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Edition 2
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Screwdrivers

Series 7

Maintenance Information

Save These Instructions

Ingersoll Rand

Product Safety Information

WARNING

- Failure to observe the following warnings, and to avoid these potentially hazardous situations, could result in death or serious injury.
- Read and understand this and all other supplied manuals before installing, operating, repairing, maintaining, changing accessories on, or working near this product.
- Always wear eye protection when operating or performing maintenance on this tool. The grade of protection required should be assessed for each use and may include impact-resistant glasses with side shields, goggles, or a full face shield over those glasses.
- Always turn off the air supply, bleed the air pressure and disconnect the air supply hose when not in use, before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool or any accessory.

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

Lubrication

Each time a Series 7 Screwdriver is disassembled for maintenance, repair or replacement of parts, lubricate the tool as follows:

1. **Motor**

   Use **Ingersoll Rand** No.10 Oil for lubricating the motor. Inject a few drops of oil into the air inlet before attaching the air hose.

2. **Gearing**

   For L gearing, coat the gears with 2 cc of **Ingersoll Rand** No. 28 Grease. **For M or N gearing**, coat the gears with 4 cc of **Ingersoll Rand** No. 28 Grease.

3. **Clutch**

   Lightly lubricate the Adjustable Cushion Clutch with **Ingersoll Rand** No. 67 Grease.

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 a 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 repair or replacement.
4. Do not disassemble tool unless you have a complete set of new gaskets and O-rings for replacement.

Disassembly of the Tool

1. Grasp the flats on the nose of the Clutch Housing (201, 301 or 401) in a leather-covered or copper-covered vise jaws, making certain not to distort the Clutch Housing.
2. Using an adjustable wrench, grasp the flats on the Gear Case (127) and unscrew the entire power unit from the Clutch Housing.
3. If you are disassembling a pistol grip model, lightly grasp the handle of the Motor Housing (1) in leather-covered or copper-covered vise jaws, so that the Gear case is upward. If you are disassembling a lever throttle model, lightly grasp the flats on the Motor Housing (51) in leather-covered vise jaws so that the Gear Case is upward.
4. Using an adjustable wrench, grasp the flats on the Gear Case and unscrew the Gear Case from the Motor Housing. Lift the Gear Case along with the gearing from the Motor Housing.
5. Remove the Motor Housing from the vise and grasp the pinion end of the Rotor (104) in the vise. Make certain to use leather-covered or copper-covered vise jaws for this operation. Withdraw the motor from the Motor Housing.

Disassembly of the Gearing

1. If the Bearing Housing Spacer (113) remained with the Gear Case (127) when the tool was disassembled. Slide it from the bore of the Gear Case.
2. **For 7RAM and 7RAN models,** hold the Gear Case vertically, external threaded end upward, and tap it gently against the surface of a workbench to jar the Gear Head (122), Gear Head Planet Gears (123) and Gear Head Spacer (125) from the Gear Case. If the Rotor Pinion (120) remained in the Gear Case when the tool was disassembled, it will come out with the Gear Head and associated parts.
3. **For all models**, position the Gear Case, external threaded end up, on the table of an arbor press. Using a small drift against the end of the Spindle (114), press the Spindle along with Spindle Planet Gear (118) from the bore of the Spindle Bearing (130).
4. Lift the Seal (117), Seal Support (115) and Seal Retaining Washer (116) from the Spindle.
5. If the Spindle Planet Gear Bearings (119) and Gear Head Planet Gear Bearings (124) are to be replaced, press them from the Planet Gears.
6. Using snap ring pliers, remove the Spindle Bearing Retainer (131) from the Gear Case.
7. Gently tap the external threaded end of the Gear Case against the workbench to dislodge the Spindle Bearing (130) and Grease Shield (129).

Disassembly of the Motor

1. Slide the Front Rotor Bearing housing (111) along with the two Bearing Spring Washers (110) from the Front Rotor Bearing (109).
2. **For 7RAM and 7RAN models,** if the Rotor Pinion (120) and Rotor Pinion Spacer (121) remained with the motor when the tool was disassembled, slide them from the Rotor (104). Grasp the pinion end of the Rotor in leathercovered or copper-covered vise jaws so that the Rear End Plate (102) is upward.

