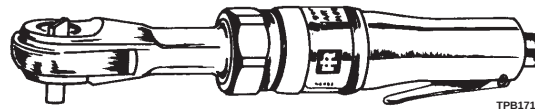


OPERATION AND MAINTENANCE MANUAL for 106 MODEL B SUPER DUTY RATCHET WRENCH



WARNING

**IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.**

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

- 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 3/8" (10 mm) inside diameter air supply hose.
- 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.
- 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.
- 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.
- Tool accessory may continue to rotate briefly after throttle is released.
- 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.
- Use accessories recommended by Ingersoll-Rand.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.

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.

Ingersoll-Rand is not responsible for customer modification of tools for applications on which Ingersoll-Rand was not consulted.

Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll-Rand Authorized Service center.

It is the responsibility of the employer to place the information in this manual into the hands of the operator.

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

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INGERSOLL-RAND®
PROFESSIONAL TOOLS

WARNING LABEL IDENTIFICATION



FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

PLACING TOOL IN SERVICE

LUBRICATION



Ingersoll-Rand No. 10



Ingersoll-Rand No. 28

Always use an air line lubricator with this tool.
We recommend the following Filter-Lubricator-Regulator Unit:

For USA – No. C22-04-G00

For International – No. C26-C4-A29

Before starting the tool and after each two or three hours of operation, unless the air line lubricator is used, pour approximately 1.5 cc of Ingersoll-Rand No. 10 Oil into the air inlet.

After each 40 hours of operation, or as experience indicates, inject about 0.5 cc of Ingersoll-Rand No. 28 Grease into the Grease Fitting (32).

Whenever the Ratchet Head is removed from the power unit, work some Ingersoll-Rand No. 28 Grease into the Front Rotor Bearing (20) and Spindle Bearing (28). Coat the Planet Gears (27) with a light film of Ingersoll-Rand No. 28 Grease.

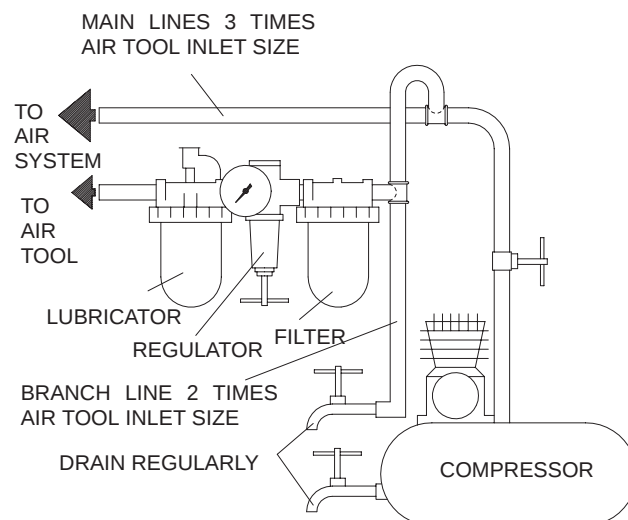
INSTALLATION

Air Supply and Connections

Always use clean, dry air. Dust-corrosive fumes and/or excessive moisture can ruin the motor of an air tool. An air line filter can greatly increase the life of an air tool. The filter removes dust and moisture.

Low pressure (under 90 psig; 6.2 bar/620 kPa) reduces the speed of air tools. Low pressure not only wastes time, but also costs money. High pressure (over 90 psig; 6.2 bar/620 kPa) raises performance beyond the rated capacity of the tool and could cause injury.

Make sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905-1 for a typical piping arrangement.



