



Form 80151624

Edition 1

October 2005

Pistol DC Electric Nutrunner

QE4 Series

Maintenance Information



Save These Instructions

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General Instructions:

- Refer to "Suggested Tools" in the Parts Information Manual Form 80151632 for quick reference to the tools recommended for the following disassembly/assembly instructions.

WARNING

- Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll-Rand Authorized Service Center.
- Disconnect the power cord from the receptacle before performing any maintenance on this or any other tool.
- Always use protective eyewear when performing maintenance on a tool or while operating a tool.
- Use of non-Ingersoll-Rand parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury.

Lubrication

Whenever this product is disassembled, clean the parts and re-lubricate them as follows:

- Clean and degrease all parts except for the 1st and 2nd Stage Spindle Assemblies (75 and 77).
- Wipe clean the 1st and 2nd Stage Spindle Assemblies with a clean, dry and lint-free rag
- Once cleaned, apply prescribed amounts of **Ingersoll-Rand #67 Grease** as follows:
 - 2 to 3 cc to central area between gears of Spindle Assemblies
 - 1 to 2 cc to faces of Spindle Assemblies

- Thin layer on Ring Gear teeth
- Apply light coat of grease to Trigger Magnet Post. Use **Ingersoll-Rand #67 Grease**.
- For Trigger Start, Push-To-Start, and Trigger Permit Models: Use **Ingersoll-Rand #67 Grease** to lubricate Bearing (43) located inside Spindle Housing Assembly and the gear teeth drive spindle assembly (20).
- For Extended Spindle Models: Use **Ingersoll-Rand #67 Grease** to lubricate the Drive Spindle Bearings, the Drive Spindle (68) and the Disengaging Spring (67).

Disassembly

WARNING

- This procedure is to be performed by an authorized, trained repair person. To ensure proper functioning of the tool.
- When replacing the Motor Housing Assembly (34), always ensure that the Memory Chip (32), Communication Board (38), Transducer Gear Pack Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.

CAUTION

- When replacing an Attachment, always use the Assembly Attachment designed for that model. Never replace a Push-To-Start Assembly Attachment with a Trigger Start or Extended Spindle Attachment.
- When replacing a Transducer Gear Pack Assembly, always use the Assembly designed for that model.

- Through the Handle Cover opening, disconnect all connectors.
- If necessary, remove the Main Board from the pistol housing assembly. The Main Board must be carefully lifted/bent over the trigger post. Use a pick or hook tool to aid in this operation.
- Slide board partially out of housing assembly until trigger screw is visible through hole in board. Unscrew trigger screw (12), relieving tension on the board and continue to remove the main board.

WARNING

- Tool board components may be damaged during disassembly if care is not taken. Board must be bent to clear Trigger Post prior to dislodging board from Housing.
- Remove white LED assembly (37) from housing.
 - Slide transducer gear pack assembly (27) out of housing.
 - Remove LED board assembly (35).
 - Unscrew and remove trigger screw (12) and trigger washer (10) and remove the trigger (16).
 - For Push-to-Start models: Remove trigger spacer (7) from trigger post.
 - If necessary, remove trigger spring (11) from trigger body.

General Instructions for Disassembly:

- Do not disassemble the tool any further than necessary to replace or repair damaged parts.
- To protect part surfaces and to prevent distortion of housings and threaded joints, use care when grasping the tool.
- Avoid clamping non-metal surfaces unless directed otherwise.
- Do not remove any press fit part or any part of an assembly unless its removal is necessary for repair or replacement.

WARNING

- When grasping tool in vise, support both handle and barrel simultaneously. Do not clamp down excessively or crush housing. Use only enough force to arrest rotation.

Disassembly of External Components

- Unscrew and remove handle cover screw (39) with appropriate hex key and pull out bottom of handle cover (33). Lower out of pistol handle opening.
- Unscrew and remove back cap screws (9) with appropriate hex key and pull back cap assembly (8) straight back out of housing.
- Slide Switch Reverse Ring (31) away from the housing, being cautious not to lose the Ball (45) and Springs (29 and 30).
- Dislodge O-rings (15).
- Remove Chip Holder Assembly (32) from Motor Housing Assembly.

Disassembly of Internal Components

- Remove Retainer (28) used to hold Main Board (38) located in the handle of the housing.

