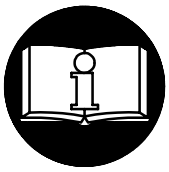
03542370
Form P7311
Edition 5
June, 2000

OPERATION AND MAINTENANCE MANUAL FOR MODELS BP10P3 AND BP10PQ1 BATTERY POWERED IMPULSE WRENCHES

NOTICE

Models BP10P3 and BP10PQ1 Battery Powered Impulse Wrenches are designed for use in assembly operations when a permanent power source is impractical. They are ideally suited to appliance assembly.

Ingersoll–Rand is not responsible for customer modification of tools for applications on which Ingersoll–Rand was not consulted.



⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ ALL THESE INSTRUCTIONS BEFORE PLACING TOOL IN SERVICE OR OPERATING THIS TOOL AND SAVE THESE INSTRUCTIONS.
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.
WHEN USING ELECTRIC TOOLS, BASIC SAFETY PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK AND PERSONAL INJURY, INCLUDING THE FOLLOWING.

PLACING THE TOOL IN SERVICE

- **Do not remove any labels. Replace any damaged label.**

USING THE TOOL

- **Always wear eye protection when operating or performing maintenance on this tool.**
- **Power 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.**
- **Guard against electric shock.** Prevent body contact with earthed or grounded surfaces. For example; pipes, radiators, ranges, refrigerator enclosures.
- **Keep work area clean.** Cluttered areas and benches invite injuries.
- **Consider work area environment.** Don't expose power tools and chargers to water. Keep work area well lighted. Do not use tool in explosive or flammable atmospheres.
- **Keep bystanders and children away.** Do not permit unauthorized personnel to operate this tool, or touch tool or battery.

NOTICE

The use of other than genuine Ingersoll–Rand replacement parts may result in personal injury, decreased tool performance and increased maintenance, and may invalidate all warranties.

Have your tool repaired by a qualified person. This electric tool is in accordance with the relevant safety requirements. Repairs should only be carried out by qualified persons using original spare parts; otherwise this may result in considerable danger to the user.

Repairs should be made only by authorized, trained personnel. Consult your nearest Ingersoll–Rand Authorized Servicenter.

Refer All Communications to the Nearest Ingersoll–Rand Office or Distributor.

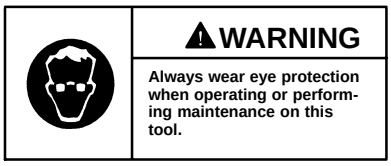
Printed in Japan

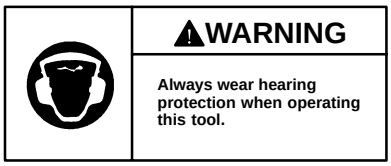
Ingersoll-Rand®

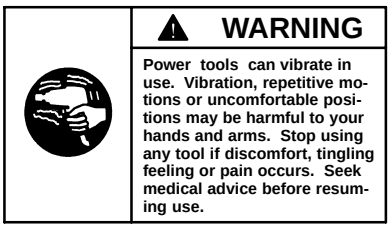
WARNING LABEL IDENTIFICATION

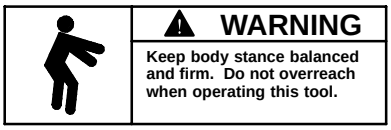
⚠ WARNING

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.









USING THE TOOL *(Continued)*

- **Store Idle tools.** When not in use, tools should be stored in a dry, high or locked up place, out of reach of children.
- **Don't force the tool.** It will do the job better and more safely at the rate for which it was intended.
- **Use the right tool.** Don't force a small tool or attachment to do the job of a heavy–duty tool.
- **Do not use a tool for a purpose for which it was not intended.** Example: Do not use a screwdriver as a drill.
- **Dress properly.** Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and non–skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.
- **Secure work.** Use clamps or a vise to hold work. Operators often need both hands to perform job functions.
- **Don't overreach.** Keep proper footing, balance and a firm grip on the tool at all times.
- **Maintain tools with care.** Keep tools clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect the tool periodically and if damaged, have it repaired by an authorized service facility. Inspect extension cords periodically and replace if damaged. Keep handles dry, clean and free from oil and grease.
- **Remove adjusting wrenches.** Form habit of checking to see that adjusting wrenches are removed from the tool before turning it on.
- **Avoid unintentional starting.** Don't carry tool with finger on switch.
- **Do not drop or abuse the tool.**
- **Whenever a tool is not being used, position the Power Switch to the "OFF" position and disconnect the power source.**
- **Stay alert. Watch what you are doing. Use common sense. Do not operate tool when you are tired.**
- **Check damaged parts.** Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this operation manual.
- **Have defective switches replaced by an authorized service center.**
- **Do not use the tool if the switch does not turn it on and off.**
- **Whenever changing a bit, make certain the Forward/Reverse Switch is in the "OFF" position and the power supply is disconnected.**
- **Do not allow chemicals such as acetone, benzene, thinner, ketone, trichlorethylene or other similar chemicals to come in contact with the tool housing as damage will result.**
- **Do not operate the Forward/Reverse Switch when the motor is running.**
- **The use of any accessory or attachment other than recommended in this manual can present a risk of personal injury.**