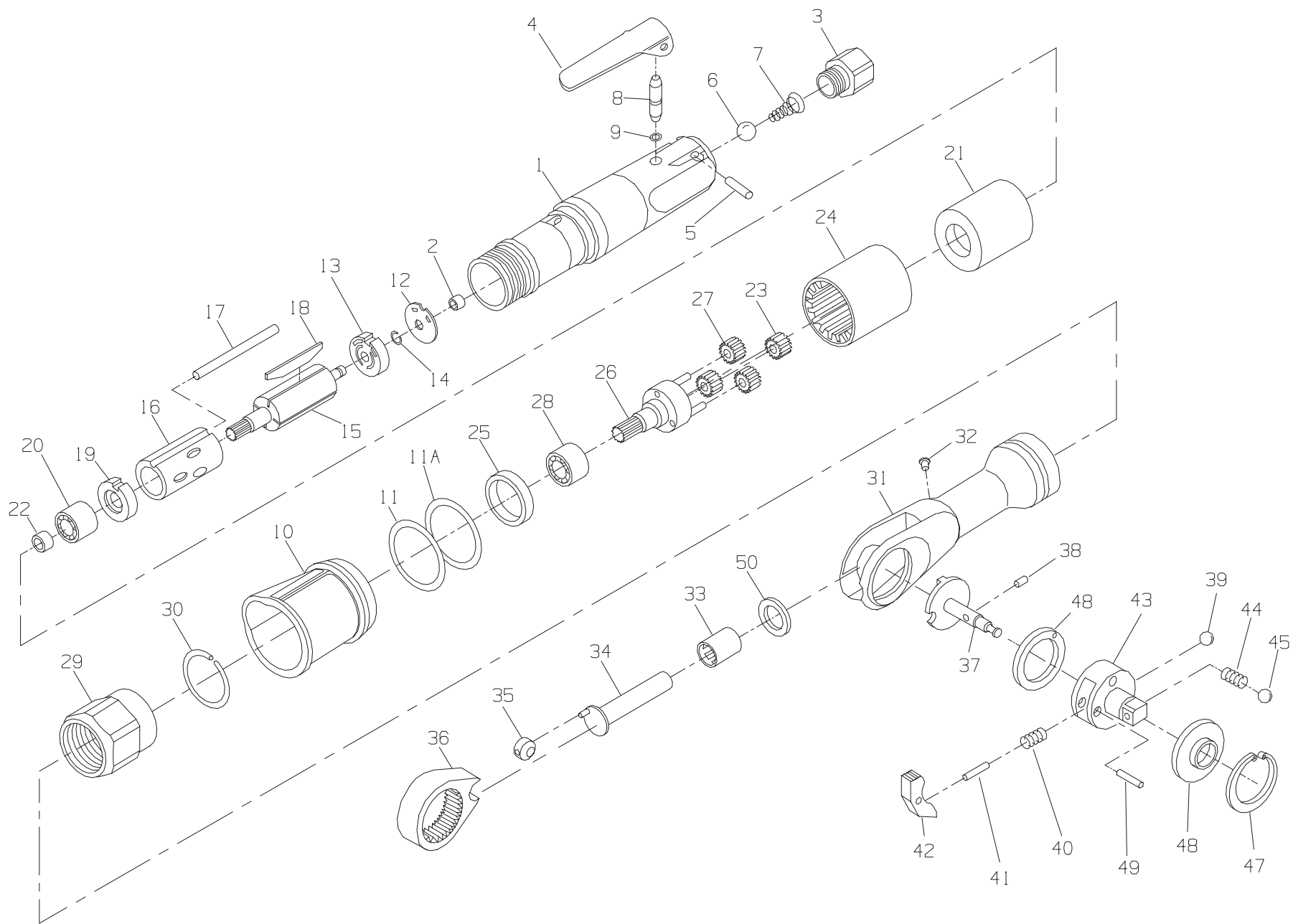
(Dwg. TPD905-1)

The 106 Model A Ratchet Wrench is designed for muffler and shock absorber work, replacement of water pumps, radiators and air conditioning units and general automotive repair.

