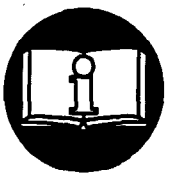
IMPULSE WRENCH

MODEL: PS087A-A5

NOTICE

Model PS087A-A5 Impulse Wrench is designed for assembly operations requiring high speed rundown of fasteners with consistent torque delivery and reduced torque reaction.

ARO is not responsible for customer modification of tools for applications on which ARO was not consulted.



⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.
IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

PLACING TOOL IN SERVICE

- Always operate, inspect and maintain this tool in accordance with all regulations (local, state, federal and country), that may apply to hand held/ hand operated pneumatic tools.
- For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 3/8" (10 mm) inside diameter air supply hose.
- 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.
- Do not use damaged, frayed or deteriorated air hoses and fittings.
- Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905-1 for a typical piping arrangement.
- Always use clean, dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool.
- Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Do not remove any labels. Replace any damaged label.

USING THE TOOL

- Always wear eye protection when operating or performing maintenance on this tool.
- Always wear hearing protection when operating this tool.
- Keep hands, loose clothing and long hair away from rotating end of tool.
- Note the position of the reversing lever before operating the tool so as to be aware of the direction of rotation when operating the throttle.
- Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.
- Keep body stance balanced and firm. Do not over-reach when operating this tool. High reaction torques can occur at or below the recommended air pressure.
- Tool shaft may continue to rotate briefly after throttle is released.
- Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.
- Use accessories recommended by ARO.
- Use only impact sockets and accessories. Do not use hand (chrome) sockets or accessories.
- Impact wrenches are not torque wrenches. Connections requiring specific torque must be checked with a torque meter after fitting with an impact wrench.
- This tool is not designed for working in explosive atmospheres.

NOTICE

The use of other than genuine ARO replacement parts may result in safety hazards, decreased tool performance, and increased maintenance, and may invalidate all warranties.
Repairs should be made only by authorized trained personnel. Consult your nearest ARO Tool Products Authorized Servicenter.

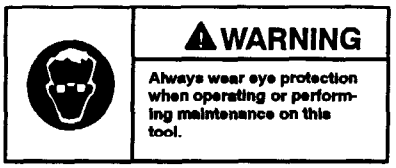
For parts and service information, contact your local ARO distributor, or the Customer Service Dept. of the Ingersoll-Rand Distribution Center, White House, TN at PH: (615) 672-0321, FAX: (615) 672-0601

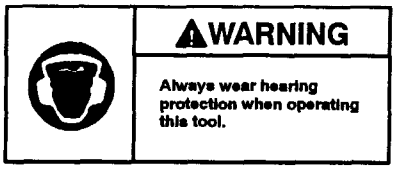
ARO Tool Products
Ingersoll-Rand Company
1725 U.S. No. 1 North, PO Box 8000, Southern Pines, NC 28388-8000

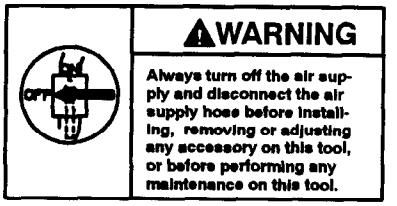
WARNING LABEL IDENTIFICATION

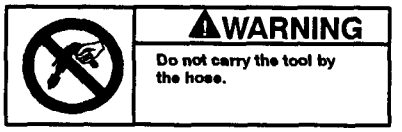
⚠ WARNING

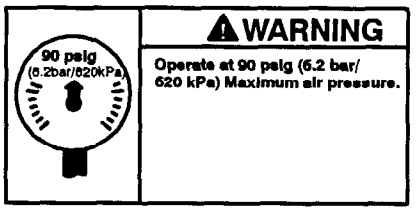
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.











ADJUSTMENTS

TORQUE ADJUSTMENT

To adjust the torque on these Twin Blade Impulse Wrenches, proceed as follows:

1. Remove the Adjustment Hole Plug.
2. Rotate the Drive Shaft until the Torque Adjustment Screw is visible in the opening.
3. Using a 1.5 mm hex wrench, rotate the Adjustment Screw clockwise to increase the torque output and counterclockwise to decrease the torque output. Do not rotate the Oil Plug.

NOTICE

Make all final adjustments at the job.

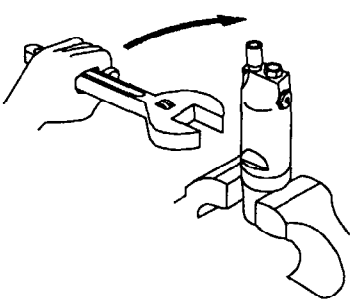
4. Replace the Adjustment Hole Plug.

CHANGING THE MECHANISM FLUID

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

1. Use a pointed probe to to push the Spring Seat against the Retaining Sleeve Spring. While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring. Lift the Spring Seat, Spring and Bit Retaining Sleeve off the Drive Shaft and remove the Bit Retaining Ball.
2. Using leather-covered or copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover with the output end of the Drive Shaft downward.
3. Using an adjustable wrench, unscrew the the Motor Housing Assembly from the Mechanism Cover. This is a **left-hand thread,** rotate the Motor Housing **clockwise** to remove it. See Dwg. TPD1292.

