

IMPULSE WRENCH

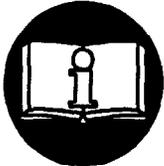
MODEL: PG087A-A5

NOTICE

Model PG087A-A5 Impulse Wrench is designed for assembly operations which require 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

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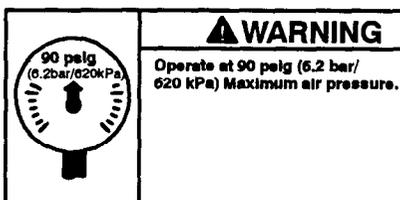
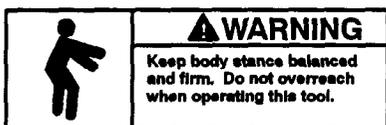
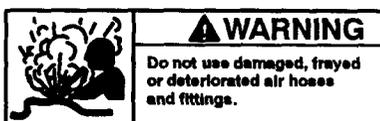
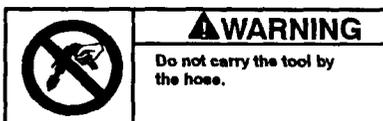
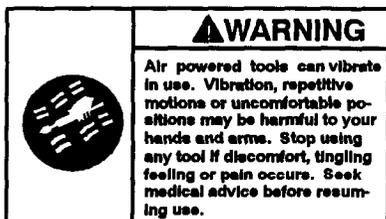
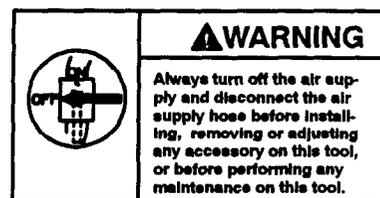
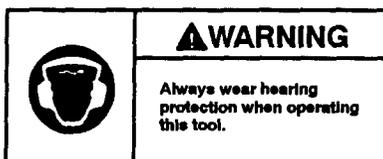
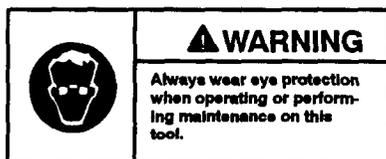
ARO

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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.

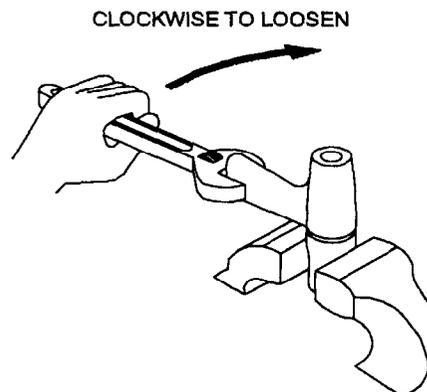
4. Replace the Adjustment Hole Plug.

CHANGING THE MECHANISM FLUID

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

1. Use a pointed probe to 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 snap ring pliers, remove the Retaining Sleeve Spring Stop from the Drive Shaft.
3. Remove the Rubber Housing Boot.
4. Using copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover with the output end of the Drive Shaft downward.
5. Using an adjustable wrench, unscrew the Motor Housing Assembly from the Mechanism Cover. This is a **left-hand thread**, rotate the Motor Housing clockwise to remove it. See Dwg. TPD1264.



(Dwg. TPD1264)

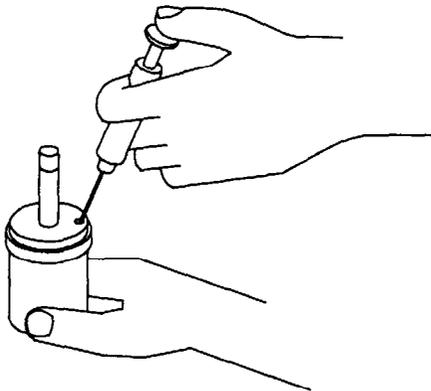
6. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover.