HOW TO ORDER A RATCHET WRENCH

3/8" HEAVY DUTY RATCHET WRENCH

Model	Free Speed, rpm	Recommended Torque Range	
		in.	mm
106 Model B	210	10 to 50	13 to 36



MAINTENANCE SECTION

(Dwg. TPB839)

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Motor Housing Assembly	106-A40	27	Planet Gear (3)	5RAN-9
*	Warning Label	WARNING-9-99	28	Spindle Bearing	R0A2-22
2	Rear Rotor Bearing	5R-24	29	Coupling Nut	106-27
3	Inlet Bushing	R001-182	30	Ratchet Head Retaining Ring	182A53-29
4	Throttle Lever	201-273		Ratchet Head Assembly	106-A322A
5	Throttle Lever Pin	7L-120	31	Ratchet Housing	106-322
6	Throttle Valve (3/8" dia. steel ball)	D04-280	32	Grease Fitting	D0F9-879
7	Throttle Valve Spring	504-51	33	Crankshaft Bearing	106-32A
8	Throttle Valve Plunger Assembly	106-A302	34	Crankshaft	106-35A
9	Throttle Valve Plunger Seal	85L-259	35	Drive Bushing	106-36A
10	Exhaust Deflector	106-A23	36	Yoke	106-37A
11	Exhaust Deflector Seal	M0V010AA-379	37	Reverse Button	106-38A
11A	Deflector Seal Retaining Ring	106-323	38	Reverse Button Pin	106-39A
12	Rear End Plate Gasket	5RLK-739	39	Reverse Button Retaining Ball (3/16" dia. steel ball)	106-49A
13	Rear End Plate	5RLK-12	40	Ratchet Spring	106-41A
14	Rear End Plate Retainer	5RLK-118	41	Ratchet Lock Pin	106-42A
15	Rotor	106-53	42	Ratchet Pawl	106-43A
16	Cylinder	5LK-3	43	Ratchet Anvil	106-A44A
17	Cylinder Dowel	106-98	44	Detent Spring (2)	106-45A
18	Vane Packet (set of 4 Vanes)	106-42-4	45	Detent Ball (5/32" dia. steel ball) (2)	2U-696
19	Front End Plate	106-11	46	Thrust Washer	106-47A
20	Front Rotor Bearing	WWA100-97	47	Anvil Retaining Ring	106-48A
21	Front Rotor Bearing Housing	106-13	48	Wear Washer	106-52B
22	Rotor Pinion Spacer	5RAN-18	49	Pawl Retaining Pin	106-34A
23	Rotor Pinion	5RAN-17	50	Ratchet Head Seal	106-603
24	Ring Gear	106-406	*	Nameplate	106-301A
25	Ring Gear Spacer	106-118	*	Protection Boot	106-32
26	Spindle	106-8			

* Not illustrated.

MAINTENANCE SECTION

WARNING

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

Always turn off air supply and disconnect air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

LUBRICATION

Each time a 106 Model B Ratchet Wrench is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

Pour approximately 1.5 cc of Ingersoll-Rand No. 10 Oil into the air inlet. Degrease and relubricate the internal parts of the Ratchet Head. If the Ratchet Head “hangs up,” it is usually because of lack of lubrication.

Check the Rotor, bore of the Cylinder (16) and the faces of the End Plates (13 and 19) for scoring. Minor scoring on the Rotor and Cylinder can be smoothed over with a fine grit emery cloth. If the End Plates are slightly scored, they can be smoothed over by placing a piece of fine grit emery cloth on a surface plate or similar flat surface, and rubbing the surface of the End Plate against it in a figure-8 pattern.

Before reassembling the motor and gearing, make certain that all the parts are clean and free of dirt or grit. Work a little of the recommended grease into the Rear Rotor Bearing (2), Front Rotor Bearing (20) and Spindle Bearing (28). Lightly coat the Planet Gears, Rotor Pinion and planet gear shafts with a thin film of the recommended grease. Coat the Vanes, Rotor, End Plates and Cylinder bore with a film of the recommended oil.

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 Ratchet Wrench unless you have a complete set of new gaskets and O-rings for replacement.