TOOL AND CHARGER USE AND CARE

- **When not in use,** lock the Trigger Switch by putting the Forward/Reverse Lever in the neutral (center) position.
- **Store idle tools.** When not in use, tools should be stored in a dry, high or secured place.
- **This tool is always in an operating condition.** It does not have to be plugged into an electrical outlet in order to operate.
- **Accessories.** The use of accessories or attachments other than those recommended might present a hazard.
- **Be sure the Battery is securely latched in position when inserted into the tool.**
- **An extension cord should not be used unless absolutely necessary.** Use of an improper extension cord could cause fire or electric shock. If an extension cord must be used, be sure it meets the following requirements:
  a. The pins on the plug of the extension cord must be the same number, size and shape as those on the plug of the Battery Charger.
  b. The extension cord must be properly wired and in good electrical condition.
  c. The wire size must be large enough for the AC ampere rating of the Battery Charger as specified:

AWG SIZE OF CORD FOR LENGTH OF CORD				
Feet	25	50	100	150
AWG	18	18	18	16

  d. An extension cord is a temporary solution. Move the Charger to a standard receptacle as soon as the job has been completed.

- **Don't abuse the cord.** Never carry Charger by cord or yank it to disconnect from receptacle. Keep cord from heat, oil and sharp edges.
- **Do not operate Battery Charger if it has received a sharp blow, been dropped** or otherwise damaged in any way. If any of these conditions occur, take the Battery Charger to a qualified serviceman for repair.
- **Do not disassemble the Battery Charger.** Take it to a qualified serviceman when service or repair is required.
- **Inspect plug and cord before each use.** Replace them if they show wear or damage.

PLACING TOOL IN SERVICE

TORQUE ADJUSTMENT

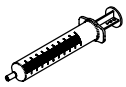
1. Remove the Battery from the tool.
2. Rotate the Drive Shaft until the Torque Adjustment Screw is visible in the opening in the Housing Cover below the Drive Shaft.
3. Using the 1.5 mm Hex Wrench, rotate the Adjustment Screw clockwise to increase the torque output and counterclockwise to decrease the torque output. Do not rotate the Oil Plug .

NOTICE

Make all final adjustments at the job.

LUBRICATION

Ingersoll–Rand No. 67



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

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, the output shaft and the gearing with Ingersoll–Rand No. 67 Grease before assembly.

Operating the Battery Charger

Models BP10P3–951–UL and BP10P3–952–UL are certified by Underwriters Laboratory for use in the United States.

Models BP10P3–951–CSA and BP10P3–952–CSA are certified for use in Canada.

Model BP10P3–951–EU is certified for use in the European Common Market

⚠ WARNING

Read the following instructions before using any of the Battery Chargers listed above.

- Before using the Battery Charger, read all instructions on the Battery Chargers, Battery and cordless Impulse Wrench.

⚠ WARNING

To reduce risk of injury, charge only BP10P3–950 rechargeable batteries. Other types of batteries can burst causing personal injury and damage. The use of an attachment not sold or recommended by the manufacturer of the Battery Charger could cause fire, electrical shock or personal injury. to reduce the risk of electric shock, unplug the Battery Charger from the outlet before attempting any maintenance or cleaning.

- Do not expose the Battery Charger to wet conditions.
- To prevent damage to electric cord and plug, disconnect Battery Charger from electrical outlet by pulling on plug rather than cord.
- Make sure cord is located so that it will not be stepped on, tripped over or otherwise subjected to damage or stress.

NOTICE

When charging a Battery with any of the above listed Battery Chargers, observe the following procedures.

- Do not charge Battery when temperature is below 50°F (10°C) or above 95°F (35°C). Otherwise, battery life will be shortened.
- Never attempt to connect two Chargers together.
- **Models BP10P3–951–UL, BP10P3–951–CSA, BP10P3–952–UL and BP10P3–952–CSA,** are designed to operate on standard 110V electrical power. Do not attempt to use any other voltage. **Model BP10P3–951–EU** is designed to operate on standard 230V electrical power. Do not use any other voltage.
- Frequent charging can cause overheating. **Wait 20 minutes between charging cycles if it is necessary to charge Batteries after consecutive periods of use.**
- Do not insert foreign matter into the battery receptacle on the Charger.
- Do not use a booster transformer when charging.
- Do not use an engine generator or DC power source when charging a Battery.
- Do not disassemble the Battery.
- Do not store the Battery in locations where the temperature may reach or exceed 104°F (40°C). Such locations and conditions might include outside sheds or metal buildings during the summer.
- Do not short circuit the Battery.

CAUTION

Do not incinerate the Battery even if it is severely damaged or is completely worn out. The Battery can explode if placed in a fire. Battery leakage can occur under extreme usage or temperature conditions. If liquid which has leaked from the Battery comes in contact with skin, wash immediately with soap and water and then with lemon juice or vinegar. If liquid gets in the eyes, wash with a strong solution of boric acid and get medical attention immediately.

PLACING TOOL IN SERVICE

Disposal of Worn Out Battery

Return the worn out Battery to the distributor from which it was purchased as soon as the post charging battery life becomes too short for practical use.

Charging the Battery

NOTICE

Use only the models of Battery Chargers listed in the section of this form PLACING THE TOOL IN SERVICE, for charging the BP10P3–950 Battery.