CLOCKWISE TO LOOSEN



(Dwg. TPD1292)

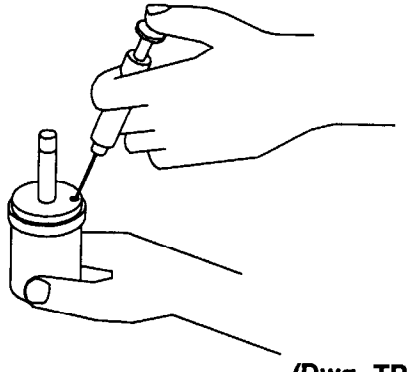
4. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover.
5. Using a 1.5 mm hex wrench, rotate the Torque Adjustment Screw clockwise until the Screw stops. Rotate the Screw counterclockwise until it stops or makes six complete revolutions.
6. Using the special Tee Wrench furnished in the Tool Kit (Part No. 180PQ-99), remove the Oil Plug and Oil Plug Seal.

ADJUSTMENTS

7. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
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. See Dwg. TPD1265.

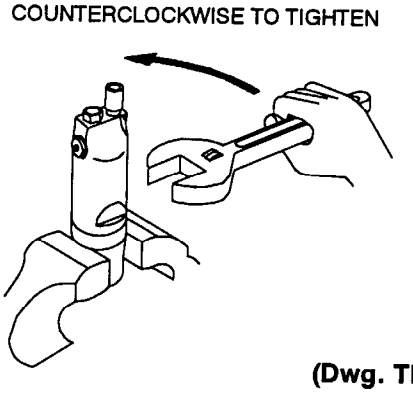
NOTICE

DO NOT SUBSTITUTE ANY OTHER FLUID. Failure to use the fluid provided could damage the tool, increase maintenance and decrease performance. Use only clean fluid in these tools.



(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. Thread the Oil Plug with the Oil Plug Seal into the mechanism until it is snug.
11. Using a 1.5 mm hex wrench, turn the Torque Adjustment Screw clockwise until it stops. This is the maximum torque position.
12. Wipe the outside of the mechanism dry and clean and remove the Oil Chamber Plug. Using the syringe, withdraw 0.4 cc of fluid.
13. Install the Oil Chamber Plug and tighten it between 20 and 25 in-lb (2.3 and 2.8 Nm) torque.
14. Insert the mechanism assembly, output end leading, into the Mechanism Cover clamped in the vise jaws.
15. Insert the hex end of the rotor shaft into the hex recess at the rear of the Drive Shaft and thread the assembled Motor Housing onto the Mechanism Cover. This is a **left-hand thread.** Rotate the Housing **counterclockwise** to tighten it. See Dwg. TPD1294.



(Dwg. TPD1294)

PLACING TOOL IN SERVICE

LUBRICATION

Ingersoll-Rand No. 50

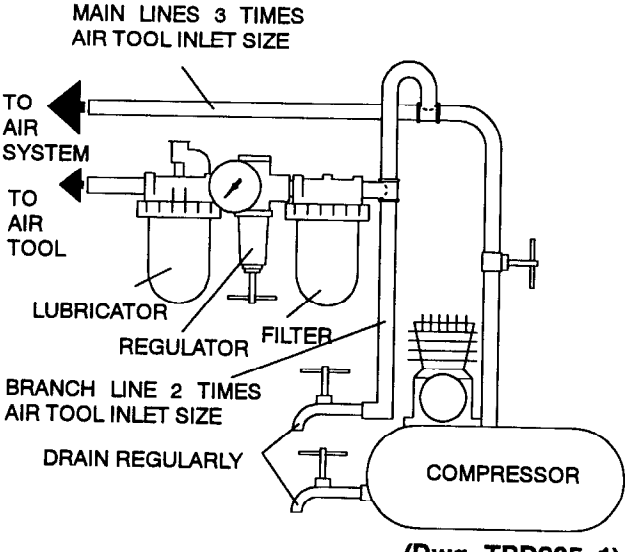
Ingersoll-Rand No. 67

Ingersoll-Rand Fluid Part No. EQ106S-400-1

Always use an air line lubricator with these tools. We recommend the following Filter-Lubricator-Regulator Unit:

USA - No. C22-04-G00
International - No. C16-C3-A29

After each 20 000 cycles, or as experience indicates, drain and refill the Impulse Unit Drive Assembly as instructed in this manual using the Fluid Replacement Kit (Part No. EQ106S-K400). Lubricate the hex drive and the output shaft before assembly.

