47109533
Edition 1
September 2010

Air Impulse Wrench (Twin Blade)

Model 500PS3, 700PS3 and 900PS4

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).

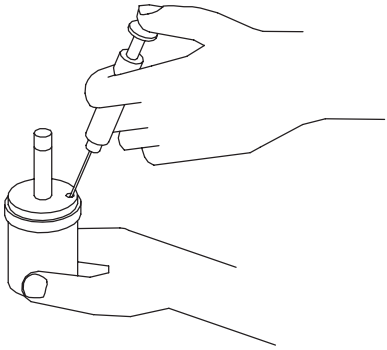
Changing The Mechanism Fluid

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

1. Using a hex wrench, remove the three Hammer Case Cap Screws and Lock Washers. Lift the Hammer Case off the Motor Housing over the Drive Shaft. Remove the Hammer Case Gasket.
2. Lift the assembled mechanism off the Rotor.
3. Using a 2.5 mm hex wrench, unscrew and remove the Oil Plug. Remove the Oil Plug Seal and Oil Plug Seal Support.
4. Using either the 1.5 mm or the 2 mm hex wrench furnished with the tool, rotate the Adjustment Screw without paint in the wrench hole, counterclockwise until it stops.
5. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
6. Using the syringe and fluid from the Fluid Replacement Kit (Part No. EQ106S–K400), fill the mechanism with the fluid furnished in the Kit until the fluid overflows the fill hole. Model 500PS3 will require 9 cc of fluid; Model 700PS3, 12 cc and Model 900PS4, 17 cc.
   (Refer to Dwg. TPD1265)

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.



(Dwg. TPD1265)

7. Submerge the mechanism in a reservoir containing mechanism fluid, and using a wrench, rotate the Drive Shaft clockwise and counterclockwise to purge any remaining air from the system.
8. Remove the mechanism from the fluid and rotate the Adjustment Screw clockwise until it stops.
9. Thread the Oil Plug with the Oil Plug Seal and Seal Support into the mechanism until it is snug.
10. Wipe the outside of the mechanism dry and clean and remove the Oil Chamber Plug. Using the syringe, withdraw 0.55 cc of fluid from 500PS3 models, 0.65 cc of fluid from 700PS3 models and 0.90 cc from 900PS4 models.
11. Install the Oil Chamber Plug and tighten it between 20 and 25 in–lb (2.3 and 2.8 Nm) torque.
12. Position a new Hammer Case Gasket on the Motor Housing and install the assembled mechanism on the rotor shaft.
13. Place the Hammer Case Cover over the Drive Shaft against the Housing and Gasket. Install the three Hammer Case Cap Screws and Lock Washers. Tighten each Screw between 45 an 50 in–lb (5.1 and 5.6 Nm) torque.
14. Test the tool for torque at maximum, minimum and mid–range torque settings. If the tool does not perform satisfactorily, repeat the refill procedure and pay particular attention to removing unwanted air from the fluid system. Refer to the section TORQUE ADJUSTMENT for specific adjustment procedures.
15. If the torque is satisfactory but the tool fails to shut–off, only then, is it necessary to adjust the shut–off mechanism. If it should become necessary, proceed as follows:
    a. Remove the Adjusting Hole Plug from the Hammer Case.
    b. Using a pointed probe, pick the paint out of the wrench opening in the Adjustment Screw that is 180 degrees away from the Torque Adjustment Screw.
    c. Rotate the Screw counterclockwise not more than ten degrees.
    d. Permanently mark the Screw for future identification and then retest the tool. Adjustments to the shutoff mechanism should only be made in five to ten degree increments.

NOTICE

Before operating the tool, mark the shutoff Adjustment Screw with a permanent marker or paint so that it can be distinguished for future adjustments.

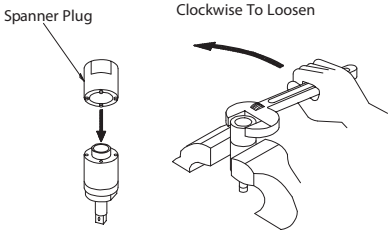
Disassembly

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.