For continuos service of the Impulse Tool, a spare Battery should be kept on hand for alternate use.
During the initial charge or after the Battery has not been used for a long time, the Battery may not take a full charge. If this occurs, use the Battery in the Impulse Tool again before resuming the charging cycle. It should then accept a full charge.

1. Disengage the Battery by depressing the button on the Battery to release the latch and then pulling the Battery out the bottom of the housing handle.
2. Insert the AC power cord of the Battery Charger into the power receptacle.
3. Insert the Battery into the charger making sure that the positive (+) and negative (–) sides are properly oriented. The Charger has a series of lines embossed to match the lines on the battery when the Battery is properly positioned. Additionally, the Battery will not fully enter the Charger if the orientation is off 180° from correct insertion. When properly inserted, the power indicator light will remain red.
4. When the Battery is fully charged, the red light will flash in half second intervals.

NOTICE

If the light blinks in one tenth or two tenths of a second intervals, a charging problem exists. Consult the Battery Charger Manual for probable causes and solutions.

Changing Rotational Direction

Before operating the Impulse Wrench, make certain the socket is rotating in the direction required for the job application.

CAUTION

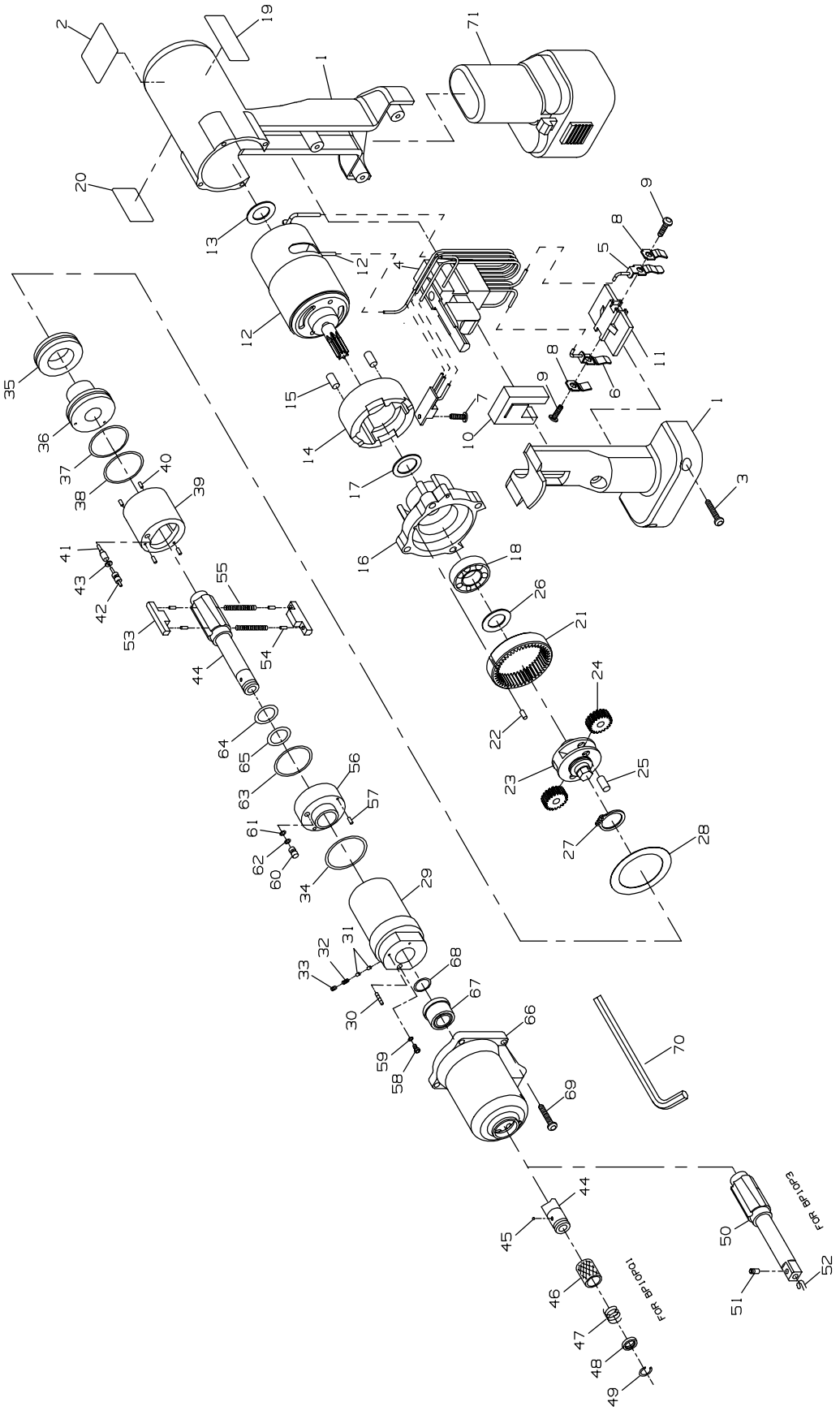
Do not attempt to change rotational direction while the tool is running or without releasing the Trigger Switch. Failure to do so can cause damage to the Trigger Switch.