Trigger Start, Trigger Permit and Push-to-Start Attachments

- While holding tool carefully using a vise, use a spanner wrench to unscrew nose cap (41).
- While holding tool carefully using a vise, use a spanner wrench #GEA40-478 (or other appropriate wrench) to unscrew coupling nut (40).
 - For Push-to-Start models: Verify that the Push-to-Start connector has been removed from its terminal on the main board (38). (See Disassembly of Internal Components section)
- Verify that the transducer gear pack assembly connector has been removed from its terminal on the main board (38). (See Disassembly of Internal Components section)
 - For Push-to-Start models: Slide the spindle housing assembly (1) and transducer gear pack assembly (24, 25, 26 or 27) simultaneously out of the motor housing assembly (34) while ensuring clearance for wire assemblies between the spline teeth of the transducer and the relief notch in the motor housing assembly.
- Slide the spindle housing (2) out of the motor housing assembly (34).
- If necessary, remove coupling nut retainer (42) from spindle housing (1 or 2).
- If necessary, press bearing (43) out of spindle housing (2).
- Remove spring (44).
- Slide the drive spindle assembly (20) out of the transducer gear case assembly inside the motor housing assembly.
- Slide the transducer gear case assembly (24, 25, 26 or 27) out of the motor housing assembly (34) while ensuring clearance for wire assemblies between the spline teeth of the transducer and the relief notch in the motor housing assembly.

10. **For 3/8" and 1/4" Square Drive Spindles,**
 - a. Locate Retaining Pin (59 or 61) and Retaining Spring (60 or 62) of Spindle's square socket.
 - b. If necessary, use a pointed metal probe to pull Retaining Spring out of Spindle cavity.
 - c. Also, if necessary, remove Pin from Square Drive Spindle.
11. **For Quick Change Spindles,**
 - a. Remove Retaining Ring (58), using Snap Ring Pliers.
 - b. Slide Spring (57), Sleeve (56) and Ball (55) off the Spindle (52).

NOTICE

- **Bearing Cap (72) has a left handed thread.**
2. Pull the Drive Spindle Assembly (68) out of Housing Assembly (49).
 3. If necessary, using a bearing puller tool, press the Rear Spindle Bearing (71) off the Drive Spindle Assembly. Then remove the Retaining Ring (70) and Washer (69).
 4. Now tilt Spindle Housing, causing the Disengaging Spring (67), Coupler (64), Square Drive or Quick Change Spindle (53 or 54 or 52), and Washers (50 and 51) to slide out.
 5. Note that the No-Float Models have an extra Spacer (66) inside the Coupler.

For Extended Spindle Model Attachment

1. Using an adjustable Pin Wrench, unscrew Bearing Cap (72).

Assembly

Assembly-Motor Housing

General Instructions

1. To protect the part's surfaces and to prevent distortion of Housings and threaded joints, use care when grasping the tool.
2. Always press on the inner ring of a ball-type bearing when installing the bearing onto a shaft.
3. Always press on the outer ring of a ball-type bearing when pressing the bearing into a bearing recess.
4. Refer to the "Lubrication" section of this manual for instructions on how to properly grease this tool.



WARNING

- The following procedures are to be performed by an authorized, trained repair person. To ensure proper functioning of the tool.
- When replacing the Motor Housing Assembly (34), always ensure that the Memory Chip (32), Communication Board (38), Transducer Gear Pack Assembly, and Attachment are all assembled as a set with the new Motor Housing Assembly.



CAUTION

- When replacing a Transducer Gear Pack Assembly, always use the Assembly designed for that model.

3. **For Quick Change Spindles,**
 - a. Place Ball (55) into hole in Spindle.
 - b. Slide Sleeve (56) onto Spindle so that it retains the Ball, and slide Spring (57) onto Spindle underneath the Sleeve.
4. Place Retaining Ring (58) into groove of Spindle to retain Spring and Sleeve.
5. Slide Coupling Nut (64) over Attachment.
6. Using an appropriate tool, install Retainer (70) on assembly. Take care to seat Retainer Ring in groove.
7. Slide Coupling Nut over Retainer (70), and spin by hand to check freedom of movement.
8. Engage Attachment's Pinion into spline of Spindle Assembly (68), then engage the spline on the Attachment with the internal spline of the Motor Housing Assembly.
9. Thread Coupling Nut (64) onto Motor Housing Assembly.
10. While holding the tool using a Hook Spanner or similar wrench, use a Spanner Wrench to torque Coupling Nut to 15 - 20 lb. ft. (20 - 27 Nm).