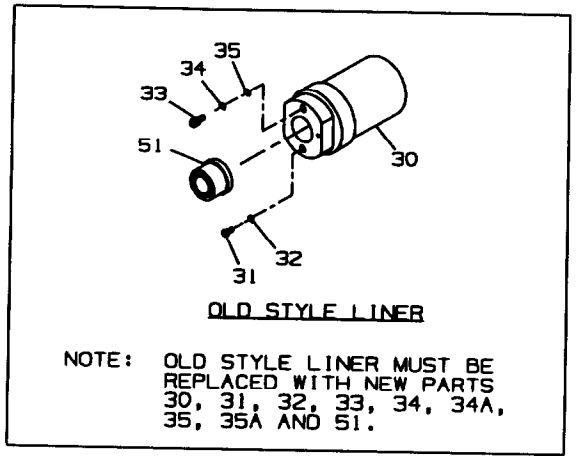


(Dwg. TPD905-1)

HOW TO ORDER AN IMPULSE WRENCH

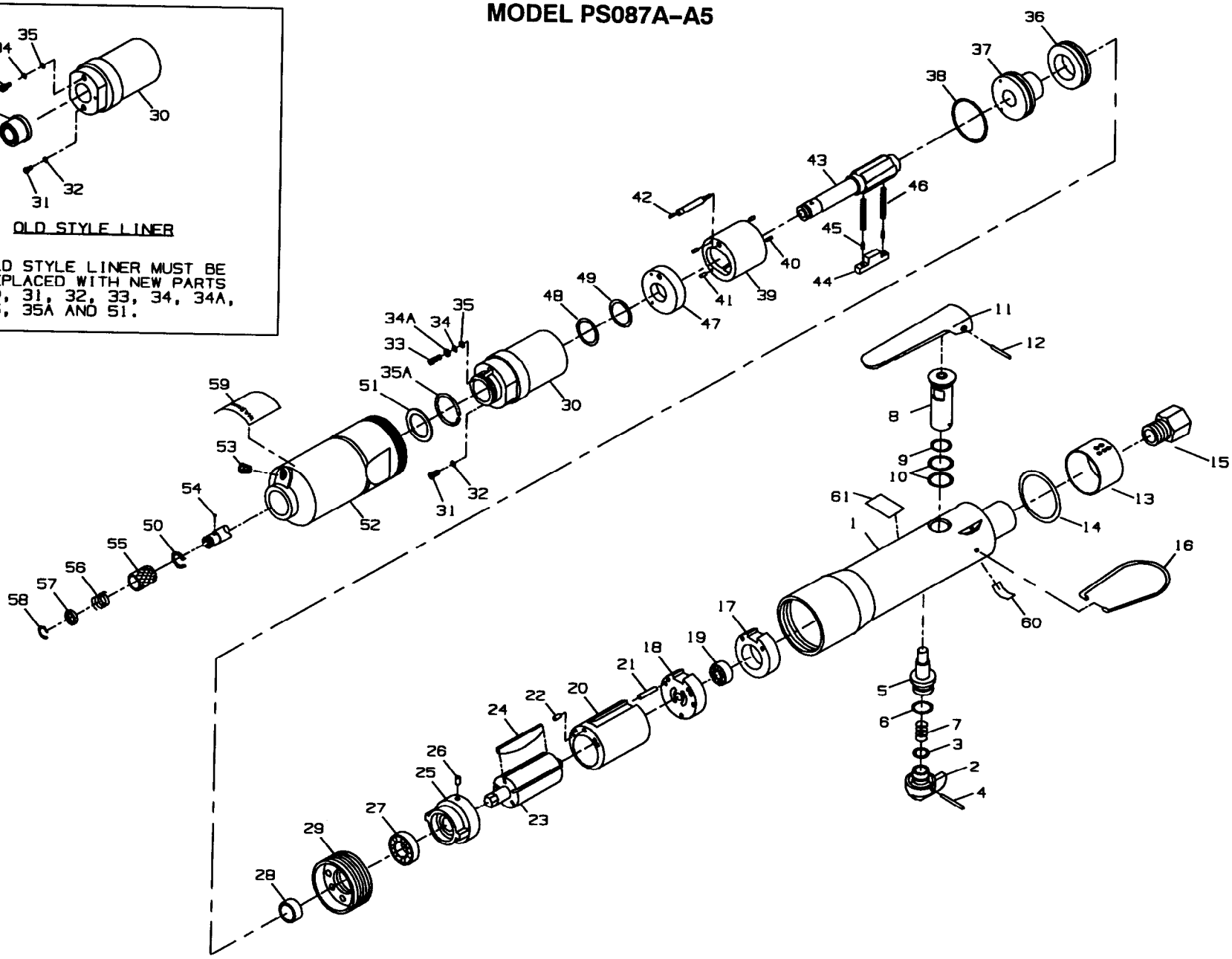
Model	Free Speed	Recommended Torque Range			
		Soft Draw		Hard Slam	
		ft-lb	Nm	ft-lb	Nm
PISTOL GRIP with 1/4" INSERT BIT CHUCK					
PS087A-A5	10 000	3-6	4-8	4-9	5-12

MODEL PS087A-A5



OLD STYLE LINER

NOTE: OLD STYLE LINER MUST BE REPLACED WITH NEW PARTS 30, 31, 32, 33, 34, 34A, 35, 35A AND 51.