The forward/reverse lever is located at the top of the Trigger Switch. To change direction, proceed as follows:

1. Hold the tool in a normal manner and release the Trigger Switch.
2. For right hand or clockwise rotation, push the lever completely to the right.
3. For left hand or counterclockwise rotation, push the lever completely to the left.

HOW TO ORDER AN IMPULSE WRENCH

Model	Free Speed	Recommended Torque Range			
		Soft Draw		Hard Slam	
		in–lb	Nm	in–lb	Nm
PISTOL GRIP with 1/4” INSERT BIT CHUCK					
BP109PQ1	2200	80–142	9–16	97–168	11–19
PISTOL GRIP with 3/8” SQUARE DRIVE					
BP10P3	2200	80–142	9–16	97–168	11–19



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PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

	Motor Housing Assembly		14	Front Motor Support	BP10P3–937
	for model BP10P3	BP10P3–A40	15	Front Motor Support Pin (2)	BP10P3–297
	for model BP10P3–EU	BP10P3–EU–A40	16	Front Rotor Bearing Cage	BP10P3–935
	for model BP10PQ1	BP10PQ1–A40	17	Bearing Cage O–ring	100PQ–236
	for model BP10PQ1–EU	BP10PQ1–EU–A40	18	Front Rotor Bearing	BP10P3–606
1	Motor Housing		20	Label	55P3–99
	for model BP10P3	BP10P3–B40	21	Ring Gear	BP10P3–939
	for model BP10P3–EU	BP10P3–EU–B40	22	Ring Gear Retaining Pin	BP10P3–944
	for model BP10PQ1	BP10PQ1–B40	23	Planetary Gear Frame	BP10P3–938
	for model BP10PQ1–EU	BP10PQ1–EU–B40	24	Planet Gear (2)	BP10P3–940
2	Warning Label		25	Planet Gear Shaft (2)	BP10P3–298
	for model BP10P3 and BP10PQ1	WARNING–22–99	26	Rear Planet Gear Shaft Retainer	BP10P3–229
	for model BP10P3–EU and BP10PQ1–EU	EU–99	27	Front Planet Gear Shaft Retainer	BP10P3–953
2A	Nameplate		28	Grease Shield	BP10P3–739
	for model BP10P3	BP10P3–301	29	Impulse Housing Assembly	280PQ–A31
	for model BP10P3–EU	BP10P3–EU–301	30	Torque Adjustment Screw	180PQ–230
	for model BP10PQ1	BP10PQ1–301	31	Adjustment Screw Plug Lock (2)	180PQ–283
	for model BP10PQ1–EU	BP10PQ1–EU–301	32	Plug Lock Spring	180PQ–219
3	Motor Housing Screw (3)	BP10P3–955	33	Plug Lock Screw	500A–230
4	Trigger	BP10P3–943	34	Liner O–ring	180PQ–236
5	Wire Terminal (with brown wire)	BP10P3–947	35	Housing Cap	180PQ–207
6	Wire Terminal (with blue wire)	BP10P3–948	36	Rear Liner Cover Assembly	180PQ–A212
7	Mounting Screw	BP10P3–954	37	Liner Cover O–ring	180PQ–240
8	Terminal Spring (2)	BP10P3–949	38	Rear Liner Seal	180PQ–273
9	Mounting Screw (2)	BP10P3–956	39	Liner Assembly	BP10P3–A203
10	Insulator Packing	BP10P3–941	40	Liner Pin (4)	55P3–297
11	Terminal Mounting Plate	BP103P–942	41	Relief Valve	280PQ–222
12	Motor Assembly	BP10P3–936	42	Spring Guide Assembly	280PQ–A255
13	Rear Motor Cushion	BP10P3–283	43	Spring Guide Seal	180PQ–272

		PART NUMBER FOR ORDERING
	Drive Shaft Assembly (for Model BP10PQ1) . .	BP10PQ1–A726
44	Drive Shaft	BP10P3–626
45	Bit Retaining Ball	EQ104S–929
46	Bit Retaining Sleeve	EQ104S–930
47	Bit Retaining Sleeve Spring	EQ104S–931
48	Spring Seat	EQ104S–932
49	Retaining Ring	EQ104S–933
	Drive Shaft Assembly (for Model BP10P3)	BP10P3–A626
50	Drive Shaft	BP10P3–981
51	Socket Retaining Pin	5020–716
52	Retaining Pin Spring	401–718
53	Blade Assembly (2)	BP10P3–A220
54	Blade Assembly Pin (2 per assembly)	100PQ–120
55	Blade Spring (2)	180PQ–568
56	Front Liner Cover Assembly	180PQ–A211
57	Liner Cover Pin	180PQ–232
58	Oil Plug	180PQ–277
59	Oil Plug Seal	EQ110P–288
60	Oil Stop Cap Assembly	180PQ–A38
61	Stop Cap O–ring	EQ106P–288
62	Back–up Ring	380SQ–272
63	Front Liner Seal	EQ104S–236
64	Drive Shaft Seal	55P3–271
65	Seal Back–up Ring	55P3–224

		PART NUMBER FOR ORDERING
	Mechanism Cover Assembly	BP10P3–A727
66	Mechanism Cover	BP10P3–727
67	Cover Bushing	180PQ–641
68	Bushing Spacer	180PQ–229
69	Mechanism Cover Mounting Screw (4)	BP10P3–638
70	Hex Wrench (1.5 mm)	55P3–900
71	Battery (9.6 volt)	BP10P3–950
*	Battery Charger (1 hour charging time)	BP10P3–951–UL
*	Battery Charger (9 minutes charging time)	BP10P3–952–UL
*	Fluid Replacement Kit (includes Fluid Syringe, Fill Tube and 4 oz. [31 mL] of Replacement Fluid) . .	EQ106S–K400
*	Replacement Fluid (4 oz. [31 mL])	EQ106S–400–1
*	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	55P–199
*	Mechanism Tune–up Kit (includes illustrated items 32, 34, 37, 38, 43, 45, 47, 51, 52, 55 [2], 59, 61, 62, 63, 64, 65 and 68)	BP10P3–K600

* Not illustrated.

