47143300
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Air Impulse Wrench (Twin Blade)

Series 500A and 700A

Maintenance Information

Save These Instructions

Ingersoll Rand

⚠ WARNING

Always wear eye protection when operating or performing maintenance on this tool.
Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool or before performing any maintenance on this tool.

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

Changing The Mechanism Fluid

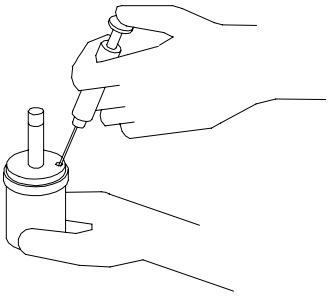
To change the Mechanism Fluid in the Impulse Mechanism, proceed as follows:

1. Grasp the tool in Copper-covered or Leather- covered vise jaws with the Angle Housing (69) Upward.
2. Using a Hex Wrench, remove the four Angle Housing Mounting Screws (89) and Lock washer (90). Lift the assembled Angle Housing off the Motor Housing (1). Remove the Housing Gasket (78).
3. Lift the assembled mechanism off the Rotor (22).
4. Using a wrench, rotate the Torque Adjustment Screw (33 or 57) Clockwise untill the Screw stops. Rotate the Screw Counterclockwise untill it stops or Makes six complete revolutions.
5. Using a 2.5mm Hex wrench, unscrew and remove the Oil Plug (59 or 63). Remove the Oil Plug Seal (60 or 64) and Oil Plug Seal Support (61).
6. With the oil plug openings downward aver a container, rotate the Drive Shaft (48) to purge the fluid from the mechanism.
7. **For Model 500A,** thread the Tee Wrench included with the Tool Kit (Part No. 180PQ-99) through the oil plug hole into the Spring Guide (45) and Pull the Guide toward the output end of the mechanism untill it stops.
   For Model 700A, thread the Tee Wrench included with the Tool Kit (Part No. 700PQ-99) through the oil plug hole into the Spring Guide (45) that is 180° from the Torque Adjustment Screw (57) and Pull the Guide toward the output end of the mechanism untill it stops.

NOTICE

Do not substitute any other fluid.
Failure to use the impulse mechanism fluid provided could damage the tool, increase maintenance and decrease performance. Use only clean fluid in these tools.

8. Using the syringe and fluid from the fluid Replacement Kit (Part No. EQ106S-K400), fill the mechanism with the fluid furnished in the Kit untill the fluid overflows the fill hole. Model 500A will require 9 cc of fluid and Model 700A, 12 cc.
   (Refer to Dwg. TPD1265)



(Dwg. TPD1265)

9. Submerge the fill opening in the remainder of the fluid, and using a wrench, rotate the Drive Shaft to purge any remaining air from the system.
10. Remove the mechanism from the fluid and use the Tee Wrench to push the Spring Guide Assembly slowly downward untill the fluid flows from the fill opening.
11. Thread the Oil Plug with the Oil Plug Seal into the mechanism until it is snug.
12. Using a 1.5 mm hex wrench, turn the Torque Adjustment Screw clockwise until it stops. This is the maximum torque position.
13. Wipe the outside of the mechanism dry and clean and remove the Oil Chamber Plug. Using the syringe, withdraw .2 cc of fluid from 500A models and .50 cc of fluid from 700A models.
14. Install the Oil Chamber Plug and tighten it between 20 and 25 in–lb (2.3 and 2.8 Nm) torque.
15. Install the assembled mechanism on the rotor shaft.
16. Place the new Housing Gasket on the Angle Housing and install the assembled Angle Housing over the Drive Shaft against the Housing. Install the four Angle Housing Mounting Screw and Lock Washers. Tighten each Screws between 45 and 50 in-lb (5.1 and 5.6 Nm) torque.

Disassembly

General Instructions

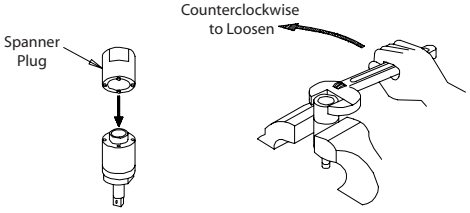
1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. When grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
3. Do not remove any part which is a press fit in or on an assembly unless the removal of that part is necessary for repairs or replacement.

