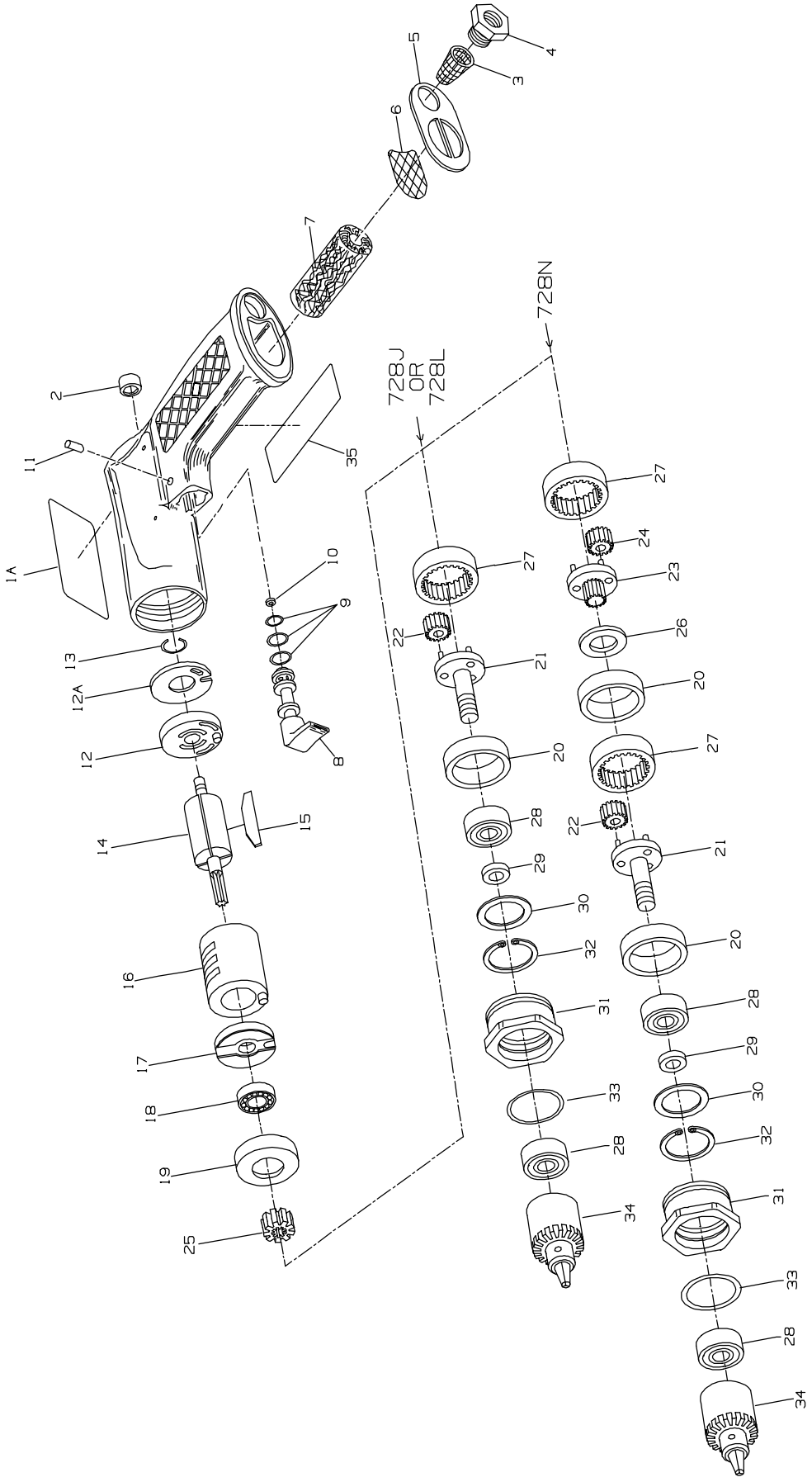


(Dwg. TPD905–1)

HOW TO ORDER A DRILL

DRILL WITH PISTOL GRIP HANDLE

Model	Free Speed rpm	Chuck Capacity in	Chuck Capacity mm
728JA1	3,800	5/16	8
728J6K	3,800	3/8	10
728LA2	2,100	3/8	10
728L6K	2,100	3/8	10
728NA3	950	1/2	13
728N8K	950	1/2	13



(Dwg. TPA628–5)

