45527785
Edition 1
July 2008

Electric Screwdrivers

ES 115V AC Series

Maintenance Information

Save These Instructions

Ingersoll Rand

⚠ WARNING

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

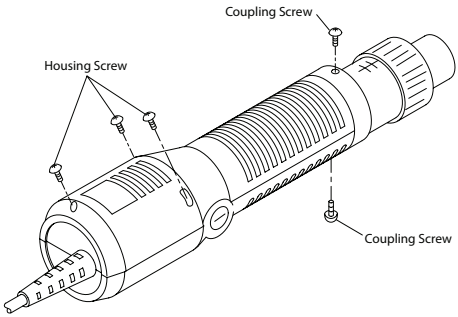
Note: *(When reading the instructions, refer to exploded diagrams in parts Information Manuals when applicable (see under Related Documentation for form numbers).*

Disassembly

1. Using a No. 2 tip Phillips head screwdriver on the Housing Screws (1B) and a No. 1 Phillips head screwdriver on the Coupling Screws (36B or 3SB), remove the two Coupling Screws and the three Housing Screws.

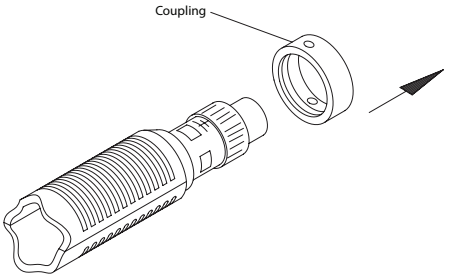
NOTICE

The screw threads are coated with Threadlocker 222®*. It may be necessary to rapidly tap the end of the screwdriver handle with a hammer while backing the Screws out of the Housing.



(Dwg. TPD1029)

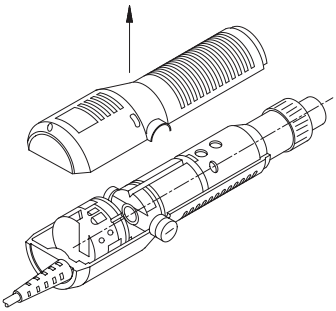
2. Remove the Coupling (36A or 3SA) by pulling it off the front end of the Electric Screwdriver.



(Dwg. TPD1030)

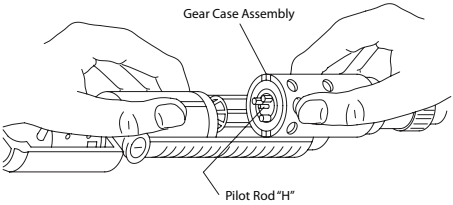
3. Carefully separate the two halves of the Housing (1A) by using a thin blade screwdriver to pry them apart.

* Registered trademark of Loctite Corporation.



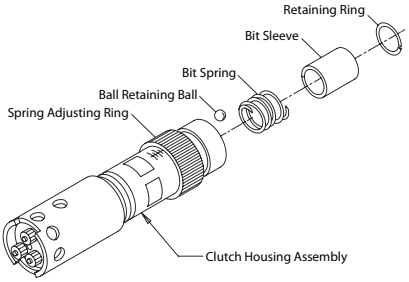
(Dwg. TPD1031)

4. With the assembled motor elevated slightly from the Housing, pull the Gear Case Assembly (21 or 22) away from the assembled motor.



(Dwg. TPD1032)

5. Remove the Pilot Rod "H" (27 or 28) from the Gear Case Assembly.
6. Using a thin blade screwdriver, spiral the Retaining Ring (39C or 41C) out of the front of the Clutch Housing Assembly (34 or 36). Remove the Bit Sleeve (39A or 41A), Bit Spring (39B or 41B) and the Bit Retaining Balls (40 or 42). Loosen the Spring Adjusting Ring (37 or 39) until it is just finger tight.