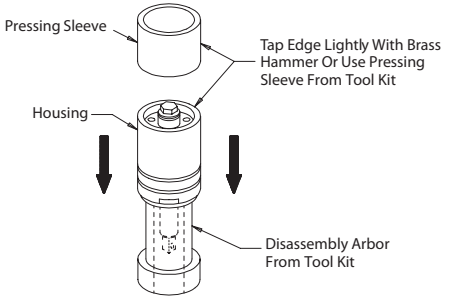
Disassembly of the Impulse Mechanism

1. Use a hooked wire to pull the Retaining Pin Spring (68) out of the end of the Drive Shaft (66) and remove the Socket Retaining Pin (67).
2. Using a hex wrench, remove the three Hammer Case Cap Screws (85) and Lock Washers (86). Lift the Hammer Case (82) off the Motor Housing (1) over the Drive Shaft. Remove the Hammer Case Gasket (80).
3. Lift the assembled mechanism off the Rotor (42).
4. Grasp the flats of the Housing (47) in vise jaws with the output end of the Drive Shaft downward.
5. Insert the pins of the Spanner Plug from the No. 700A–99 Tool Kit into two holes in the Housing Cap (49). Using a wrench on the plug, unscrew and remove the Housing Cap from the Housing. (Refer to Dwg. TPD1267).



(Dwg. TPD1267)

6. 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. TPD1268)



(Dwg. TPD1268)

NOTICE

In the following step, do not remove or turn the Shut–off Adjustment Screw (73) located in the Front Liner Cover (72). It is the Screw with the paint in the wrench opening.

7. Disassemble the components of the mechanism in the sequence shown in Drawing TPA1480 on Page X.

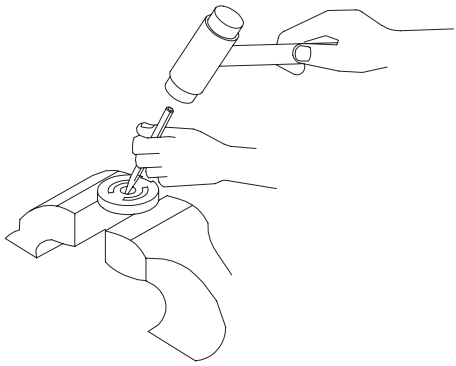
Disassembly of the Motor

1. Grasp the Motor Housing (1) in vise jaws with the Backcap (23) upward.
2. Using a hex wrench, remove the three Backcap Screws (36) and Lock Washers (37).
3. Lifting straight upward, remove the Backcap and assembled shut–off mechanism from the Motor Housing and also the Backcap Gasket (35). Set the assembled Backcap aside.
4. Remove the Housing from the vise jaws and insert a rod into the central opening in the output end of the rotor shaft.
5. While holding the motor end of the Housing above a piece of cardboard on the workbench, lightly tap the rod to remove the Rear End Plate Assembly (38), Rotor (42) and Vanes (43).
6. On the table of an arbor press, support the Rear End Plate with blocks as close to the Rotor as possible and press the Rotor out of the Rear End Plate and Rear Rotor Bearing (39).

NOTICE

In the following two steps, do not enlarge or damage the shaft hole in the End Plate.

7. 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. TPD1271)



(Dwg. TPD1271)

8. Using a longer drift punch through the Cylinder (41), tap the Front Rotor Bearing (45) out of the Front End Plate Assembly (44) in the same manner.
9. The Cylinder and Front End Plate are a shrink fit in the Motor Housing and parts that can be damaged during the heating process must be removed before heating the Housing.
10. Press the Reverse Lever Retaining Pin (21) out of the Reverse Lever (19) and pull the lever off the shaft of the Reverse Valve (15).
11. Using snap ring pliers, remove the Reverse Valve Retainer (18).
12. Grasp the shaft of the Reverse Valve with pliers, and pull the Reverse Valve, Reverse Valve Detent Ball (17) and Detent Spring (16) out of the Reverse Valve Bushing (14). Be careful not to lose the Ball and Spring.

13. Using a pin punch, tap the Throttle Retaining Pin (13) out of the Handle.
14. Grasp the Trigger (11) and pull the assembled throttle out of the Motor Housing.
15. Using a pin punch and without damaging the Trigger, remove the Trigger Pin (12).
16. Slide the Throttle Bushing Assembly (4) off the shaft of the Throttle Rod Assembly (8).
17. Using a thin blade screwdriver, remove the Valve Retaining Ring (10) and slide the Throttle Valve Assembly (6) off the shaft of the Throttle Valve Rod.
18. Using an adjustable wrench, unscrew and remove the Inlet Bushing (2) and Exhaust Deflector Assembly (22).
19. 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 End Plates and Cylinder snug with another nut and washer. Do not tighten the assembly excessively.

⚠ CAUTION

In the following step, take all precautions necessary to prevent being burned by handling warm or hot parts.

20. 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. Do not apply enough heat to distort the Housing.
21. To disassemble the shut–off mechanism, grasp the Backcap in copper–covered vise jaws with the Control Shaft Assembly (33) upward.
22. Using a spanner wrench, unscrew the Control Bushing Assembly (29) and carefully separate the components. Be doubly careful not to lose the three Control Bushing Balls (31) from the shaft of the Control Bushing.

