

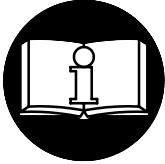


# OPERATION AND MAINTENANCE MANUAL FOR SERIES EP 115 VOLT ELECTRIC SCREWDRIVERS

## NOTICE

Series EP Electric Screwdrivers are designed for installing threaded fasteners in light industrial and appliance manufacturing applications. 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 TOOL IN SERVICE

- Use outdoor extension leads. When tool is used outdoors, use only extension cords intended for outdoor use.
- 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 electric tools.
- Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility. Inspect extension cords periodically and replace if damaged. 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.

- **Don't Abuse Cord.** Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.
- **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 cord.
- **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 tool.** It will do the job better and more safely at the rate for which it was intended.
- **Use the right tool.** Do not 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 is 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.

## 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.

**INGERSOLL-RAND®**  
**PROFESSIONAL TOOLS**

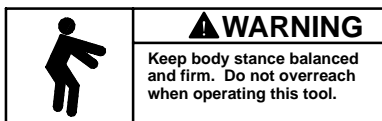
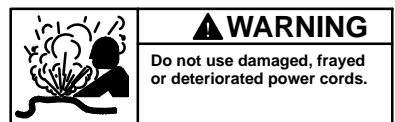
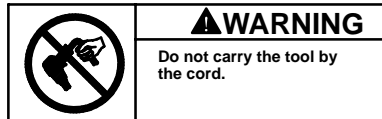
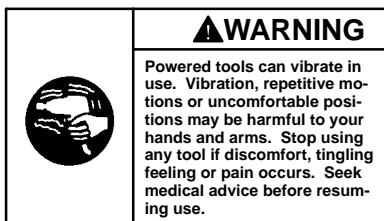
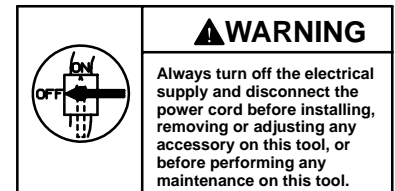
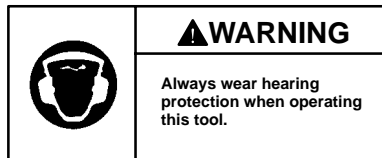
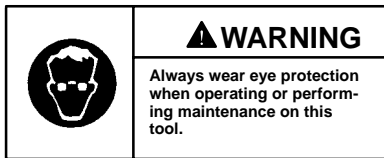
**⚠ WARNING**

**FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.**

**USING THE TOOL (Continued)**

- **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 tool cords periodically and if damaged, have them 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 keys and wrenches.** Form habit of checking to see that keys and adjusting wrenches are removed from 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 unplug the power cord.**
- **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.**
- **Do not drop or abuse the screwdriver.**
- **Whenever changing a bit, make certain the Forward/Reverse Switch is in the "OFF" position and the tool is unplugged.**
- **Do not allow chemicals such as acetone, benzene, thinner, ketone, trichloroethylene or other similar chemicals to come in contact with the screwdriver housing as damage will result.**
- **Do not adjust the torque setting higher than 5 on the Torque Scale.**  
 Duty cycle: 1200 rpm and 2000 rpm models –  
 MAX 0.5 sec. "ON"  
 MIN 3.5 sec. "OFF"  
 all other models –  
 MAX 0.8 sec. "ON"  
 MIN 3.5 sec. "OFF"
- **Do not tighten more than 900 tapping screws (size: 2 mm, length: 4 mm) per hour.**
- **Do not operate the Forward/Reverse Switch when the motor is running.**
- **Whenever a tool is not being used, move the Forward/Reverse Switch to the "OFF" position and unplug the screwdriver.**
- **The use of any accessory or attachment other than recommended in this manual can present a risk of personal injury.**

**WARNING LABEL IDENTIFICATION**



# ADJUSTMENTS

## TORQUE ADJUSTMENT

To adjust the torque on these screwdrivers, proceed as follows:

1. Determine the torque output of the tool by checking a tightened fastener with a torque wrench.
2. Increase or decrease the torque output by rotating the Spring Adjusting Ring (4). Rotating the Ring **clockwise** to a higher number on the Torque Scale increases torque output while rotating the Ring **counterclockwise** to a lower number decreases the torque output.

### NOTICE

The numbers from one to five on the Torque Scale are reference numbers only and are not an indication of actual torque output.

3. Check the adjustment with a torque wrench. A number of factors will affect torque output from one job to another. Final torque adjustment should be made at the job through a series of gradual increases. Always start below the desired torque and work upward.

### DO NOT ATTEMPT TO REPAIR THIS TOOL.

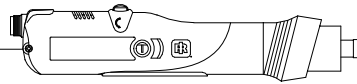
All repairs and maintenance of this tool and its cord must be performed by an authorized service center. See Form 6647 for the service center nearest you.

### NOTICE

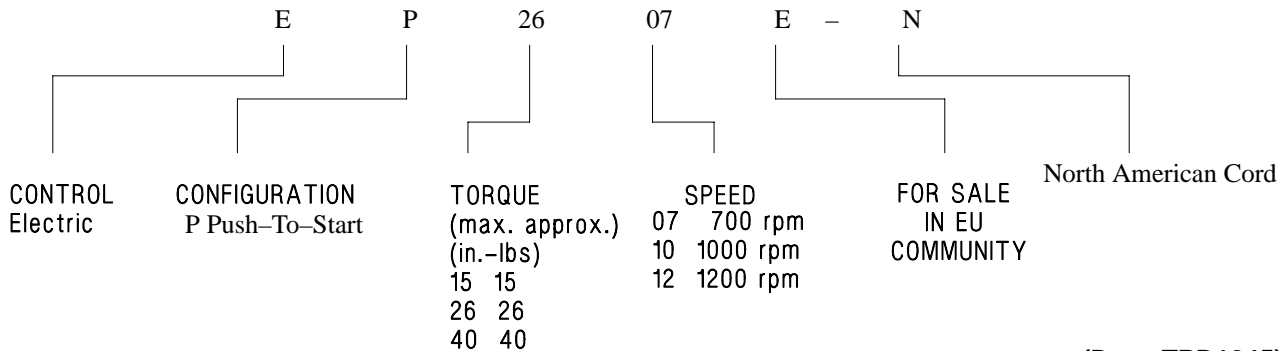
SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

## MODEL IDENTIFICATION

High Torque



- Power: 115V AC
- Reversible: Yes
- Cable Length: 3m



(Dwg. TPD1845)

**DECLARATION OF CONFORMITY**

We Ingersoll-Rand, Co.  
(supplier's name)

Swan Lane, Hindley Green, Wigan WN2 4EZ  
(address)

declare under our sole responsibility that the product,

Series EP 115 Volt Electric Screwdrivers

to which this declaration relates, is in compliance with the provisions of

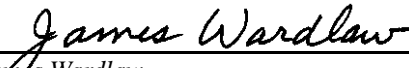
89/336/EEC, 73/23/EEC, 92/31/EEC, 98/37/EC Directives.

EN292, ISO 8662, PN8NTC1.2,

By using the following Principle Standards: EN50144-1, EN55014 and EN50082-1

Serial No. Range: (1994 →) XUA XXXXX →

  
\_\_\_\_\_  
D. Vose  
Name and signature of authorised persons

  
\_\_\_\_\_  
James Wardlaw  
Name and signature of authorised persons

March, 1999  
\_\_\_\_\_  
Date

March, 1999  
\_\_\_\_\_  
Date

**NOTICE**

**SAVE THESE INSTRUCTIONS. DO NOT DESTROY.**

When the life of the tool has expired, it is recommended that the tool be disassembled, degreased and parts be separated by material so that they can be recycled.