Assembly-Extended Spindle Attachment

1. Visually check Housing for loose material fragments.
2. **For 3/8" and 1/4" Square Drive Spindles,** install Socket Retaining Pin (59 or 61) into small hole on one of the flat sides of square Spindle.
 - a. With Socket Retaining Pin (59 or 61) in place, locate the Pin's groove inside end-hole of square Spindle.
 - b. Position Socket Retaining Spring (62 or 60) inside large hole of square Spindle such that the free ends of the Socket Retaining Spring are faced away from the hole and the closed side of the spring will straddle the Socket Retaining Pin (59 or 61).
 - c. Holding the Socket Retaining Pin steady, push Spring down hole of square Spindle until the Socket Retaining Spring's wire engages Socket Retaining Pin.
 - d. Socket Retaining Pin is properly installed when Socket Retaining Spring snaps into place.
3. **For Quick Change Spindles,**
 - a. Place Ball (55) into hole in Spindle.
 - b. Slide Sleeve (56) onto Spindle so that it retains the Ball, and slide Spring (57) onto Spindle underneath the Sleeve.
 - c. Place Retaining Ring (58) into groove of Spindle to retain Spring and Sleeve.
4. Spin Spindle by hand to check freedom of movement.
5. Lubricate the bearings of the Housing Assembly (49) with **Ingersoll-Rand #67 Grease.**
6. Slide Washer (50) and Washer (51) onto applicable output Spindle; Square Drive Spindle (53 or 54) or Quick Change Spindle (52), and insert output Spindle into Housing Assembly (49).
7. Align the Coupler (64) to slide over splines of output Spindle.
8. Slide Coupler into position in Housing Assembly (49).
9. For No-Float Models, insert Spacer (66) into the Coupler.
10. Slide Washer (69) on the Drive Spindle Assembly (68).
11. Use snap-ring Pliers to install the Retaining Ring on top of the Washer.
12. Press on Rear Spindle Bearing (71) to Drive Spindle Assembly (68).
13. Place Disengaging Spring (67) over Drive Spindle Assembly.
14. Align the Drive Spindle Assembly with spline of Coupler and insert Drive Spindle Assembly into Housing Assembly (49).
15. Apply one drop of Perma-Lok MM-115 to threads of Bearing Cap(72).
16. Carefully grasp the Housing Assembly.

NOTICE

- In the following step, the Bearing Cap (72) has a left-handed thread.

Assembly-Transducer Gear Pack

1. Apply Grease (**Ingersoll-Rand #67**) to ring gear of Transducer Assembly (73).
2. Place one Spacer (74) into Transducer Assembly against bottom face.
3. Grease the planet gear teeth of the 2nd Stage Spindle Assembly (75), and slide into Transducer Assembly.
4. Place second Spacer (76) into Transducer Housing against face of 2nd Stage Spindle Assembly.
5. Grease the planet gear teeth of the 1st Stage Spindle Assembly (77), and slide into Transducer Assembly, taking care to align gear teeth of the 1st Stage Spindle Assembly with the planet gears of the 2nd Stage Spindle Assembly.
6. Place third Spacer (78) against 1st Stage Spindle Assembly.
7. Finally, install Retaining Ring (79) taking care to properly align into groove of Transducer Assembly.
8. To assure free rotation of assembly, hold Transducer Gear Pack Assembly steady, and manually rotate the 1st Stage Spindle Assembly.

Assembly-Trigger Start, Push-to-Start, and Trigger Permit Attachments

1. Visually check Housing for loose material fragments.
2. **For 3/8" and 1/4" Square Drive Spindles,** install Socket Retaining Pin (59 or 61) into small hole on one of the flat sides of square Spindle.
 - a. With Socket Retaining Pin (59 or 61) in place, locate the Pin's groove inside end-hole of square Spindle.
 - b. Position Socket Retaining Spring (62 or 60) inside large hole of square Spindle such that the free ends of the Socket Retaining Spring are faced away from the hole and the closed side of the spring will straddle the Socket Retaining Pin (59 or 61).
 - c. Holding the Socket Retaining Pin steady, push Spring down hole of square Spindle until the Socket Retaining Spring's wire engages Socket Retaining Pin.
 - d. Socket Retaining Pin is properly installed when Socket Retaining Spring snaps into place.

