03541299

Form P7213
Edition 5
March, 1999

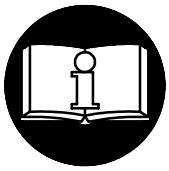
GB

OPERATION AND MAINTENANCE MANUAL FOR SERIES EL, EP AND ET 230V AC ELECTRIC SCREWDRIVERS

NOTICE

Series EL, EP and ET Electric Screwdrivers are earthed (grounded) and 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

- **Do not operate this tool unless the Retainer Coupling (1) and Flange (2) are installed securely.**
- **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.

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

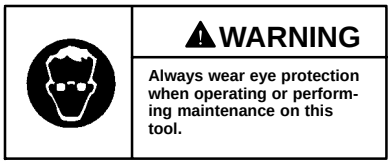
⚠ WARNING

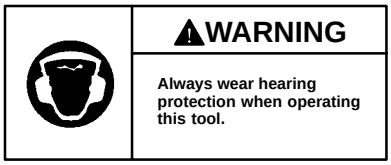
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

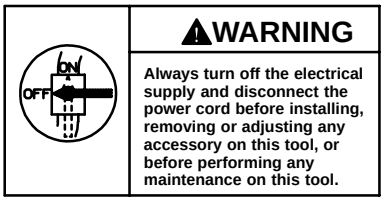
USING THE TOOL *(Continued)*

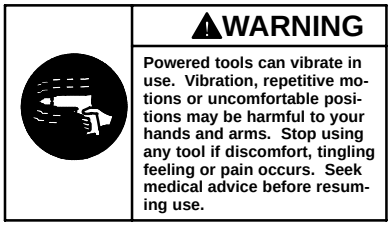
- **Secure work.** Use clamps or a vise to hold work. Operators often need both hands to perform job functions.
- **Don't overreach.** Keep proper footing, balance, and a firm grip on the tool at all times.
- **Maintain tools with care.** Keep tools clean for better and safer performance. Follow instructions 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:
  MAX 0.8 sec. "ON"
  MIN 3.2 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.**

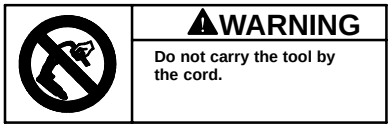
WARNING LABEL IDENTIFICATION

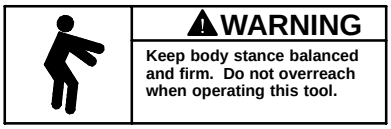












ADJUSTMENTS

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.

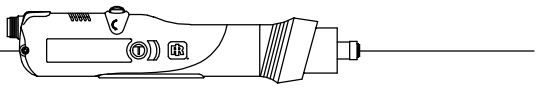
All repairs and maintenance of this tool and its cord must be performed by an authorized service center. Contact Sales Office listed on last page of this form.

NOTICE

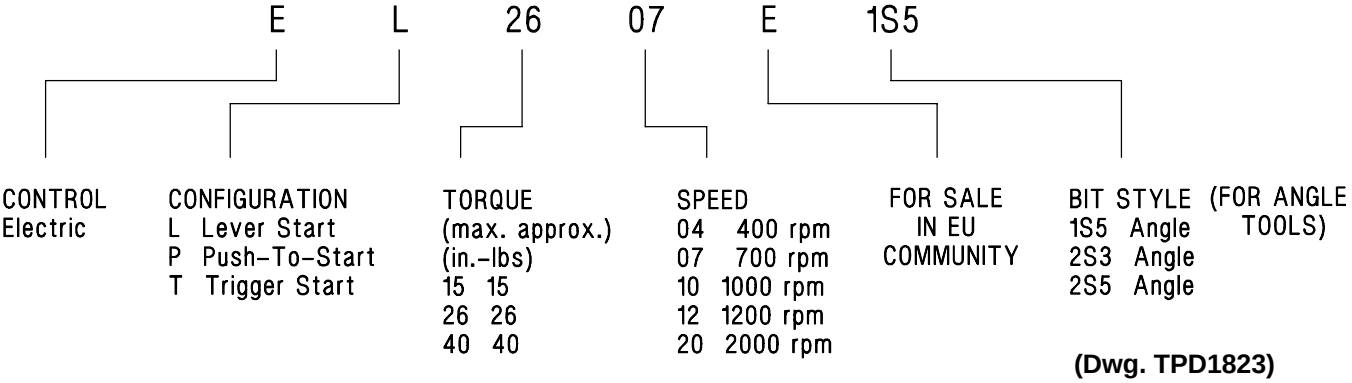
SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