(Dwg. TPA1610)

			PART NUMBER FOR ORDERING
		Motor Housing Assembly	100SQ-A40
	1	Motor Housing	100SQ-40
	2	Reverse Lever	100SQ-328
♦	3	Reverse Lever Seal	EQ104S-119
	4	Reverse Lever Retaining Pin	EQ106S-152
	5	Throttle Rod Assembly	100SQ-A302
	6	Throttle Rod Seal	EQ208S-238
	7	Throttle Rod Spring	100SQ-219
	8	Reverse Valve Assembly	100SQ-A329
	9	Reverse Valve Seal	100SQ-289
♦	10	Reverse Bushing Seal (2)	180SQ-289
	11	Throttle Lever	100SQ-273
	12	Lever Retaining Pin	100SQ-152
	13	Exhaust Deflector	100SQ-310
♦	14	Exhaust Deflector Seal	100SQ-238
	15	Inlet Bushing	EQ106S-565
	16	Hanger	EQ106S-365
	17	Rear End Plate Spacer	100SQ-41
	18	Rear End Plate Assembly	100SQ-A12
♦	19	Rear Rotor Bearing	500A-22
	20	Cylinder Assembly	100SQ-A3
	21	Rear End Plate Dowel	100SQ-299
	22	Front End Plate Dowel	500A-299
	23	Rotor	100SQ-53
♦	24	Vane Packet (set of 5 Vanes)	100SQ-42-5

			PART NUMBER FOR ORDERING
	25	Front End Plate Assembly	100SQ-A11
	26	End Plate Alignment Pin	100PQ-298
♦	27	Front Rotor Bearing	500A-22
	28	Dust Washer	100SQ-229
	29	Front End Plate Spacer	100PQ-41
		Impulse Unit Drive Assembly	
		for old style units	100PQ-A200
		for new style units	100PQ-A200A
	30	Liner Housing	
		for old style units	100PQ-31
		for new style units	100PQ-31A
	31	Oil Plug	180PQ-277
+	32	Oil Plug Seal	EQ110P-288
	33	Torque Adjustment Bolt Assembly	100PQ-A230A
+	34	Adjustment Bolt Seal	EQ106S-288
	34A	Seal Washer (for new style units only)	04351631
+	35	Seal Back-up Ring	380SQ-272
	35A	Adjustment Bolt Stop Ring (for new style units only)	04351623
	36	Housing Cap	100PQ-207
	37	Rear Liner Cover Assembly	100PQ-A212
+	38	Rear Liner Cover O-ring	100PQ-236

♦ Indicates Tune-up Kit part.

\+ Indicates Mechanism Tune-up Kit part.

		PART NUMBER FOR ORDERING
	39	Liner Assembly 100PQ-A203
	40	Liner Rear Pin (2) 180PQ-298
	41	Liner Front Pin (2) 100SQ-298
	42	Relief Valve 100PQ-222
	43	Drive Shaft 100PQ-626
	44	Blade Assembly 100PQ-A627
	45	Blade Spring Pin (2) 100PQ-120
+	46	Blade Spring (2) 100PQ-569
	47	Front Liner Cover Assembly 100PQ-A211
+	48	Drive Shaft Seal 100PQ-237
+	49	Seal Back-up Ring 100PQ-272
	50	Retaining Sleeve Spring Stop 100PQ-303
	51	Mechanism Cover Spacer
		for old style units 100PQ-274
		for new style units 04351656
		Mechanism Cover Assembly 100PQ-A727
	52	Mechanism Cover 100PQ-727
	53	Adjustment Hole Plug 100PQ-95
		Bit Chuck Assembly 180PQ-A667
	54	Bit Retaining Ball EQ104S-929
	55	Bit Retaining Sleeve EQ104S-930
	56	Retaining Sleeve Spring EQ104S-931
	57	Spring Seat EQ104S-932
	58	Retaining Ring EQ104S-933

		PART NUMBER FOR ORDERING
	59	Warning Label WARNING-2-99
	60	Oil Daily Label 500P-69
	61	Nameplate PS087A-A5-301
*		Fluid Replacement Kit (includes Fluid Syringe, Fill Tube and4 oz. [31 mL] of Replacement Fluid) EQ106S-K400
*		Replacement Fluid (4 oz.) EQ106S-400-1
*		Replacement Fluid (1 gal.) EQ106S-BF400-1
*		Motor Tune-up kit (includes illustrated items 3, 10[2], 14, 19, 24, and 27) 100SQ-K500
*		Mechanism Tune-up Kit (includes illustrated items 32, 34, 35, 38, 46[2], 48 and 49) 100PQ-K600
*		Repair Tool Kit (includes all the specialized tooling required to repair these tools and consists of two Spanner Plugs, a Tee Wrench with a special tip, an O-ring Installer Fixture and a pressing fixture that has a Disassembly Arbor and Pressing Sleeve) 100PQ-99

* Not illustrated.

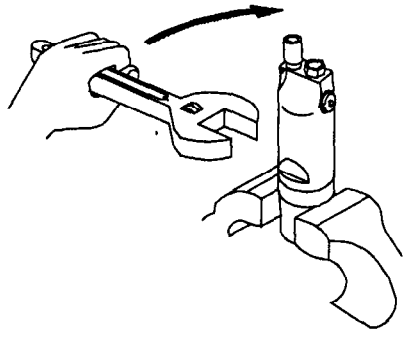
\+ Indicates Mechanism Tune-up Kit part.

– CHANGING THE MECHANISM FLUID —

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

1. Use a pointed probe to push the Spring Seat (57) against the Retaining Sleeve Spring (56). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (58). Lift the Spring Seat, Spring and Bit Retaining Sleeve (55) off the Drive Shaft (43) and remove the Bit Retaining Ball (54).
2. Using snap ring pliers, remove the Retaining Sleeve Spring Stop (50) from the Drive Shaft.
3. Using copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover (52) with the output end of the Drive Shaft downward.
4. Using an adjustable wrench, unscrew the Motor Housing Assembly (1) from the Mechanism Cover. This is a **left-hand thread**, rotate the Motor Housing **clockwise** to remove it. (Refer to Dwg. TPD1292.)

