

# OPERATION AND MAINTENANCE MANUAL

## for

# MODEL EQ230P EQUI-PULSE® NUTRUNNERS

**Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1) and any other applicable safety codes and regulations.**

**FOR TOP PERFORMANCE AND MAXIMUM DURABILITY OF PARTS, OPERATE THIS TOOL AT 90 psig (6.2 bar/6,0 kPa) AIR PRESSURE WITH 3/8" (10 mm) AIR SUPPLY HOSE.**

### ▲WARNING

**Air power tools can vibrate in use. Repetitive motions, uncomfortable positions, vibrations can cause injury to hands, fingers, wrists of some persons. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.**

### ▲WARNING

**Use only Impact Wrench Sockets and Accessories on this Tool. Do not use hand sockets and accessories. 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. Failure to do so could result in injury. Always use protective eyewear when performing maintenance on a tool or when operating a tool. Replace the Warning Label (3) whenever it becomes unreadable.**

### LUBRICATION

**Oil:** Ingersoll-Rand No. 50 Oil.  
**Grease:** Ingersoll-Rand No. 67 Grease.  
**Fluid:** Use only Ingersoll-Rand fluid part number EQ106S-400-1.

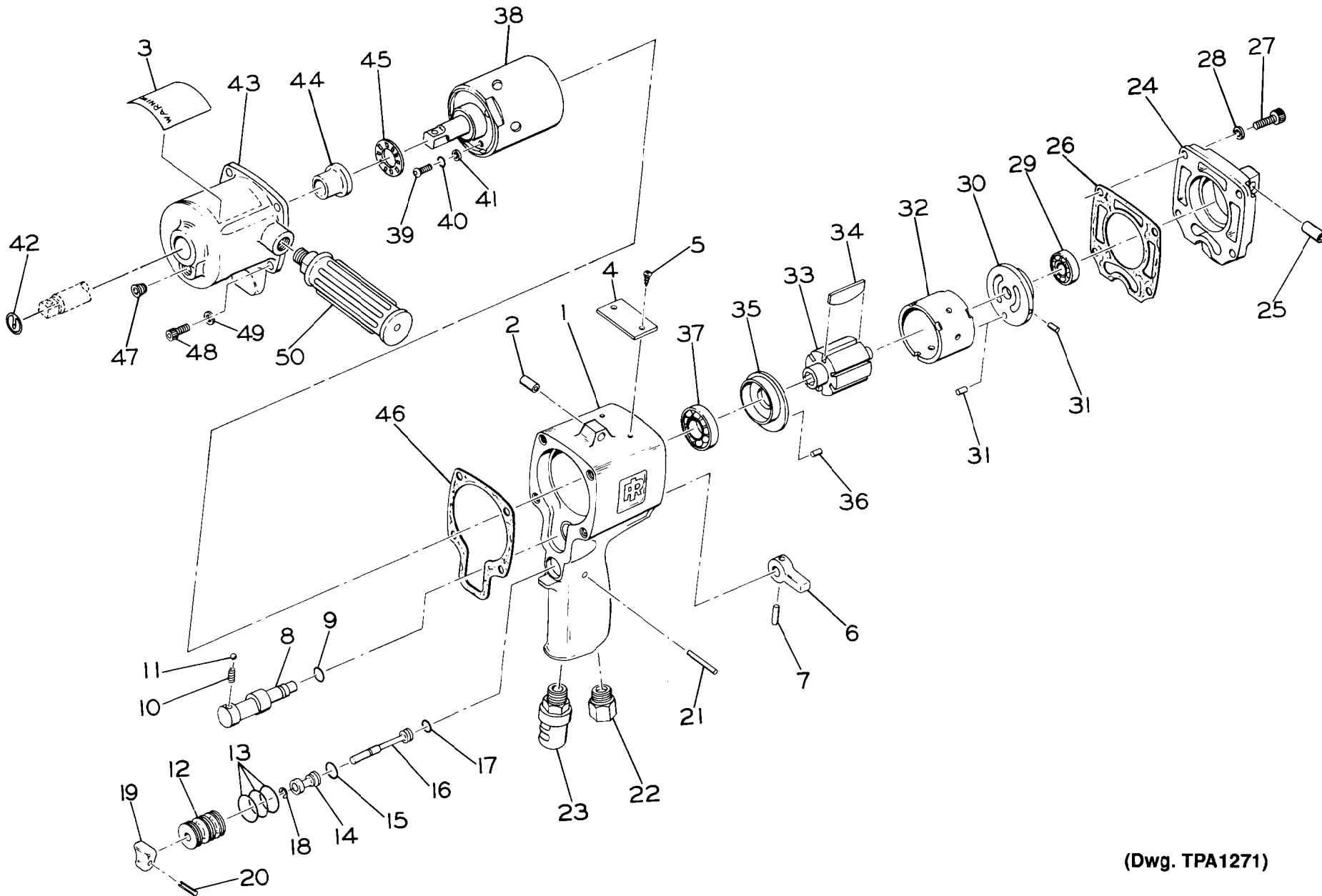
**After each 50 000 cycles, or as experience indicates, drain and refill the Impulse Mechanism Assembly (38) as instructed in this manual using the Fluid Replacement Kit (Part No. EQ106S-K400). Lubricate the hex drive and the output shaft before assembly.**