PART NUMBER FOR ORDERING

	Motor Housing Assembly		
	for 728J and 728L	728J–A40	
	for 728N	728N–A40	
1	Motor Housing		
	for 728J and 728L	728J–B40	
	for 728N	728N–B40	
1A	Warning Label	WARNING–7–99	
• ♦ 2	Rear Rotor Bearing	728–24	
• ♦ 3	Air Strainer Screen	D92–61	
4	Inlet Bushing	R001–182	
5	Exhaust Plate	728–123	
• ♦ 6	Exhaust Plate Screen	728–122	
• ♦ 7	Exhaust Silencer	728–310	
• 8	Throttle Valve Bushing Assembly	728–A503	
♦ 9	Throttle Valve Bushing		
	O–ring (3)	AF120–290	
♦ 10	Throttle Valve Face	R000BR1C–283	
11	Bushing Retaining Pin	5UT–757	
12	Rear End Plate Assembly	728–A12	
• ♦ 12A	End Plate Gasket	728–739	
• ♦ 13	Rear End Plate Retainer	728–38	
14	Rotor	728–53	
♦ 15	Vane Packet (set of 4 Vanes)	728–42–4	
16	Cylinder Assembly	728–A3	
17	Front End Plate	728–11	
♦ 18	Front Rotor Bearing	R0A2–22	

PART NUMBER FOR ORDERING

19	Front Rotor Bearing Support	728–13A
20	Spacer (1 for 728J and 728L; 2 for 728N)	728–118
21	Spindle Assembly (includes planet gear shafts)	
	for 728J	728J–A8
	for 728L	728L–A8
	for 728N	728J–A8
22	Spindle Planet Gear (3)	
	for 728J	728J–10
	for 728L	728L–10
	for 728N	728J–10
23	Gear Head (includes planet gear shafts) (for 728N)	728N–A2I6
24	Gear Head Planet Gear (3 for 728N)	728J–10
25	Rotor Pinion (for 728J and 728N)	728J–17
26	Gear Head Thrust Plate (for 728N)	728N–80
27	Ring Gear (1 for 728J and 728L; 2 for 728N)	728–406
28	Front Spindle Bearing (2)	728–510
29	Inner Spindle Bearing Spacer	728–111
30	Outer Spindle Bearing Spacer	728–112
31	Bearing Cage Assembly	728–A107
• 32	Spindle Bearing Retainer	4E–118
• 33	Spindle Bearing Snubber	AF120–294

* Not Illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

♦ Indicates Tune–up Kit part.

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
34	Drill Chuck		*	Drill Chuck Key	
	for 728JA1 (0 to 3/8” capacity)			for 6A–99 Chuck	R0J–J253
	(standard)	6A–99		for R00A–99 Chuck	R00A–J253
	for 728JA1 (0 to 1/4” capacity)			for 7801–99–6 Chuck	728N–253
	(heavy duty)	R00A–99		for 7806–99–8 Chuck	728N–253
	for 728LA2 (0 to 3/8” capacity)	7801–99–6	*	Exhaust Plate Assembly	
	for 728NA3 (0 to 1/2” capacity)	7806–99–8		(for piped–away exhaust)	
	for 728J6K or 728L6K			(includes crimped–on hose fitting) . .	D1400–A123
	(0 to 3/8” capacity) (keyless)	728–99–KC5	*	Dead Handle (for 728N)	728N–A48
	for 728N8K (0 to 1/2” capacity)		*	Tune–up Kit (includes illustrated parts:	
	(keyless)	728–99–KC8		2, 3, 6, 7, 9 [3], 10, 12A, 13, 15 and 18)	728–TK3
35	Nameplate				
	for 728JA1	728JA1–301			
	for 728J6K	728J6K–301			
	for 728LA2	728LA2–301			
	for 728L6K	728L6K–301			
	for 728NA3	728NA3–301			
	for 728N8K	728N8K–301			

* Not Illustrated.

MAINTENANCE SECTION

⚠ 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 assembling a tool, work some Ingersoll–Rand No. 28 Light Grease into the Rear Rotor Bearing (2), Front Rotor Bearing (18) and into the teeth of the Planet Gears (22 and 24) or Ring Gear (27).

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to repair or replace 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.

Disassembly of the Gearing

1. Grasp the handle of the tool in leather–covered or copper–covered vise jaws with the Drill Chuck (34) upward.
   For Chucks requiring a Key, insert the shaft of the Drill Chuck Key into one of the holes in the Chuck and give it a sharp rap to loosen the Chuck. Unscrew and remove the Chuck.
   For Keyless Chucks, insert one leg of a ninety degree hex wrench into the Chuck and tighten the Chuck. Give the protruding end of the hex wrench a sharp rap to loosen the Chuck. Unscrew and remove the Chuck.
2. Using a wrench, unscrew the Bearing Cage Assembly (31) and grasp the shaft of the Spindle Assembly (21) to pull the Front Spindle Bearings (28), Clamp Nut Assembly, Outer Spindle Bearing Spacer (30) and Inner Bearing Spacer (29).
3. To remove the Bearings, support the flange of the Clamp Nut with the threaded end of the Spindle upward. Press the Spindle out of the Bearing nearest the thread and the Clamp Nut.
4. Remove the Bearing and Spindle Bearing Snubber (33) from the Clamp Nut.
5. Remove the two Bearing Spacers and using a bearing puller, pull the remaining Front Spindle Bearing off the spindle shaft.
6. **For Series 728J or 728L,** remove the Spacer (20), Spindle Planet Gears (22) and Ring Gear (27) from the Motor Housing (1).
   For Series 728N, remove the two Spacers (20), Spindle Planet Gears (22), two Ring Gears (27), Gear Head Thrust Plate (26), Gear Head Assembly (23), Gear Head Planet Gears (24) and Rotor Pinion (25) from the Motor Housing (1).