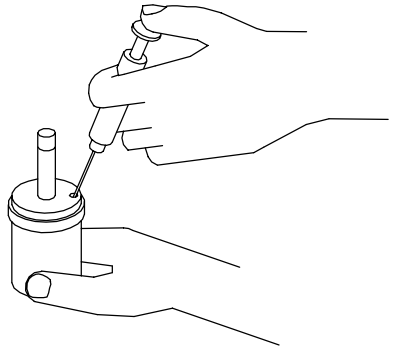
– CHANGING THE MECHANISM FLUID —

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

1. Remove the Battery (71) from the tool.
2. **For Model BP10PQ1,** use a pointed probe to push the Spring Seat (48) against the Retaining Sleeve Spring (47). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (49). Lift the Spring Seat, Spring and Bit Retaining Sleeve (46) off the Drive Shaft (44) and remove the Bit Retaining Ball (45).
3. Using a Phillips head screwdriver, remove the four Mechanism Cover Mounting Screws (69).
4. Lift the Mechanism Cover (66) off the Motor Housing (1) over the Drive Shaft.
5. Using the 1.5 mm Hex Wrench (70), rotate the Torque Adjustment Screw (30) 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 Number 55P–199), remove the Oil Plug (58) and the Oil Plug Seal (59).
7. With the oil plug opening downward over a container, rotate the drive shaft to purge the oil from the mechanism. As an alternate method, using the syringe from the Fluid Replacement Kit (Part No. EQ106S–K400), purge the fluid from the first cavity. Then rotate the Drive shaft to expose the second cavity and purge the fluid using the syringe.
8. Using the syringe and fluid from the Fluid Replacement Kit (Part Number 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.



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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 the 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 0.3 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. Place the mechanism on the hex hub of the Planetary Gear Frame (23) and install the Mechanism Cover over the Drive Shaft against the Motor Housing. Install the four Mechanism Cover Mounting Screws.
15. **For Model BP10PQ1,** insert the Bit Retaining Ball into the hole in the Drive Shaft. Install the Bit Retaining Sleeve, Retaining Sleeve Spring and Spring Seat on the output end of the Drive Shaft. While compressing the Spring with the Seat, install the Retaining Ring in the groove on the Shaft.

DISASSEMBLY

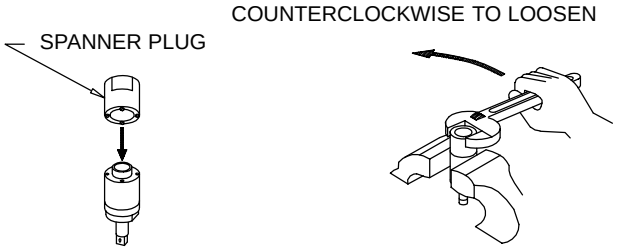
General Instructions

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 that 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 replacements.

Disassembly of the Impulse Mechanism

1. Remove the Battery (71) from the tool.
2. **For Model BP10PQ1,** use a pointed probe to push the Spring Seat (48) against the Retaining Sleeve Spring (47). While the Spring is compressed, use another pointed probe or thin blade screwdriver to remove the Retaining Ring (49). Lift the Spring Seat, Spring and Bit Retaining Sleeve (46) off the Drive Shaft (44) and remove the Bit Retaining Ball (45). **For Model BP10P3,** use a hooked wire to pull the Retaining Pin Spring (52) out of the end of the Drive Shaft (50) and remove the Socket Retaining Pin (51).

3. Using a Phillips head screwdriver, remove the four Mechanism Cover Mounting Screws (69).
4. Lift the Mechanism Cover (66) and the assembled mechanism off the Motor Housing (1).
5. Pull the mechanism, the Grease Shield (28) and the Bushing Spacer (68) out of the Mechanism Cover.
6. With the oil plug opening downward over a container, rotate the drive shaft to purge the oil from the mechanism. As an alternate method, using the syringe from the Fluid Replacement Kit (Part No. EQ106S–K400), purge the fluid from the first cavity. Then rotate the Drive shaft to expose the second cavity and purge the fluid using the syringe.
7. Grasp the flats of the Impulse Housing Assembly (29) in vise jaws with the output end of the Drive Shaft downward.
8. Insert the pins of the spanner plug from the No. 55P–199 Tool Kit into the 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. TPD1267)