Disassembly of the Angle Head

1. Grasp the tool in the copper-covered or leather-covered vise jaws with the Angle Housing (69) upward.
2. Using a hex wrench, remove the four Angle Housing Mounting Screw (89) and Lock washer (90). Lift the assembled Angle Housing off the Motor Housing (1). Remove the Housing Gasket (78) and Angle Housing Spacer (72).
3. Unscrew and remove the Bearing Cap Retainer Screw (74).
4. Using the spanner wrench, unscrew and remove the Pinion Bearing Cap (73).
5. Pull the two Pinion Bearings (75), any Pinion Bearing Shims (76) and Bevel Pinion (77) out of the Angle Housing.
6. Unscrew and remove the Spindle Cap Retaining Screw (86).
7. Unscrew and remove the Spindle Cap (85) and pull the Spindle (81), Spindle Shaft (79) and any Spindle Shims (80 or 84) that are in the assembly.

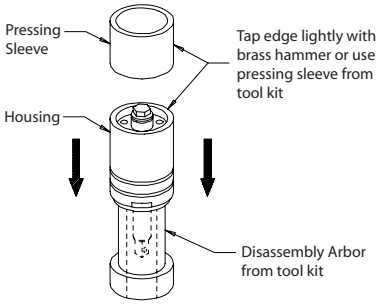
Disassembly of the Impulse Mechanism

1. Lift the assembled mechanism off the Rotor (22).
2. Using a wrench, rotate the Torque Adjustment Screw (33 or 57) clockwise untill the Screw stops. Rotate the Screw counterclockwise untill it stops or makes six complete revolutions.
3. Using a 2.5 mm hex wrench, unscrew and remove the Oil Plug (59 or 63). Remove the Oil Plug Seal (60 or 64) and Oil Plug Seal Support (61).
4. With the oil plug opening downward over a container, rotate the Drive Shaft (48) to purge teh fluid from the mechanism.
5. Grasp the flats of the Housing (31 or 32) in vise jaws with the output end of the Drive Shaft downward.
6. Insert the pins of the spanner plug from the No. 180PQ–99 or No. 700A-99 Tool Kit into the two holes in the Housing Cap (35). Using a wrench on the plug, unscrew and remove the Housing Cap from the Housing Assembly.
   Refer to Dwg. TPD1295.



(Dwg. TPD1295)

7. Stand the disassembly arbor from the Tool Kit, large end downward, on a workbench or the table of an arbor press. Insert the output end of the Drive Shaft into the central opening and either tap the Housing downward off the components or use the pressing sleeve in the Kit to press the Housing downward off the components.
   Refer to Dwg. TPD1296.

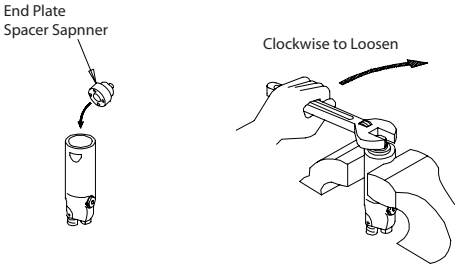


(Dwg. TPD1296)

8. Disassemble the components of the mechanism in the sequence shown in Drawing TPB960.

Disassembly of the Motor

1. Grasp the Motor Housing (1) in vise jaws with the shaft of the Rotor (22) upward.
2. Insert the pins of the end plate spacer spanner into the holes in the Front End Plate Spacer (27). Using a wrench, unscrew and remove the Spacer. This is a **left–hand thread**; rotate the wrench **clockwise** to remove the Spacer.
   Refer to Dwg. TPD1297.