CAUTION

Make certain the Retainer does not fly off when it is slipped off the hub of the Rotor.

3. Using a pair of external snap ring pliers with just the tips of the pliers inserted between tie ends of the End plate Retainer (103), spread the Retainer enough to remove it from the groove in the hub of the Rotor.

4. Lift off the Rear End Plate (102), Cylinder (106) and Vanes (105).
5. Check the Front Rotor Bearing for damage or roughness. If replacement is necessary, support the Front End Plate (107) between two blocks of wood on the table of an arbor press and press the Rotor from the Front Rotor Bearing.

Disassembly of the Lever Throttle Motor Housing

1. Unscrew the Retainer Set Screw (60) from the Reverse Valve (56). Turn the Motor Housing (51) to allow the Lock Pin Retainer (59) to slide from the hole in the Reverse Valve.
2. Hold the Motor Housing horizontally with the Throttle Lever (54) at the bottom, and withdraw the Reverse Valve 16575276_ed1 EN-2 EN and Reverse Valve Spring (57), making certain not to drop or lose the Reverse Valve Lock Pin (58).
3. Lightly grasp the flats on the Motor Housing in leathercovered or copper-covered vise jaws so that the Inlet Bushing (73) is upward.
4. Using a small punch or drift, tap the Throttle Lever Pin (55) from the Exhaust Deflector (62).
5. Unscrew the Inlet Bushing and remove the Exhaust Deflector, Inlet Bushing Spacer (72), Air Strainer Screen (71), Throttle Valve Spring (70) and Throttle Valve (68). Withdraw the Throttle Valve Plunger (69). If the Plunger Bushing (53A) is to be replaced, withdraw it from the Housing with a stiff wire hook. Slide the Exhaust Silencer (64) and Silencer Seal Ring (65) from the Motor Housing.
6. If the Rear Rotor Bearing (53) is to be replaced, remove the old Bearing by threading a No.10-24 thread cap screw into the Bearing Ejecting Nut (52) and jacking the Bearing from the Housing (51).
7. If the Throttle Valve Seat (67) and Throttle Valve Seat Support (66) are to be replaced, withdraw them from the Motor Housing with a stiff wire hook.

Disassembly of the Pistol Grip Motor Housing

1. Grasp the handle of the Motor Housing (1) in leathercovered or copper-covered vise jaws.
2. If the Rear Rotor Bearing (3) is to be replaced, remove the old Bearing by threading a No. 10-24 thread cap screw into the Bearing Ejecting nut (2) and jacking the Bearing from the Housing.
3. Unscrew the Reverse Valve Cap (6) and remove the Reverse Valve Spring (5) and Reverse Valve Cap Seal (7).
4. Thread a No. 8-32 thread cap screw into the top of the Reverse Valve (4) and pull the Reverse Valve from the Motor Housing.

NOTICE

A 10mm hexagon socket fits the Actuating Valve Bushing.

5. Unscrew the Actuating Valve Bushing (11) from the Motor Housing, and remove the entire Actuating Valve Assembly, Actuating Valve Spring (15) and Actuating Valve Bumper (16A).

NOTICE

A 10 mm hexagon socket fits the Actuating Valve Cap.

6. Unscrew the Actuating Valve Cap (14).
7. Unscrew the Inlet Bushing (26) and remove the Inlet Bushing Spacer (25), Air Strainer Screen (27), Muffler Assembly (23), Muffler (24), Throttle Valve Spring (22) and Throttle Valve (19).
8. Withdraw the Trigger Assembly (17). If the Trigger Bushing (3A) is to be replaced, withdraw it from the Housing with a stiff wire hook.
9. If the Throttle Valve Seat (20) and Throttle Valve Seat Support (21) are to be replaced, withdraw them from the handle with a stiff wire hook.

