

# OPERATION AND MAINTENANCE MANUAL

for

## MODELS EQ112P AND EQ112P7 EQUI-PULSE™ NUTRUNNERS

Form P6811  
Edition 3  
March, 1987

**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/620 kPa) AIR PRESSURE WITH 3/8" (10 mm) AIR SUPPLY HOSE.**

### WARNING

Use only Impact Wrench Sockets and Accessories on this Nutrunner. 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 (37) 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. 3LUB8 Lubricator. For permanent installations, we recommend using an Ingersoll-Rand NFLRU-8 Filter-Lubricator-Regulator unit. These units have 1/2" pipe tap inlet and outlet. The 3LUB8 has 1/6 pt (79 mL) capacity; the NFLRU-8 has 1/2 pt (237 mL) capacity. Larger capacity units may be used, but do not use a unit having less than 1/2" pipe tap inlet and outlet. Adjust the lubricator so there is a slight oil mist in the exhaust.

### TORQUE ADJUSTMENT

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

1. Remove the Adjustment Hole Plug (46).
2. Rotate the spindle until the torque adjustment screw is visible in the adjustment hole plug opening.
3. Using a 2.5 mm hex wrench, rotate the adjustment screw clockwise to increase torque output and counterclockwise to decrease torque output. **Note:** Make all final adjustments at the job. Do not rotate the Oil Plug (38).
4. Replace the Adjustment Hole Plug.