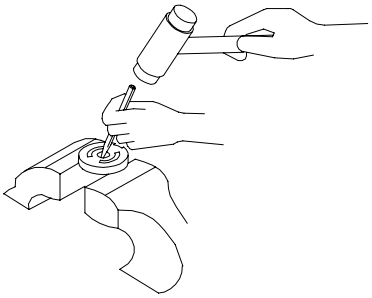
(Dwg. TPD1297)

3. Pull the assembled motor from the Motor Housing.
4. Remove the Front End Plate (24), Front Rotor Bearing (26), Cylinder Assembly (20) and Vanes (23) from the Rotor.
5. On the table of an arbor press, support the Rear End Plate (18) with blocks as close to the Rotor as possible and press the Rotor out of the Rear End Plate and Rear Rotor Bearing (19).

NOTICE

Do not enlarge or damage the shaft hole in the End Plate.

6. To remove the Rear Rotor Bearing from the Rear End Plate, use a small drift or pin punch through the central opening of the Rear End Plate to tap the Bearing out of the End Plate.
   Refer to Dwg. TPD1299.



(Dwg. TPD1299)

7. Press the Reverse Lever Pin (4) out of the Reverse Lever (2) and remove the Reverse Lever, Reverse Lever Seal (3), Throttle Valve Spring (11) and the Throttle Ball (12).
8. Spread the end of the Suspension Bail (17), where the ends enter the Motor Housing, and remove the Bail.
9. Using a pin punch, tap the Throttle Lever Pin (10) and the Deflector Retaining Pin (16) out of the Handle. Remove the Throttle Lever (9), Throttle Plunger (13) and the Exhaust Deflector Assembly (15).
10. Push the Reverse Valve Assembly (5) out the throttle lever end of the Housing and Remove the two Reverse Valve Bushing Seals (8) if they need to be replaced.
11. Unscrew and remove the Inlet Bushing (14).
12. If the Reverse Valve bushing (7) must be replaced, press it from the Motor Housing.

Assembly

General Instructions

1. 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.
2. Always press on the inner ring of a ball–type bearing when installing the bearing on a shaft.
3. Always press on the outer ring of a ball–type bearing when pressing the bearing into a bearing recess.
4. Except for bearings and mechanism parts, always clean every part and wipe every part with a thin film of oil before installation.
5. Wipe a thin film of mechanism fluid on all internal mechanism components before installing them in the mechanism.
6. Apply a film of O–ring lubricant to every O–ring before installation.

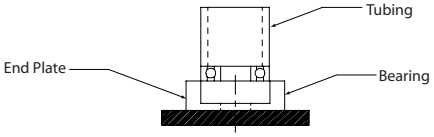
Assembly of the Motor

1. If the Reverse Valve Bushing (7) was removed from the Motor Housing (1), press it into the Housing, lug end trailing, from the side of the Housing opposite the lever position. Make certain the ports align with the bushing holes.
2. Thread the Inlet Bushing (14) into the threaded hole at the rear of the handle of the Motor Housing and tighten it between 30 and 35 ft-lb (40 and 47 Nm) torque.
3. Position the Exhaust Deflector Assembly (15) in the hole at the rear of the motor housing handle and install the Deflector Retaining Pin (16) to secure it in position.

NOTICE

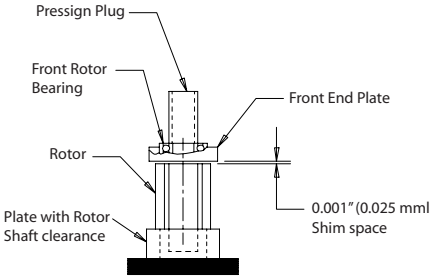
It may be necessary to slide the Assembly in or out in order to align the groove in the Assembly with the pin hole.

4. Install two new Reverse Valve Bushing Seals (8) in the grooves inside the Reverse Valve Bushing, if they were removed.
5. Install the Reverse Valve Seal (6) in the groove next to the large hub of the Reverse Valve (5).
6. Install the Reverse Valve Assembly, seal and trailing, into the lever side of the Motor Housing. Make certain the square depression on the shaft of the Valve faces forward toward the output end of the tool.
7. Install the Reverse Lever Seal (3) in the groove on the small hub of the Reverse Lever (2).
8. Insert the Throttle Ball (12) followed by the Throttle Valve Spring (11) into the Reverse Valve Assembly.
9. Position the Reverse Lever Assembly on the Reverse Valve Assembly with the indicator lever rearward. Make certain the crossholes in the Lever align with the pin holes in the Valve. Press the Knob Retaining pin (4) into the Lever and Valve.
10. Insert the Throttle Plunger (13) into the Reverse Valve Assembly.
11. Position the Throttle Lever (9) on the Motor Housing and secure it by pressing the Throttle Lever Pin (10) into the Housing and Lever.
12. Using an arbor pres and a piece of tubing that contacts the outer ring of the bearings, press the Front Rotor Bearing (26) into the Front End Plate (24) and the Rear Rotor Bearing (19) into the Rear End Plate (18). (Refer to Dwg. TPD1300).