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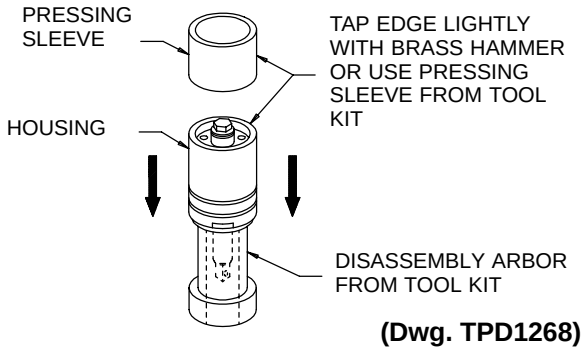
9. Stand the disassembly arbor from the Tool Kit, large end downward, on a workbench or table of an arbor press. Insert the output end of the Drive Shaft into the central opening and either tap the Housing downward off the components or use the pressing sleeve in the Kit to press the Housing downward off the components. (Refer to Dwg. TPD1268)



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10. Disassemble the components of the mechanism in the sequence shown in Drawing TPA1562 on Page 7.

Disassembly of the Gearing and Motor Housing

1. Remove the assembled Planetary Gear Frame (23) from the shaft of the Motor Assembly (12) and out of engagement with the Ring Gear (21).
2. Remove the Rear Planet Gear Shaft Retainer (26) from the hub at the motor end of the Gear Frame and from the opposite end, push the two Planet Gear Shafts (25) out of the Gear Frame. Remove the two Planet Gears (24).
3. Using a Phillips head screwdriver, unscrew and remove the three Motor Housing Screws (3) and pull the front section of the Motor Housing (1) away from the rear section.
4. Grasp the shaft of the Motor Assembly and pull the assembled motor out of the Housing.
5. Remove the Front Rotor Bearing Cage (16) and the Bearing Cage O–ring (17) from the Motor Assembly.
6. If the Ring Gear (21) must be replaced, pull it from the Front Rotor Bearing Cage.
7. If the Front Rotor Bearing (18) must be replaced, press the Bearing from the Front Rotor Bearing Cage.
8. To remove the Rear Motor Cushion (13), insert a hooked tool through the central opening and catching the underside of the Cushion, pull it from the Housing.

ASSEMBLY

General Instructions

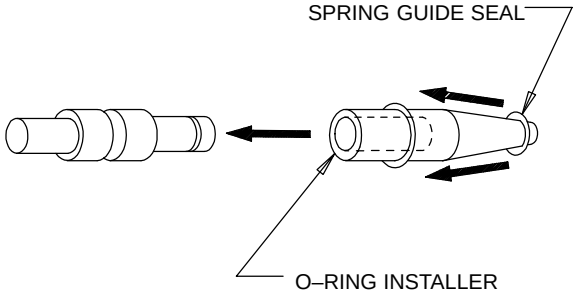
1. When grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
2. Always press on the **inner** ring of a ball–type bearing when installing the bearing on a shaft.
3. Always press on the **outer** ring of a ball–type bearing when pressing the bearing into a recess.
4. Except for bearings and mechanism parts, always clean 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 Gearing and Motor Housing

1. Insert the Rear Motor Cushion (13) into the recess in the Motor Housing (1).
2. With the Front Motor Support (14) positioned on the hub of the motor, grasp the spindle of the Motor Assembly (12) and insert it into the Motor Housing against the Cushion. Make certain the leads and Trigger (4) are positioned to be inserted into the handle grip.
3. If the Insulator Packing (10) was removed, install it on the Trigger with the center section of the Packing between the trigger button and the switch body and under the forward/reverse lever.
4. Slide the Terminal Mounting Plate (11) into the rear section of the Motor Housing so that it is captured between the molded bosses in the Housing.
5. Position the Trigger into the switch cavity in the rear section of the Motor Housing without crimping or kinking the wiring. While keeping everything in position, place the front section of the Motor Housing over the Trigger against the rear section of the Motor Housing and install the three Motor Housing Screws (3).
6. If the Front Rotor Bearing (18) was removed, stand the Front Rotor Bearing Cage (16) on the table of an arbor press, small hub downward, and press the Front Rotor Bearing into the central opening until it bottoms in the Cage.
7. Install the Bearing Cage O–ring (17) in the groove located inside the small central opening toward the motor end of the Cage.
8. Align the notch in the outer edge of the Ring Gear (21) with the notch in the large central opening of the Bearing Cage and push the Ring Gear into the Cage. Insert the Ring Gear Retaining Pin (22) into the hole formed by the two notches to keep the Ring Gear in position.
9. Insert the assembled Bearing Cage, small hub leading, into the Front Motor Support and align the mounting holes in the Cage with the mounting holes in the Housing.
10. If the Front Planet Gear Shaft Retainer (27) was removed from the Planetary Gear Frame (23), use snap ring pliers to install the Retainer in the groove on the hex driver end of the Gear Frame.
11. Lubricate a Planet Gear (24) with Ingersoll–Rand No. 67 Grease and insert it into the side of the Gear Frame. From the end of the Gear Frame opposite the hex driver, insert a Planet Gear Shaft (25) to retain the Gear in the Gear Frame.
12. Repeat the previous step with the remaining Planet Gear on the opposite side of the Gear Frame.
13. Install the Rear Planet Gear Shaft Retainer (26) on the motor end hub of the Gear Frame.
14. While engaging the teeth of the Planet Gears with the teeth of the Ring Gear, insert the assembled Planet Gear Frame into the Bearing Cage. Lubricate the hex driver with Ingersoll–Rand No.67 Grease.