ADJUSTMENTS

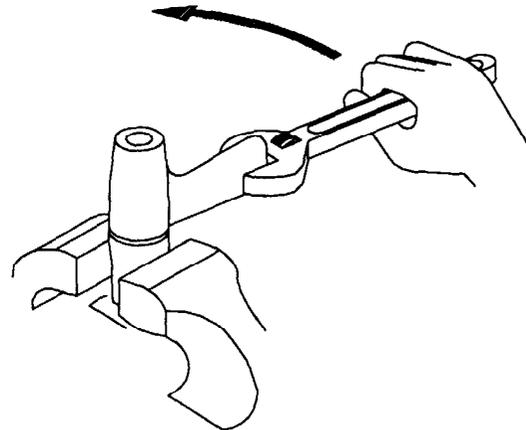
- Using a 1.5 mm hex wrench, rotate the Torque Adjustment Screw clockwise until the Screw stops. Rotate the Screw counterclockwise until it stops or makes six complete revolutions.
- Using the special Tec Wrench furnished in the Tool Kit (Part No. 100PQ-99), remove the Oil Plug and Oil Plug Seal.
- With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
- 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.
- 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.
- Thread the Oil Plug with the Oil Plug Seal into the mechanism until it is snug.
- Using a 1.5 mm hex wrench, turn the Torque Adjustment Screw clockwise until it stops. This is the maximum torque position.
- Wipe the outside of the mechanism dry and clean and remove the Oil Chamber Plug. Using the syringe, withdraw 0.25 cc of fluid.
- Install the Oil Chamber Plug and tighten it between 20 and 25 in-lb (2.3 and 2.8 Nm) torque.
- Insert the mechanism assembly, output end leading, into the Mechanism Cover clamped in the vise jaws.
- 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. TPD1266.

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)



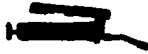
(Dwg. TPD1266)

PLACING TOOL IN SERVICE

LUBRICATION



Ingersoll-Rand No. 50



Ingersoll-Rand No. 67

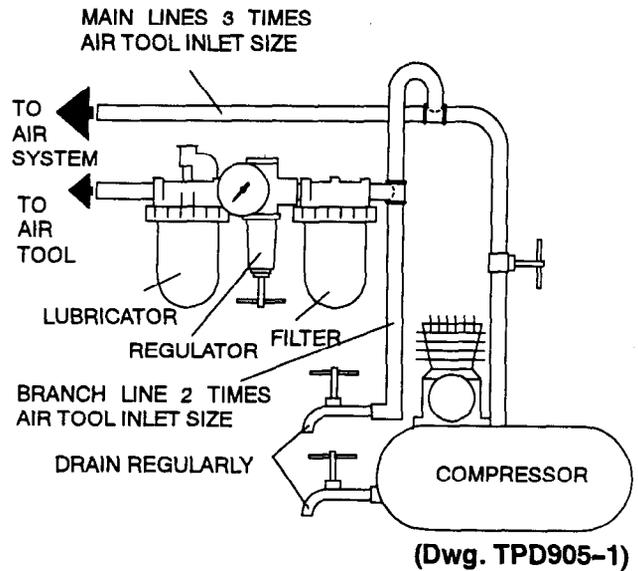
Ingersoll-Rand Fluid Part
No. EQ106S-400-1

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

For 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.