- Using the appropriate tool, tighten Bearing Cap to 15-20 lb. ft. (20 - 27 Nm) of torque.
- Slide Coupling Nut (64) over Housing Assembly (49).
- Using an appropriate tool, install Retainer (42) onto spline of Housing Assembly until seated into groove.
- Slide Coupling Nut over Retainer (40), and spin by hand to check freedom of movement.

Installation-Transducer Gear Pack Assembly

- Orient the Spacer located in the Motor Housing Assembly groove at the bottom of the spline, so that the opening in the spacer lines up with the hole in the housing.
- After guiding Transducer's connector into the hole found at end of Motor Housing Assembly's inner groove, insert Transducer Gear Pack Assembly into Motor Housing Assembly.
- Carefully pull Transducer's connector and wiring through opposite end of Motor Housing Assembly.
- Engage external spline teeth of Transducer Gear Pack Assembly into the internal spline teeth of Motor Housing Assembly. Continue sliding Transducer Gear Pack Assembly into the Motor Housing while guiding the wire through the hole.
- Align and engage the 1st Stage Spindle planet gears with gear teeth on rotor of the Motor Housing Assembly. Be Certain that the Transducer wire exits the Transducer directly over the access hole through with the wire was fed.
- Continue inserting the Transducer Assembly until it is fully seated.

Installation-Trigger Start, Attachment

- Insert applicable output spindle assembly (52, 53 or 54) into spacer (4).
- Press bearing (43) into spindle housing (2).
- Press coupling nut retainer (42) onto groove in OD of spindle housing (2).
- Insert output spindle assembly into spindle housing (2).
- Insert spring (44) into hole in end of drive spindle assembly (20).
- Insert drive spindle assembly (20) into transducer assembly inside motor housing assembly (34).
- Guide output spindle assembly and spindle housing assembly over spring (44).
- Engage external gear spline on spindle housing (2) with internal spline in motor housing assembly (34).
- Align gear teeth of output spindle assembly with matching teeth of drive spindle assembly (20).
- Thread coupling nut (40) onto motor housing assembly (34).
- While holding the tool carefully in a vise, use a spanner wrench to torque coupling nut to 20-27 Nm.

Installation- Push-to-Start and Trigger Permit Attachments

- Press coupling nut retainer (42) onto groove in OD of spindle housing assembly (1).
- Insert applicable output spindle assembly (21, 22 or 23) into spindle housing assembly (1).
- Insert spring (44) into hole in end of drive spindle assembly (20).
- Guide output spindle assembly and spindle housing assembly over spring (44).
- Align gear teeth of output spindle assembly with matching teeth of drive spindle assembly (20).
- Insert transducer assembly onto drive spindle bearing and hold the group of parts as one unit.
- Group the transducer wire and spindle housing assembly wire together making sure the spindle assembly wire is sitting in the groove on the outside of the transducer body.
- Insert the two wire assemblies into housing along groove inside motor assembly housing.
- Carefully guide the transducer and spindle housing assembly wires through the housing from the opposite end while inserting all the parts.
- Engage external gear spline on spindle housing assembly (1) with internal spline in motor housing assembly (34).
- Thread coupling nut (40) onto motor housing assembly (34).
- While holding the tool carefully in a vise, use a spanner wrench to torque coupling nut to 20-27 Nm.

Installation-Extended Spindle Attachment

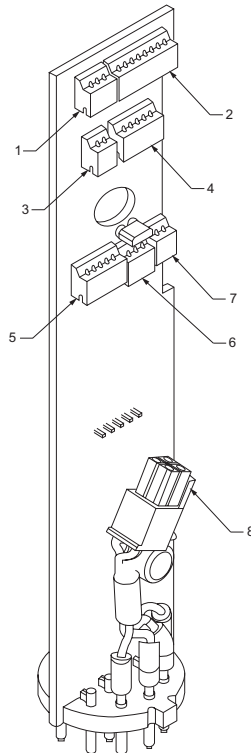
- Position the Attachment appropriately.
- Engage the spline on the drive spindle of the Attachment with the matching internal spline of the Transducer Gear pack Assembly, engage the spline on the Housing Assembly with the internal spline of the Motor Housing Assembly and thread the Coupling Nut onto the Motor Housing.
- While holding the tool carefully using a vise, use a Spanner wrench to torque the Coupling Nut to 15 - 20 lb. ft. (20 - 27 Nm).