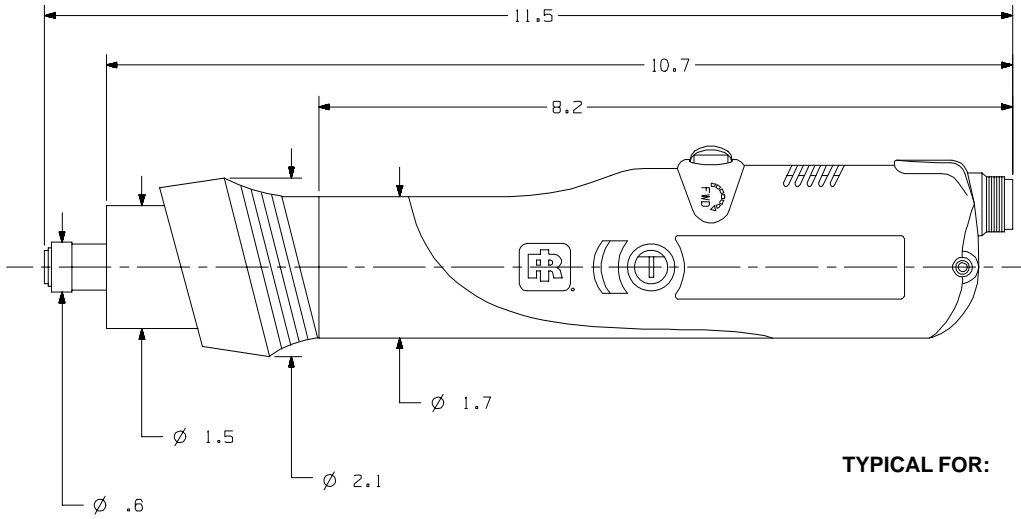
**INGERSOLL-RAND  
PROFESSIONAL TOOLS  
Allen & Martinsville Roads  
PO Box 1776  
Liberty Corner, NJ 07938**

Model	Hertz	Watts	Volts	Revolutions per minute	Type of cord	Torque Range in-lbs	Torque Range Kgf-cm	Weight		Length		Drive Size in.	■Sound Pressure Level dB (A)	◆Vibrations Level m/s <sup>2</sup>
								lbs.	Kg.	in.	mm			
<b>STRAIGHT SCREWDRIVERS</b>														
EP1510E-N	50/60 Hz	35W	115 V ~	1000 min <sup>-1</sup>	USA	5.0 – 15.0	5.8 – 17.3	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EP2612E-N	50/60 Hz	45W	115 V ~	1200 min <sup>-1</sup>	USA	11.0 – 26.0	12.7 – 30.0	1.6	0.73	10.8	274	1/4 hex	67.8	1.1
EP4007E-N	50/60 Hz	45W	115 V ~	700 min <sup>-1</sup>	USA	18.0 – 40.0	20.7 – 46.0	1.83	0.83	10.8	274	1/4 hex	70.7	1.1

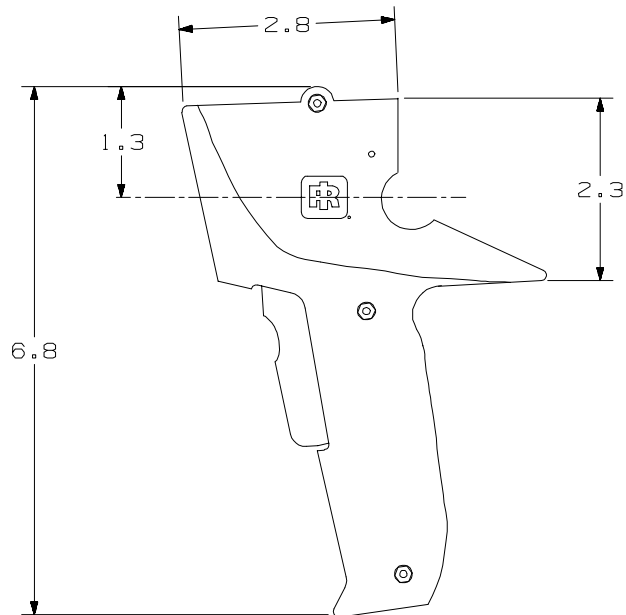
- Tested in accordance with ANSI S5.1-1971 at free speed.
- ◆ Tested in accordance to ISO8662-1 at free speed.

# MAINTENANCE SECTION

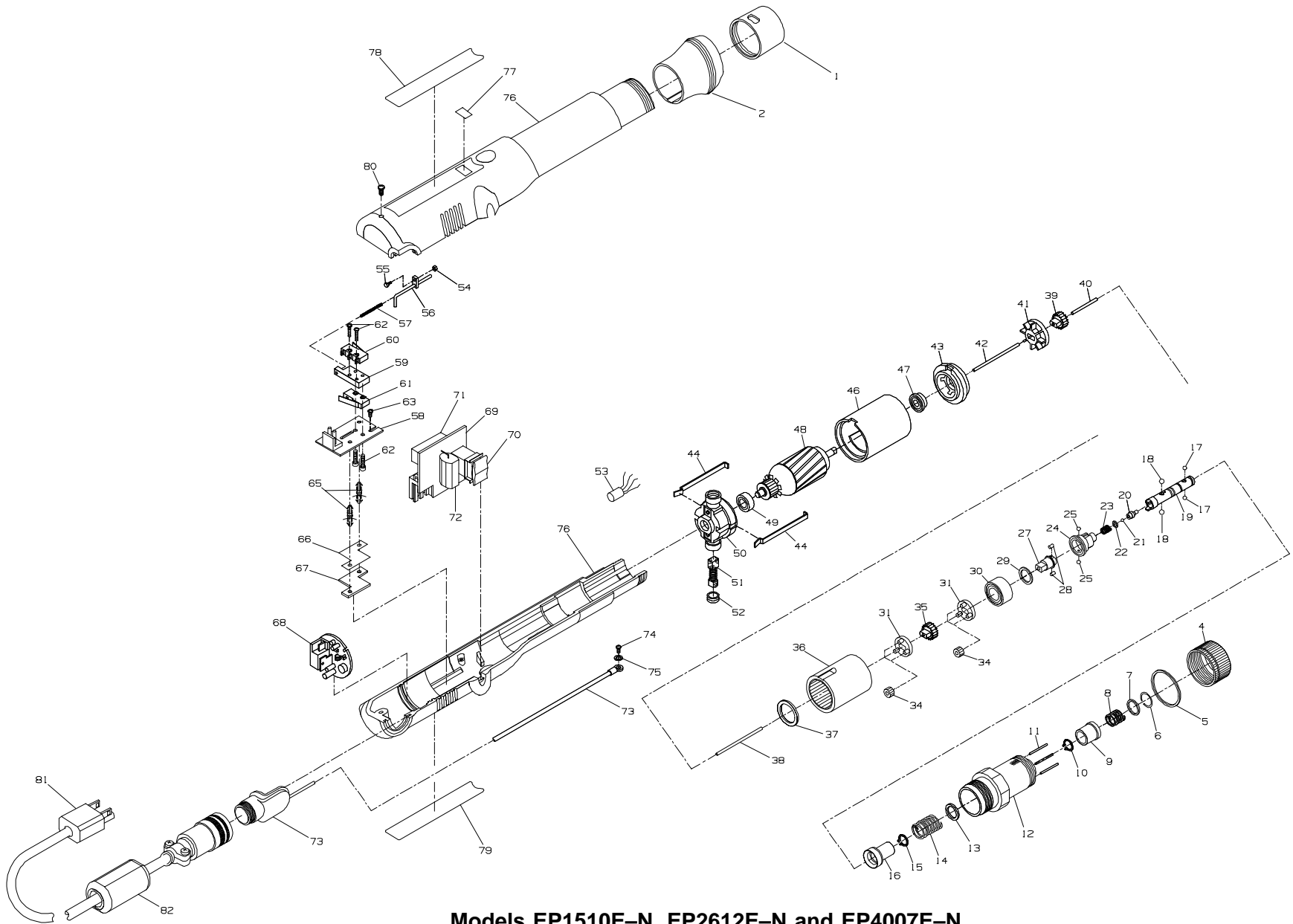
## Dimensions for Models EP1510E-N, EP2612E-N and EP4007E-N Electric Screwdrivers