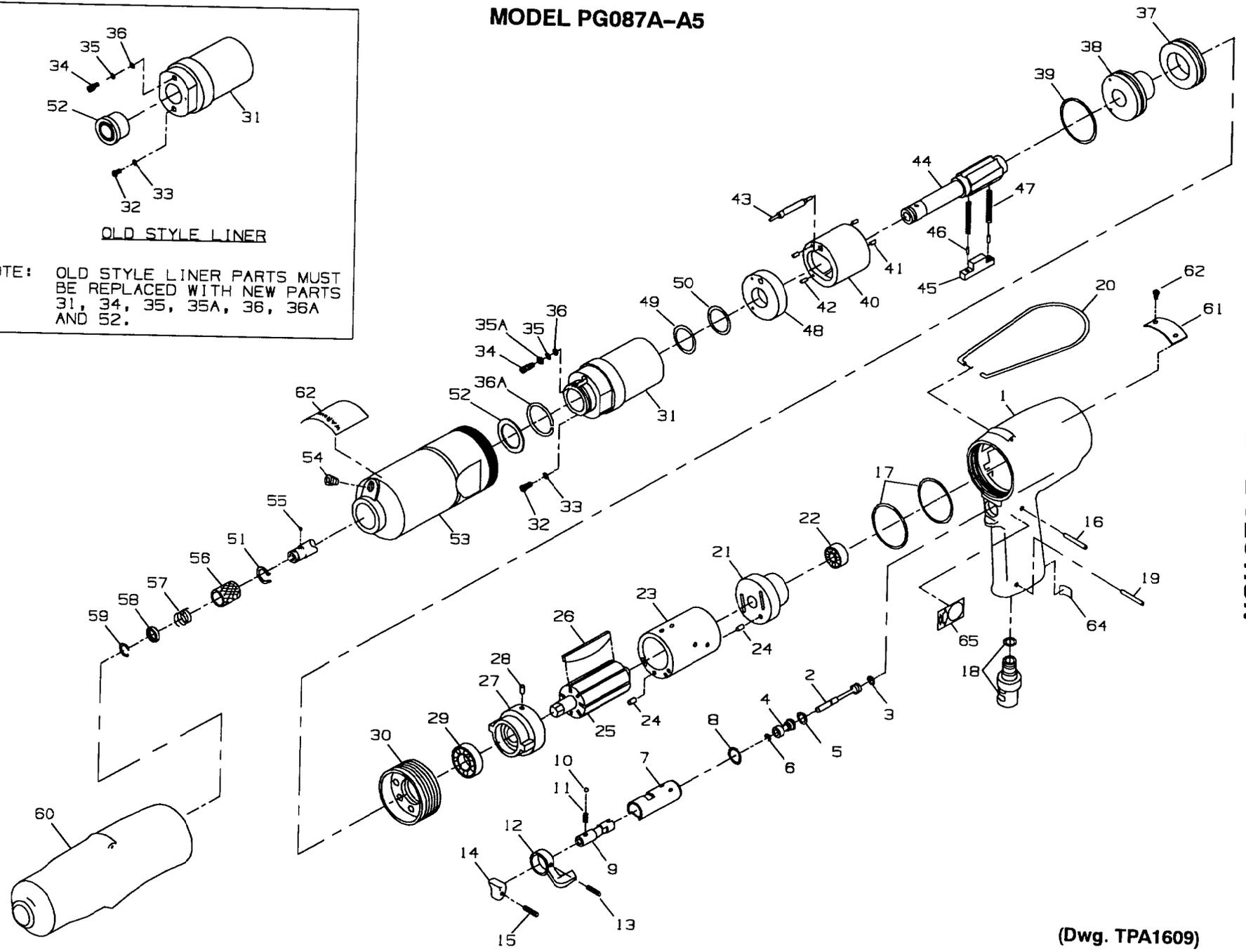
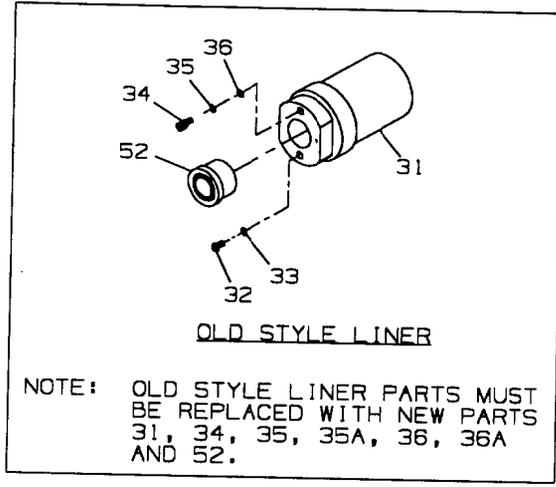


HOW TO ORDER AN IMPULSE WRENCH

PISTOL GRIP with 1/4" INSERT BIT CHUCK

Model	Free Speed	Recommended Torque Range			
		Soft Draw		Hard Slam	
		ft-lb	Nm	ft-lb	Nm
PG087A-A5	9 300	3-6	4-8	3-8	4-11

MODEL PG087A-A5



MAINTENANCE SECTION

(Dwg. TPA1609)