MODEL IDENTIFICATION

High Torque



- Power: 230V AC
- Cable Length: 3m
- Reversible: Yes



(Dwg. TPD1823)

Model	Hertz	Watts	Volts	Revolutions per minute	Type of cord	Torque Range in–lbs	Torque Range Kgf–cm	Weight lbs.	Weight Kg.	Length in.	Length mm	Drive Size in.	▮ Sound Pressure Level dB (A)	♦ Vibrations Level m/s^2
STRAIGHT SCREWDRIVERS														
EL1510E–E	50/60 Hz	30W	230 V ~	1000 min^{-1}	VDE	5.0 – 15.0	5.8 – 17.3	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EL1510E–U	50/60 Hz	30W	230 V ~	1000 min^{-1}	UK	5.0 – 15.0	5.8 – 17.3	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EL2607E–E	50/60 Hz	30W	230 V ~	700 min^{-1}	VDE	11.0 – 26.0	12.7 – 30.0	1.6	0.73	10.8	274	1/4 hex	61.7	1.0
EL2607E–U	50/60 Hz	30W	230 V ~	700 min^{-1}	UK	11.0 – 26.0	12.7 – 30.0	1.6	0.73	10.8	274	1/4 hex	61.7	1.0
ET4004E–E	50/60 Hz	30W	230 V ~	400 min^{-1}	VDE	18.0 – 40.0	20.7 – 46.0	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
ET4004E–U	50/60 Hz	30W	230 V ~	400 min^{-1}	UK	18.0 – 40.0	20.7 – 46.0	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EP1510E–E	50/60 Hz	30W	230 V ~	1000 min^{-1}	VDE	5.0 – 15.0	5.8 – 17.3	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EP1510E–U	50/60 Hz	30W	230 V ~	1000 min^{-1}	UK	5.0 – 15.0	5.8 – 17.3	1.6	0.73	10.8	274	1/4 hex	70.7	1.1
EP2607E–E	50/60 Hz	30W	230 V ~	700 min^{-1}	VDE	11.0 – 26.0	12.7 – 30.0	1.6	0.73	10.8	274	1/4 hex	61.7	1.0
EP2607E–U	50/60 Hz	30W	230 V ~	700 min^{-1}	UK	11.0 – 26.0	12.7 – 30.0	1.6	0.73	10.8	274	1/4 hex	61.7	1.0
EP4004E–E	50/60 Hz	30W	230 V ~	400 min^{-1}	VDE	18.0 – 40.0	20.7 – 46.0	1.83	0.83	10.8	274	1/4 hex	70.7	1.1
EP4004E–U	50/60 Hz	30W	230 V ~	400 min^{-1}	UK	18.0 – 40.0	20.7 – 46.0	1.83	0.83	10.8	274	1/4 hex	70.7	1.1
ANGLE SCREWDRIVERS, ANGLE WRENCHES														
EL1510E1S5–E	50/60 Hz	30W	230 V ~	950 min^{-1}	VDE	4.0 – 17.0	4.6 – 19.6	2.0	0.91	17.5	444	1/4 square	70.7	1.1
EL1510E1S5–U	50/60 Hz	30W	230 V ~	950 min^{-1}	UK	4.0 – 17.0	4.6 – 19.6	2.0	0.91	17.5	444	1/4 square	70.7	1.1
EL1510E2S3–E	50/60 Hz	30W	230 V ~	650 min^{-1}	VDE	6.0 – 23.0	6.9 – 26.5	2.2	1.00	17.6	447	1/4 hex	70.7	1.1
EL1510E2S3–U	50/60 Hz	30W	230 V ~	650 min^{-1}	UK	6.0 – 23.0	6.9 – 26.5	2.2	1.00	17.6	447	1/4 hex	70.7	1.1
EL1510E2S5–E	50/60 Hz	30W	230 V ~	650 min^{-1}	VDE	6.0 – 23.0	6.9 – 26.5	2.2	1.00	17.6	447	1/4 square	70.7	1.1
EL1510E2S5–U	50/60 Hz	30W	230 V ~	650 min^{-1}	UK	6.0 – 23.0	6.9 – 26.5	2.2	1.00	17.6	447	1/4 square	70.7	1.1
ET4004E2S3–E	50/60 Hz	30W	230 V ~	260 min^{-1}	VDE	15.0 – 56.0	17.3 – 64.5	2.2	1.00	17.6	447	1/4 hex	70.7	1.1
ET4004E2S3–U	50/60 Hz	30W	230 V ~	260 min^{-1}	UK	15.0 – 56.0	17.3 – 64.5	2.2	1.00	17.6	447	1/4 hex	70.7	1.1
ET4004E2S5–E	50/60 Hz	30W	230 V ~	260 min^{-1}	VDE	15.0 – 56.0	17.3 – 64.5	2.2	1.00	17.6	447	1/4 square	70.7	1.1
ET4004E2S5–U	50/60 Hz	30W	230 V ~	260 min^{-1}	UK	15.0 – 56.0	17.3 – 64.5	2.2	1.00	17.6	447	1/4 square	70.7	1.1