(Dwg. TPC635)



(Dwg. TPD1829)



Models EP1510E-N, EP2612E-N and EP4007E-N

(Dwg. TPA1524-1)



Models EP1510E-N, EP2612E-N and EP4007E-N

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Retainer Coupling	EP4007N-125	19	Bit Holder Assembly	EP4007N-586
2	Slanted Flange (standard on 1510E-N and 2612E-N)	EP4007N-124	20	Pilot	EP4007N-408
*	Straight Flange (standard on EP4007E-N)	EP4007N-123	21	Pilot Ball (.062 dia.)	EP4007N-422
4	Clutch Adjusting Ring	EP4007N-582	22	Pilot Push Spring Washer	EP4007N-421
5	Indicator Ring	EP4007N-682	23	Pilot Push Spring	EP4007N-420
6	Bit Retainer Retaining Ring (Front)	EP4007N-683	24	Cam Guide	EP4007N-681
7	Bit Retainer Collar	EP4007N-585	25	Cam Guide Ball (2) (.156 dia.)	2U-696
8	Bit Retainer Spring	EP4007N-931	27	Cam	EP4007N-581
9	Bit Retainer Sleeve	EP4007N-930	28	Cam Roller (2)	EP4007N-587
10	Bit Retainer Retaining Ring	EP4007N-584	29	Spindle Washer	EP4007N-509
11	Clutch Adjusting Pin (3)	EP4007N-416	30	Spindle Bearing	EP4007N-510
12	Clutch Housing Assembly	EP4007N-580	31	Spindle/Gear Head (2)	
13	Clutch Spring Plate	EP4007N-623		for EP1510E-N	EP2607N-216
14	Clutch Spring			for EP2612E-N	EP2612N-216
	for EP1510E-N	EP1510N-583		for EP4007E-N	EP4007N-216
	for EP2612E-N	EP2607N-583	34	Planet Gear	
	for EP4007E-N	EP4007N-583		for EP1510E-N (6)	EP1510N-10
15	Taper Ring Retaining Ring	EP4007N-584		for EP2612E-N (6)	EP2612N-10
16	Taper Ring Assembly			for EP4007E-N (6)	EP4007N-10
	for EP1510E-N and EP1612E-N	EP2607N-588			
	EP4007E-N	EP4007N-588			
17	Bit Retaining Ball (.094" dia.) (2)	R000B-263			
18	Pilot Cam Ball (2) (.156 dia.) (4)	2U-696			

MAINTENANCE SECTION



**Models EP1510E-N, EP2612E-N and EP4007E-N (Continued)**

**PART NUMBER FOR ORDERING**

**PART NUMBER FOR ORDERING**

35	Gear Head Pinion Gear for EP1510E-N ..... for EP2612E-N ..... for EP4007E-N .....	EP1510N-17 EP2612N-17 EP4007N-17	47	Front Armature Bearing .....	EP4007N-24
36	Gear Case for EP1510E-N ..... for EP2612E-N and EP4007E-N .....	EP1510N-37 EP4007N-37	48	Armature for EP1510E-N ..... for EP2612N and EP4007N .....	EP2607N-53 EP4007N-53
37	Gear Case Shield .....	EP4007N-207	49	Rear Armature Bearing .....	EP4007N-22
38	Clutch Pilot Rod "I" (2.26" long) .....	EP4007N-435	50	Rear End Plate .....	EP4007N-12
39	Fan Pinion Gear for EP1510E-N ..... for EP2612E-N ..... for EP4007E-N .....	EP1510N-18 EP2612N-18 EP4007N-18	51	Brush Assembly (includes 10 pieces) .....	EP4007N-BP
40	Fan Pilot Rod "G" (.385" long) .....	EP4007N-436	52	Brush Cap (2) .....	EP4007N-25
41	Fan .....	EP4007N-52	53	Motor Coil .....	EP4007E-N-594
42	Motor Pilot Rod "J" (2.71" long) .....	EP4007N-437	54	Adjusting Screw Nut .....	EP4007N-593
	Motor Assembly for EP1510E-N ..... for EP4007E-N and EP2612E-N .....	EP2607N-A53 EP4007N-A53	55	Pilot Rod Adjusting Screw .....	EP4007N-592
43	Front End Plate .....	EP4007N-11	56	Switch Pilot Rod "D" .....	EP4007N-438
44	Motor Assembly Spring (2) .....	EP4007N-98	57	Pilot Rod Spring .....	EP4007N-595
46	Field for EP1510E-N ..... for EP2612E-N and EP4007E-N .....	EP2607N-54 EP4007N-54	58	Microswitch Circuit Board .....	EP4007N-220
			59	Switch Plate .....	EP4007N-221
			60	Shut-off Switch .....	EP4007N-223
			61	Start Switch .....	EP4007N-222
			62	Switch Screw (12mm) (4) .....	EP4007N-224
			63	Switch Base Screw (5mm) (2) .....	EP4007N-226
			65	Switch Base Spacer (2) .....	EP4007N-225
			66	Insulating Film .....	EP4007N-227

**Models EP1510E-N, EP2612E-N and EP4007E-N (Continued)**

**PART NUMBER FOR ORDERING** 

**PART NUMBER FOR ORDERING** 

67	Brush Light Circuit Board .....	EP4007N-228	79	Warning Label .....	EP4004E-99
68	Controller Assembly .....	EP4007E-N-424	80	Housing Screw (package of 10) .....	EP4007N-41
	Reverse Switch Circuit Board Assembly .....	EP4007N-A229	81	Power Cord (8'; straight) .....	EP4007EN-239
69	Reverse Switch Circuit Board .....	EP4007N-229	*	Torque Adjusting Wrench .....	EP4007N-516
70	Reverse Switch .....	EP4007N-329	*	Suspension Bail	
*	Reverse Switch Rocker .....	EP4007N-330		for EP4007EN (fits Pistol Grip) .....	EP4007N-366
71	Capacitor (2) .....	EP4007N-230		for EP1510EN and EP2612EN .....	EP4007N-365
72	Resistor .....	EP4007N-231	*	Microswitch Adjusting Wrench Package .....	ES60T-MSW
73	Receptacle Assembly .....	EP4004E-44	*	Pistol Grip Assembly .....	EP4007N-48
74	Ground Screw .....	EP4007N-42	*	Test Brush (115V) .....	EP4007N-TB115
75	Ground Screw Washer .....	EP4007N-43	*	Switch Adjustment Gauge (for high torque models) .....	EP1510N-SG
	Housing Assembly		*	Gear Case Jig (for high torque models) .....	EP1510N-J37
	for EP1510E-N .....	EP1510EN-A40	*	Hardware Package (includes illustrated items 6, 10, 15, 17 [2], 44 [2], 52 [2], 54, 55, 62 [4], 63 [2], 66, 74, 75 and 80 .....	EP4007N-HP
	for EP2612E-N .....	EP2612EN-A40			EP4007N-302
	for EP4007E-N .....	EP4007EN-A40	*	Maintenance Label .....	EP4007N-240
76	Housing Package .....	EP4007N-40	82	Noise Suppressor .....	
77	Brush Light Cover .....	EP4007N-45			
78	Nameplate				
	for EP1510E-N .....	EP1510EN-301			
	for EP2612E-N .....	EP2612EN-301			
	for EP4007E-N .....	EP4007EN-301			

\* Not illustrated.