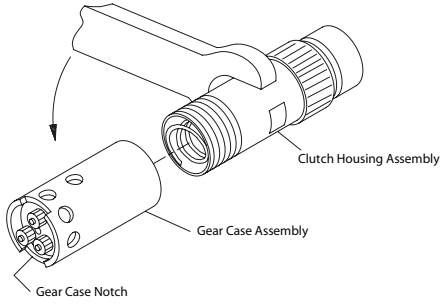


(Dwg. TPD1033)

7. Fit the two notches at the rear of the Gear Case Assembly (21 or 22) into an assembly fixture and using an open end wrench on the flats on the Clutch Housing Assembly (34 or 36), unscrew and remove the Clutch Housing Assembly.

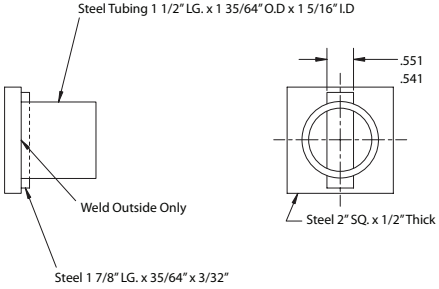
NOTICE

This is a left-hand thread.



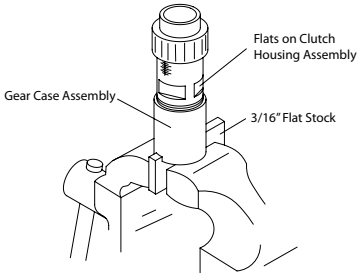
(Dwg. TPD1034)

ES6OT Clutch Housing Fixture



(Dwg. TPD1053)

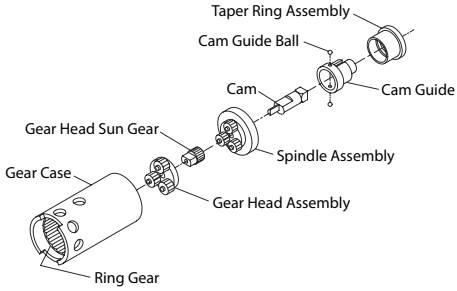
Removing the Clutch Housing from the Gear Case



(Dwg. TPD1056)

8. Remove the Taper Ring Assembly (29 or 30), Cam Guide (28B or 29A) and Cam Guide Balls (28C or 29B) from the Gear Case Assembly. **For Model ES5OP, ES1OOP or ES1OOT,** remove the Cam (26A or 27A), Cam Pins (26B or 27B) (2 for model ES80P and 4 for model ES1OOP or ES100T) and the Cam Washer (26C or 27C). **For Model ES90P or ES90T,** remove the Cam (25 or 27). Remove the Spindle Assembly (24 or 25) and the two Spindle Washers (24C or 25C) from the Gear Case Assembly.

For all other models, remove the Cam (25 or 27). Remove the Spindle Assembly (24 or 25), Gear Head Sun Gear (23 or 24) and Gear Head Assembly (22 or 23) from the Gear Case Assembly. Do not attempt removal of the ring gear inside the Gear Case. It is a press fit into the Gear Case.

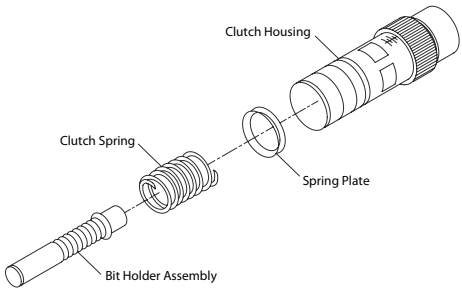


(Dwg. TPD1035)

9. Slide the Bit Holder Assembly, Clutch Spring (30 or 31) and Spring Plate (33 or 35) out of the Clutch Housing.

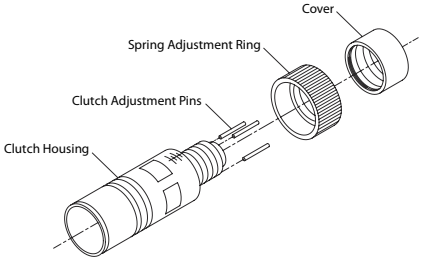
NOTICE

Trigger models have a Holder Bearing Assembly. Remove the Assembly from the Clutch Housing.