Disassembly of the Motor

1. Grasp the shaft of the Rotor (14) and pull the assembled motor out of the Motor Housing (l).
2. Remove the Front Rotor Bearing Support (19) and Front Rotor Bearing (18) from the shaft of the Rotor and press the Bearing out of the Bearing Support.
3. Slide the Front End Plate (17) and Cylinder (16) off the Rotor and remove the Vanes (15).
4. Remove the Rear End Plate Retainer (13) and slide the Rear End Plate (12) off the rear hub of the Rotor.
5. If the Rear Rotor Bearing (2) must be removed, press the Bearing out through the motor from the rear of the tool.

Disassembly of the Throttle and Inlet

1. Using a wrench, unscrew and remove the Inlet Bushing (4).
2. Lift the Exhaust Plate (5), Exhaust Plate Screen (6) and Air Strainer Screen (3) off the handle of the Motor Housing (1).
3. Pull the Exhaust Silencer (7) out of the Housing.
4. Press the Bushing Retaining Pin (11) out of the Motor Housing and pull the Throttle Valve Bushing Assembly (8) out of the Housing.
5. Remove the Throttle Valve Face (10) and push the assembled trigger out of the Bushing.
6. Remove the three Throttle Valve Bushing O–rings (9) from the Valve Bushing.

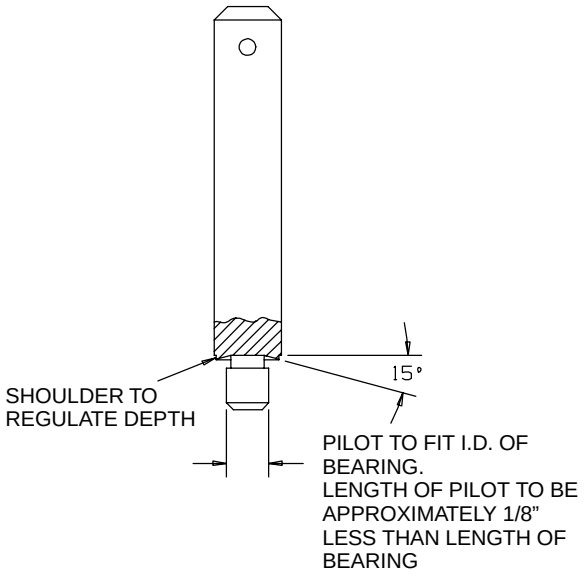
ASSEMBLY

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 and 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 bearings should never be cleaned.** Work grease thoroughly into every open bearing before installation.
7. Unless otherwise noted, press on the stamped end of a needle bearing when installing the needle bearing in 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 trigger stem into the end of the Throttle Valve Bushing Assembly (8) that is not counterbored. Install the Throttle Valve Face (10) in the stem groove to capture the trigger in the Bushing.
2. Install the three Throttle Valve Bushing O–rings (9) on the Throttle Valve Bushing Assembly and insert the Assembly into the trigger hole in the Motor Housing (1).
3. Position the Assembly so that the area between the trigger and the face of the Bushing is aligned with the hole for the Bushing Retaining Pin (11). Capture the Assembly by pressing the Pin into the Housing.
4. Insert the Exhaust Silencer (7) into the handle of the Housing.
5. Place the Exhaust Plate Screen (6) and Exhaust Plate (5) against the handle.
6. Insert the Air Strainer Screen (3), closed end leading, through the Plate and Screen into the inlet hole in the handle. Install the Inlet Bushing (4) and tighten it to a minimum of 15 ft–lb (20 Nm) torque.