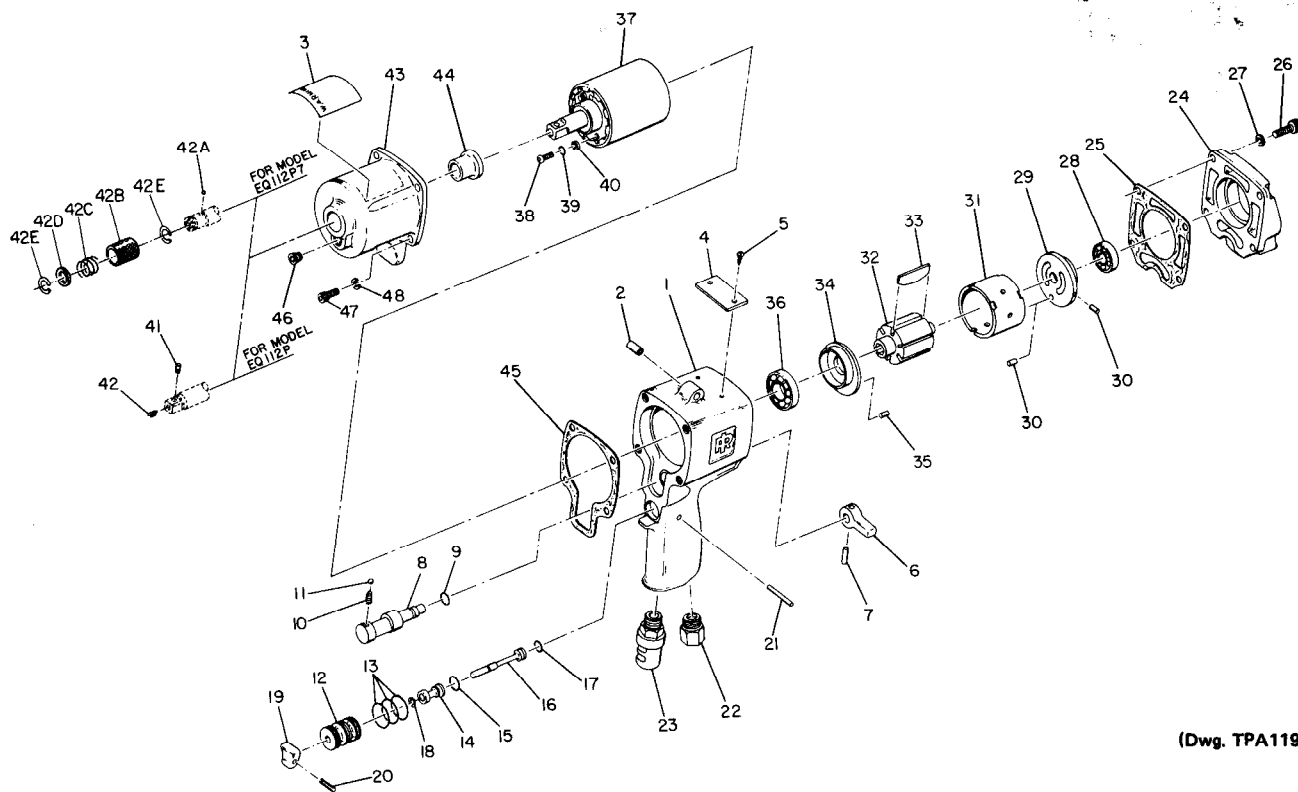
### CHANGING THE MECHANISM FLUID

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. For Model EQ112P7, using a pointed probe, push the Spring Seat (42D) against the Retaining Sleeve Spring (42C). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (42E).
3. For Model EQ112P7, lift the Spring Seat, Spring and Bit Retaining Sleeve (42B) off the spindle and remove the Bit Retaining Ball (42A). Remove the remaining Retaining Ring (43E) from the spindle.
4. Using a 5/32" hex wrench, unscrew and remove the four Mechanism Cover Cap Screws (47) and Lock Washers (48).
5. Remove the Mechanism Cover Assembly (43) and lift the Impulse Mechanism Assembly (37) off the Rotor (32).
6. Using a 2.5 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.
7. Using a pointed wire, pick the material out of the hex in the head of the Oil Plug (38).
8. Using a 4 mm hex wrench, unscrew and remove the Oil Plug. Remove the Oil Plug Seal (39) and Oil Plug Seal Support (40).
9. With the oil plug opening downward over a container, rotate the spindle to purge the fluid from the mechanism.
10. 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.
11. 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.
12. Invert the Impulse Mechanism Assembly so that the spindle is upward and the accumulator piston is down.
13. Rotate the spindle until the internal blade is visible in the fill opening. Continue rotating the spindle until the blade is approximately one half turn from the opening.
14. Using the Fluid Replacement Kit (Part No. EQ106S-K400), fill the impulse mechanism with the fluid.
15. Install the Oil Plug Seal Support and Oil Plug Seal.
16. Thread the Oil Plug into the mechanism housing until it is snug.
17. Rotate the spindle by hand to purge the air from the mechanism.
18. Remove the Oil Plug, rotate the spindle to position the blade one half turn from the fill opening and fill the mechanism with fluid.
19. 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.

*(Continued on Page 3.)*

**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. TPA1199)

PART NUMBER FOR ORDERING

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1	Motor Housing Assembly . . . . .	EQ112P-A40	≠ 36	Front Rotor Bearing . . . . .	---
2	Suspension Hole Liner . . . . .	EQ106P-366	• † 37	Impulse Mechanism Assembly	
3	Warning Label . . . . .	EQ104S-999		for model EQ112P . . . . .	EQ112P-A200
4	Nameplate			for model EQ112P7 . . . . .	EQ112P7-A200
	for model EQ112P . . . . .	EQ112P-301	38	Oil Plug . . . . .	EQ112P-277
	for model EQ112P7 . . . . .	EQ112P7-301	39	Oil Plug Seal . . . . .	EQ112P-228
5	Nameplate Drive Screw (2) . . . . .	EQ106S-322	40	Oil Plug Seal Support . . . . .	EQ112P-229
6	Reverse Lever . . . . .	EQ106P-658	41	Socket Retaining Pin	
▲ 7	Reverse Lever Retainer . . . . .	---	42	(for model EQ112P) . . . . .	804-716
8	Reverse Valve Assembly . . . . .	EQ112P-A329	42A	Retaining Pin Spring	
▲ 9	Reverse Valve Seal . . . . .	---	42B	(for model EQ112P) . . . . .	5UHD-718
▲ 10	Reverse Valve Detent Spring . . . . .	---	42C	Bit Retaining Ball	
▲ 11	Reverse Valve Detent Ball . . . . .	---	42D	(for model EQ112P7) . . . . .	EQ110P7-929
• 12	Throttle Bushing Assembly . . . . .	EQ112P-A503	42E	Bit Retaining Sleeve	
▲ 13	Throttle Bushing Seal (3) . . . . .	---	42C	(for model EQ112P7) . . . . .	EQ110P7-930
14	Throttle Valve Assembly . . . . .	EQ112P-A304	42D	Retaining Sleeve Spring	
▲ 15	Throttle Valve Seal . . . . .	---	42E	(for model EQ112P7) . . . . .	EQ110P7-931
16	Throttle Valve Rod Assembly . . . . .	EQ112P-A302	42E	Spring Seat (for model EQ112P7) . . . . .	EQ110P7-932
▲ 17	Valve Rod Face Seal . . . . .	---	43	Retaining Ring	
▲ 18	Valve Retaining Ring . . . . .	---	44	(for model EQ112P7) (2) . . . . .	EQ110P7-933
19	Trigger . . . . .	EQ106P-93	43	Mechanism Cover Assembly . . . . .	EQ112P-A727
▲ 20	Trigger Retaining Pin . . . . .	---	44	Cover Bushing . . . . .	EQ110P-641
21	Throttle Retaining Pin . . . . .	EQ106P-120	• 45	Mechanism Cover Gasket . . . . .	EQ112P-36
22	Inlet Bushing . . . . .	EQ106S-565	46	Adjustment Hole Plug . . . . .	R2-227
23	Exhaust Deflector . . . . .	EQ110P-23	47	Mechanism Cover Cap Screw (4) . . . . .	ROH-354
24	Housing Cover . . . . .	EQ112P-202	48	Cap Screw Lock Washer (4) . . . . .	8U-58
• 25	Housing Cover Gasket . . . . .	EQ112P-739	*	Suspension Ring . . . . .	EQ106P-365
26	Housing Cover Cap Screw (4) . . . . .	ROH-354	• •	Fluid Replacement Kit (4 oz. [31 ml]	
27	Cap Screw Lock Washer (4) . . . . .	84-58	fluid) . . . . .	EQ106S-K400	
≠ 28	Rear Rotor Bearing . . . . .	---	Fluid Syringe . . . . .	---	
29	Rear End Plate Assembly . . . . .	EQ112P-A12	Fill Tube . . . . .	---	
30	End Plate Alignment Dowel (2) . . . . .	EQ112P-99	Replacement Fluid (4 oz.) . . . . .	EQ106S-400-1	
31	Cylinder . . . . .	EQ112P-3	• •	Motor Tune-up Kit (includes illustrated	
32	Rotor . . . . .	EQ112P-53	parts 3, 25, 28, 33, 36 and 45) . . . . .	EQ112P-TK1	
33	Vane Packet (set of 6 Vanes) . . . . .	EQ112P-42-6	• •	Throttle Valve Tune-up Kit (includes	
34	Front End Plate Assembly . . . . .	EQ112P-A11	illustrated parts 3, 7, 9, 10, 11, 13 [3],		
35	End Plate Alignment Dowel . . . . .	EQ112P-99	15, 17, 18 and 20) . . . . .	EQ106P-TKTRV1	