We recommend the use of an air line lubricator in the air supply line. Attach the unit as close to the tool as practical. Where the lubricator cannot be permanently mounted, we recommend using an Ingersoll-Rand No. L01-02-000 Lubricator. For permanent installations, we recommend using an Ingersoll-Rand C22-03-G00 Filter-Lubricator-Regulator unit. These units have 1/4" pipe tap inlet and outlet. The L01-02-000 has .25 oz. (7.5 cc) capacity; the C22-03-G00 has 5 oz. (150 cc) capacity. Adjust the lubricator so there is a slight oil mist in the exhaust.

*(Continued on Page 4)*

### NOTICE

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



(Dwg. TPA1271)

**PART NUMBER FOR ORDERING**

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1	Motor Housing Assembly	EQ230P-A40	31	End Plate Alignment Dowel (2)	EQ112P-99
2	Suspension Hole Liner	EQ106P-366	32	Cylinder	EQ230P-3
• 3	Warning Label	EQ104S-999	33	Rotor	EQ230P-53
4	Nameplate	EQ230P-301	• 34	Vane Packet (set of 6 Vanes)	EQ230P-42-6
5	Nameplate Drive Screw (2)	EQ106S-322	35	Front End Plate Assembly	EQ230P-A11
6	Reverse Lever	EQ106P-658	36	End Plate Alignment Dowel	EQ112P-99
• 7	Reverse Lever Retainer	EQ106P-152	• 37	Front Rotor Bearing	EQ230P-97
8	Reverse Valve Assembly	EQ230P-A329	% 38	Impulse Mechanism Assembly	EQ230P-A200
• 9	Reverse Valve Seal	EQ230P-67	39	Oil Plug	EQ230P-277
• 10	Reverse Valve Detent Spring	EQ106S-334	40	Oil Plug Seal	EQ230P-228
• 11	Reverse Valve Detent Ball	EQ106S-333	41	Oil Plug Seal Support	EQ230P-229
• 12	Throttle Bushing Assembly	EQ112P-A503	42	Socket Retaining Ring	+
• 13	Throttle Bushing Seal (3)	EQ106P-283	43	Mechanism Cover Assembly	EQ230P-A727
14	Throttle Valve Assembly	EQ112P-A304	44	Cover Bushing	EQ230P-641
• 15	Throttle Valve Face	EQ112P-159	45	Mechanism Cover Bearing	EQ230P-510
16	Throttle Valve Rod Assembly	EQ112P-A30Z	• 46	Mechanism Cover Gasket	EQ230P-36
• 17	Valve Rod Seal	EQ106P-288	47	Adjustment Hole Plug	R2-227
• 18	Valve Retaining Ring	EQ106P-303	48	Mechanism Cover Cap Screw (4)	R0H-354
19	Trigger	EQ106P-93	49	Cap Screw Lock Washer (4)	8U-58
• 20	Trigger Retaining Pin	EQ106P-265	50	Dead Handle	EQ230P-A48
21	Throttle Retaining Pin	EQ106P-120	*	Suspension Ring	EQ106P-365
22	Inlet Bushing	EQ106S-565	*	Fluid Replacement Kit (includes Fluid Syringe, Fill Tube and 4 oz. (31 mL) of Replacement Fluid)	EQ106S-K400
23	Exhaust Deflector	EQ110P-23	*	Replacement Fluid (4 oz.)	EQ106S-400-1
24	Housing Cover Assembly	EQ230P-A202	*	Replacement Fluid (1 gal.)	EQ106S-BF400-1
25	Suspension Hole Liner	EQ106P-366	*	Motor Tune-up Kit (includes illustrated parts 3, 26, 29, 34, 37 and 47)	EQ230P-TK1
• 26	Housing Cover Gasket	EQ230P-739	*	Throttle Valve Tune-up Kit (includes illus. parts 3, 7, 9, 10, 11, 13, 15, 17, 18, and 20)	EQ106P-TKTRV1
27	Housing Cover Cap Screw (4)	R0H-354			
28	Cap Screw Lock Washer (4)	8U-58			
• 29	Rear Rotor Bearing	EQ230P-24			
30	Rear End Plate Assembly	EQ230P-A12			

\* 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 eight tools in service.