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

	Motor Housing Assembly	100PQ-A40		Impulse Unit Drive Assembly	
1	Motor Housing	100PQ-40		for old style units	100PQ-A200
2	Throttle Rod Assembly	EQ112P-A302		for new style units	100PQ-A200A
3	Throttle Rod Seal	EQ106P-288	31	Liner Housing	
4	Throttle Valve Assembly	EQ106P-A304		for old style units	100PQ-31
5	Throttle Valve Seal	100PQ-288		for new style units	100PQ-31A
6	Throttle Valve Retainer	EQ106P-303	32	Oil Plug	180PQ-277
7	Throttle Bushing Assembly	100PQ-A503	+ 33	Oil Plug Seal	EQ110P-288
8	Throttle Bushing Seal	EQ106P-283	34	Torque Adjustment Bolt Assembly	100PQ-A230A
9	Reverse Valve	100PQ-329	35	Adjustment Bolt Seal	EQ106S-288
10	Reverse Valve Detent Ball	EQ104S-929	35A	Seal Washer	04351631
11	Reverse Valve Detent Spring	100PQ-568	36	Seal Back-up Ring	380SQ-272
12	Reverse Lever	100PQ-328	36A	Adjustment Bolt Stop Ring (for new	
13	Reverse Lever Retaining Pin	180SQ-152		style units only)	04351623
14	Trigger	EQ106P-93	37	Housing Cap	100PQ-207
15	Trigger Retaining Pin	EQ106P-265	38	Rear Liner Cover Assembly	100PQ-A212
16	Throttle Retaining Pin	100PQ-297	+ 39	Rear Liner Cover O-ring	100PQ-236
◆ 17	Rear Motor Seal (2)	380PQ-236	40	Liner Assembly	100PQ-A203
18	Exhaust Deflector Assembly	180PQ-A23	41	Liner Rear Pin (2)	180PQ-298
19	Deflector Retaining Pin	EQ106P-152	42	Liner Front Pin (2)	100SQ-298
20	Hanger	EQ106S-365	43	Relief Valve	100PQ-222
21	Rear End Plate Assembly	100PQ-A12	44	Drive Shaft	100PQ-626
◆ 22	Rear Rotor Bearing	100PQ-22	45	Blade Assembly	100PQ-A627
23	Cylinder Assembly	100PQ-A3	46	Blade Spring Pin (2)	100PQ-120
24	End Plate Dowel (2)	100PQ-298			
25	Rotor	100PQ-53			
◆ 26	Vane Packet (set of 7 Vanes)	100PQ-42-7			
27	Front End Plate Assembly	100PQ-A11			
28	End Plate Alignment Pin	100PQ-298			
◆ 29	Front Rotor Bearing	500A-22			
30	Front End Plate Spacer	100PQ-41			

◆ Indicates Motor Tune-up Kit part.

+ Indicates Mechanism Tune-up Kit part.

MAINTENANCE SECTION

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

+ 47	Blade Spring (2)	100PQ-569	64	Oil Daily Label	500P-69
48	Front Liner Cover Assembly	100PQ-A211	65	Two Speed Trigger Label	180PQ-68
+ 49	Drive Shaft Seal	100PQ-237	*	Fluid Replacement Kit (includes Fluid Syringe, Fill Tube and 4 oz. [31 mL] of Replacement Fluid)	EQ106S-K400
+ 50	Seal Back-up Ring	100PQ-272	*	Replacement Fluid (4 oz.)	EQ106S-400-1
51	Retaining Sleeve Spring Stop	100PQ-303	*	Replacement Fluid (1 gal.)	EQ106S-BF400-1
52	Mechanism Cover Spacer for old style units	100PQ-274	*	Motor Tune-up kit (includes illustrated items 17 [2], 22, 26 and 29)	100PQ-K500
	for new style units	04351656	*	Mechanism Tune-up Kit (includes illustrated items 33, 35, 36, 39, 47 [2], 49 and 50)	100PQ-K600
	Mechanism Cover Assembly	100PQ-A727	*	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
53	Mechanism Cover	100PQ-727			
54	Adjustment Hole Plug	100PQ-95			
	Bit Chuck Assembly	180PQ-A667			
55	Bit Retaining Ball	EQ104S-929			
56	Bit Retaining Sleeve	EQ104S-930			
57	Retaining Sleeve Spring	EQ104S-931			
58	Spring Seat	EQ104S-932			
59	Retaining Ring	EQ104S-933			
60	Rubber Housing Boot	100PQ-2			
61	Nameplate	PG087A-A5-301			
62	Nameplate Screw (2)	100PQ-322			
63	Warning Label	WARNING-2-99			

+ Indicates Mechanism Tune-up Kit part.

* Not illustrated.

MAINTENANCE SECTION

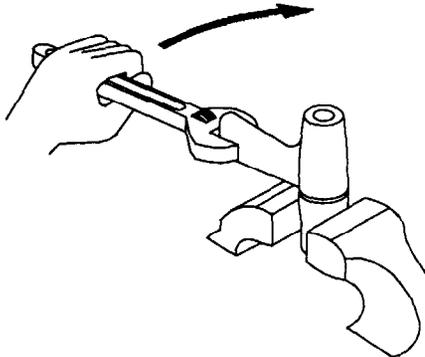
MAINTENANCE SECTION

— 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 (58) against the Retaining Sleeve Spring (57). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (59). Lift the Spring Seat, Spring and Bit Retaining Sleeve (56) off the Drive Shaft (44) and remove the Bit Retaining Ball (55).
2. Using snap ring pliers, remove the Retaining Sleeve Spring Stop (51) from the Drive Shaft.
3. Remove the Rubber Housing Boot (60).
4. Using copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover (53) with the output end of the Drive Shaft downward.
5. 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.