Disassembly of the Ratchet Head

1. Rotate the Reverse Button (37) to the neutral position.
2. Using a pair of good snap ring pliers, remove the Anvil Retaining Ring (47).
 - Grasp the square driver, and pull the Anvil (43) with its attached parts from the Ratchet Head.
4. Slide the Thrust Washer (46) off the square driver, and remove the Reverse Button Retaining Ball (39) from the hole in the side of the Anvil.
5. Remove the two Detent Balls (45) and Springs (44).
6. Lift off the Wear Washer (48).
7. Using a thin bladed screwdriver, push out the Pawl Retaining Pin (49) and remove the Ratchet Pawl (42).
8. Using a pair of needle nose pliers, remove the Ratchet Lock Pin (41) and Ratchet Spring (40) from the Reverse Button.
9. Withdraw the Reverse Button from the Anvil.
10. While looking through the slot in the side of the Ratchet Head, use a thin bladed screwdriver to rotate the Crankshaft (34) until the crankpin is adjacent to one of the slots. Withdraw the Yoke (36).
11. Remove the Drive Bushing (35) from the Yoke.

Disassembly of the Motor

1. Grasp the flats on the Motor Housing (1) in leather-covered or copper-covered vise jaws, with the Ratchet Head upward.
2. Unscrew the Coupling Nut (29). This is a right-hand thread.
3. Lift off the Ratchet Head.
4. If the Ratchet Head is to be disassembled, follow the preceding instructions for disassembly of the Ratchet Head.
5. Remove the Motor Housing from the vise and carefully withdraw the Spindle (26). The Planet Gears (27) will probably remain within the Ring Gear (24).
6. Hold the Housing vertically with the large open end down and strike it lightly against a wooden block or wooden surface of the workbench to jar the motor and gearing free. Once the Planet Gears and Rotor Pinion (23) are removed, grasp the splined end of the Rotor (15) and pull the entire motor from the Housing.
7. After the motor has been disassembled, check the Vanes (18) for cracks, or chipped or burned edges. If any single Vane needs replacement, replace the entire set.

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.

MAINTENANCE SECTION

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 the recommended 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 Ratchet Head

1. Make sure that all parts removed from the Ratchet Head have been degreased and relubricated.
2. Insert the Reverse Button (37) in the Anvil (43) so that the Reverse Button Pin (38) engages the crescent shaped recess in the top of the Anvil.
3. Using needle-nose pliers, insert the Ratchet Spring (40) followed by the Ratchet Lock Pin (41) into the side of the Reverse Button.
4. Slide the Ratchet Pawl (42), concave side first, into the cutaway slot in the Anvil and insert the Pawl Retaining Pin (49).
5. Note that one side of the Wear Washer (48) has a small, dimpled projection. Place the Wear Washer over the Reverse Button and onto the Anvil so that this projection is exposed.
6. Place the Reverse Button Retaining Ball (39) in the hole in the side of the Anvil.
7. Place the Drive Bushing (35) in the recess in the Yoke (30).
8. Make certain the crankpin is adjacent to the opening in the side of the Ratchet Head, and insert the Yoke so that the crankpin enters the hole in the Drive Bushing.
9. Look inside the Ratchet Head and note the small dimpled recess machined in the face. Align the small projection on the Wear Washer with this dimpled recess, and insert the assembled Anvil and Reverse Button into the Ratchet Head. Make certain it enters all the way.
10. Insert the Detent Springs (44) in the two holes in the Anvil.
11. Place the Detent Balls (45) on the Detent Springs.
12. Place the Thrust Washer (46), flat side first, over the square driver and against the Detent Balls.
13. Using a pair of snap ring pliers, insert the Anvil Retaining Ring (47) in the groove in the Ratchet Head. If you have difficulty working it into the groove because of the compression of the Detent Springs, support the Ratchet Head on a sleeve that clears the Reverse Button and, using a second sleeve that will just fit into the bore of the Ratchet Head, push the snap ring into place.