Disassembly of the 7C1 or 7C3 Cushion Clutch

1. Grasp the splined end of the Clutch Driver (205) and pull the entire Clutch Driver Assembly from the Clutch Housing (201).
2. Lightly clamp the splined end of the Clutch Driver in leather-covered or copper-covered vise jaws. Grasp the flats on the Clutch Adjusting Nut (216) with an adjustable wrench and unscrew the Nut until the compression of the Clutch Spring (211) is relieved.
3. Remove the unit from the vise and while holding it over a small box or container, unscrew the Clutch Adjusting Nut from the Clutch Driver. Remove the Adjusting Nut Lock (215), Spring Seat Bearing (214), Clutch Spring Seat (213), Clutch Spring Clutch Ball Seat (210) and Clutch Release Balls (209).
4. If it is necessary to replace the Clutch ball Seat (210), Front Clutch Jaw (206) or Jaw Bearing Balls (207), remove the Spring Seat Stop (212) from the Groove in the Clutch Driver.
5. Remove the Disengaging Plunger (218) and Disengaging Plunger Spring (217) from the bore of the Clutch Driver.
6. **For 7C1 Cushion Clutch**, remove the Spring Seat Retainer (221A). Use a fine blade screwdriver and work the first coil of the Retaining Sleeve Spring (220) over the end of the Bit holder. Thread the remainder of the Spring over the end of the Bit holder. Be careful not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (221) and dump the Bit Retaining Ball (222) from the Bit Holder. Tap the large open end of the Clutch Housing against the top of the workbench to remove the Bit Holder.
7. **For 7C3 Cushion Clutch**, tap the large open end of the Clutch Housing (201) against the top of the workbench to remove the Bit Holder (223).

Disassembly of the 7D1 Direct Drive Attachment

1. Remove the Spring Sleeve Retainer (307A).
2. Using a fine blade screwdriver, work the first coil of the Retaining Sleeve Spring (307) over the end of the Bit Holder (305). Thread the remainder of the Spring over the end of the Bit Holder being certain not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (308) and dump the Bit Retaining Ball (306) from the Bit Holder. Grasp the splined end of the Bit Holder and pull it from the Housing (301).

Disassembly of the 7P1 or 7P3 Jaw Clutch

1. Remove the Clutch Driver Spacer Retainer (414) from the Clutch Driver (410) and withdraw the Clutch Driver Spacer (411) and rear Clutch Jaw(408).
2. Remove the Disengaging Plunger (412) and Plunger Spring (413) from the bore of the Bit Holder (404 or 405).

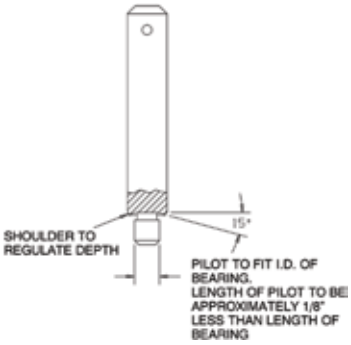
3. **For 7P1 Positive Jaw Clutch**, remove the Sleeve Spring Retainer (416A). Use a fine blade screwdriver and work the first coil of the Retailing Sleeve Spring (417) over the end of Bit Holder. Thread the remainder of the Spring over the end of the Bit Holder, being careful not to distort the Spring. Once the Spring is removed, slide off the Bit Retaining Sleeve (416) and dump the Bit Retaining Ball (415) from the Bit Holder. Tap the large end of the Clutch Housing (401) against the top of the workbench to remove the Bit Holder.
4. **For 7P3 Positive Jaw Clutch**, if the Bit Holder did not come free from the Clutch Housing in Step 2, lightly tap the large open end of the Clutch Housing on the top of the workbench to dislodge the Bit Holder.
5. Remove the Clutch Jaw Retaining Ring (409) and front Clutch Jaw.

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. Unless otherwise noted, always press on the stamped end of a needle bearing when installing the needle bearing in a recess.
4. 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.
5. Always clean every part and wipe every part with a thin film of oil before installation.
6. Apply a film O-ring lubricant to all O-rings before final assembly.
7. 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.

Needle Bearing Inserting Tool



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Assembly of the 7P1 or 7P3 Positive Jaw Clutch