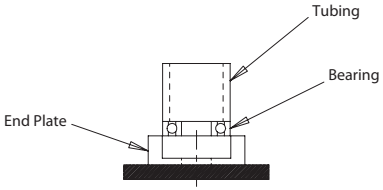
Assembly

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.

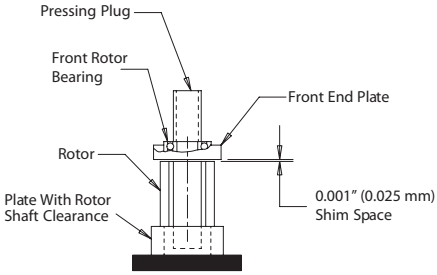
Assembly of the Motor

1. If the shut–off mechanism was disassembled, install the Control Shaft Seal (34) into the groove on the Control Shaft (33).
2. Insert the Control Shaft Spring (32) into the central opening at the large end of the Control Bushing (29) and insert the assembled Shaft, Seal end leading, into the opening. The end of the Shaft must be encircled by the Spring and the long groove must align with the three crossholes for the Control Bushing Balls (31).
3. Coat the Control Bushing Balls with **Ingersoll Rand** No.28 Grease and insert them into the crosshole openings.
4. Install the Control Valve Seal (28) on the Control Valve (27) and place the Control Plate (26), large open end leading, over the shaft of the Control Bushing.
5. Install the Backcap Front Spring (25) and the Control Valve Assembly, seal end leading, over the shaft of the Control Bushing. Install the Control Bushing Seal in annular groove around the bushing shaft.
6. Fit the Backcap Rear Spring (24) against the Control Valve and thread the entire assembly, spring end leading, into the Backcap (23). Using a spanner wrench, tighten the Control Bushing in the Backcap.
7. Using an arbor press and a piece of tubing that contacts the outer ring of the bearings, press the Front Rotor Bearing (45) into the Front End Plate (44) and the Rear Rotor Bearing (39) into the Rear End Plate (38).
   (Refer to Dwg. TPD1274)
8. Stand the Rotor (42) 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.



(Dwg. TPD1274)

9. Place a 0.001" (0.025 mm) 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. TPD1275)



(Dwg. TPD1275)

10. Coat each Vane (43) with a thin film of oil and insert a Vane into each of the rotor vane slots with the straight edge of the Vane outward.
11. Install the Cylinder (41) over the Vanes and Rotor making certain the End Plate Alignment Dowel (46) enters the notch in the end face of the Cylinder.
12. Stand the assembly on an arbor press table so that the rotor shaft on the front end plate end contacts the table. Press the Rear End Plate Assembly, bearing end trailing, onto the rotor shaft against the Cylinder. Make certain the End Plate Alignment Dowel (40) enters the notch in the end face of the Cylinder.
13. Stand the assembly on a table with the Front End Plate Assembly upward.

⚠ CAUTION

In the following step, take all precautions necessary to prevent being burned by handling warm or hot parts.

14. Using an induction coil or oven, heat the Motor Housing (1) until the motor opening is large enough to be placed over the Cylinder. At that time, install the Housing over the Cylinder and Front End Plate making sure the radial End Plate Alignment Pin in the Rear End Plate enters the notch in the Motor Housing.
15. Allow the assembly to cool and install the Backcap Gasket (35) and the assembled Backcap (23).
16. Secure the Backcap to the Housing by installing the three Backcap Mounting Screws (36) and Lock Washers (37). Tighten each Screw between 45 and 50 in–lb (5.1 and 5.6 Nm) torque.
17. Install the Exhaust Deflector (22) in the bottom of the handle of the Motor Housing and tighten it between 20 and 25 ft–lb (27 and 34 Nm) torque.
18. Thread the Inlet Bushing (2) into the bottom of the handle of the Motor Housing (1) and tighten it between 30 and 35 ft–lb (40 and 47 Nm) torque.
19. Install the Throttle Rod Seal (9) in the groove on the large hub of the Throttle Rod (8).
20. Install the Throttle Valve Seal (7) in the groove on the large hub of the Throttle Valve (6).
21. Slide the Throttle Valve, Valve Seal end first, onto the Throttle Valve Rod.
22. Secure the Throttle Valve Assembly by installing the Valve Retaining Ring (10) in the small groove on the Throttle Valve Rod.
23. Install the three Throttle Bushing Seals (5) in the grooves on the Throttle Bushing (4).
24. Slide the Throttle Bushing Assembly onto the shaft of the Throttle Valve Rod and position the Trigger (11) on the same shaft. Install the Trigger Pin (12).
25. 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 aligns with hole for the Throttle Retaining Pin (13). Install the Pin making certain it captures the Throttle Valve and secures the assembled Trigger.
26. Align the detent hole in the Reverse Valve (15) with the hole inside the Reverse Valve Bushing (14) and slide the Valve into the Bushing until almost reaching the detent hole. Insert the Reverse Valve Detent Spring (16) and Reverse Valve Detent Ball (17) into the hole and while compressing the Spring with the Ball, slide the Valve completely into the Bushing.
27. Using snap ring pliers, install the Reverse Valve Retainer (18).
28. Slide the Reverse Lever (19) onto the Reverse Valve, making certain the Reverse Lever Alignment Pin (21) enters the notch on the face of the Reverse Valve Bushing. Secure the Lever to the Valve by inserting the Reverse Lever Retaining Pin (20).