CLOCKWISE TO LOOSEN

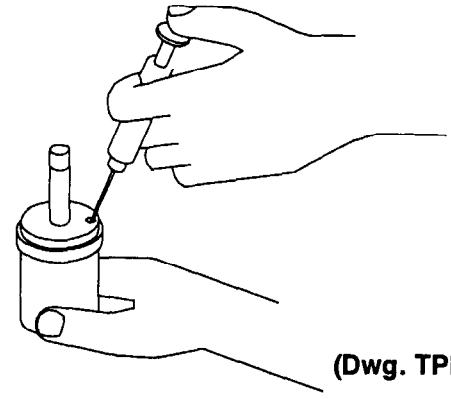


(Dwg. TPD1292)

5. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover.
6. Using a 1.5 mm hex wrench, rotate the Torque Adjustment Bolt (33) clockwise until the Bolt stops. Rotate the Bolt counterclockwise until it stops in new style Liner Housings. Do not rotate the Bolt more than 3-1/2 turns counterclockwise in old style Liner Housings or the Bolt will fall out of the Housing.
7. Using the special Tee Wrench furnished in the Tool Kit (Part No. 100PQ-99), remove the Oil Plug (31) and Oil Plug Seal (32).
8. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
9. Using the syringe and fluid from the Fluid Replacement Kit (Part No. EQ106S-K400), fill the mechanism with the fluid furnished in the Kit. (Refer to Dwg. TPD1265.)

NOTICE

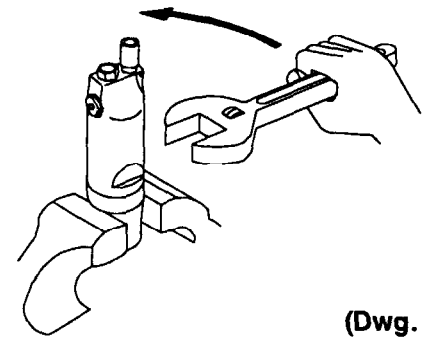
DO NOT SUBSTITUTE ANY OTHER FLUID. Failure to use the fluid provided could damage the tool, increase maintenance and decrease performance. Use only clean fluid in these tools.



(Dwg. TPD1265)

10. 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.
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 .25 cc of fluid.
14. Install the Oil Chamber Plug and tighten it between 20 and 25 in-lb (2.3 and 2.8 Nm) torque.
15. Insert the mechanism assembly, output end leading, into the Mechanism Cover clamped in the vise jaws.
16. Insert the hex end of the rotor shaft into the hex recess at the rear of the Drive Shaft and thread the assembled Motor Housing onto the Mechanism Cover. This is a **left-hand thread**. Rotate the Housing **counterclockwise** to tighten it. (Refer to Dwg. TPD1294.)

COUNTERCLOCKWISE TO TIGHTEN



(Dwg. TPD1294)