## MAINTENANCE SECTION

### DISASSEMBLY

#### WARNING

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

#### Disassembly of the Housing

1. Unplug the Power Cord (81) from the wall socket. Unscrew the connection ring and set the cord aside.
2. Unscrew the Retainer Coupling (1) and remove the Flange (2).

#### NOTICE

**This is a left-hand thread.**

3. Lay the tool on the workbench with the Brush Light Plate (77 or 80) side down and remove the Housing Screw (80) using a #1 phillips screwdriver.
4. Insert a thin blade screwdriver into the two notches and carefully pry the two halves of the Housing Package (76) apart.

#### Disassembly of the Clutch Housing and Gear Case

1. Tilt the Clutch Housing (12), Gear Case (36) and Motor Assembly upward slightly and turn the Gear Case until the Ground Screw (74) shows.

#### NOTICE

**Be sure to hold the Motor Assembly and Gear Case together. Rough handling may damage the Fan Pilot Rod (40) in the Fan (41).**

2. Using a phillips screwdriver, remove the Ground Screw and the Ground Screw Washer (75).
3. Remove the Clutch Housing and Gear Case from the Housing. When removing the Gear Case from the Housing, hold the Gear Case Shield (37) so that the Gears do not fall out.
4. Remove the Fan (41) and the Fan Pinion Gear (39). Remove the Fan Pilot Rod (40).

#### NOTICE

**The Fan Pilot Rod is ceramic. Do not mishandle or drop.**

5. Remove the Gear Case Shield and drop the two Spindle/Gear Heads (31) from the Gear Case.
6. Separate the Spindle/Gear Heads and remove the Gear Head Pinion Gear (35) and Planet Gears (34).
7. Fit the two notches at the rear of the Gear Case into the Gear Case Jig part no. EP1510N-J37. (Refer to Dwg. TPD1820).
8. Using a thin blade screwdriver, remove the Front Bit Retainer Retaining Ring (6) from the Bit Retainer Sleeve (9). Remove the Bit Retainer Collar (7), the Bit Retainer Spring (8) and the Bit Retainer Sleeve.
9. Remove the two Bit Retaining Balls (17 or 19) from the Bit Holder Assembly (19 or 21) by tapping the Housing on the work surface.
10. Unscrew the Clutch Adjusting Ring (4) and remove the three Clutch Adjusting Pins (11).
11. Using external snap ring pliers, remove the Bit Retainer Retaining Ring (10).
12. Using a 29mm wrench on the flats of the Clutch Housing, unscrew and remove the Clutch Housing from the Gear Case.

#### NOTICE

**This is a left-hand thread.**

13. Remove the Clutch Spring Plate (13 or 15) and the Clutch Spring (14 or 16).
14. Remove the Taper Ring Retaining Ring (15 or 17).
15. Remove the Bit Holder Assembly and separate it from the Taper Ring Assembly (16 or 18).
16. Remove the two Pilot Cam Balls (18 or 20), the Pilot Push Spring (23), the Pilot Push Spring Washer (22) and the Pilot (20 or 22) from the Bit Holder Assembly.
17. Remove the Clutch Pilot Rod (38) and the Cam Guide (24). Remove the two Cam Guide Balls (25) from the Guide.

## MAINTENANCE SECTION

18. Lift the Gear Case from the Gear Case Jig and push the Spindle Bearing (30) and Cam (27) from the Case.
19. Lift the Cam from the Spindle Bearing and remove the Cam Rollers (28).
20. Slide the Spindle Washer (29) from the Spindle Bearing.

### Cleaning and Inspection of the Tool

1. Clean all of the mechanical parts in an approved safety solution in a well-ventilated area. Inspect for damage or wear.
2. Inspect the Fan. If the four corners of the hole are worn, replace the Fan.
3. Inspect the Fan Pinion Gear and Fan Pilot Rod. If they are damaged or cracked, replace them.
4. If the taper on the Pilot is worn, replace the Pilot and the two Pilot Cam Balls.
5. Inspect the Cam Guide Balls. If they are worn, replace them.
6. Inspect the Cam Guide. If its holes are worn, replace it.
7. Inspect the Taper Ring Assembly. If the internal taper is worn, replace it.
8. Inspect the Cam Rollers. If they are worn, replace them.
9. Inspect the Spindle Washer. If the surface is worn, replace it.
10. Inspect the Spindle Bearing. If it does not rotate smoothly, replace it.
11. Inspect the Gears and the Gear Case. If the teeth are worn, replace them.

### Disassembly of the Electrical Components

1. Remove the Reverse Switch Circuit Board (69) from the Housing.

#### NOTICE

**Do not touch any circuit paths if using pliers.**

2. Loosen the Receptacle Assembly (73).
3. Using a #0 phillips screwdriver, remove the two Switch Base Screws (63) mounted on the Microswitch Circuit Board (58).

#### NOTICE

**The Switch Base Screws are coated with thread adhesive. Unscrew gradually to prevent damage to the threads.**

4. Remove the Motor Assembly and the Controller Assembly (68) from the Housing Package while holding both of them together.

#### NOTICE

**Be careful not to damage the Motor Pilot Rod (42).**

5. To remove the Controller Assembly, pull the three-pin connector from the Reverse Switch Circuit Board.
6. Remove the two-pin connector from the Microswitch Circuit Board.
7. Using needle nose pliers, remove the three wires from the Shut-off Switch (60).

#### NOTICE

**Be careful not to damage the Shut-off Switch Terminals.**

8. Set the Controller Assembly aside.
9. Grasp the Microswitch Circuit Board using needle nose pliers and squeeze the ends of the two white Switch Base Spacers (65). Lift the Brush Light Circuit Board (67) from the Switch Base Spacers.
10. Using needle nose pliers, squeeze the Switch Base Spacers and remove the Insulating Film (66).
11. Using the pliers, remove the Switch Base Spacers from the Brush Light Circuit Board.
12. Remove the two Shut-off Switch Screws (62).
13. Remove the two Start Switch Screws (62).
14. Remove the Switch Plate (59) and the Switch Pilot Rod (56) from the Switch Plate.
15. Inspect the tip of the Switch Pilot Rod. If it is bent or worn, replace it.
16. Check the Shut-off Switch for continuity. Replace it if defective.
17. Check the Start Switch (61) for continuity. If it is defective, desolder and remove it from the Microswitch Circuit Board.
18. If the Brush Light Circuit Board is defective, desolder and remove the red and blue wires.
19. If the components on the Reverse Switch Circuit Board are damaged or defective, desolder and remove the red and blue wires.
20. If the Reverse Switch (70) is damaged, desolder and replace.
21. Using an Ohm meter, check the Resistor (72) on the Reverse Switch Circuit Board. Readings should be 20 Ohm for 115V Tools and 80 Ohm for 230V Tools. Desolder and replace Resistor if necessary.
22. If the Capacitor (71) is damaged, desolder and replace it.
23. If the Motor Coil (53) is damaged, desolder the red and blue motor leads and replace the coil.