1. Slide a Clutch Jaw (408), jaw side first, over the splined end of the Clutch Driver (410) until it seats.
2. Slide the Clutch Driver Spacer (411), large diameter first, over the splined end of the Clutch Driver and against the Clutch Jaw.
3. Install the Clutch Driver Spacer Retainer (414) on the splined end of the Clutch Driver against the Clutch Driver Spacer.
4. Slide the second Clutch Jaw (408), plain side first, on the short hub end of the Bit Holder (404 or 405). Retain it withthe Clutch Jaw Retaining Ring (409).
5. Insert the small end of the Disengaging Plunger (412) into the Disengaging Plunger Spring (413).
6. Insert the Disengaging Plunger and spring, spring end first, into the bore of the Bit Holder. Smear this bore of the Bit Holder with a thin film of grease.
7. If the Housing Bushing (402) was removed, press a new Housing Bushing into the Clutch Housing (401) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
8. **For 7P1 Positive Jaw Clutch**
   a. Insert the Bit Holder (404), hexagon recess first, into the Clutch Housing.
   b. Insert the Bit Retaining Ball (9/64" diameter) (415) in the hole in the side of the Bit Holder.
   c. Slide the Bit Retaining Sleeve (416), small inside diameter first, onto the end of the Bit Holder.
   d. Thread the Retaining Sleeve Spring (417), large coil end first over the end of the Bit Holder until the small-coil end snaps into place behind the shoulder on the lip of the Bit Holder.
   e. Install the Sleeve Spring Retainer (416A).
9. **For 7P3 Positive Jaw Clutch**
   a. Insert the Bit Retaining Ball (1/8" diameter) (407) in the hole in the side of the Bit Holder (405).
   b. Snap the Bit Retaining Spring (406) in the groove around the Bit Holder to retain the Ball in place.
   c. Invert the Bit Holder, hexagon recess first, into the Clutch Housing.
10. Insert the assembled Clutch Driver, jaw end first, into the Clutch Housing so that the pilot on the Clutch Driver enters the bore of the Bit Holder.

Assembly of 7D1 Direct Drive Attachment

1. If the Housing Bushing (302) was removed, press a new Housing Bushing into the Clutch Housing (301) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
2. Slide the Spacer (303) over the splined end of the Bit Holder (305) and install the Spacer Retainer (304) to hold it in position.
3. Insert the Bit Holder, hexagon recess first, into the Clutch housing.
4. Insert the Bit Retaining Ball (9/64" diameter) (306) into the hole in the side of the Bit Holder.
5. Slide the Bit Retaining Sleeve (308), small inside diameter first, onto the end of the Bit Holder.
6. Thread the Retaining Sleeve Spring (307), large-coil end first, over the end of the Bit Holder until the small-coil end snaps into place behind the shoulder on the lip of the Bit Holder.
7. Install the Spring Sleeve Retainer (307A).

Assembly of the 7C1 and 7C3 Cushion Clutch

1. Hold the Clutch Driver (205) in a vertical position with the large diameter end upward.
2. Slip the Front Clutch Jaw (206), pocket side first, over the end of the Clutch Driver far enough so that the large groove in the Clutch Driver is fully exposed. Smear a liberal amount of grease in the large groove.
3. Place the twelve Jaw Bearing Balls (5/32" diameter) (207) in the large groove and then slide the Front Clutch Jaw against them to retain them. Invert the Clutch Driver.
4. With the Clutch Driver inverted, set the Clutch Ball Spacer (208), pocket side first, down over the Clutch Driver and against the Front Clutch Jaw. Align the pockets in the Front Clutch Jaw with those in the Clutch Ball Spacer and smear the pockets with a liberal amount of grease.
5. Place a Clutch Release Ball (3/16" dia.) (209) in each pocket.
6. Install the Spring Seat Stop (212) in the small groove on the Clutch Driver.
7. Slip the Clutch Spring Seat (213) down over the Clutch Driver and against the Clutch Release Balls.

NOTICE

Be sure to install the correct Clutch Spring. These arecolor coded as follows:

Light Spring	**Black**
Medium Spring	**Yellow**
Heavy Spring	**Green**

8. Set the Clutch Spring (211) on top of the Clutch Spring Seat.
9. Smear some grease on the flat surface of the Adjusting Nut Lock (215). Set the Spring Seat on the Bearing (214) on this surface and smear some grease on the Bearing. Place the Clutch Spring Seat (213) against the Bearing.
10. Grasp the Adjusting Nut Lock, Bearing and Spring Seat as a unit, and slide it Spring Seat first over the Clutch Driver and against the Clutch Spring.
11. Smear a liberal amount of grease on the pocket face of the Adjusting Nut Lock.
12. Thread the Clutch Adjusting Nut (216), detent side first, onto the Clutch Driver and against the Adjusting Nut Lock. The trailing end of the Clutch Adjusting Nut must not extend over the threaded end of the Clutch Driver.
13. If the Housing Bushing (202) was removed, press a new Housing Bushing into the Clutch Housing (201) until it is flush with the face of the shoulder at the bottom of the clutch chamber. Smear the inside of the Housing Bushing with grease.
14. **For 7C1 Cushion Clutch**
    a. Insert the Bit Holder (219), hexagon recess first, into the Clutch Housing.
    b. Insert the Bit Retaining Ball (9/64" diameter) (222) in the hole in the side of the Bit Holder.
    c. Slide the Bit Retaining Sleeve (221), small inside diameter first onto the end of the Bit Holder.
    d. Thread the Retaining Sleeve (220), large coil end first, over the end of the Bit Holder until the smallcoil end snaps into place behind the shoulder on the lip of the Bit Holder.
    e. Install the Sleeve Spring Retainer (221A).
15. **For 7C3 Clutch**
    a. Insert the Bit Retaining Ball (1/8" diameter) (225) in the hole in the side of the Bit Holder (223).
    b. Snap the Bit Retaining Spring (224) in the groove around the Bit Holder to retain the ball in place.
    c. Insert the Bit Holder, Hexagon recess first, into the Clutch Housing.
16. Work the small coil end of the Plunger Spring (217) over the small diameter end of the Disengaging Plunger (218).
17. Insert the Plunger and Spring, spring end first, into the bore of the assembled Clutch Driver. Smear the bore of the Clutch Driver with a thin film of grease.
18. Insert the assembled Clutch Driver, jaw end first, into the Clutch Housing so that the pilot on the Bit Holder enters the bore of the Clutch Driver.

Assembly of the Lever Throttle Motor Housing

1. If the Rear Rotor Bearing (53) was removed, install a new one as follows:
    a. Place the Bearing Ejecting Nut (52) in the small recess at the bottom of the bore of the Motor Housing (51).
    b. Using a bearing inserting tool that has a pilot that fits the bore of the Bearing and a shoulder that contacts the outer radius on the bearing shell, press the Rear Rotor Bearing, stamped end trailing, into the bearing recess of the Motor Housing until it is about.010" (0.25 mm) below flush.
    c. Inject 0.5 cc of grease into the Bearing.
2. Lightly clamp the flats on the Motor Housing in leathercovered or copper-covered vise jaws so that the inlet end of the Housing is upward.

NOTICE

The Throttle Valve Seat is symmetrical. If one side appears worn, turn Seat over so that the good side will face the Throttle Valve (68).

3. Install the Throttle Valve Seat Support (66) by pushing it into place with a 1/2" diameter dowel. Follow this with the Throttle Valve Seat (67).
4. Install the Plunger Bushing (53A) and insert the Throttle Valve Plunger (69), hole end first, into the Plunger Bushing until the hole through the Plunger is aligned with the hole in the Throttle Valve Seat.
5. Using needle nose pliers, grasp the short end of the Throttle Valve Stem and install the Throttle Valve (68) so that the long end of the valve stem passes through the Throttle Valve Seat and enters the hole in the Throttle Valve Plunger.
6. Install the Muffler Element (61) by wrapping it horseshoe fashion around the inside of the Exhaust Deflector (62). Make certain that all exhaust holes are covered.
7. Snap the Exhaust Silencer (64) into the large open end of the Exhaust Deflector.
8. Install the Exhaust Deflector Seal (63) into the groove on the front end of the Exhaust Deflector.
9. Install the Silencer Seal Ring (65) over the hub of the Motor Housing and against the shoulder near the base of the hub.
10. Install the Exhaust Deflector over the hub of the Motor Housing, aligning the tabs on the Deflector with the notches in the Housing. Make certain the Deflector is oriented so that the Throttle Lever (54) will be over the Throttle Valve Plunger.
11. Slide the Inlet Bushing Spacer (72) over the threaded end of the Inlet Bushing (73).
12. Insert the Air Strainer Screen (71), closed end first, into the external threaded end of the Inlet Bushing.
13. Insert the Throttle Valve Spring (70), large coil end first, into the Inlet Bushing making certain it contacts the Air Strainer Screen.
14. Thread the Inlet Bushing into the Motor Housing, making certain the Throttle Valve Spring encircles the short-stem end of the Throttle Valve. Tighten the Bushing to a minimum of 25 ft-lb (34 Nm) of torque.
15. Note that one end of the throttle lever pin hole in the Exhaust Deflector is larger than the other end. Install the Throttle Lever (54) and Throttle Lever Pin (55), making certain to start the Pin in the large end of the hole through the Exhaust Deflector.
16. Remove the Motor Housing from the vise.
17. Insert the Reverse Valve Spring (57) into the plain end of the Reverse Valve (56).
18. Insert the Reverse Valve Lock Pin (58) into the small hole in the side of the Reverse Valve.
19. While holding the Motor Housing horizontally with the Throttle Lever on top, and, while holding the Reverse Valve with the Lock Pin facing upward, insert the Reverse Valve into the reverse valve bushing. Push it in against the compression of the Reverse Valve Spring and rotate it one-half turn (180°) to allow the Lock Pin to drop into a slot in the wall of the bushing. After the lock pin has engaged the slot in the bushing, you can release the Reverse Valve and it will stay in position.
20. Insert the Lock Pin Retainer (59) in the tapped end of the Reverse Valve and install the Retainer Set Screw (60). Tighten the Retainer Set Screw to 5 to 20 in-lbs (0.57 to 2.26 Nm) torque.