▮ Tested in accordance with ANSI S5.1–1971 at free speed.

♦ Tested in accordance to ISO8662–1 at free speed.

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 EL, EP and ET 230V AC Electric Screwdrivers

to which this declaration relates, is in compliance with the provisions of ***89/336/EEC, 73/23/EEC, 92/31/EEC AND 93/37/EC*** *Directives.*

By using the following Principle Standards: ***EN292, ISO8662, PN8NTC1.2, EN50144–1, EN50082–1 and EN55014***

Serial No. Range: ***(1995 →) 3VH XXXXX →***

D. Vose
Name and signature of authorised persons

James Wardlaw
Name and signature of authorised persons

March, 1999
Date

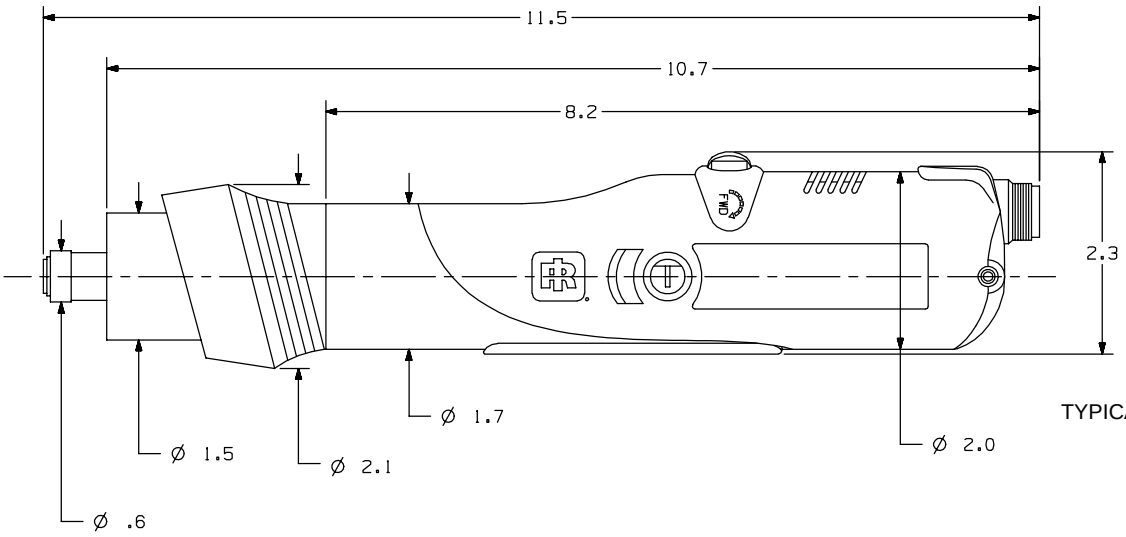
March, 1999
Date

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

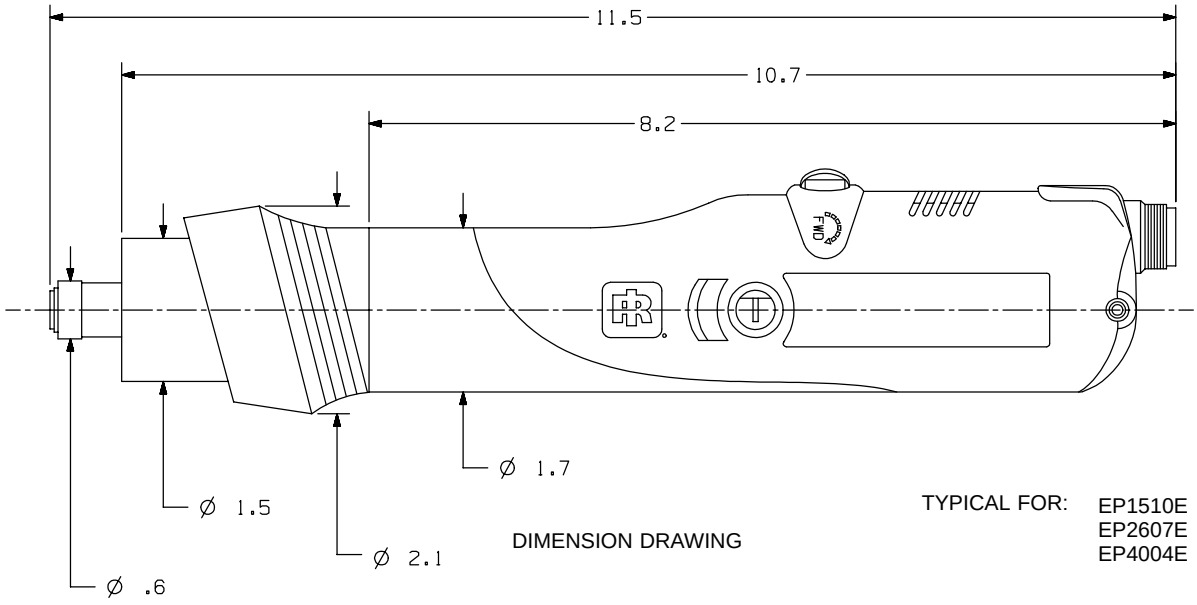
When the life of the tool has expired, it is recommended that the tool be disassembled, degreased and parts be separated by material so that they can be recycled.

Dimensions for Series EL/EP/ET Electric Screwdrivers



TYPICAL FOR: EL1510E
EL2607E
ET4004E

(Dwg. TPC630)



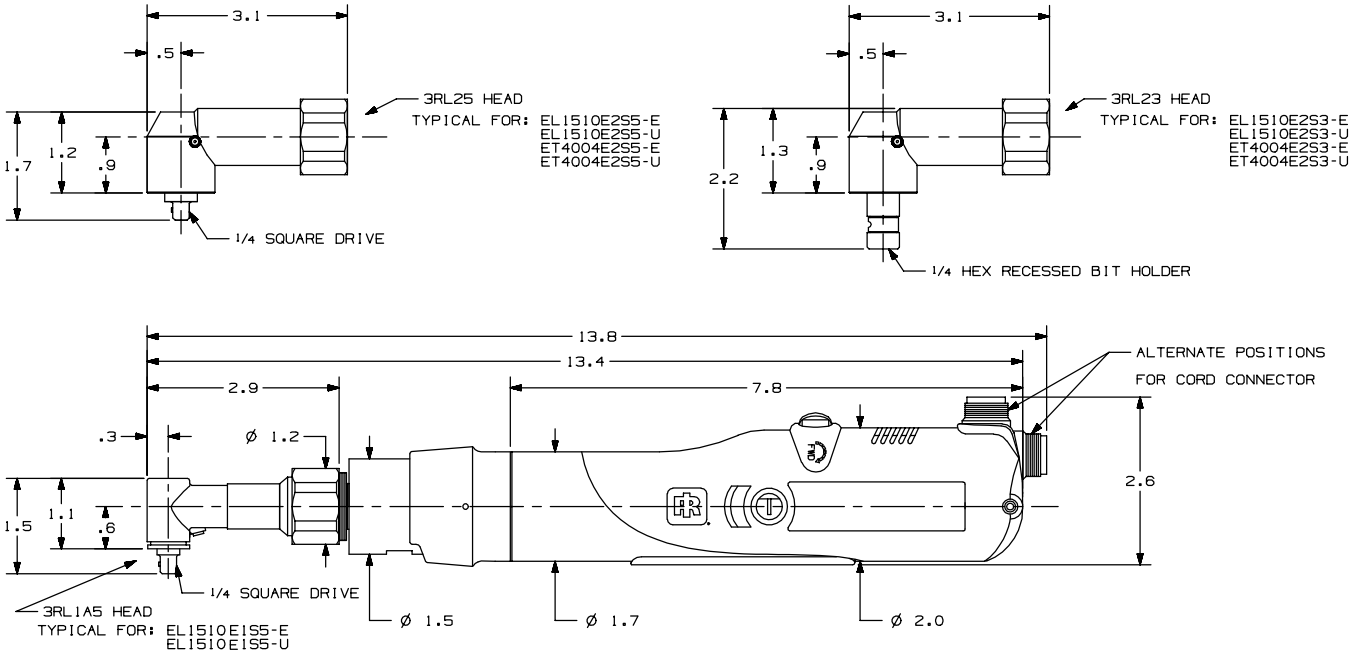
DIMENSION DRAWING

TYPICAL FOR: EP1510E
EP2607E
EP4004E

(Dwg. TPC629)