% **For repair information for the Impulse Mechanism Assembly, contact your Ingersoll-Rand distributor or sales office.**

+ Several sizes of Socket Retaining Rings are available for use on these tools. Consult your Ingersoll-Rand catalog for the Part Number of the correct Ring to use with various size Sockets.

## TORQUE ADJUSTMENT

To adjust the torque on these Equi-Pulse Nutrunners, proceed as follows:

1. Remove the Adjustment Hole Plug (47).
2. Rotate the spindle until the torque adjustment screw is visible in the adjustment hole plug opening.
3. Using a 2 mm hex wrench, rotate the adjustment screw clockwise to increase torque output and counterclockwise to decrease torque output.

### NOTICE

Make all final adjustments at the job. Do not rotate the Oil Plug (39).

4. Replace the Adjustment Hole Plug.

## CHANGING THE MECHANISM FLUID

To change the Mechanism Fluid in the Impulse Mechanism Assembly, proceed as follows:

1. Lightly grasp the tool in copper-covered vise jaws with the spindle upward.
2. Using a 5/32" hex wrench, unscrew and remove the four Mechanism Cover Cap Screws (48) and Lock Washers (49).
3. Remove the Mechanism Cover Assembly (43) and lift the Impulse Mechanism Assembly (38) off the Rotor (33).
4. Secure the Impulse Mechanism Assembly in a bench vise. Using a 2 mm hex wrench, rotate the torque adjustment screw clockwise until the screw stops. Rotate the screw counterclockwise until it stops or makes six complete revolutions.
5. Using a pointed wire, pick the material out of the hex in the head of the Oil Plug (39).
6. Using a 2.5 mm hex wrench, unscrew and remove the Oil Plug. Remove the Oil Plug Seal (40) and Oil Plug Seal Support (41).
7. Remove the Impulse Mechanism Assembly from the bench vise. With the oil plug opening downward over a container, rotate the spindle to purge the fluid from the mechanism.
8. Thread an M3 x .5 metric screw at least 76 mm (3") long into the accumulator piston and push the piston into the mechanism as far as it will travel.
9. With the accumulator piston pushed into the mechanism and the oil plug opening downward, rotate the spindle several additional turns to remove any remaining fluid.
10. Invert the Impulse Mechanism Assembly so that the spindle is upward and the accumulator piston is down.
11. Secure the Impulse Mechanism Assembly in a bench vise. Rotate the spindle until the internal blade is visible in the fill opening. Continue rotating the spindle until the blade is approximately one-quarter turn from the opening.
12. Using the Fluid Replacement Kit (Part No. EQ106S-K400), fill the Impulse Mechanism with the fluid.
13. Install the Oil Plug Seal Support and Oil Plug Seal.
14. Thread the Oil Plug into the mechanism housing until it is snug.
15. Rotate the spindle by hand to purge the air from the mechanism.
16. Remove the Oil Plug, rotate the spindle to position the blade one quarter turn from the fill opening and fill the mechanism with fluid.
17. Grasp the metric screw that was threaded into the accumulator piston. Pull the piston forward toward the output end of the spindle and fill the mechanism with fluid.
18. Repeat steps 14, 15 and 16 until all air is purged from the mechanism.
19. With the Oil Plug removed, slowly push the accumulator piston into the mechanism until it stops and all air and some fluid are expelled from the system. Remove the metric screw from the accumulator piston.
20. Install the Oil Plug and tighten the Plug between 20 to 25 in-lb (2.3 to 2.8 N m) torque.
21. After lubricating the hex drive and the output shaft of the Impulse Mechanism with 1 to 2 cc of the recommended grease, position the Impulse Mechanism Assembly on the Rotor making certain the hex at the rear of the Mechanism engages the hex in the rotor shaft.
22. Position the Mechanism Cover Assembly over the Impulse Mechanism and secure it with the four Mechanism Cover Cap Screws and Lock Washers. Tighten the Screws between 45 to 50 in-lb (5.1 to 5.6 N m) torque.
23. Adjust the torque as described in the section **Torque Adjustment**.