CLOCKWISE TO LOOSEN

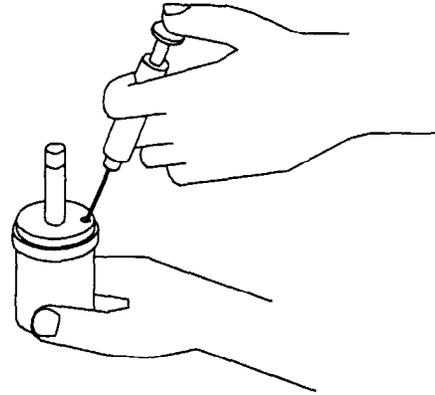


(Dwg. TPD1264)

6. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover.
7. Using a 1.5 mm hex wrench, rotate the Torque Adjustment Screw (34) clockwise until the Screw stops. Rotate the Screw counterclockwise until it stops in new style Liner Housings. Do not rotate the Screw more than 3-1/2 turns counterclockwise in old style Liner Housings or the Screw will fall out of the Housing.
8. Using the special Tee Wrench furnished in the Tool Kit (Part No. 100PQ-99), remove the Oil Plug (32) and Oil Plug Seal (33).
9. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.
10. 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

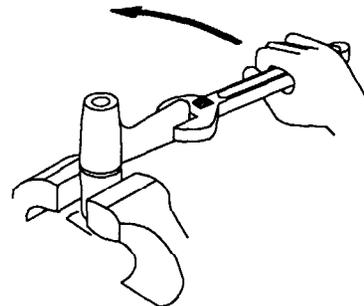
DO NOT SUBSTITUTE ANY OTHER FLUID. Failure to use the fluid provided could damage the tool, increase maintenance and decrease performance. Use only clean fluid in these tools.



(Dwg. TPD1265)

11. 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.
12. Thread the Oil Plug with the Oil Plug Seal into the mechanism until it is snug.
13. Using a 1.5 mm hex wrench, turn the Torque Adjustment Screw clockwise until it stops. This is the maximum torque position.
14. Wipe the outside of the mechanism dry and clean and remove the Oil Chamber Plug. Using the syringe, withdraw .25 cc of fluid.
15. Install the Oil Chamber Plug and tighten it between 20 and 25 in-lb (2.3 and 2.8 Nm) torque.
16. Insert the mechanism assembly, output end leading, into the Mechanism Cover clamped in the vise jaws.
17. 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. TPD1266.

COUNTERCLOCKWISE TO TIGHTEN



(Dwg. TPD1266)

MAINTENANCE SECTION

DISASSEMBLY

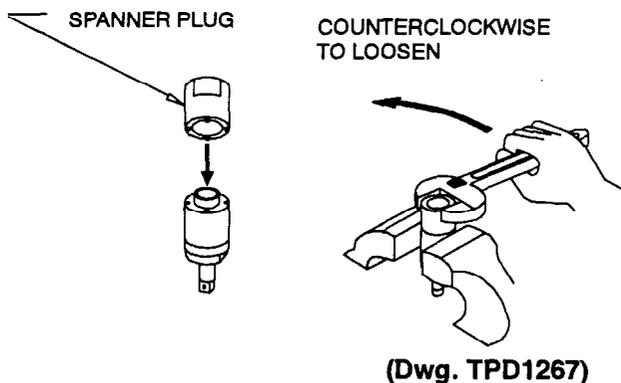
General Instructions

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.