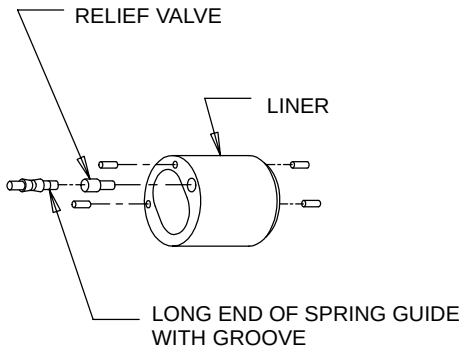
Assembly of the Impulse Mechanism

1. Insert the long shaft with the annular groove of the Spring Guide (42) into the central opening of the O–ring installer furnished with the Tool Kit (Part No. 55P–199). Place the Spring Guide Seal (43) on the tapered end of the installer and roll the Seal up the taper and into the groove on the large body of the Spring Guide.
   (Refer to Dwg. TPD1281).



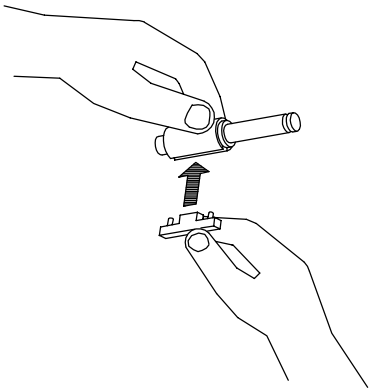
(Dwg. TPD1281)

2. Insert the Relief Valve (41), large end trailing, into the Liner (39). Insert the assembled Spring Guide, long hub with the annular groove leading, into the Liner against the Relief Valve.
   (Refer to Dwg. TPD1282).



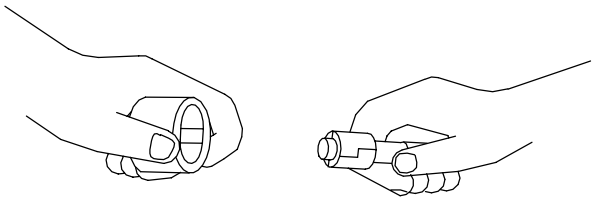
(Dwg. TPD1282)

3. Place a Blade (53) into one of the slots of the Drive Shaft (44) with the Blade Assembly Pins (54) inward.
4. From the opposite side of the Shaft, encircle each Pin with a Blade Spring (55).
5. Install the Assembly Pins of the remaining Blade in the open ends of the Springs.
   (Refer to Dwg. TPD1283).



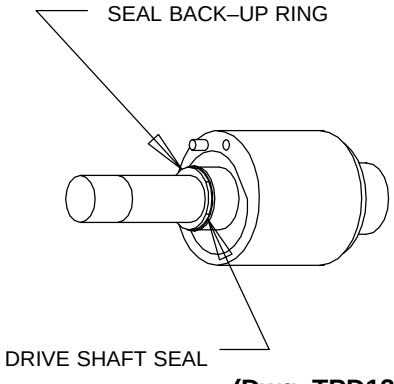
(Dwg. TPD1283)

6. Compress the Springs with the Blades until both Blades are 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 Spring Guide.
   (Refer to Dwg. TPD1284). Make certain the ends of the Blades are flush with the ends of the Liner.



(Dwg. TPD1284)

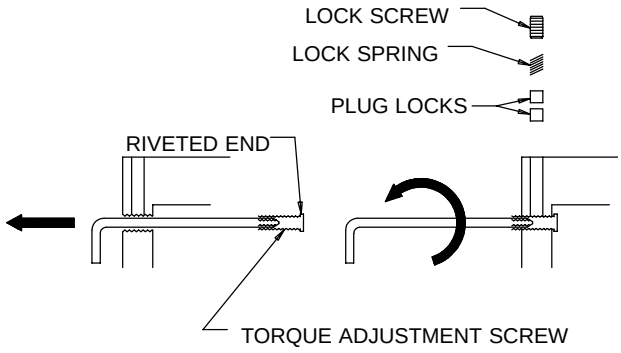
7. Install the Drive Shaft Seal (64) followed by the Seal Back–up Ring (65) on the Drive Shaft against the hub. (Refer to Dwg. TPD1285).



(Dwg. TPD1285)

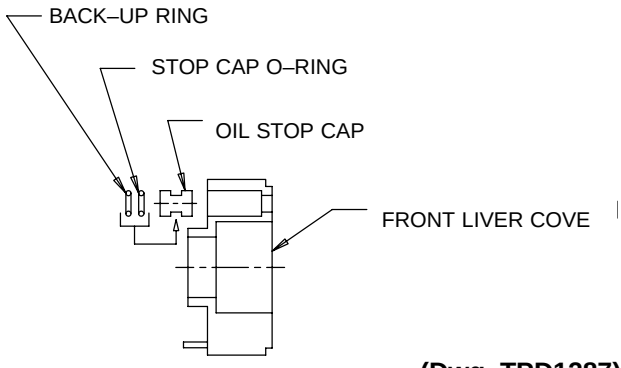
8. The Torque Adjustment Screw (30) can only be installed from the liner end of the Impulse Housing (29). If the Torque Adjustment Screw was removed, proceed as follows:
   a. Insert a 1.5 mm hex wrench into the threaded hole for the Torque Adjustment Screw from the Oil Plug end of the Housing.
   b. From the opposite end of the Housing, install the hex of the Torque Adjustment Screw onto the hex wrench.
   c. Push the Screw and wrench toward the threaded hole until it contacts the face of the Housing.
   d. While applying finger pressure to the rivet end of the Screw, rotate the wrench counterclock–wise to thread the Screw into the Housing. Continue rotating the Screw until the rivet end stops against the face of the Housing.