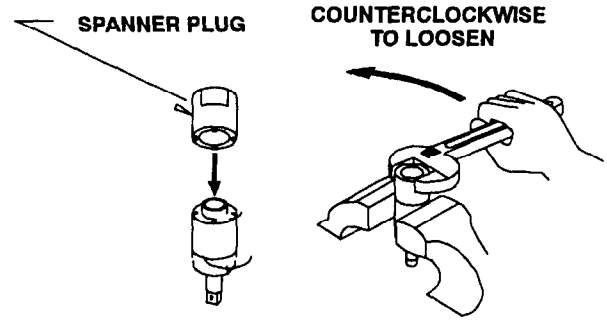
DISASSEMBLY

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

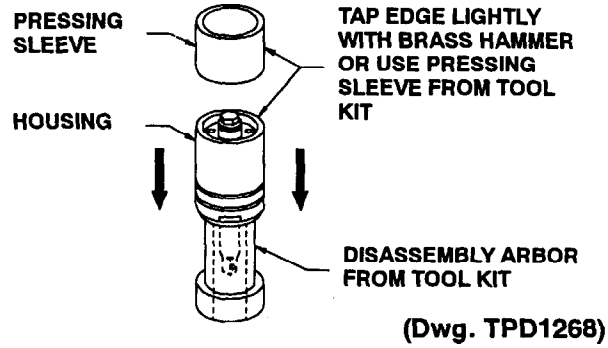
Disassembly of the Impulse Mechanism

1. Use a pointed probe to push the Spring Seat (57) against the Retaining Sleeve Spring (56). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (58). Lift the Spring Seat, Spring and Bit Retaining Sleeve (55) off the Drive Shaft (43) and remove the Bit Retaining Ball (54).
2. Using snap ring pliers, remove the Retaining Sleeve Spring Stop (50) from the Drive Shaft.
3. Using copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover (52) with the output end of the Drive Shaft downward.
4. Using an adjustable wrench, unscrew the Motor Housing Assembly (1) from the Mechanism Cover. This is a **left-hand thread**, rotate the Motor Housing **clockwise** to remove it. (Refer to Dwg. TPD1264.)
5. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover. Remove the Mechanism Cover Spacer (51).
6. Using a 1.5 mm hex wrench, rotate the Torque Adjustment Bolt (33) clockwise until the Screw stops. Rotate the Bolt counterclockwise until it stops in new style Liner Housings. Do not rotate the Bolt more than 3-1/2 turns counterclockwise in old style Liner Housings or the Bolt will fall out of the Housing.
7. Using the special Tee Wrench furnished in the Tool Kit (Part No. 100PQ-99), remove the Oil Plug (31) and Oil Plug Seal (32).
8. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
9. Grasp the flats of the Liner Housing (30) in vise jaws with the output end of the Drive Shaft downward.
10. Insert the pins of the spanner plug from the No. 100PQ-99 Tool Kit into the two holes in the Housing Cap (36). Using a wrench on the plug, unscrew and remove the Housing Cap from the Housing Assembly. (Refer to Dwg. TPD1267.)



(Dwg. TPD1267)

11. 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.)

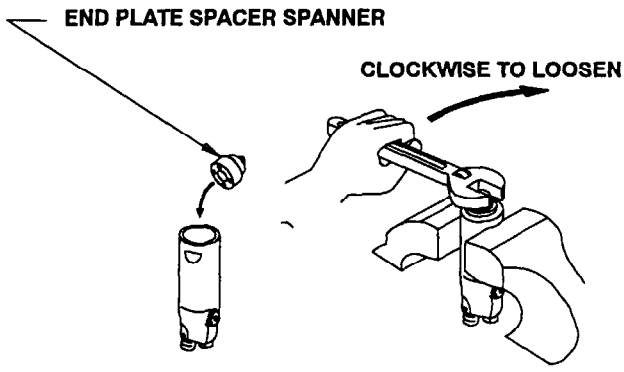


(Dwg. TPD1268)

12. Disassemble the components of the mechanism in the sequence shown in Drawing TPA1610 on Page 5.

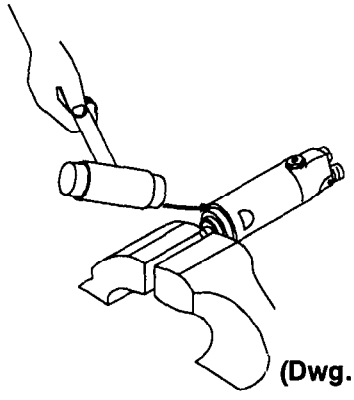
Disassembly of the Motor

1. Grasp the Motor Housing (1) in vise jaws with the shaft of the Rotor (23) upward.
2. Insert the pins of the end plate spacer spanner into the holes in the Front End Plate Spacer (29). 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) Remove the Dust Washer (28).



(Dwg. TPD1297)

3. Reposition the Motor Housing in the vise jaws so that the vise jaws grip the end of the rotor shaft and the handle grip of the Housing is downward. Tap the edges of the Housing surrounding the motor bore with a plastic hammer to separate the Housing from the motor. (Refer to Dwg. TPD1298.)



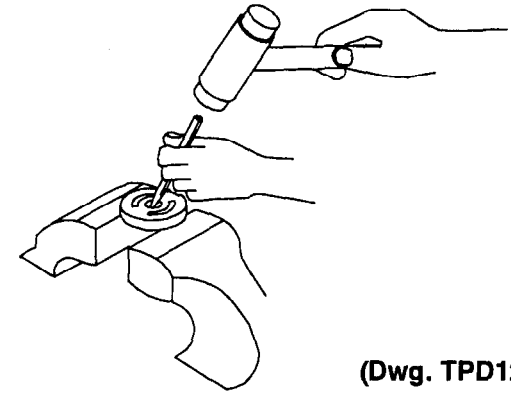
(Dwg. TPD1298)

4. Remove the motor from the vise jaws and remove the Front End Plate (25), Front Rotor Bearing (27), Cylinder Assembly (20) and Vanes (24) from the Rotor.
5. Remove the Rear End Plate Spacer (17) from the Motor Housing or the Rear End Plate (18).
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 (19).

NOTICE

In the following step, do not enlarge or damage the shaft hole in the End Plate when removing the Bearing.

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 an adjustable wrench, unscrew and remove the Inlet Bushing (15). Remove the Exhaust Deflector (13) and Exhaust Deflector Seal (14).
9. Using a pin punch and without damaging the Reverse Lever (2), remove the Reverse Lever Retaining Pin (4) and separate the Lever from the Reverse Valve Assembly (8). Remove the Reverse Valve Seal (9) from the Lever.
10. Remove the Throttle Rod Assembly (5) and Throttle Rod Spring (7) from the Reverse Valve Assembly (8).
11. Using a pin punch, tap the Lever Retaining Pin (12) out of the Throttle Lever (11) and Housing and remove the Lever.
12. Push the Reverse Valve Assembly out the lever side of the Housing.