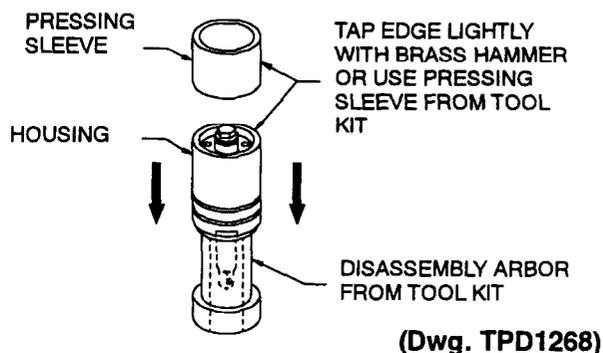
Disassembly of the Impulse Mechanism

1. Use a pointed probe to push the Spring Seat (58) against the Retaining Sleeve Spring (57). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (59). Lift the Spring Seat, Spring and Bit Retaining Sleeve (56) off the Drive Shaft (44) and remove the Bit Retaining Ball (55).
2. Using snap ring pliers, remove the Retaining Sleeve Spring Stop (51) from the Drive Shaft.
3. Remove the Rubber Housing Boot (60).
4. Using copper-covered vise jaws, carefully grasp the flats of the Mechanism Cover (53) with the output end of the Drive Shaft downward.
5. 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.)
6. Lift the assembled motor off the Mechanism Cover and pull the mechanism assembly out of the Cover. Remove the Bushing Spacer (52).
7. Using a 1.5 mm hex wrench, rotate the Torque Adjustment Screw (34) clockwise until the Screw stops. Rotate the Screw counterclockwise until it stops in new style Liner Housings. Do not rotate the Screw more than 3-1/2 turns counterclockwise in old style Liner Housings or the Screw will fall out of the Housing.
8. Using the special Tee Wrench furnished in the Tool Kit (Part No. 100PQ-99), remove the Oil Plug (32) and Oil Plug Seal (33).
9. With the oil plug opening downward over a container, rotate the Drive Shaft to purge the fluid from the mechanism.

10. Grasp the flats of the Housing Assembly (31) in vise jaws with the output end of the Drive Shaft downward.
11. Insert the pins of the spanner plug from the No. 100PQ-99 Tool Kit into the two holes in the Housing Cap (37). Using a wrench on the plug, unscrew and remove the Housing Cap from the Housing Assembly. Refer to Dwg. TPD1267.



12. 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.

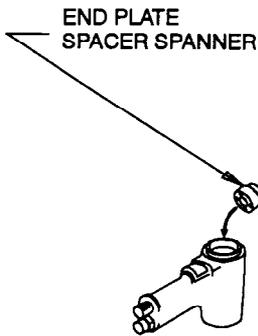


13. Disassemble the components of the mechanism in the sequence shown in Drawing TPA1609 on Page 5.

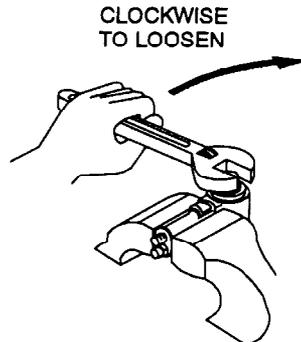
Disassembly of the Motor

1. Grasp the Motor Housing (1) in vise jaws with the shaft of the Rotor (25) upward.
2. Insert the pins of the end plate spacer spanner into the holes in the Front End Plate Spacer (30). 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. TPD1269.

MAINTENANCE SECTION

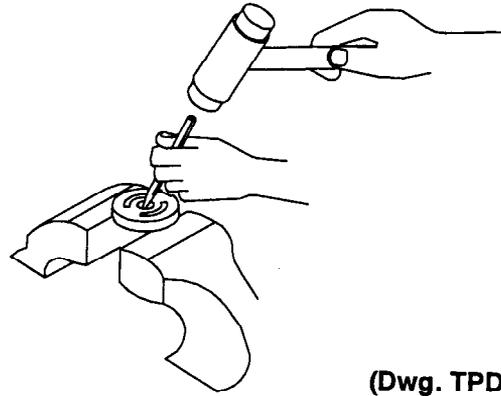


END PLATE
SPACER SPANNER



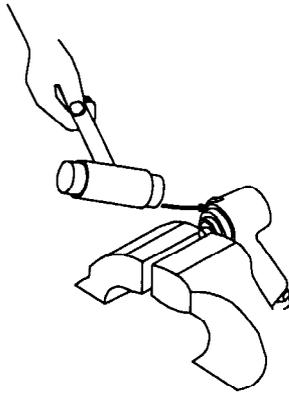
CLOCKWISE
TO LOOSEN

(Dwg. TPD1269)



(Dwg. TPD1271)

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. TPD1270.