(Dwg. TPD1300)

13. Stand the Rotor (22) on the table of an arbor press. It should be upright on a flat metal plate having a clearance hole for the shaft. The shaft with the hex must be upward.
14. Place a 0.001" (0.025mm) shim on the upward surface of the large portion of the rotor body. Using a piece of tubing that contacts the inner ring of the bearing, press the Front Rotor Bearing and Front End Plate, End Plate leading, onto the shaft of the Rotor until the End Plate contacts the shim. Remove the shim. (Refer to Dwg. TPD1301).

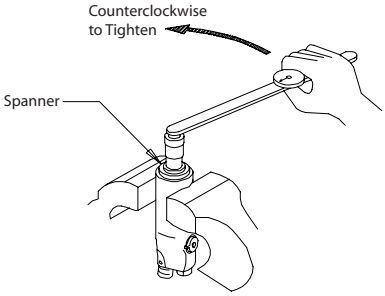


(Dwg. TPD1301)

15. Coat each Vane (23) with a thin film of oil and insert a Vane into each of the rotor vane slots with the straight edge of Vane outward.
16. Install the Cylinder (20) over the Vanes and Rotor. Make certain the contour at the end of the Cylinder matches the contour of the End Plate. Make certain the Cylinder Alignment Pin (21) enters the hole in the face of the End Plate.
17. Place the Rear End Plate and Bearing against the face of the Cylinder, Bearing end trailing. Make certain the Cylinder Alignment Pin enters the hole in the End Plate.
18. Insert the assembly, Rear End Plate leading, into the Motor Housing making sure the End Plate Alignment Pin (25) enters the notch in the Housing.
    It may be necessary to tap the assembly into position with a brass of plastic hammer. (Refer to Dwg. TPD1303).

(Dwg. TPD1303)

19. Grasp the Motor Housing in vise jaws with the rotor shaft upward. Thread the Front End Plate Spacer (27) into the Housing and using the end plate spacer spanner, tighten the Spacer to 12 ft-lb (16 Nm) torque. This is a **left-hand thread**; rotate the wrench **counterclockwise** to tighten. (Refer to Dwg. TPD1304).

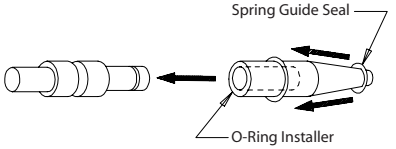


(Dwg. TPD1304)

20. After installing the Front End Plate Spacer, grasp the shaft of the Rotor and rotate it by hand. If the Rotor does not turn easily, disassemble the motor unit and determine where the assembly is binding. The motor must rotate freely before proceeding further with the assembly.

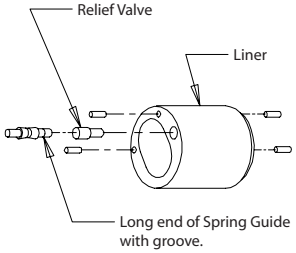
Assembly of the Impulse Mechanism

1. Insert the long shaft of the Spring Guide (41) into the central opening of the O-ring Installer furnished with the Tool Kit (Part No. 180PQ-99 or Part No. 700A-99). Place the Spring Guide Seal (46) on the tapered end of the installer and roll the Seal up the taper and into the groove on the large body of Spring Guide. **For Model 700A,** repeat the procedure with the second Spring Guide and Seal. (Refer to Dwg. TPD 1305)



(Dwg. TPD1305)