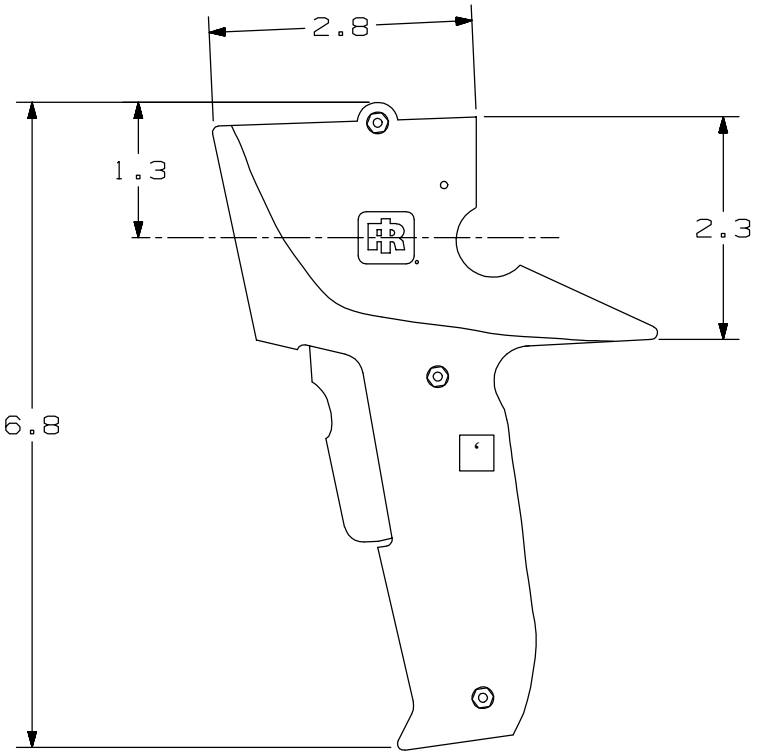
MAINTENANCE SECTION

Dimension for Series EL/EP/ET Electric Screwdrivers



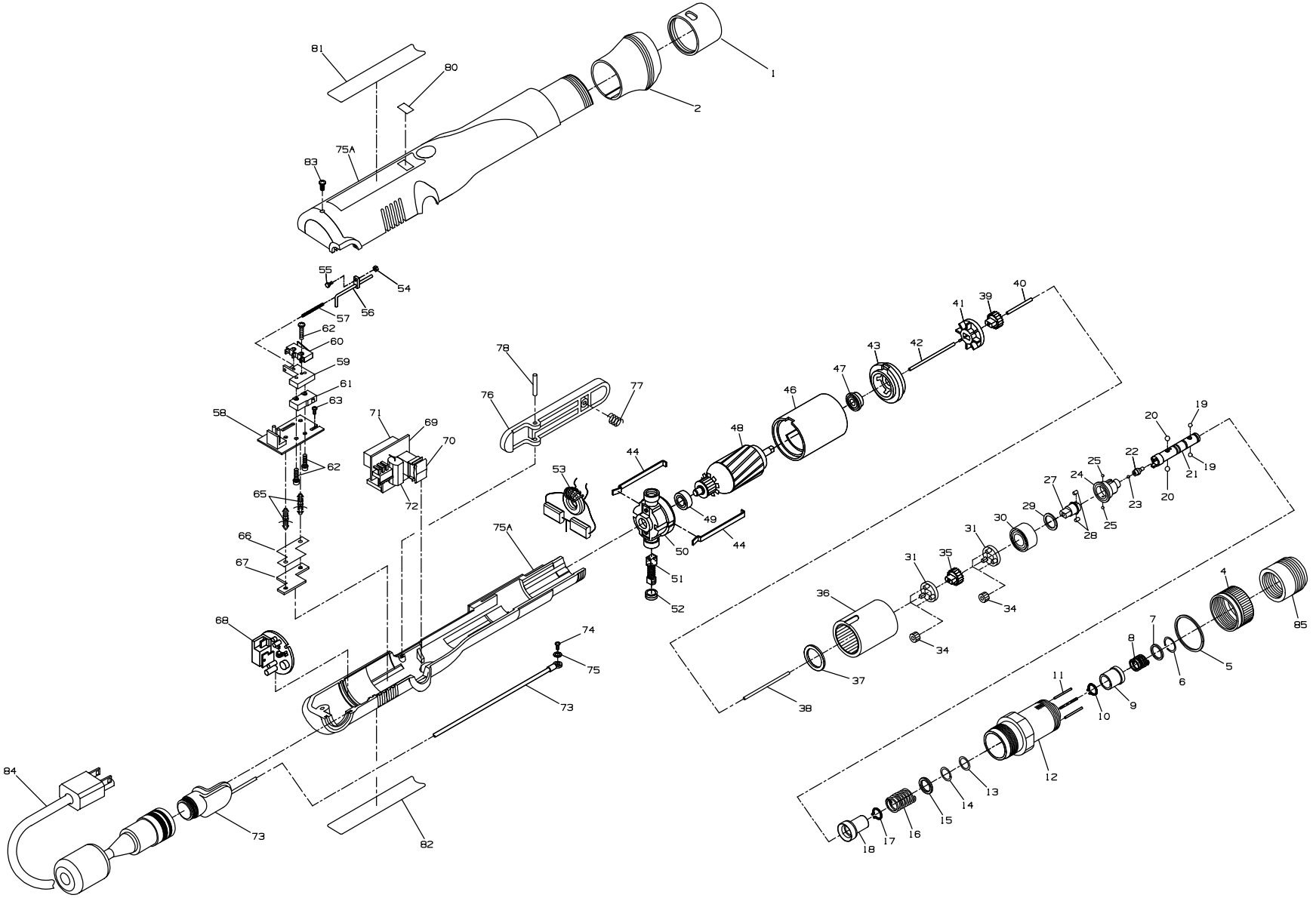
(Dwg. TPC631)