Assembly of the Pistol Grip Motor Housing

1. If the Rear Rotor Bearing (3) was removed, install a new bearing as follows:
   a. Place the Bearing Ejecting Nut (2) in the small recess at the bottom of the bore in the Motor Housing (1).
   b. Using a bearing inserting tool that has a pilot to fit the inside of the Bearing, and a shoulder that contacts the outer radius on the bearing shell, press the Rear Rotor Bearing, stamped end trailing, into the bearing recess of the Motor Housing until it is about.010" (0.25 mm) below flush. Inject 0.5 cc of grease into the Bearing.
2. Grasp the handle in leather-covered or copper-covered vise jaws so that the bore of the Motor Housing is horizontal.
3. Slide the Reverse Valve (4), tapped end trailing, into the reverse valve bushing.
4. Place the Reverse Valve Spring (5) on top of the Reverse valve.
5. Install the Reverse Valve Cap Seal (7) around the rim of the reverse valve bushing.
6. Install the Reverse Valve Cap (6). Tighten it to 7 to 9 ft-lb (9.5 to 12 Nm) of torque.
7. The Actuating Valve (9) can be assembled in either side of the Motor Housing (1), depending upon operator preference.

NOTICE

A 10 mm hexagon socket will fit the Actuating Valve Cap.

8. Install the Actuating Valve Bumper (16A) in the Housing. Install the Actuating Valve Cap Seal (16) on the Actuating Valve Cap (15) and thread the Cap into the side of the Motor Housing. Tighten it to 4 to 6 ft-lb (5.4 to 8 Nm) of torque.
9. Install the Valve Bushing Seal (12) on the Actuating Valve Bushing (11).
10. Install the Actuating Valve Face (10) in the groove on the Actuating Valve (9) and insert the small end of the Actuating Valve into the threaded end of the Bushing until it protrudes from the opposite end.
11. Press the Actuating Valve Button (13) on the small diameter of the Actuating Valve (9).
12. Place the Actuating Valve Spring (14) in the cross bore of the Motor Housing so that it enters the recess in the Actuating Valve Cap.

NOTICE

A 10mm hexagon socket will fit the Actuating Valve Bushing.

13. Take the assembled Actuating Valve and Bushing and thread the Bushing into the cross-bore so that the end of the Actuating Valve enters the bore of the Spring. Work the Actuating Valve a few times to see that it functions smoothly. Tighten the Actuating Valve Bushing to 4 to 6 ftlb (5.4 to 8 Nm) of torque.
14. Change the position of the Motor Housing in the vise so that the handle is vertical and the entrance to the handle bore is upward.

NOTICE

The Throttle Valve Seat is symmetrical. If one side appears worn turn the Seat over so that the good side will face the Throttle Valve (19).