#### NOTICE

**115V Tools have one coil.**

## MAINTENANCE SECTION

### Disassembly of the Motor

1. Remove the Brush Caps (52) from the Rear End Plate (50). Using a pick, catch the terminal of the Brush Assembly (51) and pull it out of the Rear End Plate.

#### NOTICE

**Do not damage the copper wires of the Brush Assembly. Reinstall the Brushes as they were removed unless they are replaced.**

2. Remove the insulation tape around the Motor.
3. Using a thin blade screwdriver, remove the Motor Assembly Springs (44) by inserting the screwdriver between the Springs and the Rear End Plate and prying upward.
4. Remove the Rear End Plate and the Front End Plate (43) from the Field (46).
5. Pushing the Armature (48) toward the Fan side, remove the Armature from the Field.
6. Do not damage the commutator or the windings of the Armature. Hold the rotor, not the commutator.
7. Remove the Motor Pilot Rod from the Armature and inspect it. If it is worn, replace it.
8. Remove the Front Armature Bearing (47) and the Rear Armature Bearing (49) from the Armature and inspect them. If they do not rotate smoothly, replace them.
9. Inspect the Armature, Field and End Plates. Use a piece of fine cloth to wipe away contamination. For excess build up, spray with contact cleaner and brush if necessary.
10. To clean the commutator on the Armature, spray with contact cleaner and brush if necessary.
11. Using a tester, inspect the commutator. Replace the Armature if necessary.

### ASSEMBLY

#### Assembly of the Motor Housing

1. Install the Front Armature Bearing (47) and the Rear Armature Bearing (49) to the Armature shaft ends.
2. Apply grease to both ends of the Motor Pilot Rod (42) and insert it into the center hole of the Motor Assembly.
3. Insert the Armature through the notched end of the Field (46).

#### NOTICE

**Be careful not to damage the commutator or the windings. Hold the rotor, not the commutator when assembling.**

4. Install the Rear End Plate (50) to the notched end and the Front End Plate (43) to the field.
5. Snap the two Motor Assembly Springs (44) over the notches of the Rear End Plate and the Front End Plate.
6. Insert the Brush Assemblies (51) into the brush holders of the Rear End Plate. Be sure the tab on the Brush Assembly slides into the notch in the holder.
7. Screw on the Brush Caps (52).
8. Wrap one layer of 3M #56 insulation tape around the Motor Assembly.

#### Assembly of the Electrical Components

1. Solder the red and blue wires to the Brush Light Circuit Board.
2. Solder the Reverse Switch (70) and the Resistor (72). Using shrink tubing 5mm long as spacers, solder the Capacitor (71) into place. Solder the red and blue wires to the Reverse Switch Circuit Board (69).
3. Solder the Start Switch (61) onto the Microswitch Circuit Board (58).
4. Insert the Switch Pilot Rod (56) into the hole in the Switch Plate (59). (Refer to Dwg. TPD 1819).

## MAINTENANCE SECTION

5. Mount the Switch Plate with the Pilot Rod onto the Start Switch by depressing the Start Switch lever with the Pilot Rod. Insert the Pilot Rod into the slot in the Microswitch Circuit Board and align the Switch Plate on top of the Start Switch. Insert the two Switch Base Screws (63) from the bottom of the Microswitch Circuit Board into the Switch Plate. Tighten the Screws to 1.6 KG-cm.
6. Mount the Shut-off Switch (60) onto the Switch Plate with the two Switch Screws (62). Tighten the screws to 1.6 KG-cm.
7. Position the Insulating Film (66) onto the back of the Brush Light Circuit Board. Insert the two Switch Base Spacers (65) through the Insulating Film and into the holes of the Circuit Board.
8. Install the Brush Light Circuit Board onto the back of the Microswitch Circuit Board by inserting the two Switch Base Spacers into the holes in the Circuit Board.

### NOTICE

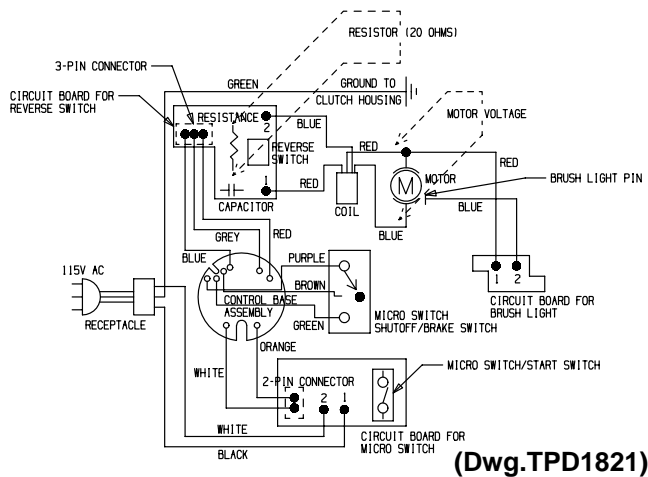
**Be sure that the Brush Light LED is toward the motor side of the circuit board.**

9. Using needle nose pliers, install the three connectors from the Controller Assembly (68) onto the Shut-off Switch.

### NOTICE

**Make sure to connect the correct color wire to the proper terminal. Refer to the wiring diagram to insure that all wires are installed properly.**

**Refer to Dwg. TPD1821.**



10. Install the two-pin connector from the Controller Assembly onto the Microswitch Circuit Board.
11. Install the three-pin connector from the Controller Assembly onto the Reverse Switch Circuit Board.
12. Run the ground wire around the Switch Base Spacers and between the Microswitch Circuit Board and the Brush Light Circuit Board.

13. Bring the Motor Assembly and Microswitch Circuit Board together by inserting the Motor Pilot Rod into the hole in the Motor shaft and then setting both into the Housing Package (76).
14. Install the two Switch Base Screws and tighten to 1.6 KG-cm.
15. Install the Controller Assembly into its groove in the Housing. Place the ground wire into the notch in the Controller Assembly and align this notch with the tab in the Housing.
16. Install the Reverse Switch Circuit Board into the two grooves in the Housing.
17. Install the Receptacle Assembly (73) into the Housing, making sure the ground wire is underneath the HIC. The Receptacle can be installed in either position.
18. Place the black and white Receptacle wires into the notch in the Controller Assembly.
19. Place the ceramic Fan Pilot Rod (40) into the Fan Pinion Gear (39) and then fit the Gear into the Fan (41). Now slide the Fan onto the Motor shaft.

### Assembly of the Gear Case and Clutch Housing

1. Apply grease to the Planet Gears (34), the surfaces of the Gear Heads (32) and the teeth of the Gear Head Pinion Gear (35).
2. Assemble the Spindle/Gear Heads, the Gear Head Pinion Gear and the Gear Head.
3. Apply grease to all the Gears.
4. Place the Gear Head onto the Spindle/Gear Heads.
5. Apply grease to the Spindle Washer (29).
6. Place the Spindle Washer, then the Spindle Bearing (30), onto the Cam (27).
7. Apply grease to the inner teeth of the Gear Case (36).
8. Insert the Cam into the Spindle Bearing.
9. Hold the Cam with needle nose pliers and insert the entire unit into the Gear Case while rotating the Cam and the Gear Case.
10. Apply grease to the gear end of the Gear Case and install the Gear Case Shield (37).
11. Apply grease to the notches of the Cam.
12. Place the Cam Rollers (28) into the notches on the Cam.
13. Apply grease to the inner surface, the holes and the grooves of the Cam Guide (24).
14. Insert the Cam Guide Balls (25) into the holes in the Cam Guide.
15. Install the Cam Guide over the Cam. Keep the Cam Balls at a 90 degree angle to the Cam Rollers to prevent the Balls from being pushed out.
16. Apply grease to the inner surface of the Bit Holder Assembly (19 or 21). Using a rod, push the Pilot (20 or 22) into the Bit Holder.