## DISASSEMBLY

### General Instructions

#### **⚠ WARNING**

1. Always use protective eyewear when performing maintenance on a tool or when operating a tool.
2. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
3. 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 and help prevent distortion. This is particularly true of threaded members and housings.
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.

### Disassembly of the Tool

1. Lightly grasp the tool in copper-covered vise jaws with the spindle upward.
2. Using a 5/32" hex wrench, unscrew and remove the Mechanism Cover Cap Screws (48) and Lock Washers (49) and lift the Mechanism Cover Assembly (43) and Mechanism Cover Bearing (45) off the tool.
3. Lift the Impulse Mechanism Assembly (38) from the tool.

#### **NOTICE**

The Impulse Mechanism Assembly can be returned to Ingersoll-Rand for service or repair. Send the complete Mechanism to your nearest Ingersoll-Rand authorized servicer. Refer to Form 6647 for the servicer nearest you.

4. Remove the Mechanism Cover Gasket (46) from the Motor Housing (1).
5. If the Mechanism Cover Bushing (44) must be replaced, stand the Cover on the table of an arbor press with the Bushing upward and press the Bushing out the large end of the Cover.
6. Remove the four Housing Cover Cap Screws (27) and Lock Washers (28) and remove the Housing Cover (24) and Housing Cover Gasket (26) from the rear of the Motor Housing.
7. Insert a brass drift into the hex recess in the front end of the Rotor (33) and tap lightly to remove the Rotor, Vanes (34), Rear End Plate Assembly (30) and Rear Rotor Bearing (29) from the Housing.
8. If the Front Rotor Bearing (37) must be replaced, use a bearing puller to remove it from the Front End Plate (35).
9. If the Rear Rotor Bearing must be replaced, support the Rear End Plate on the table of an arbor press with the Bearing downward and press the Bearing from the End Plate.
10. Rotate the Reverse Lever (6) so that the arm of the Lever points toward the Inlet Bushing (22).
11. Lightly scribe or mark the end face of the Reverse Valve (8) and reverse valve bushing to time the Valve to the bushing for Assembly.

#### **NOTICE**

If a new Valve is to be installed, use the marked Valve as an orientation guide for the new one.

12. Use a pin punch to remove the Reverse Lever Retainer (7) and pull the Reverse Lever (6) from the Reverse Valve Assembly (8).
13. Being careful not to lose the Reverse Valve Detent Ball (11) and Reverse Valve Detent Spring (10), slide the Reverse Valve out of the Reverse Valve Bushing.
14. Using a pin punch, remove the Throttle Retaining Pin (21) and pull the assembled throttle from the Housing.
15. Using a pin punch and without damaging the Trigger (19), remove the Trigger Retaining Pin (20).
16. Slide the Throttle Bushing Assembly (12) off the shaft of the Throttle Valve Rod Assembly (16).
17. Using a thin blade screwdriver, remove the Valve Retaining Ring (18) and slide the Throttle Valve Assembly (14) off the shaft of the Throttle Valve Rod.
18. Remove the Inlet Bushing (22) and Exhaust Deflector (23).

19. The Cylinder (32) and Front End Plate (35) are a sweat fit in the Housing. If the Cylinder or End Plate becomes scored and must be replaced, proceed as follows:
- If the Front Rotor Bearing was not removed from the Front End Plate, use a bearing puller to remove it.
  - If the Rear Rotor Bearing was not removed, support the Rear End Plate on the table of an arbor press with the Bearing downward and press the Bearing from the End Plate.
  - Insert a threaded rod through the Cylinder and Front End Plate and install a nut and washer on the end plate end of the rod. Position the Rear End Plate on the threaded rod against the Cylinder and clamp the Cylinder and End Plates snug with another nut and washer.

### **▲ CAUTION**

**Do not tighten the assembly excessively.**

- Using a heat induction coil or an oven, heat the assembly and Housing until it is warm enough to pull the assembly out the rear of the Motor Housing.

## **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 leather-covered or copper-covered vise jaws. Take extra care with threaded parts and housings.
- Always clean every part and wipe every part with a thin film of oil before installation.
- Apply a film of O-ring lubricant to all O-rings before final assembly.