15. Insert the Throttle Valve Seat Support (21) into the tapped bore of the handle and push it into place with 1/2" (13 mm) dowel. Follow the Throttle Valve Seat Support with the Throttle Valve Seat (20).
16. If the Trigger (17) was removed from the Trigger Pin (18), press a new Trigger onto the grooved end of the Pin so that it is at right angles to the hole in the opposite end of the Pin.
17. Install the Trigger Bushing (3A). Install the assembled Trigger and Trigger Pin in the Trigger Bushing.
18. Installation of the Throttle Valve can sometimes be difficult due to the smallness of the Valve and the depth of the bore in which it is located. The difficult part is in holding the Valve while inserting the long end of the valve stem through the hole in the trigger stem. Although the Valve can be held with a push-button mechanical drafting pencil or a wooden dowel, one of the easiest ways to hold it is by using a common wooden pencil with rubber eraser. Insert the short end of the valve stem into the rubber eraser. Insert the short end of the valve stem into the rubber eraser full depth. Then back it out far enough so that the Valve is easily supported. Insert the Valve into the bore of the handle so that the long end of the stem enters the hole in the Trigger Stem. Pull outward on the Trigger to hold the Valve while removing the pencil.
19. Place the Air Strainer Screen (27), closed end first, inside the large end coil of the Throttle Vale Spring (22).
20. Insert the Throttle Valve Spring and Screen, small coil first, into the handle so that the Spring encircles the end of the Throttle Valve.
21. Place the Muffler Element (24) over the perforated baffle of the Muffler Assembly (23).
22. Insert the Muffler Element (24A) and place the Muffler on the face of the handle so that the perforated baffle extends into the handle.
23. Slide the Inlet Bushing Spacer (25) over the threaded end of the Inlet Bushing (26), and install the Inlet Bushing in the handle. Tighten it to 25 ft-lb (34 Nm) of torque.

NOTICE

Assembly of the Motor

1. Slide the Front End Plate (107), flat side first, over the splined end of the Rotor (104).
2. Using a sleeve that contacts only the inner ring of the Front Rotor Bearing (109), press the Front Rotor Bearing onto the splined hub of the Rotor until it seats against the Front End Plate.
3. The clearance between the Front End Plate and Rotor is critical. While holding the Front End Plate, gently tap the splined end of the Rotor with a plastic hammer until you can insert a 0.001" feeler gauge or shim between the face of the Rotor and End Plate.
4. Grasp the splined end of the Rotor in leather-covered or copper-covered vise jaws so that the short hub of the Rotor is upward.
5. Place the Cylinder (106) down over the Rotor and against the Front End Plate. The four exhaust holes perpendicular to the cylinder axis MUST be at the 5 o'clock position when looking down through the Cylinder at the Front End Plate.
6. Wipe each Vane (105) with a light film of oil and place a Vane in each slot in the Rotor. Maker certain the vane slots are clean.
7. Place the Rear End Plate (102), flat side first, over the short hub of the Rotor.

⚠ CAUTION

Make certain the Retainer does not spring loose as you slip it on the hub of the Rotor.

8. Install the Rear End Plate Retainer (103) in the groove on the hub of the Rotor.

Assembly of the Gearing

1. Stand the Gear Case (127), external threaded end upward, on the workbench.
2. Place the Grease shield (129) in the bottom of the bearing recess in the Gear case.
3. Slip the Spindle Bearing (130) into the Gear Case until it seats against the Grease Shield.
4. Using snap ring pliers, install the Spindle Bearing Retainer (131) in the groove in front of the Spindle Bearing.
5. If the Spindle Planner Gear Bearings (119) or the Gear Head Planet Gear Bearings (124) were removed, press in new Planet Gear Bearings using a bearing inserting tool that has a pilot that fits the bore of the bearing and a shoulder that contacts the outer radius of the Bearing. Press against the stamped end of the Bearing. Press all Bearings flush or slightly below flush with the face of the Spindle Planet Gear (118) or Gear Head Planet Gear (123).
6. **For 7RAL model, proceed as follows:**
   a. Turn the Gear Case over so that the external threaded end is downward. Place it on the table of an arbor press so that it is supported on the inner ring of the Spindle Bearing.
   b. Place the Seal Retaining Washer (116) followed by the Seal Support (115) and Seal (117) over the hub of the Spindle (114).
   c. Press the Spindle into the Spindle Bearing until the Seal Support contacts the inner ring of the bearing.