e. Insert the two Adjustment Screw Lock Plugs (31) and the Plug Lock Spring (32) into the crosshole leading to the Adjustment Screw. Thread the Plug Lock Screw (33) into the same hole to capture the components. (Refer to Dwg. TPD1286).



(Dwg. TPD1286)

9. If the Oil Stop cap Assembly (60) was removed from the Front Liner Cover (56), install the Stop Cap O–ring (61) and Back–up Ring (62) in the groove of the Cap and insert the assembly into the Cover. (Refer to Dwg. TPD1287).

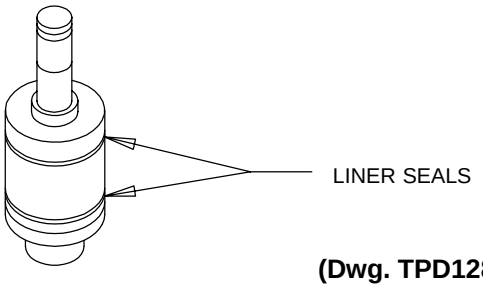


(Dwg. TPD1287)

10. Install the Liner Cover O–ring (37) in the groove on the large hub of the Rear Liner Cover (36). Align the pin holes in the face of the Cover with the two Liner Pins (40) at the rear of the Liner and place the Cover against the Liner. A groove will be formed between the Liner and Cover for the Rear Liner Seal (38).

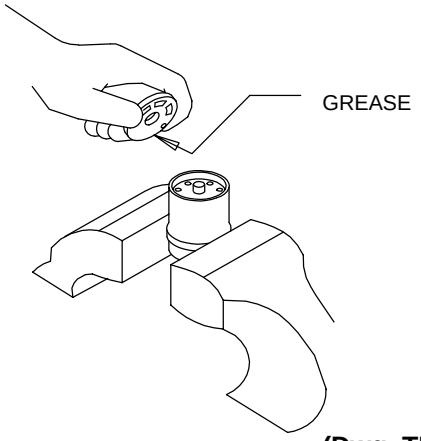
    Do not attempt to put the Seal in the groove at this time.

11. Align the pin holes in the Front Liner Cover (56) with the Pins in the front face of the Liner and place the Cover against the face of the Liner. Another groove will be formed between the Liner and Cover for the Front Liner Seal (63). Install both the Front and Rear Liner Seals in the grooves at this time and stand the assembly on the workbench with the output end of the Drive Shaft upward. (Refer to Dwg. TPD1288).



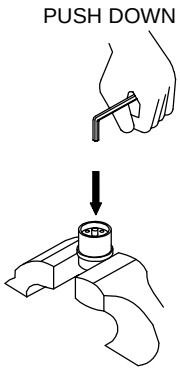
(Dwg. TPD1288)

12. Apply a thin film of grease to the Liner O–ring (34) and install it in the forward bore of the Housing.
13. Lubricate the Front and Rear Liner Seals and after orienting the Housing to the proper position, install the Housing over the Liner.
14. 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).



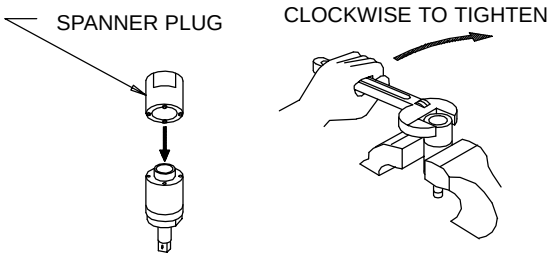
(Dwg. TPD1289)

15. 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)

16. Install the Housing Cap (35) and using the spanner plug furnished with the Tool Kit, tighten the Cap between 58–65 ft–lb (78–88 Nm) torque. (Refer to Dwg. TPD1291).



(Dwg. TPD1291)

17. 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**.
18. After filling the mechanism with fluid, place the mechanism on the hex hub of the Planetary Gear Frame (23) and install the Mechanism Cover (66) over the Drive Shaft (44) against the Motor Housing (1). Install the four Mechanism Cover Mounting Screws (69).
19. **For Model BP10PQ1,** insert the Bit Retaining Ball (45) into the hole in the Drive Shaft. Install the Bit Retaining Sleeve (46), Retaining Sleeve Spring (47) and Spring Seat (48) on the output end of the Drive Shaft. While compressing the Spring with the Seat, install the Retaining Ring (49) in the groove on the Shaft.
    For Model BP10P3, insert the Socket Retaining Pin (51) into the hole in the Drive Shaft and insert the Retaining Pin Spring (52) into the end of the Drive Shaft to capture the Pin.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

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