Assembly of the Motor

1. Slide the Rear End Plate (13), counterbored side trailing, onto the short hub of the Rotor (15). Install the Rear End Plate Retainer (14) in the groove on the Rotor hub. The Rear End Plate can be identified from the Front End Plate (19) by the two air ports that go completely through the End Plate.
2. Stand the Rotor upright, grasping the short hub in leather-covered or copper-covered vise jaws.
3. Place a Vane (18) in each vane slot in the Rotor.
4. Note that one end of the Cylinder (16) is machined so that it has two crescent shaped pockets. Place the Cylinder, pocket end first, down over the Rotor so that the slot in the side of the Cylinder is aligned with the notch in the Rear End Plate.
5. Place the Front End Plate, counterbored face trailing, over the splined rotor hub until it just contacts the face of the Cylinder.
6. Place the Rear End Plate Gasket (12) in the bottom of the Housing bore so that the ports in the Gasket are aligned with those in the Housing. Lightly grease the Gasket to hold it in place.
7. Obtain a 3/32 (2.3mm) diameter rod about 10" (254mm) long for use as an assembly dowel.
8. Align the notches in the End Plates with the groove along the side of the Cylinder. While holding the assembly dowel in these notches so that the dowel protrudes a few inches beyond the Rear End Plate, enter the dowel into the small dowel hole at the bottom of the housing bore, and slide the motor into the Housing (1) until it is firmly seated.
9. Withdraw the assembly dowel and install the Cylinder Dowel (17). If the motor and Cylinder Dowel are properly installed, the Cylinder Dowel will be flush with, but will not protrude beyond, the face of the Front End Plate.
10. Using a sleeve that contacts only the outer ring of the Front Rotor Bearing (20), press the Bearing into the Front Rotor Bearing Housing (21).
11. Slide the Front Rotor Bearing Housing, bearing side first, down over the splined rotor shaft until it seats against the Front End Plate.

MAINTENANCE SECTION

12. Slide the Rotor Pinion Spacer (22) onto the splined hub of the Rotor until it contacts the Front Rotor Bearing.
13. Slide the Rotor Pinion (23) onto the splined hub of the Rotor.
14. Slide the Ring Gear (24) inside the Motor Housing until it contacts the Front Rotor Bearing Housing.
15. Place a Planet Gear on each planet gear shaft, and insert the assembled Spindle (26) into the Housing so that the Planet Gears (27) mesh with the Ring Gear (24) and the Rotor Pinion.
16. Slide the Ring Gear Spacer (25) into the Motor Housing until it contacts the Ring Gear.
17. Install the Ratchet Head on the Motor Housing so that the square driver is in line with and on the same side of the tool as the Throttle Lever (4). Tighten the Coupling Nut (29) 30 to 35 ft-lb (40.6 to 47.4 Nm) torque.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Loss of power	Low air pressure	Check the air supply. For top performance, the air pressure must be 90 psig (6.2 bar/620 kPa) at the inlet of the tool.
	Clogged Inlet Bushing	Clean the Inlet Bushing in a clean, suitable, cleaning solution. If it cannot be cleaned, replace it.
	Worn or broken Vanes	Replace the complete set of Vanes.
	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	Install a new Throttle Valve.
	Dirt accumulation on Throttle Valve	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 Ingersoll-Rand No. 10 Oil into the inlet and operate the tool for 30 seconds to lubricate all the cleaned parts.
Housing gets hot	Excessive grease	Clean and inspect the gearing parts and lubricate as instructed.
	Worn or damaged parts	Clean and inspect the gearing parts. Replace worn or broken components.
Tool will not ratchet	Dirty ratchet mechanism	Disassemble, degrease and re-lubricate as instructed in the LUBRICATION section.
	Worn ratchet mechanism parts	Install a Ratchet Head Repair Kit.

NOTICE

SAVE THESE INSTRUCTION. DO NOT DESTROY.

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