⚠ CAUTION

Make certain Seal does not get pinched between the Seal Support and Spindle Bearing.

   d. Place a Spindle Planet Gear (118) on each planet gear shaft.
   e. Work 3 to 6 cc of the recommended grease into the gear train.
7. **For 7RAM and 7RAN models**, proceed as follows:
   a. Turn the Gear Case over so that the external threaded end is downward. Place it on the table of an arbor press so that it is supported on the inner ring of the Bearing.
   b. Place the Seal Retaining Washer (116) followed by the Seal Support and Seal (117) over the hub of the Spindle (114).
   c. Press the Spindle into the Spindle Bearing until the Seal Support contacts the inner ring of the Bearing.

⚠ CAUTION

Make certain the seal does not get pinched between the Seal Support and Spindle Bearing.

d. Place a Spindle Planet Gear (118) on each Planet Gear Shaft.

e. Work 3 to 6 cc of the recommended grease into the spindle gear train.

f. Place the Gear Head Spacer (125) against the face of the Spindle Planet Gears.

g. Insert the splined hub of the Gear Head (122) through the Gear Head Spacer so that it meshes with the Spindle Planet Gears.

h. Place a Gear Head Planet Gear on each planet gear shaft.

8. Insert the Bearing Housing Spacer (113) in the Gear Case so that it seats against the internal gear teeth.

Assembly of the Tool

1. Position the Rear End Plate Gasket (101) in the bottom of the bore of the Motor Housing (1 or 51) so that the dowel hole and air inlet ports in the Gasket align with those in the Motor Housing.
2. Using an assembly dowel 3/32" in diameter by 10" long (2.3 mm x 254 mm), align the dowel groove in the Front End Plate (107), Cylinder (106) and Rear End plate (102). Place the assembly rod in the aligned grooves so that about 3" (75 mm) of the rod extends beyond the Rear End Plate. Inert the extension into the dowel hole in the Motor Housing and slide the motor into the MotorHousing until it seats.
3. Withdraw the assembly dowel and insert the Cylinder Dowel (108). When properly positioned, the Cylinder Dowel should be slightly below the surface of the Front End Plate.
4. Place the two Bearing Spring Washers (110) inside the Front Rotor Bearing Housing (111) and against the Front Rotor Bearing Retainer (112).
5. Slide the Front Rotor Bearing Housing over the Front Rotor Bearing.
6. For 7RAM, 7RAN and 7RLM models, slide the Rotor Pinion Spacer (121) followed by the Rotor Pinion (120) onto the splined end of the Rotor (104).
7. Thread the assembled Gear Case (127) onto the Motor Housing, and tighten it to 40 ft.-lb. (54 Nm) of torque.

NOTICE

Run the motor at reduced air pressure while tightening the Gear Case. Listen for any rubbing, grating or scraping noises which can indicate a condition that causes scoring.

NOTICE

The Gear Case has left-hand threads.

8. Thread the assembled clutch onto the Gear Case. Draw the clutch up snugly, but do not tighten it excessively.
9. **For 7C1 and 7C3 Cushion Clutches**, adjust the clutch as described in the Clutch Adjustment section in Product Information Manuals 80167299 or 80167349.

Troubleshooting Guide

Trouble	Probable Cause	Solution
Low 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.
	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 Valve 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 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 components.
Inconsistent disengagement of Adjustable Clutch	Improper lubrication	Remove Adjustable Clutch mechanism and check. Lubricate as instructed on page EN-1.
	Worn or damaged parts	Remove Adjustable Clutch mechanism and examine parts.
	Wrong Clutch Spring (using Heavy Clutch Spring on light torque application)	Change to Medium or Light Clutch Spring.
Motor Stalls before Adjustable Clutch ratchets	Improper Clutch adjustment or improper tool ratio for application	Check Clutch Adjustment and review tool performance vs. requirements.
	Low air pressure at the inlet	Check the air supply. For top performance, the air pressure must be 90 psig (6.9 bar/620 kPa) at the inlet.
	Insufficient grease	Lubricate the Clutch as instructed on page EN-1.

Related Documentation

For additional information refer to:
Product Safety Information Manual 04585006.
Product Information Manual 80167299, 80167349.
Parts List Manual 16574584.

Manuals can be downloaded from ingersollrandproducts.com

Notes:

Notes:

ingersollrandproducts.com