(Dwg. TPD1036)

10. Unscrew and remove the Cover (38 or 40). Unscrew and remove the Spring Adjusting Ring (37 or 39) and pull the three Clutch Adjusting Pins (35 or 37) out of the Clutch Housing.



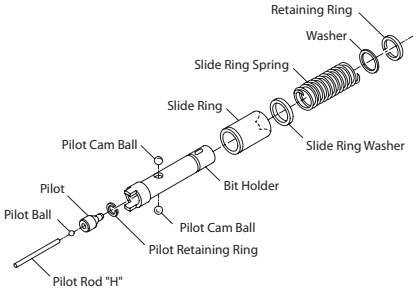
(Dwg. TPD1037)

11. Pull the Pilot Rod "H" (27 or 28) out of the Bit Holder and using miniature, internal snap ring pliers, remove the Stop Ring (32E or 33E) from the Bit Holder (31A or 32A).

NOTICE

Spread the Ring only enough to remove it from the Bit Holder. Excessive expansion may damage the Ring.

12. Remove the Washer (32D or 33D), Slide Ring Spring (32C or 33C), Slide Ring Washer (32B or 33B) and Slide Ring (32A or 33A) from the Bit Holder.



(Dwg. TPD1038)

13. When the Slide Ring is removed, the two Pilot Cam Balls (32 or 33) will come out of the Bit Holder. Removing the Balls allows the Pilot (31B or 32B), Pilot Ball (31C or 32C) and Pilot Retaining Ring (31D or 32D) to be removed from the end of the Bit Holder.

NOTICE

The Pilot Ball must be clean to be removed from the Pilot. However, only remove the Pilot Ball and Pilot Retaining Ring if it is necessary.

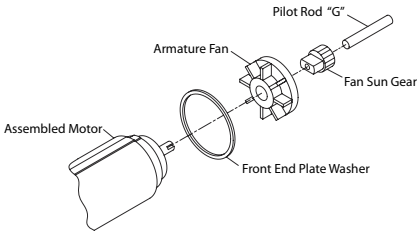
14. Remove the Front End Plate Washer (if the tool has one), the Fan Sun Gear (19 or 20) and the Armature Fan (18 or 19) from the front of the motor.

NOTICE

The Front End Plate Washer consists of one or more thin, semi-transparent plastic pieces. Pull the Pilot Rod "G" (20 or 21) out of the Fan Sun Gear.

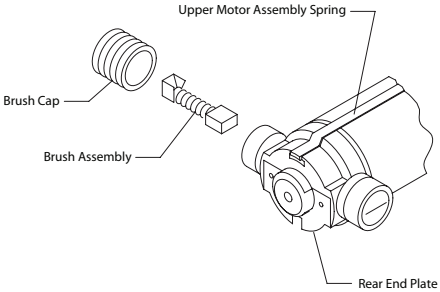
⚠ WARNING

Do not lose, substitute or damage Pilot Rod "G". It is a critical component of the tool's electrical insulation system and any substitution, omission or damage could cause a shock.



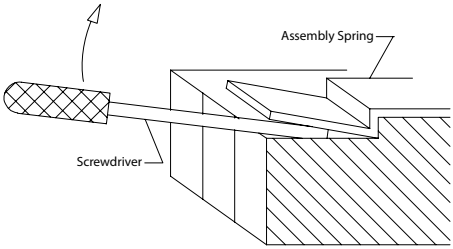
(Dwg. TPD1039)

15. If additional disassembly is required, unsolder the Capacitors (15A or 16A) and (16 or 17) from the Control Base (7A or 8) and from the end of the Upper Motor Assembly Spring (15B or 16B).



(Dwg. TPD1040-2)

16. Unscrew and remove the two Brush Caps (15 or 16) and pull the two Brush Assemblies (14A or 15A) out of the Rear End Plate (14 or 15). Mark the Brushes so they can be reinstalled exactly as they were removed unless they are replaced.
17. Using a thin blade screwdriver, remove the Motor Assembly Springs (15B or 16B) by inserting the screwdriver between the Spring and Rear End Plate and prying upward.