## MAINTENANCE SECTION

17. Insert the Pilot Push Spring Washer (22) and the Pilot Push Spring (23) into the Bit Holder.
18. Apply grease to the holes of the Bit Holder and insert the two Pilot Cam Balls (18 or 20).
19. Apply grease to the inner diameter and the tapered end of the Taper Ring Assembly (16 or 18). Insert grease between the ball bearing thrust washer and the Taper Ring Assembly, which are attached. Install the Taper Ring Assembly onto the Bit Holder.
20. Install the Bit Holder Assembly onto the Cam Guide in the Gear Case.
21. The Taper Ring Retaining Ring (15 or 17) has a round edge side and a sharp side edge. Install the Taper Ring Retaining Ring, sharp edge side first, into the groove on the Bit Holder.

### NOTICE

**There are four grooves on the Bit Holder. The fourth groove from the bit end is for Push to Start Models.**

22. Place the Clutch Spring (14 or 16) and the Clutch Spring Plate (13 or 15) over the Bit Holder.
23. Fit the two notches at the rear end of the Gear Case Assembly into the Gear Case Jig part no. EP1510N–J37. Screw the Clutch Housing (12) partially into the Gear Case.

### NOTICE

**This is a left–hand thread.**

At the middle of the Clutch Housing threads, apply Loctite Threadlocker 3 Bond 1406®\* to about three threads. Push down and rotate the Bit Holder until it engages the Cam Guide. Hold in place. Screw the Clutch Housing in completely.

24. Using an open end torque wrench on the flats of the Clutch Housing, tighten the Clutch Housing to 28.5 Nm.

25. Apply grease to both ends of the Clutch Pilot Rod (36 or 38) and insert it into the Gear Case.
26. Install the Bit Retainer Retaining Ring (10), sharp edge side first, into the second groove from the bit end of the Bit Holder.
27. Apply grease to the holes of the Bit Holder and insert the two Bit Retaining Balls (17 or 19) into the holes.
28. Apply grease to one end of each Clutch Adjusting Pin (11) and insert the three Pins into the Clutch Housing.
29. Apply grease to the other end of each Clutch Adjusting Pin and the threads of the Clutch Housing. Screw the Clutch Adjusting Ring (4) onto the Housing.
30. Install the Bit Retainer Sleeve (9), the Bit Retainer Spring (8) and the Bit Retainer Collar (7) onto the Bit Holder.
31. Using a thin blade screwdriver, install the Front Bit Retainer Retaining Ring (6).
32. Unclamp the Gear Case Jig from the vise and turn it over to remove the Clutch and Gear Case Assembly. Hold the Gear Case Shield to keep the Gears in place.
33. Lift the Motor slightly and slide the Gear Case onto the Motor with the Ground Screw hole adjacent to the ground wire.
34. Attach the ground wire to the Gear Case with the Ground Screw (74) and Washer (75). Tighten to 4 KG–cm.
35. Turn the Gear Case until the notch in the Gear Case matches the tab in the Housing.
36. Completely insert the ground wire into the groove in the Housing.

### Adjusting the Brake Timing

1. Insert a .90 mm thick gauge or pin gauge between the Pilot Rod Adjusting Screw (55) head and the Shut–off Switch. Push the Bit Holder. **The Shut–off Switch should not click.**
2. Insert a 1.05 mm gauge and push the Bit Holder. **The Shut–off Switch should click.**
3. Adjust the Pilot Rod Adjusting Screw if necessary using the two adjusting spanner wrenches.

## **MAINTENANCE SECTION**

### **Assembly of the Tool**

1. Make sure the ground wire is inserted in the groove in the Housing.
2. Snap the Housing halves together.
3. While compressing the Throttle Spring, install the Throttle Lever onto the Throttle Lever Pin. Snap the Housing halves together.
4. Install the Housing Screws (80 or 83) into the Housing and tighten to 4 KG-cm.
5. Slide the Flange (2) onto the Housing. Screw the Retainer Coupling (1) onto the Housing until it clicks into place.

### **NOTICE**

**These are left-hand threads.**

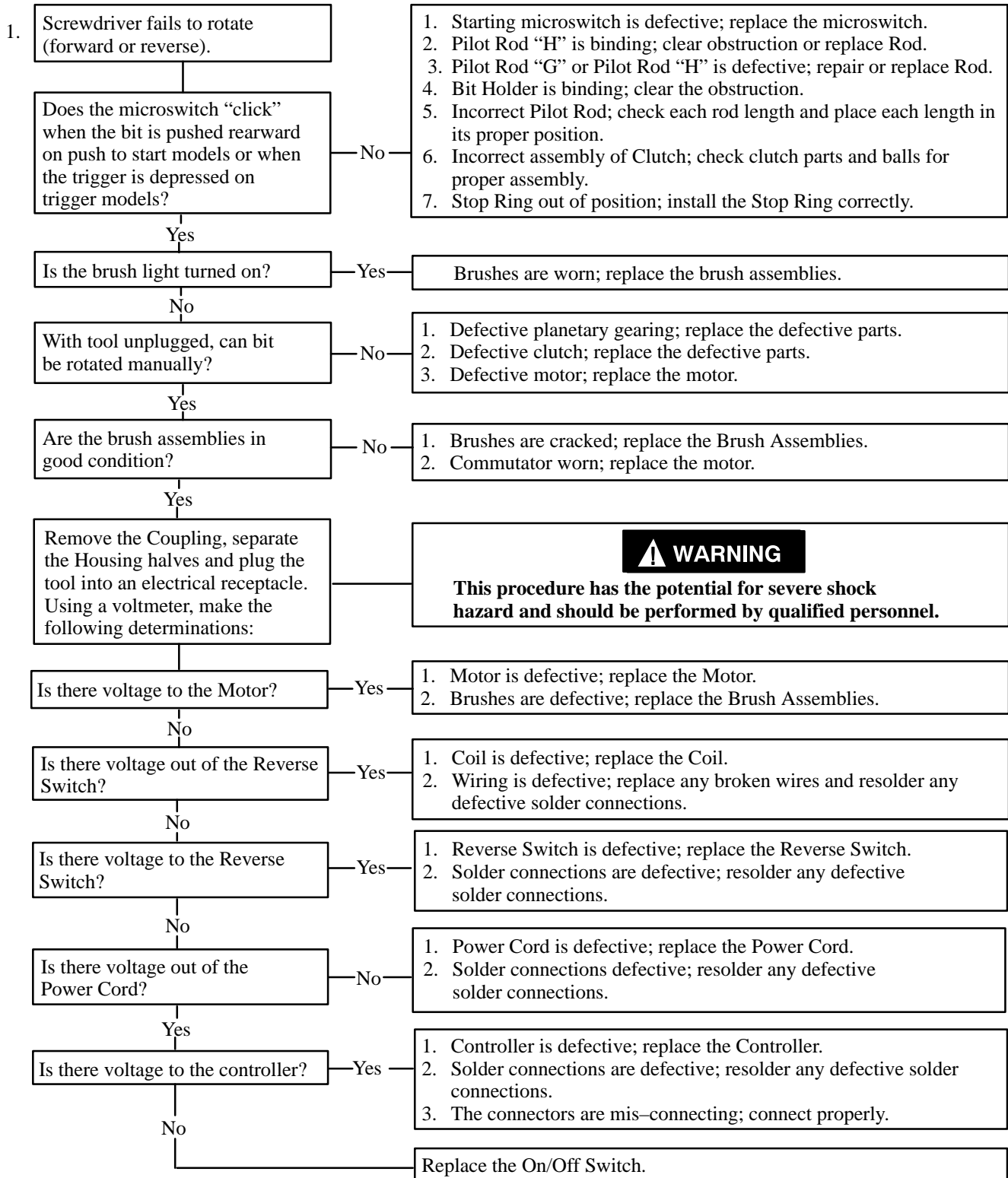
6. Attach the Power Cord (81 or 84).