Assembly of the Motor

1. If the Rear Rotor Bearing (2) was removed, use a needle bearing inserting tool and hand pressure only to insert the Bearing into the Motor Housing (1) from the motor end of the Housing. Continue pushing the Bearing into the Housing until the trailing end is seated between 0.109'– and 0.119" (2.768 mm and 3.022 mm) below the bottom face of the motor bore. Work 2 to 3 cc of Ingersoll–Rand No. 28 Grease into the Bearing.
2. If the Front Rotor Bearing (18) was pressed from the Front Rotor Bearing Support (19), press the Bearing into the Support. Work 2 to 3 cc of Ingersoll–Rand No. 28 Grease into the Bearing.
3. Slide the Front End Plate (17), flat side leading, onto the splined hub of the Rotor (14).
4. Install the assembled Support and Front Rotor Bearing on the shaft of the Rotor with the Bearing against the End Plate.
5. Grasp the splined hub of the Rotor in leather–covered or copper–covered vise jaws with rear shaft upward. Insert a Vane (15) into each slot in the Rotor.
6. Install the Cylinder Assembly (16), dowel pin end leading, down over the Rotor and Vanes. Make certain the dowel enters the hole in the Front End Plate.
7. Install the Rear End Plate Assembly (12), dowel pin end leading, on the rear hub of the Rotor. Make certain the dowel enters the hole in the Cylinder.
8. Apply a small amount of grease to the face of the Rear End Plate and place the End Plate Gasket (12A) against the End Plate.
9. Install the Rear End Plate Retainer (13) in the groove on the rear hub of the Rotor to capture the End Plate and Gasket.
10. Remove the assembled motor from the vise jaws and slide the assembly into the Motor Housing making sure the shaft of the Rotor enters the Rear Rotor Bearing.

Assembly of the Gearing

1. Press a Front Spindle Bearing (28) onto the threaded shaft of the Spindle Assembly (21) until it stops against the large face of the Spindle.
2. If the Spindle Bearing Retainer (32) was removed, use snap ring pliers to install it in the groove in the Motor Clamp Nut Assembly (31).
3. From the end of the Clamp Nut having the external thread, install the Outer Spindle Bearing Spacer (30) in the Clamp Nut against the Bearing Retainer.

4. Place the Inner Spindle Bearing Spacer (29) on the shaft of the Spindle against the Bearing and insert the assembly into the Clamp Nut until the Bearing stops against the Outer Bearing Spacer.
5. Insert the Spindle Bearing Snubber (33) into the groove inside the hex end of the Clamp Nut.
6. On the table of an arbor press, support the face of the Spindle between the gear pins and using a piece of tubing or socket, press the remaining Spindle Bearing onto the shaft of the Spindle until it stops against the Inner Bearing Spacer.
7. Install a Spindle Planet Gear (22) on each spindle gear shaft. Making sure the gear teeth mesh, place a Ring Gear (27) over the planet gears.
8. **For Series 728N,** place the remaining Spacer against the Ring Gear.
9. **For Series 728N,** place the Gear Head Thrust Plate (26) over the spline hub of the Gear Head Assembly (23) and insert the spline hub between the Spindle Planet Gears.
10. **For Series 728N,** install a Gear Head Planet Gear (24) on each gear head gear shaft. Making sure the gear teeth mesh, place the remaining Ring Gear over the planet gears.
11. **For Series 728N,** insert the Rotor Pinion (25) into the gear head so that the teeth of the Pinion mesh with the Gear Head Planet Gear teeth.
12. Work 8 or 9 cc of Ingersoll–Rand No. 28 Grease into the gear train.
13. Lubricate the external threads of the Bearing Cage. Grasping the spindle shaft, insert the assembled gear train into the Motor Housing (1) making certain that the rotor spline properly engages either the Spindle Planet Gears or the Rotor Pinion. Hand tighten the Cage while rotating the Spindle to make certain proper engagement is maintained.
14. Using a wrench on the flats of the Clamp Nut tighten the Nut to a minimum of 30 ft–lb (40 Nm) torque.
15. Thread the Chuck (34) onto the Spindle.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Loss of Power	Low Air Pressure	Check air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet.
	Plugged Air Strainer Screen Inlet Screen	Clean the Air Strainer or screen in a clean, suitable cleaning solution. If the Screen cannot be cleaned, replace it.
	Clogged Muffler or Exhaust Silencer	Clean the Muffler Element in a clean, suitable cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the **complete** set of Vanes.
	Damaged Rear End Plate Gasket	Install a new Rear End Plate Gasket.
	Worn or broken Cylinder	Replace the Cylinder if it is cracked or if the bore appears wavy or scored.
	Improper lubrication or dirt build–up	Clean the Motor Unit parts and lubricate as instructed.
Leaky Throttle Valve	Worn Throttle Valve and/or Throttle Valve Seat	Install a new Throttle Valve and/or a Throttle Valve Seat.
	Dirt accumulation on Throttle Valve and/or Throttle Valve Seat	Pour about 3 cc of a clean, suitable cleaning solution in the air inlet and operate the tool for about 30 seconds. **Immediately** pour 3 cc of the recommended oil in the air inlet and operate the tool for 30 seconds to **lubricate all the cleaned parts**.
Gear Case gets hot	Excessive grease	Clean and inspect the Gear Case and gearing parts and lubricate as instructed.
	Worn or damaged parts	Clean and inspect the Gear Case and gearing. Replace worn or broken parts.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.