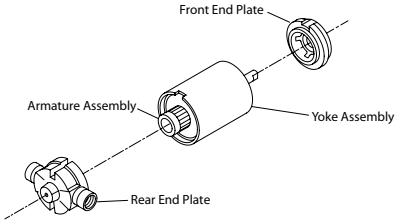


(Dwg. TPD1041)

18. Remove the Rear End Plate (14 or 15) and the Front End Plate (15G or 16G) from the Yoke Assembly (15E or 16E) and Armature Assembly (15D or 16D). If Insulators (16 or 17) and Washers (16A or 17A) are removed, replace them with new ones.

⚠ CAUTION

Do not separate the Armature Assembly from the Yoke Assembly. The magnet in the Yoke will become slightly demagnetized and adversely affect motor performance.



(Dwg. TPD1042)

Assembly

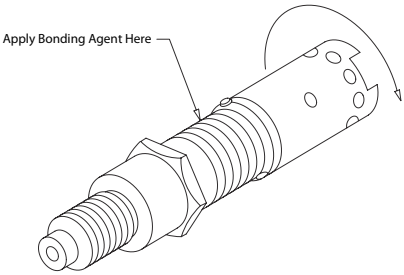
To assemble these tools, reverse the disassembly procedure. There are certain assembly and lubrication instructions which are important for optimum performance and they are as follows:

1. Keep the commutator surface of the armature free from all contaminants.
2. Use good quality, properly sized snap ring pliers when installing the Stop Ring (32E or 33E) on the Bit Holder (31A or 32A) and do not expand the Stop Ring more than required to install it on the Holder. Excessive expansion may cause the Ring to deform and fail.
3. To assemble the Clutch Housing Assembly to the Gear Case Assembly, proceed as follows:
   a. Apply 0.3 cc of **Ingersoll Rand** No. 67 Grease to the Spindle Assembly (24 or 25).
   b. Insert the Cam (25, 26A or 27), small end first, into the Gear Case (21 or 22).
   c. Inject a small amount of grease into the holes for the Cam Guide Balls (28C or 29B) and insert a Cam Guide Ball into each hole.
      For model ES5OP, insert a Cam Pin (26B or 27B) between each of the two Cam Guide Balls and hold each in position with a small amount of grease.
      For Model ES1OOP or ES1OOT, insert a Cam Pin between each of the four Cam Guide Balls and hold each in position with a small amount of grease.
   d. Being careful not to dislodge the Cam Guide Balls or Cam Guide Pins, thread the Gear Case onto the Clutch Housing about two threads.

NOTICE

This is a left-hand thread.

   e. At the middle of the Clutch Housing thread, apply Loctite Threadlocker 242, or equivalent, to approximately three threads.

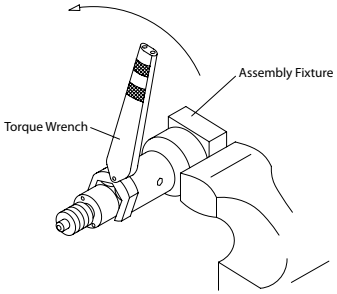


(Dwg. TPD1044)

   f. Carefully thread the Clutch Housing into the Gear Case until contact is made with the Cam. When contact is made, unscrew the Clutch Housing two full thread revolutions.
   g. Insert a 114" tee wrench or hex wrench into the end of the Bit Holder (31A or 32A). While pushing the Bit Holder inward with the wrench, rotate the Gear Case until the jaws of the Cam Guide (28B or 29A) engage the Cam. The wrench will move inward noticeably when engagement occurs.
   h. While maintaining engagement with the wrench, hand tighten the Gear Case as much as possible.
   i. With the assembly fixture held in vise jaws, position the notches in the Gear Case onto the fixture and, using a torque wrench, tighten the Clutch Housing to 21 ft-lb (28.5 Nm) torque. Refer to Drawing TPD1053 on Page 3.

NOTICE

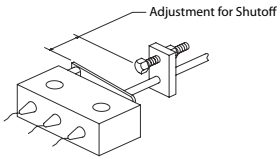
Recalibrate the torque wrench every six months.