### **Testing the Tool**

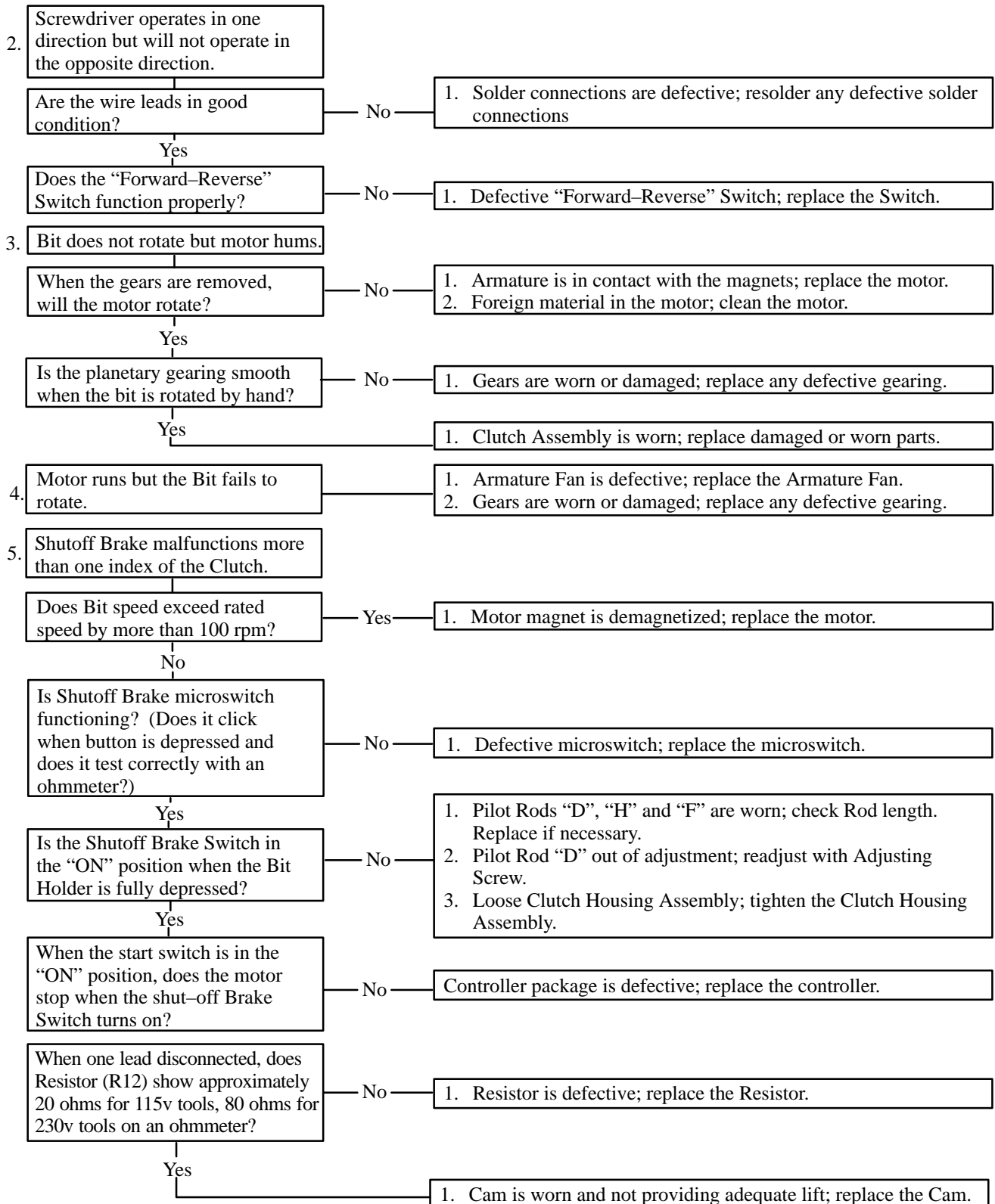
1. Test forward and reverse operation by pressing the Bit Holder against the work surface with the Reverse Switch in each position.
2. Tighten the Clutch Adjusting Ring all the way, reverse it one turn and test for proper shut off operation and maximum torque.
3. Reset the Clutch Adjusting Ring to mid scale and check for torque repeatability by cycling the tool between five to ten times.
4. For repair and troubleshooting of the high torque low voltage Controller, refer to the operation and maintenance manual.