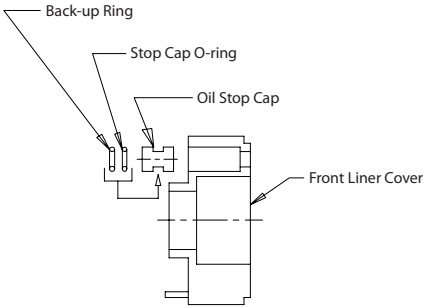
2. **For Model 500A,** insert the Relief Valve (44), large end trailing, into the Liner (42). Insert the assembled Spring Guide, long hub with annular groove leading, into the Liner against the Relief Valve. (Refer to Dwg. TPD1306).



(Dwg. TPD1306)

For Model 700A, when looking inside the central opening of the Linder (42), the internal wall has three holes on one side which do not extend through the wall. The opening on the end face of that wall is for the Relief Valve (44). Install the Relief Valve, large end trailing, into that opening. Insert the Guide Assist Spring (47) into the hole in the end face of the opposite wall.

3. **For Model 700A**, insert a Spring Guide Assembly, large end trailing, into the opening against the Relief Valve. Mark this opening with a felt marker to indicate that it contains the Relief Valve. Install the remaining Spring Guide Assembly, large end trailing, into the hole with the Spring.
4. **For Model 500A,** install the Liner Cover O-ring (40) in the groove around the Rear Liner Cover (39).
   For Model 700A, install the Rear Liner Cover Seal (41) in the annular groove on the face of the Rear Liner Cover (39).
5. **For Model 700A,** install the two Front Liner Cover Guide Seals (62) in the openings on the face of the Front Liner Cover (56).
6. **For Model 500A,** if the Oil Stop Cap Assembly (65) was removed from the Front Liner Cover (54), install the Stop Cap O-ring (66) and Back-up Ring (67) in the groove of the Cap and insert the Assembly into the Cover. (Refer to Dwg. TPD1311).



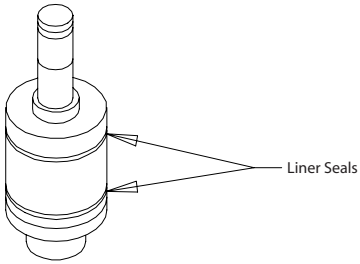
(Dwg. TPD1311)

7. Insert the short round hub of the Drive Shaft (61) into the central opening of the Rear Linder Cover.
8. **For Model 500A,** insert a Blade (49) into one slot in the Drive Shaft with the Blade Assembly Pin (50) inward toward the Shaft. Install the Blade Springs (51) through the Drive Shaft and encircle the Pins in the Blade. Place the remaining Blade on the Springs making certain the Springs encircle the Pins in that Blade.
   For Model 700A, insert a Blade (49) into one slot in the Drive Shaft. Install the Blade Springs (65) through the Drive Shaft and into the holes in the Blade. Place the remaining Blade on the Springs making certain the springs enter the holes in that Blade.

NOTICE

This following installation can be accomplished more easily by aligning the compressed Blades with the webs at the narrowest portion of the opening. Keeping the Blades on the web allows them to slide the length of the Liner without interference.

9. Using finger pressure, compress the Springs with the Blades until the outer edges of the Blades are flush with the drive shaft surface. Capture the Blades in this position by installing the Liner Assembly, guide spring end trailing, over the Drive Shaft and against the Rear Liner Cover. Make certain the Liner Pins (43) in the Liner enter the holes in the Cover.
10. Insert the hub end of the Rear Liner Cover into the Disassembly Arbor from the Tool Kit and stand it on a workbench with the Drive Shaft upward.
11. Install the Seal Back-Up Ring (53) followed by the Drive Shaft O-ring (52) in the central opening in the face of the Front liner Cover.
12. Install the Front Liner Cover Assembly over the Drive Shaft and against the Liner.
    For Model 500A, make certain the Oil Stop Cap Assembly aligns with the Spring Guide assembly.
    For Model 700A, make certain the Torque Adjustment Screw (57) aligns with the proper spring guide opening that was marked during assembly.
13. **For Model 500A,** install the Liner Cover O-ring (41) in the groove that was formed where the Rear Liner Cover contacts the Liner and install the Liner O-ring (37) in the groove formed where the Front Liner Cover contacts the Liner. Lubricate the Seals with O-ring lubricant. (Refer to Dwg. TPD1312).