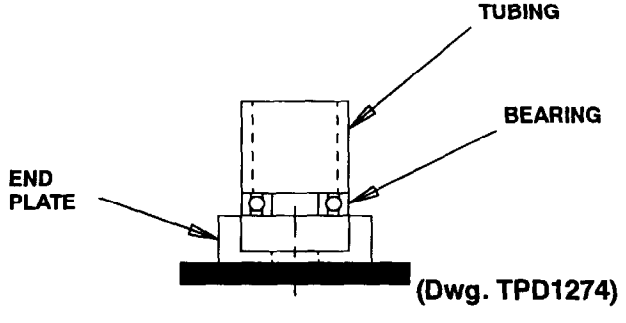
ASSEMBLY

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. 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. 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.

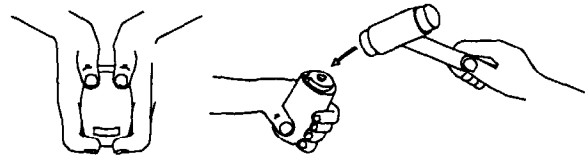
Assembly of the Motor

1. If the two Reverse Valve Bushing Seals (10) were removed from the reverse valve bushing, install new Seals inside the bushing.
2. Install a new Reverse Valve Seal (9) on the Reverse Valve (8).
3. Being careful not the cut or nick the Seals, insert the Reverse Valve, large hub trailing, into the Motor Housing (1) from the lever side of the Housing. Make certain the hole for the Reverse Lever Retaining Pin (4) and the valve porting are properly aligned.
4. Position the Throttle Lever (11) on the Housing and secure it by pressing the Lever Retaining Pin (12) through the Housing and Lever.
5. Install the Throttle Rod Seal (6) in the groove on the large hub of the Throttle Rod (5).
6. Install the Reverse Lever Seal (3) on the hub of the Reverse Lever (2).
7. Insert the Throttle Rod Assembly, small end leading, into the Reverse Valve Assembly followed by the Throttle Rod Spring (7) and assembled Reverse Lever.
8. Align the hole in the Reverse Lever with the hole in the Reverse Valve and install the Reverse Lever Retaining Pin in the aligned holes.
9. Place the Exhaust Deflector Seal (14) on the inlet and of the Motor Housing followed by the Exhaust Deflector.
10. Thread the Inlet Bushing (15) into the small hub the Housing and, after rotating the Deflector to the desired position, tighten the Inlet Bushing between 30 and 35 ft-lb (40 and 47 Nm) torque.
11. Using an arbor press and a piece of tubing that contacts the outer ring of the bearings, press the Front End Plate Bearing (27) into the Front End Plate (25) and the Rear End Plate Bearing (19) into the Rear End Plate (18). (Refer to Dwg. TPD1274.)

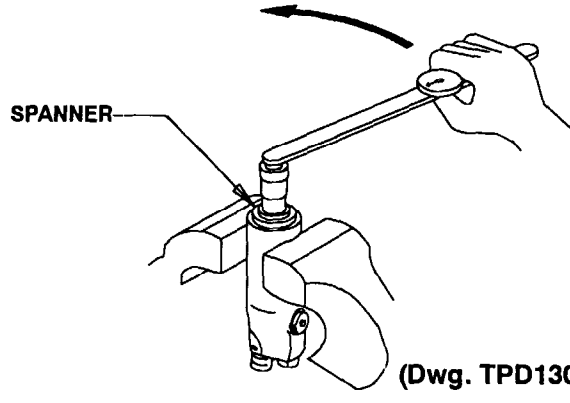


(Dwg. TPD1274)

12. Stand the Rotor (25) 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 downward.
13. 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 Rear Rotor Bearing and Rear End Plate, End Plate leading, onto the shaft of the Rotor until the End Plate contacts the shim. Remove the shim.
14. Coat each Vane (24) 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.
15. Install the Cylinder (20) over the Vanes and Rotor with the end of the Cylinder having the two holes in straight alignment nearest the end face positioned away from the Rear End Plate. Make certain the End Plate Dowel (24) enters the hole in the face of the Rear End Plate and not the porting slot.
16. Place the Front End Plate and Bearing against the face of the Cylinder, Bearing end trailing. Make certain the End Plate Dowel in that end of the cylinder enters the hole in the End Plate and not the porting slot.
17. Place the Rear End Plate Spacer (17) against the Rear End Plate making certain that the Rear End Plate Dowel enters the hole in the Spacer and the external slots align.
18. Insert the assembled motor, Rear End Plate leading, into the Motor Housing making sure the End Plate Alignment Pin (26) enters the proper notch in the Housing. It may be necessary to tap the assembly into position with a brass or plastic hammer. (Refer to Dwg. TPD1279.)


(Dwg. TPD1279)

19. Grasp the handle of the Motor Housing in vise jaws with the rotor shaft upward. Thread the Front End Plate Spacer (29) into the Housing and using the end plate spacer spanner, tighten the Spacer to 33 ft-lb (45 Nm) torque. This is a **left-hand thread;** rotate the wrench **counterclockwise** to tighten (Refer to Dwg. TPD1304.)

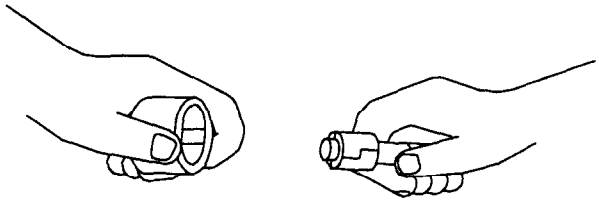


(Dwg. TPD1304)

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.
21. When the motor rotates freely, install the Dust Washer (28) on the rotor shaft and slide it downward against the Front Rotor Bearing.