(Dwg. TPD1045)

4. The brake switch must be timed to actuate when the clutch cams over. To adjust the timing, loosen the Adjusting Screw Nut (13B or 14B) and turn the Adjusting Screw (13A or 14A) in or out until the microswitch (12A or 13A) is actuated at the same time the clutch cams over or slightly before it cams over, If the motor lug before the brake switch actuates, shorten the Adjusting Screw.

Clutch Shut-off/Brake Switch



(Dwg. TPD1046)

Lubrication

Whenever an Electric Screwdriver is disassembled for maintenance or repair, lubricate the following components in the recommended manner with **Ingersoll Rand** No. 67 Grease.

1. Inject a tiny amount of grease into the hole in the Pilot (31B or 32B) for the Pilot Ball (31C or 32C).
2. Wipe a film of grease on the tapered inner surface of the Slide Ring (32A or 33A) and the Taper Ring Assembly (29 or 30).
3. Apply a moderate amount of grease to the outer surfaces of the Cam (25, 26A or 27), the Cam Guide (28B or 29A) and the Cam Guide Balls (28C or 29B).
4. Wipe a thin coat of grease on each of the Spindle Gears (24A or 25A).

⚠ CAUTION

Do not pack the gearing with grease. Excess grease may be pulled into the motor by the Armature Fan (18 or 19).

⚠ WARNING

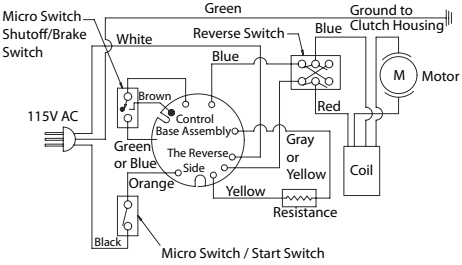
Pilot Rod "G" (20 or 21) must be totally free of grease. Grease on this Rod could cause electric shock.

Troubleshooting Guide

Trouble	Probable Cause	Solution
Screwdriver fails to rotate (forward or reverse).	Does the microswitch "click" when the bit is pushed rearward on push to start models or when the trigger is depressed on trigger models?	Starting microswitch is defective; replace the microswitch. Pilot Rod "H" is binding; clear obstruction or replace Rod. Pilot Rod "G" or Pilot Rod " H is defective; repair or replace Rod. Bit Holder is binding; clear the obstruction. Incorrect Pilot Rod; Check each rod length and place each length in its proper position. Incorrect assembly of Clutch; check clutch parts and balls for proper assembly. Stop Ring out of position; install the Stop Ring correctly.
	With tool unplugged, can bit be rotated manually?	Defective planetary gearing; replace the defective parts. Defective Clutch; replace the defective parts. Defective Motor; replace the Motor.
	Are the Brush Assemblies in good condition?	Brushes are worn or cracked; replace the Brush Assemblies. Commutator worn; replace the motor.
	Remove the Coupling, separate the Housing halves and plug the tool into an electrical receptacle. Using a voltmeter, make the following determinations:	**⚠ WARNING** **This procedure has the potential for severe shock hazard and should be performed by qualified personnel.**
	Is there voltage to the Motor?	Motor is defective; replace the Motor. Brushes are defective; replace the Brush Assemblies.
	Is there voltage to the Reverse Switch?	Coil is defective; replace the Coil. Wiring is defective; replace any broken wires and resolder any defective solder connections.
	Is there voltage to the Reverse Switch?	Reverse Switch is defective: replace the Reverse Switch. Solder connections are defective; resolder any defective solder connections.
	Is there voltage out of the Power Switch?	Power Cord is defective; replace the Power Cord. Solder connections defective; resolder any defective solder connections.
	Is there voltage to the Controller?	Controller is defective; replace the Controller. Solder connections are defective; resolder any defective solder connections. Replace the On/Off Switch.
Screwdriver operates in one direction but will not operate in the opposite direction.	Are the wire leads in good condition?	Solder connections are defective; resolder any defective solder connections.
	Does the "Forward-Reverse" Switch function properly?	Defective "Forward-Reverse" Switch; replace the Switch.
Bit does not rotate but motor hums.	When the gears are removed, will the motor rotate?	Armature is in contact with the magnets; replace the motor. Foreign material in the motor; clean the motor.
	Is the planetary gearing smooth when the bit is rotated by hand?	Bearing has failed; replace the bearing. Gears are worn or damaged; replace any defective gearing. Damaged Gear head Seat or Seat Retainer; replace damaged component. Clutch Assembly is worn; replace damaged or worn parts.
Motor runs but the Bit fails to rotate.		Armature Fan is defective; replace the Armature Fan. Gears are worn or damaged; replace any defective gearing.