\* Not illustrated.

≠ This part available only in Motor Tune-up Kit EQ112P-TK1.

▲ This part available only in Throttle Valve Tune-up Kit EQ106P-TKTRV1.

• 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.

## CHANGING THE MECHANISM FLUID (Continued)

20. Repeat steps 16, 17 and 18 until all air is purged from the mechanism.
21. 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.
22. Using a small syringe, withdraw 0.7cc of the mechanism fluid from the Impulse Mechanism Assembly.
23. Install the Oil Plug and tighten the Plug between 60 and 70 in-lb (6.8 to 7.9 Nm) torque.
24. After lubricating the hex drive and the output shaft of the impulse mechanism with 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.
25. 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 100 to 110 in-lb (11.3 to 12.4 N m) torque.
26. **For Model EQ112P7**, install one of the Retaining Rings in the annular groove on the hub of the spindle farthest from the output end.
27. **For Model EQ112P7**, install the Bit Retaining Ball in the hole in the spindle and capture it by sliding the Bit Retaining Sleeve, small bore first, onto the spindle.
28. **For Model EQ112P7**, install the Retaining Sleeve Spring and Spring Seat, counterbored end trailing, over the spindle hub and into the Sleeve. While compressing the Spring with a thin blade screwdriver against the Seat, install the Retaining Ring in the annular groove on the hub of the spindle.
29. Adjust the torque as described in the section **Torque Adjustment**.