(Dwg. TPD1270)

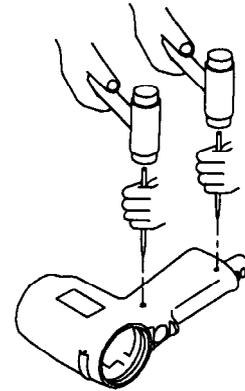
4. Remove the motor from the vise jaws and remove the Front End Plate (27), Front End Plate Bearing (29), Cylinder Assembly (25) and Vanes (26) from the Rotor.
5. Remove the two Rear Motor Seals (17) from the Motor Housing.
6. On the table of an arbor press, support the Rear End Plate (21) with blocks as close to the Rotor as possible and press the Rotor out of the Rear End Plate and Rear Rotor Bearing (22).

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.

8. Using a pin punch, tap the Throttle Retaining Pin (16) and the Deflector Retaining Pin (19) out of the Handle. The Throttle Retaining Pin is protected by an embossed circular pad of metal. Insert the pin punch into the middle of the pad to locate the Pin. Refer to Dwg. TPD1272.



(Dwg. TPD1272)

9. Grasp the Trigger (14) and pull the assembled throttle out of the Motor Housing.
10. Using a pin punch and without damaging the Trigger, remove the Trigger Pin (15).
11. Being careful not to lose the Reverse Valve Detent Ball (10) or Reverse Valve Detent Spring (11), slide the Throttle Bushing Assembly (7), Throttle Valve Assembly (4) and Throttle Rod Assembly (2) off the Reverse Valve (9).
12. Using a pin punch and without damaging the Reverse Lever (12), remove the Reverse Lever Retaining Pin (13) and separate the Lever from the Valve.
13. Using a thin blade screwdriver, remove the Throttle Valve Retainer (6) and slide the Throttle Valve Assembly off the shaft of the Throttle Valve Rod.
14. Grasp the Exhaust Deflector Assembly (18) and pull it out 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.

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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

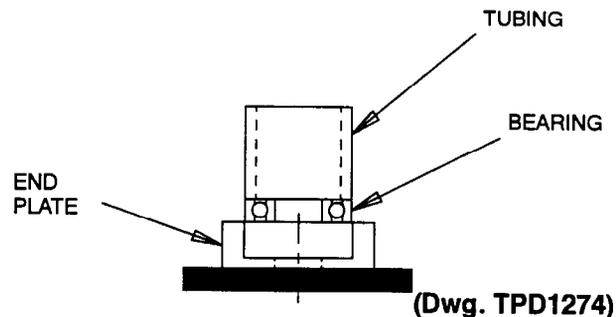
1. Position the Exhaust Deflector Assembly (18) in the bottom of the motor housing handle and install the Deflector Retaining Pin (19) to secure it in position.

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.

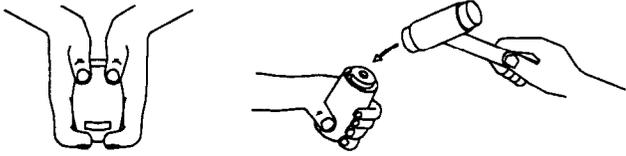
2. Install the Throttle Rod Seal (3) in the groove on the large hub of the Throttle Rod (2).
3. Install the Throttle Valve Seal (5) in the groove on the large hub of the Throttle Valve (4).
4. Slide the Throttle Valve, Valve Seal end first, onto the Throttle Rod.
5. Secure the Throttle Valve Assembly by installing the Throttle Valve Retainer (6) in the small groove on the Throttle Rod.
6. Install the Throttle Bushing Seal (8) on the hub end of the Throttle Bushing (7).
7. Position the Throttle Lever (12) on the Reverse Valve (9) and secure it by installing the Reverse Lever Retaining Pin (13).
8. Slide the Throttle Bushing Assembly, seal end leading, onto the shaft of the Throttle Rod.
9. Slide the Reverse Valve, lever end trailing, onto the shaft of the Throttle Rod and into the Throttle Bushing until the detent hole in the Valve reaches the end of the Bushing.
10. Install the Reverse Valve Detent Spring (11) followed by the Reverse Valve Detent Ball (10) in the hole in the Reverse Valve. While compressing the Spring with the Ball, continue sliding the Valve into the Bushing until the Detent Ball enters one of the detent pockets inside the Bushing.
11. Position the Trigger (14) on the shaft of the Throttle Rod and secure it by inserting the Trigger Retaining Pin (15) through the Trigger and shaft.