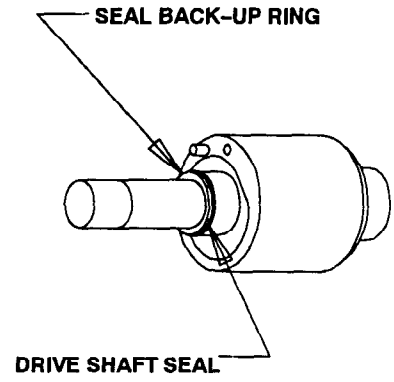
Assembly of the Impulse Mechanism

1. Install the Rear Liner Cover O-ring (38) in the annular groove around the Rear Liner Cover (37).
2. Insert the Relief Valve (42) into the Liner (39).
3. Place a Blade Spring (46) into each hole in one of the slots of the Drive Shaft (43).
4. Place the Blade (44) against the Springs so that each Spring encircles a Blade Spring Pin (45).
5. Compress the Springs with the Blade until the Blade is flush with the Drive Shaft and install the assembly in the Liner with the output end of the Drive Shaft protruding out the end of the Liner containing the Relief Valve. (Refer to Dwg. TPD1284.) Make certain the ends of the Blade are flush with the ends of the Liner.



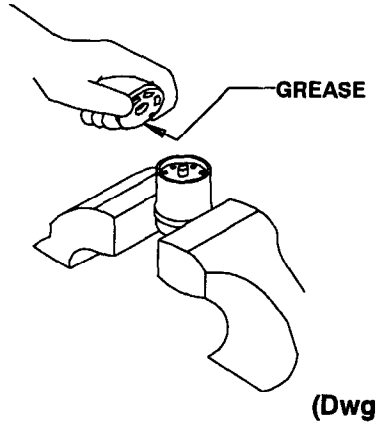
(Dwg. TPD1284)

6. Place the Rear Liner Cover Assembly against the motor end of the Liner making sure that the two Liner Rear Pins (40) enter the holes in the Cover and the rear hub of the Drive Shaft enters the central opening of the Cover.
7. Install the Front Liner Cover Assembly (47) over the Drive Shaft against the spindle end of the Liner making sure that the two Liner Front Pins (41) enter the holes in the Cover and the Relief Valve aligns with the opening in the Cover.
8. Install the Drive Shaft Seal (48) followed by the Seal Back-up Ring (49) on the Drive Shaft against the hub. (Refer to Dwg. TPD1285.)



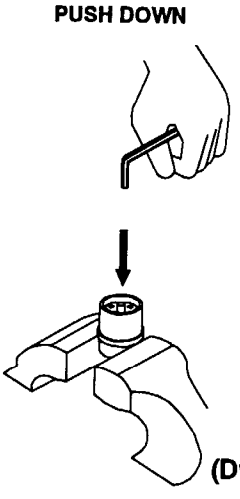
(Dwg. TPD1285)

9. Install the assembled Liner and Covers in the Liner Housing (30) making certain that the Relief Valve is in alignment with the opening for the Torque Adjustment Bolt (33).
10. Install the Adjustment Bolt Seal (34) followed by the Seal Washer (34A) and Seal Back-up Ring (35) on the Torque Adjustment Bolt and thread the assembled Bolt into the Liner Housing.
11. Install the Adjustment Bolt Stop Ring (35A) in the groove of the Liner Housing to keep the Bolt Assembly from backing out.
12. Install the Oil Plug (31) and Oil Plug Seal (32) in the liner housing hole 180 degrees from the Torque Adjustment Bolt.
13. Grasp the flats of the Housing in vise jaws with the output spindle downward. Remove the Rear Liner Cover Assembly and put grease in the central opening of the Cover. (Refer to Dwg. TPD1289.)



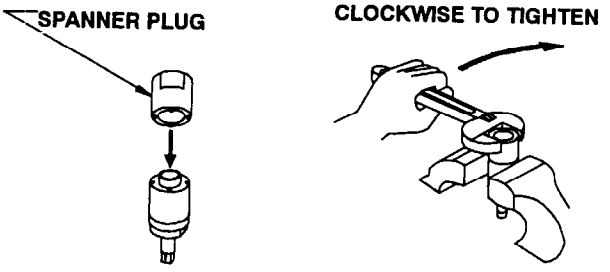
(Dwg. TPD1289)

14. Reinstall the Cover Assembly and use a hex wrench to push it below the threads at the rear of the Housing. (Refer to Dwg. TPD1290.)



(Dwg. TPD1290)

15. Install the Housing Cap (36) and using the spanner plug furnished in the Tool Kit, tighten the Cap between 58 and 65 ft-lb (78 and 88 Nm) torque. (Refer to Dwg. TPD1291.)



(Dwg. TPD1291)

16. Make certain the Drive Shaft rotates freely. Install the Mechanism Cover Spacer (51) and then fill the mechanism with fluid and reassemble the tool as instructed in the section, **CHANGING THE MECHANISM FLUID**.