## DISASSEMBLY

### General Instructions

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. **For Model EQ112P7**, using a pointed probe, push the Spring Seat (42D) against the Retaining Sleeve Spring (42C). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (42E).
3. **For Model EQ112P7**, lift the Spring Seat, Spring and Bit Retaining Sleeve (42B) off the spindle and remove the Bit Retaining Ball (42A).
4. **For Model EQ112P7**, remove the remaining Retaining Ring (42E) from the spindle.
5. Using a 5/32" hex wrench, unscrew and remove the Mechanism Cover Cap Screws (47) and Lock Washers (48) and lift the Mechanism Cover Assembly (43) off the tool.
6. Lift the Impulse Mechanism Assembly (37) from the tool. **Note:** 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.
7. Remove the Mechanism Cover Gasket (45) from the Motor Housing (1).
8. 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.
9. Remove the four Housing Cover Cap Screws (26) and Lock Washers (27) and remove the Housing Cover (24) and Housing Cover Gasket (25) from the rear of the Motor Housing.
10. Insert a brass drift into the hex recess in the front end of the Rotor (32) and tap lightly to remove the Rotor, Vanes (33), Rear End Plate Assembly (29) and Rear Rotor Bearing (28) from the Housing.
11. If the Front Rotor Bearing (36) must be replaced, use a bearing puller to remove it from the Front End Plate (34).
12. 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.
13. Rotate the Reverse Lever (6) so that the arm of the Lever points toward the Inlet Bushing (22)
14. 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. **Note:** If a new Valve is to be installed, use the marked Valve as an orientation guide for the new one.
15. Use a pin punch to remove the Reverse Lever Retainer (7) and pull the Reverse Lever (6) from the Reverse Valve Assembly (8).
16. 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.
17. Using a pin punch, remove the Throttle Retaining Pin (21) and pull the assembled throttle from the Housing.
18. Using a pin punch and without damaging the Trigger (19), remove the Trigger Retaining Pin (20).
19. Slide the Throttle Bushing Assembly (12) off the shaft of the Throttle Valve Rod Assembly (16).
20. 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.
21. Remove the Inlet Bushing (22) and Exhaust Deflector (23).
22. The Cylinder (31) and Front End Plate (34) are a sweat fit in the Housing. If the Cylinder or End Plate becomes scored and must be replaced, proceed as follows:
  - (a) If the Front Rotor Bearing was not removed from the Front End Plate, use a bearing puller to remove it.
  - (b) 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.
  - (c) 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.
  - (d) 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

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.

### Assembly of the Tool

1. If the Front End Plate (34) and Cylinder (31) were removed from the Motor Housing (1), proceed as follows:
  - (a) 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.

## Assembly of the Tool (Continued)

- (b) 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.
  - (c) Insert the assembled Cylinder and End Plates, Front End Plate first, into the rear of Motor Housing. Make certain the End Plate Alignment Dowel (30) enters the notch at the rear of the Motor Housing.
  - (d) When the Housing cools, remove the threaded rod and Rear End Plate.
2. Support the rear end of the Cylinder on the table of an arbor press and press the Front Rotor Bearing (36) into the Front End Plate.
  3. Press the Rear Rotor Bearing (28) into the Rear End Plate.
  4. Install a Valve Rod Seal (17) in the groove on the large hub of the Throttle Valve Rod (16).
  5. Install a Throttle Valve Seal (15) in the groove on the large hub of the Throttle Valve (14).
  6. Slide the Throttle Valve, Valve Seal end first, onto the Throttle Valve Rod.
  7. Secure the Throttle Valve by installing the Valve Retaining Ring (18) in the small groove on the Throttle Valve Rod.
  8. Install the three Throttle Bushing Seals (13) in the grooves on the Throttle Bushing (12).
  9. 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).
  10. 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.
  11. Install the Reverse Valve Seal (9) in the groove on the shaft of the Reverse Valve (8).
  12. Push the Reverse Valve, small end first, into the reverse valve bushing until it is about three quarters of the way into the bushing.
  13. 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 the 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 the 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 (32) and insert the Rotor, hex spline first, into the Cylinder from the motor end.
  19. Wipe each Vane (33) 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 (30) enters the alignment notch in the Motor Housing.
  21. Position the Housing Cover Gasket (25) and Housing Cover (24) on the rear of the Motor Housing.
  22. Secure the Housing Cover with the four Housing Cover Cap Screws (26) and Lock Washers (27). Tighten each Screw to between 100 to 110 in-lb (11.3 to 12.4 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. Apply 1cc to 2cc 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.
  24. With the front end of the Motor Housing upward, install the Impulse Mechanism Assembly (37) on the Rotor. The hex at the rear of the Impulse Mechanism must engage the hex spline in the Rotor.
  25. Position the Mechanism Cover Gasket (45) on the Motor Housing.
  26. Apply 1cc to 2cc of the recommended grease to the inner surface of the Housing Bushing. Place the Mechanism Cover over the Impulse Mechanism against the Housing.
  27. Secure the Cover with the four Mechanism Cover Cap Screws (47) and Lock Washers (48). Tighten each Screw to between 100 to 110 in-lb (11.3 to 12.4 N m) torque.
  28. **For Model EQ112P7**, install one of the Retaining Rings in the annular groove in the spindle shaft.
  29. **For Model EQ112P7**, install the Bit Retaining Ball in the hole in the spindle and capture it by sliding the Bit Retaining Sleeve, small bore first, onto the spindle.
  30. **For Model EQ112P7**, install the Retaining Sleeve Spring and Spring Seat, counterbored end trailing, over the spindle hub and into the Sleeve. While compressing the Spring, with a thin blade screwdriver against the Seat, install the remaining Retaining Ring in the annular groove on the hub of the spindle.
  31. Adjust the torque as described in the section **Torque Adjustment**.