### **Assembly of the Tool**

- If the Front End Plate (35) and Cylinder (32) were removed from the Motor Housing (1), proceed as follows:
  - Using a vee block to align the round exterior surfaces of the Cylinder and End Plates, clamp the three pieces together with a long piece of threaded rod, nuts and washers.
  - Using a heat induction coil or oven, heat the motor bore in the Housing until it expands enough to accept the assembled Cylinder and End Plates.
  - Insert the assembled Cylinder and End Plates, Front End Plate first, into the rear of Motor Housing. Make certain the End Plate Alignment Dowel (31) enters the notch at the rear of the Motor Housing.
  - When the Housing cools, remove the threaded rod and Rear End Plate.
- Support the rear end of the Cylinder on the table of an arbor press and press the Front Rotor Bearing (37) into the Front End Plate.
- Press the Rear Rotor Bearing (29) into the Rear End Plate.
- Install a Valve Rod Seal (17) in the groove on the large hub of the Throttle Valve Rod (16).
- Install a Throttle Valve Face (15) in the groove on the large hub of the Throttle Valve (14).
- Slide the Throttle Valve, Valve Face end first, onto the Throttle Valve Rod.
- Secure the Throttle Valve by installing the Valve Retaining Ring (18) in the small groove on the Throttle Valve Rod.
- Install the three Throttle Bushing Seals (13) in the grooves on the Throttle Bushing (12).
- Slide the Throttle Bushing onto the shaft of the Throttle Valve Rod and position the Trigger on the same shaft. Install the Trigger Retaining Pin (20).
- Insert the assembled Trigger into the Housing. Make certain the widest end of the Trigger is nearest the motor bore and the narrowest portion of the Throttle Valve (14) aligns with the hole for the Throttle Retaining Pin (21). Install the Pin making certain it captures the Throttle Valve and secures the assembled Trigger.
- Install the Reverse Valve Seal (9) in the groove on the shaft of the Reverse Valve (8).
- Push the Reverse Valve, small end first, into the reverse valve bushing until it is about three quarters of the way into the bushing.
- Rotate the Valve until the timing marks made at disassembly are aligned. Install the Reverse Valve Detent Spring (10) and Reverse Valve Detent Ball (11) in the hole in the large, exposed hub. While compressing the Ball and Spring, push Valve all the way into the bushing.

14. Install the Reverse Lever (6) on the small hub of the Reverse Valve at the rear of the Housing and secure it with Reverse Lever Retainer (7).
15. Install the Exhaust Deflector (23) and tighten it to between 20 to 25 ft-lb (27 to 34 N m) torque.
16. Install the Inlet Bushing (22) and tighten it to between 30 to 35 ft-lb (40 to 47 N m) torque.
17. Grease the Front Rotor Bearing and Rear Rotor Bearing with the recommended grease.
18. Apply a thin film of grease to the hex spline in the Rotor (33) and insert the Rotor, hex spline first, into the Cylinder from the motor end.
19. Wipe each Vane (34) with a thin film of oil and install a Vane in each vane slot in the Rotor.
20. Install the assembled Rear End Plate and Rear Rotor Bearing, bearing end trailing, on the hub of the Rotor. Make certain the End Plate Alignment Dowel (31) enters the alignment notch in the Motor Housing.
21. Position the Housing Cover Gasket (26) and Housing Cover (24) on the rear of the Motor Housing.
22. Secure the Housing Cover with the four Housing Cover Cap Screws (27) and Lock Washers (28). Tighten each Screw to between 45 to 50 in-lb (5.1 to 5.6 N m) torque.
23. If the Cover Bushing (44) was removed from the Mechanism Cover (43), stand the Cover on the table of an arbor press with the large opening upward and press the Bushing into the small hole in the Cover.
24. With the front end of the Motor Housing upward, install the Impulse Mechanism Assembly (38) on the Rotor. The hex at the rear of the Impulse Mechanism must engage the hex spline in the Rotor. Apply 1 cc to 2 cc of the recommended grease to the hex drive at the Motor end of the Impulse Mechanism Assembly and the output end of the anvil drive shaft.
25. Position the Mechanism Cover Gasket (46) on the Motor Housing.
26. Apply 1 cc to 2 cc of the recommended grease to the inner surface of the Housing Bushing. Install the Mechanism Cover Bearing (47) on the spindle. Place the Mechanism Cover over the Impulse Mechanism against the Housing.
27. Secure the Cover with the four Mechanism Cover Cap Screws (48) and Lock Washers (49). Tighten each Screw to between 45 to 50 in-lb (5.1 to 5.6 N m) torque.
28. Adjust the torque as described in the section **Torque Adjustment**.