## MAINTENANCE SECTION TROUBLESHOOTING GUIDE

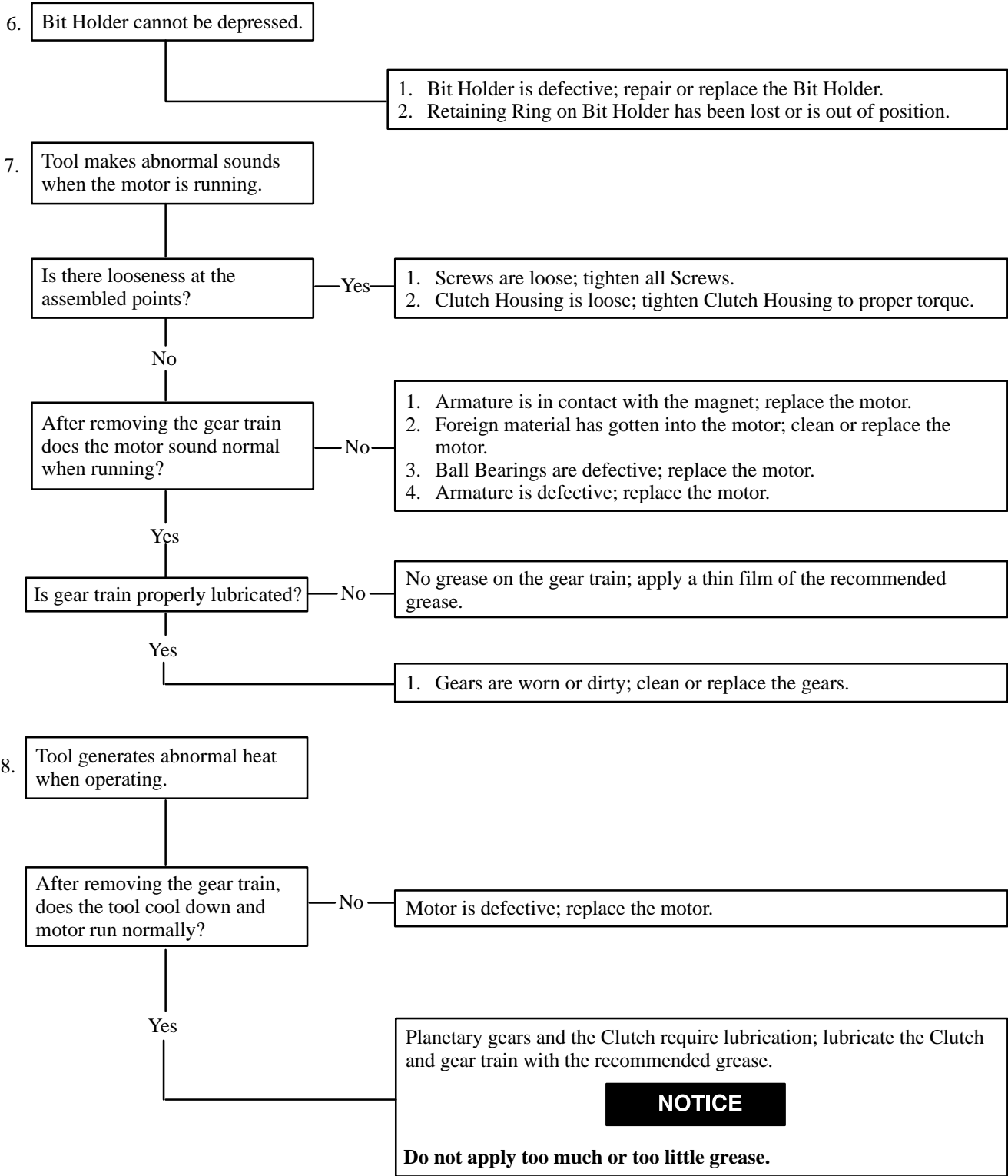


## MAINTENANCE SECTION TROUBLESHOOTING (Continued)

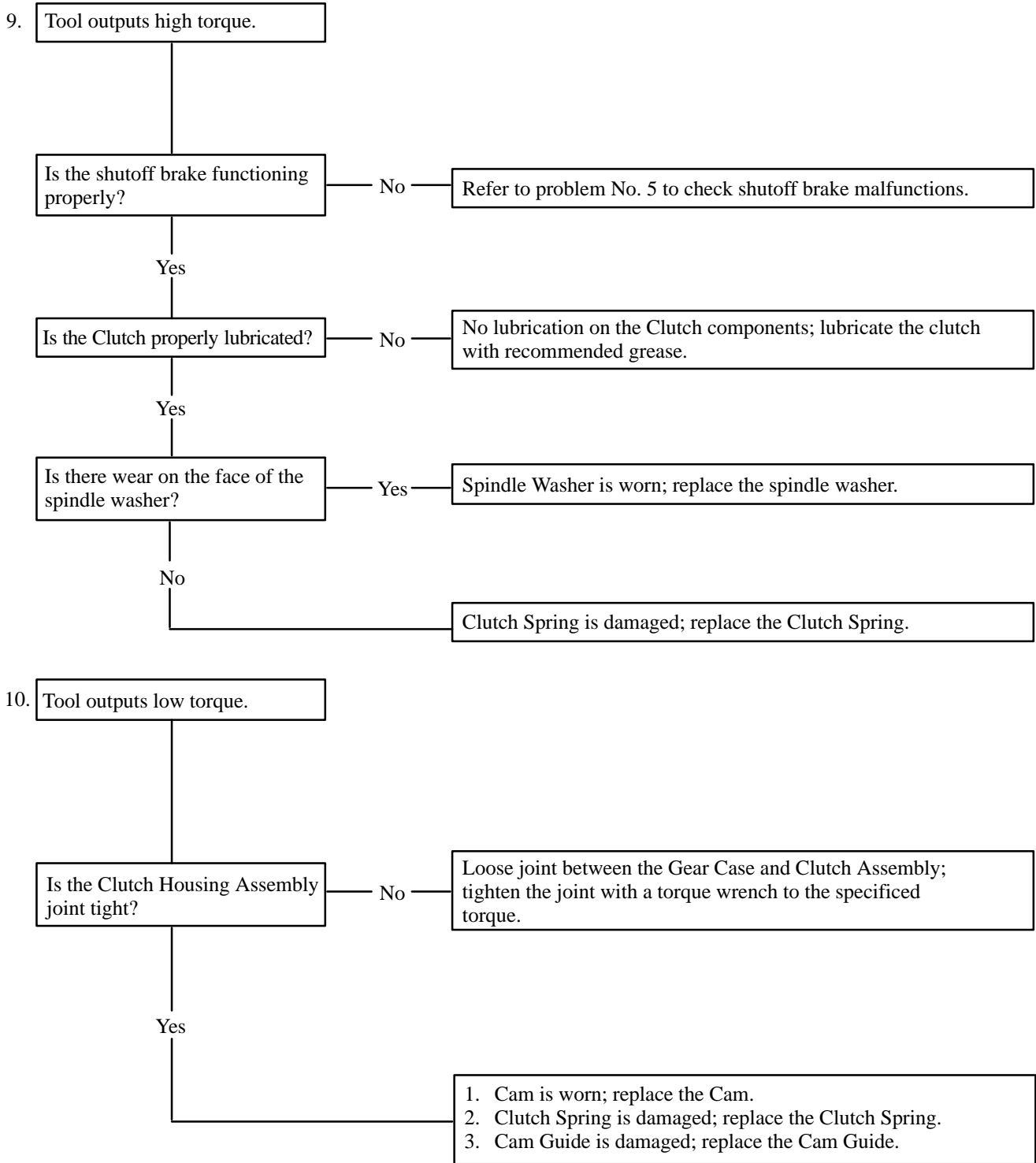


## MAINTENANCE SECTION

### TROUBLESHOOTING *(Continued)*



## MAINTENANCE SECTION TROUBLESHOOTING (Continued)



## Service Centers

Ingersoll–Rand Company  
510 Hester Drive  
White House  
TN 37188  
USA  
Tel: (615) 672 0321  
Fax: (615) 672 0601

Ingersoll–Rand  
Sales Company Limited  
Chorley New Road  
Horwich Bolton  
Lancashire BL6 6JN  
England  
UK  
Tel: (44) 1204 690690  
Fax: (44) 1204 690388

Ingersoll–Rand  
Equipements de Production  
111 avenue Roger Salengro  
BP 59  
F – 59450 Sin Le Noble  
France  
Tél: (33) 27 93 0808  
Fax: (33) 27 93 0800

Ingersoll–Rand GmbH  
Gewerbeallee 17  
45478 Mülheim/Ruhr  
Deutschland  
Tel: (49) 208 99940  
Fax: (49) 208 9994445

Ingersoll–Rand Italiana SpA  
Casella Postale 1232  
20100 Milano  
Italia  
Tel: (39) 2 950561  
Fax: (39) 2 95360159

Ingersoll–Rand Ibérica  
Camino de Rejas 1, 2–18  
28820 Coslada (Madrid)  
España  
Tel: (34) 1 6695850  
Fax: (34) 1 6696054

Ingersoll–Rand Nederland  
Produktieweg 10  
2382 PB Zoeterwoude  
Nederland  
Tel: (31) 71 452200  
Fax: (31) 71 5218671

Ingersoll–Rand Company SA  
PO Box 3720  
Alrode 1451  
South Africa  
Tel: (27) 11 864 3930  
Fax: (27) 11 864 3954

Ingersoll–Rand  
Scandinavian Operations  
Kastruplundgade 22, I  
DK – 2770 Kastrup  
Danmark  
Tlf: (45) 32 526092  
Fax: (45) 32 529092

Ingersoll–Rand SA  
The Alpha Building  
Route des Arsenaux 9  
CH –1700 Fribourg  
Schweiz/Suisse  
Tel: (41) 37 205111  
Fax: (41) 37 222932

Ingersoll–Rand Company  
Kuznetsky Most 21/5  
Entrance 3  
103698 Moscow  
Russia  
CIS  
Tel: (7) 501 882 0440  
Fax: (7) 501 882 0441

Ingersoll–Rand Company  
16 Pietro  
Ul Stawki 2  
00193 Warsaw  
Poland  
Tel: (48) 2 635 7245  
Fax: (48) 2 635 7332

## **NOTES**

## **NOTES**