(Dwg. TPD1312)

14. **For Model 500A,** apply some grease to the Liner Cover Seal (68) and install it in the grooves inside the Liner Housing (32) near the end with the external wrench flats.
    For Model 700A, apply some grease to the two Liner Cover Seals (68) and install them in the grooves inside the Liner Housing (31) near the end with the external wrench flats.
15. **For Model 500A,** orient the Liner Housing so the Liner Cover Pin (55) will enter the hole in the Housing and install the Housing over the Liner.
    For Model 700A, place the Liner Housing Seal end trailing, over the assembled Liner. Make certain the notch in the trailing end face of the Housing aligns with the Oil Plug (59) in the Front Liner Cover. Use the Pressing Sleeve from the Tool Kit to oppress the Housing over the Seals during installation.
16. Grasp the flats of the Liner Housing in the vise jaws with the output spindle downward. Remove the Rear Liner Cover and fill the recess in the Cover with grease. Reinstall the Cover and push it downward below the threads at the rear of the Housing.
17. Using Spanner Plug furnished with the Tool Kit and a torque wrench, install the Housing Cap, (castellated end leading for Model 700A). Tighten the Cap between 101 and 116 ft-lb (137 and 157 Nm) torque.
18. Make certain the Drive Shaft rotates freely and then fill the mechanism with fluid as instructed in the section, **CHANGING THE MEVHANISM FLUID**.

Assembly of the Angle Head

1. If the Spindle Shaft Busing was removed, press a new Bushing into the Angle Housing (69), large end trailing, until it seats.
2. Lubricate and install the two pinion Bearings (75) on the shaft of the Bevel Pinion (77) and insert the assembly, gear end leading, into the motor end of the Angle Housing.
3. Install the Pinion Bearing Cap (73) and tighten it snug.
4. Insert the Spindle Shaft (79) into the gear end of the Spindle (81).
5. Chalk the gear teeth of the Spindle and carefully insert the assembly into the Angle Housing. Make certain the Shaft enters the Bushing. Install the Spindle Cap (85) and lightly tighten it.
6. Using a wrench on the square drive, rotate the Spindle to sufficiently mark the chalked gear teeth. Carefully remove the Spindle Cap and examine the gear teeth.
7. If the gearing runs smoothly and gear tooth engagement is good, reinstall the Cap and tighten it and the Pinion Bearing Cap securely.
   If the gearing does not run smoothly or gear tooth engagement is poor, proceed as follows:
   a. Determine which way the Spindle or Pinion must move to improve engagement.
   b. Insert the correct thickness Pinion Bearing Shim (76), Spindle Upper Shim (80) or Spindle Lower Shim (84) separately or in combination to achieve the desired engagement.
   c. Chalk the gear teeth and test the tooth engagement again.
   d. When satisfied that the proper bevel gear engagement has been achieved, tighten the Spindle Cap and Pinion Bearing Cap securely.
8. Remove the Grease Plug (71) and fill the cavity with gear grease.
9. Install the Bearing Cap Retaining Screw (74) and Spindle Cap Retaining Screw (86) and tighten them securely.
10. Install the assembled Impulse Unit Drive Assembly on the rotor shaft in the Motor Housing (1).
11. Install the Angle Housing Space (72), small opening leading, into the Drive Shaft (48) against the impulse mechanism.
12. Place a new Gasket (78) on the Angle Housing and install the assembled Angle Housing over the Drive Shaft against the Housing. Install the four Angle Housing Mounting Screws (89) and Lock Washers (90). Tighten each Screw between 45 and 50 in-lb (5.1 and 5.6 Nm) torque.

Related Documentation

For additional information refer to:
Product Safety Information Manual 04584983.
Product Information Manual 47133053.
Parts Information Manual 47143292.

Manuals can be downloaded from www.ingersollrandproducts.com

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