Trouble	Probable Cause	Solution
Shut-off Brake malfunctions more than one index of the Clutch.	Does Bit speed exceed rated speed by more than 100 rpm?	Motor magnet is demagnetized; replace the motor.
	Is Shut-off Brake microswitch functioning? (Does it click when button is depressed an does it test correctly with an ohmmeter?)	Defective microswitch; replace the microswitch.
	Is the Shut-off Brake Switch in the "ON" position when the Bit Holder is fully depressed?	Pilot Rods "H", "G" and "F" are worn; check Rod length. Replace if necessary. Pilot Rod "D" out of adjustment; readjust with Adjusting Screw. Loose Clutch Housing Assembly; tighten the Clutch Housing Assembly.
	With one lead disconnected, does Resistor (R10) show approximately 20 ohms on an ohmmeter?	Resister is defective; replace the Resistor. Controller package is defective; replace the Controller. Cam is worn and not providing adequate lift; replace the Cam.
Bit Holder cannot be depressed		Bit Holder is defective; repair or replace the Bit Holder. Retaining Ring on Bit Holder has been lost or is out of position.
Tool makes abnormal sounds when the motor is running.	Is there looseness at the assembled points.	Screws are loose; tighten all Screws Clutch Housing is loose; tighten Clutch Housing to proper torque.
	After removing the gear train does the motor sound normal when running?	Armature is in contact with the magnet; replace the motor. Foreign material has gotten into the motor; clean or replace the motor. Ball bearings are defective; replace the Motor. Armature is defective; replace the Motor.
	Is the gear train properly lubricated?	No grease on the gear train; apply a thin film of the recommended grease. Spindle Bearing has failed; replace the Spindle Assembly. Gears are worn or dirty; clean or replace the gears.
Tool generates abnormal heat when operating.	After removing the gear train, does the tool cool down and motor run normally?	Motor is defective; replace the motor. Planetary gears and the Clutch require lubrication; lubricate the Clutch and gear train with the recommended grease. ***NOTICE*** **Do not apply too much or too little grease.**
Tool outputs high torque.	Is the shut-off brake functioning properly?	Refer to problem No. 5 to check shut-off brake malfunctions.
	Is the Clutch properly lubricated?	No lubrication on the Clutch components; lubricate the clutch with recommended grease.
	Is there wear on the face of Cam Guide where it contacts the Spindle Assembly?	Cam Guide is worn; replace the Cam Guide. Clutch Spring is damaged; replace the Clutch Spring.
Tool outputs low torque.	Is the Clutch Housing Assembly joint tight?	Loose joint between the Gear Case and Clutch Assembly; tighten the joint with a torque wrench to the specified torque. Cam is worn; replace the Cam. Clutch Spring is damaged; replace the Clutch Spring. Cam Guide is damaged; replace the Cam Guide.

Wiring Diagrams



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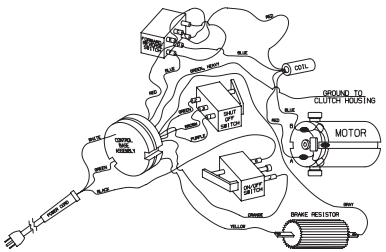

(Dwg. TPD1014-3)

Related Documentation

For additional information refer to:
Product Safety Information Manual 16602963.
Product Information Manual 45527611.
Parts Information Manual 45527751.

Manuals can be downloaded from www.irtools.com.

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