Assembly of the Impulse Mechanism

1. Insert the long shaft of the Piston Stop (58) into the central opening of the O–ring Installer furnished with the Tool Kit (Part No. 700A–99). Place the Piston Stop Seal (59) on the tapered end of the Installer and roll the Seal up the taper and into the groove on the large body of the Piston Stop. Install the Check Valve Front Seal (61) and Check Valve Rear Seal (62) on the Check Valve (60).
2. When looking inside the central opening of the Liner Assembly (55), 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 Torque Valve Piston (57). Install the Torque Valve Piston, large end trailing, into that opening.
3. Insert the Piston Spring (64) into hole in the end face of the opposite wall. Insert the Check Valve Piston (63), large end trailing, and the Check Valve Ball (65) into the same opening.
4. Thread the Threaded Tee Wrench furnished with the Tool Kit into the end of the Check Valve Assembly and using the Wrench to hold the Assembly, insert the Assembly into the opening against the Ball.
5. Unscrew the Wrench and screw it into the Piston Stop Assembly and using the Wrench to hold the Assembly, insert the Assembly into the opening against the Piston. Mark this opening with a felt marker to indicate that it contains the Torque Valve Piston.
6. Install the Sensor Seal Back–up O–ring (54) followed by the Sensor Seal (53) on one end of the Sensor (62) and insert the assembly, Seal end leading, into the central opening of the Rear Liner Cover (50). Make certain the assembly slides freely in the opening.
7. Install the Rear Liner Cover Seal (51) in the annular groove on the face of the Rear Liner Cover.
8. Install the two Front Liner Cover Piston Seals (78) in the openings on the face of the Front Liner Cover (71).
9. Install the Seal Back–Up Ring (77) followed by the Drive Shaft O–ring (76) in the central opening in the face of the Front Liner Cover.
10. Insert the short round hub of the Drive Shaft (66) into the central opening of the Rear Liner Cover.
11. Insert a Blade (69) into one slot in the Drive Shaft. Install the Blade Springs (70) 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.
12. 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, piston stop end trailing, over the Drive Shaft and against the Rear Liner Cover.

NOTICE

This 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.

13. Insert the hex 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.
14. Install the Front Liner Cover Assembly over the Drive Shaft and against the Liner. Make certain the Torque Adjustment Screw (72) aligns with the proper piston stop opening that was marked during assembly.
15. Install the two Liner Cover Seals (48) in the grooves inside the Liner Housing (47) near the end with the external wrench flats.
16. 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 (73) in the Front Liner Cover. Use the Pressing Sleeve from the Tool Kit to press the Housing over the Seals and into position. Do not Damage the Seals during installation.
17. Grasp the flats of the Liner Housing in vise jaws and using the Spanner Plug furnished with the Tool Kit and a torque wrench, install the Housing Cap, castellated end leading. This is a left–hand thread; rotate the wrench counterclockwise to tighten the Cap. Tighten the Cap on models 500PS3 and 700PS3 between 9.4 and 10.7 ft–lb (12.7 and 14.5 Nm) torque and on model 900PS4 between 10.7 and 12.1 ft–lb (12.7 and 16.4 Nm) torque.
18. Make certain the Drive Shaft rotates freely and then fill the mechanism with fluid and reassemble the tool as instructed in the section, CHANGING THE MECHANISM FLUID.

Related Documentation

For additional information refer to:
Product Safety Information Manual 04584983.
Product Information Manual 47133053.
Parts Information Manual 47135686.

Manuals can be downloaded from www.ingersollrandproducts.com

Notes:

www.ingersollrandproducts.com

Ingersoll Rand