Assembly-Internal Components

- Pull the LED Assembly (37) wires first through the small opening at the top of the front of the Motor Assembly Handle.
- Install O-Rings (15) around the LED Assembly in housing in Motor Assembly (34).
- Place Trigger Spring (11) around the long metal post on the reverse side of the Trigger Assembly (16) and rotate the Trigger Spring clockwise and counterclockwise until it is secure.
For Push-to-Start models: Install trigger spacer (7) onto metal post of trigger assembly.
- Push Trigger Assembly (16) into housing in the Motor Assembly (34).
- Put Trigger Washer (10) around Trigger Screw (12) and screw Trigger Screw into reverse side of Trigger Assembly to secure the One Finger Trigger in Motor Assembly housing.
- Insert the LED Board Assembly (35) in the rear of the Motor Assembly. Gently guide the LED Board Assembly by the cable assembly.
- Insert the Main Board (38) into the Motor Assembly by sliding it up through the bottom opening of the handle of the Motor Assembly, lifting it gently over the Trigger Post.
- Using the appropriate tool, push the Retainer (28) into the groove in the bottom of the Motor Assembly handle.

For the following seven steps (step 9 to step 15), refer to drawing "GEP15-A2309" and "Tool Board Configuration Chart".

- Connect the motor temperature sensor connector to the Main Board.
- Connect transducer connector to Main Board.
- Connect green Resolver connector to Main Board.
- If necessary, connect the Push-to-Start connector to the Main Board. If not using the Push-to-Start assembly, connect jumper connector to the Main board.
- Connect the LED assembly connector to the Main Board.
- Connect the white LED connector to the Main Board.
- If Push-to-Start only trigger needs to be disabled by installing jumper connector to main board.



(Dwg. GEP15-A2309)

**Tool Board Configuration Chart.
For TRIGGER START (TS), PUSH-TO-START (PTS) and
TRIGGER PERMIT (TP) Models.**

Connector	Description	Model Configuration	Position
Jumper Connector	3 Pin	TS	1
		PTS	6
		TP	not used
Led Board Assembly	8 Pin, White	TS, PTS, TP	2
White Led Assembly	2 Pin, Black Jacketed Cable	TS, PTS, TP	3
Motor Commutation Connector	5 Pin, Green	TS, PTS, TP	4
Transducer Connector	5 Pin, White	TS, PTS, TP	5
Push-to-start Connector	3 Pin, White	TS	not used
		PTS	1
		TP	1
Temperature Sensor Connector	2 Pin, Grey Wires	TS, PTS, TP	7
Motor Phases Connector	4 Pin, Black	TS, PTS, TP	8

Assembly-External Components

1. Rotate tool so that Handle End faces upwards and insert Spring (29) into spring track in Switch Reverse Ring (31).
2. Insert Spring (30) followed by Ball (45) into rear of Motor Assembly and be careful to hold them compressed and in place while slowly sliding the Switch Reverse Ring over rear of Motor Assembly.

NOTICE

- In Step 2 above, three triangular grooves are cut in the Switch Reverse Ring. The Spring and Ball will fit inside one of them, line one of the holes up with the location of the Spring and Ball when sliding the Switch Reverse Ring over the Motor Assembly.
3. Position the Back Cap Assembly (8) into place, mating it with the Switch Reverse Ring on the rear of the Motor Assembly.
 4. Using the appropriate Allen Wrench, screw the Back Cap Screws (9) into a secure position through the Back Cap Assembly.
 5. Insert Chip Holder Assembly (32) into hole in side of bottom of the Motor Assembly handle.
 6. Using two cable ties (48), dress wires so that they are out of the trigger post path.
 7. Put Handle Cover (33) on back of the Motor Assembly handle by putting top in first and swinging bottom into position.

NOTICE

- In Step 7 above make sure all wiring is securely inside Motor Assembly handle and be careful not to crush wiring against the Main Board.
8. Using appropriate Allen Wrench secure Handle Cover onto Motor Assembly handle by screwing Handle Cover Screw (39) into position on the bottom of the Motor Assembly handle.

Notes

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