12. Insert the assembled Trigger into the Motor Housing. Make certain the widest end of the Trigger is nearest the motor bore and the notch across the outside of the Throttle Bushing aligns with hole in the Motor Housing for the Throttle Retaining Pin (16). Install the Pin making certain it captures and secures the assembled Trigger.
13. Using an arbor press and a piece of tubing that contacts the outer ring of the bearings, press the Front End Plate Bearing (29) into the Front End Plate (27) and the Rear End Plate Bearing (22) into the Rear End Plate (21). Refer to Dwg. TPD1274.



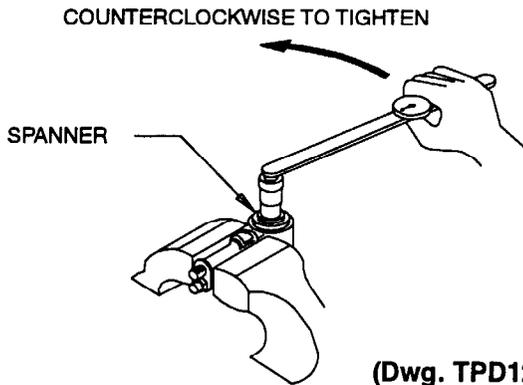
14. Stand the Rotor (25) on the table of an arbor press. It should be upright on a flat metal plate having a clearance hole for the shaft. The shaft with the hex must be downward.
15. Place a 0.001" (0.025 mm) shim on the upward surface of the large portion of the rotor body. Using a piece of tubing 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.
16. Coat each Vane (26) 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.
17. Install the Cylinder (23) 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.
18. 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.
19. Insert the two Rear Motor Seals (17) in the bottom of the Housing motor bore.
20. Insert the assembled motor, Rear End Plate leading, into the Motor Housing making sure the End Plate Alignment Pin (28) 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.

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(Dwg. TPD1279)

21. Grasp the handle of the Motor Housing in vise jaws with the rotor shaft upward. Thread the Front End Plate Spacer (30) 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. TPD1280.

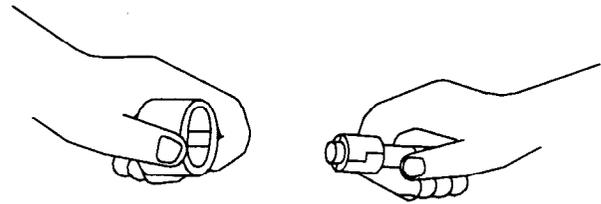


(Dwg. TPD1280)

22. 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.

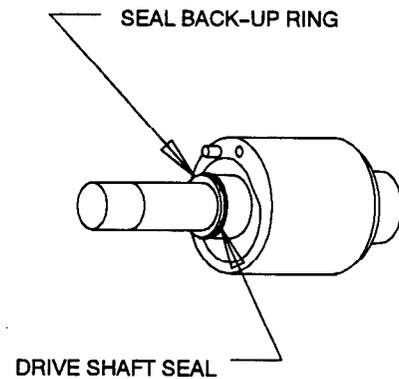
Assembly of the Impulse Mechanism

1. Install the Rear Liner Cover O-ring (39) in the annular groove around the Rear Liner Cover (38).
2. Insert the Relief Valve (43) into the Liner (40).
3. Place a Blade Spring (47) into each hole in one of the slots of the Drive Shaft (44).
4. Place the Blade (45) against the Springs so that each Spring encircles a Blade Spring Pin (46).
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 (41) 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 (48) over the Drive Shaft against the spindle end of the Liner making sure that the two Liner Front Pins (42) enter the holes in the Cover and the Relief Valve aligns with the opening in the Cover.
8. Install the Drive Shaft Seal (49) followed by the Seal Back-up Ring (50) on the Drive Shaft against the hub. Refer to Dwg. TPD1285.



(Dwg. TPD1285)

9. Install the assembled Liner and Covers in the Liner Housing (31) making certain that the Relief Valve is in alignment with the opening for the Torque Adjustment Bolt (34).
10. Install the Adjustment Bolt Seal (35) followed by the Seal Washer (35A) and Seal Back-up Ring (36) on the Torque Adjustment Bolt and thread the assembled Bolt into the Liner Housing.
11. Install the Adjustment Bolt Stop Ring (36A) in the groove of the Liner Housing to keep the Bolt Assembly from backing out.
12. Install the Oil Plug (32) and Oil Plug Seal (33) in the liner housing hole 180 degrees from the Torque Adjustment Bolt.