Handle for Series EL/EP/ET Electric Screwdrivers



(Dwg. TPD1829)

Models EL1510E, EL2607E and ET4004E Electric Screwdrivers



(Dwg. TPA1519–2)

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
1	Retainer Coupling	EP4007N–125	25	Cam Guide Ball (.156 dia.)	2U–696
2	Slanted Flange (Standard on 1510E and 2607E)	EP4007N–124	27	Cam	
*	Straight Flange (Standard on 4004E)	EP4007N–123		for ET4004E	EP4007N–581
4	Clutch Adjusting Ring	EP4007N–582		for all others	EP1510N–581
5	Indicator Ring	EP4007N–682	28	Cam Roller (2)	EP4007N–587
6	Bit Retainer Retaining Ring (Front) (for models ending in E only)	EP4007N–683	29	Spindle Washer	EP4007N–509
			30	Spindle Bearing	EP4007N–510
7	Bit Retainer Collar (for models ending in E only)	EP4007N–585	31	Spindle/Gear Head (2)	EP2607N–216
8	Bit Retainer Spring (for models ending in E only)	EP4007N–931	34	Planet Gear	
9	Bit Retainer Sleeve (for models ending in E only)	EP4007N–930		for EL1510E (6)	EP1510N–10
10	Bit Retainer Retaining Ring	EP4007N–584		for ET4004E (6)	EP1520N–10
11	Clutch Adjusting Pin (3)	EP4007N–416		for EL2607E (6)	EP2607N–10
12	Clutch Housing Assembly		35	Gear Head Pinion Gear	
	for models ending in 1S5, 2S3 or 2S5	ET4007N2S5–580		for EL1510E	EP1510N–17
	for all other models	EP4007N–580		for ET4004E	EP2603N–17
13	Front Shim	EL4007N–623		for EL2607E	EP2607N–17
14	Rear Shim	EL4007N–624	36	Gear Case	
15	Clutch Spring Plate	EP4007N–623		for EL1510E	EP1510N–37
16	Clutch Spring			for ET4004E	EP4007N–37
	for EL1510E	EP1510N–583		for EL2607E	EP2607N–37
	for EL2607E	EP2607N–583	37	Gear Case Shield	EP4007N–207
	for ET4004E	EP4007N–583	38	Clutch Pilot Rod “I” (2.26” long)	EP4007N–435
17	Taper Ring Retaining Ring	EP4007N–584			
18	Taper Ring Assembly				
	for EL2607E, EL1510E and ET4004E	EP2607N–588			
19	Bit Retaining Ball (.094” dia.) (2) (for models ending in N only)	R000B–263			
20	Pilot Cam Ball (.156 dia.) (4)	2U–696			
21	Bit Holder Assembly	EP4007N–586			
22	Pilot	EP4007N–408			
23	Pilot Ball (.062 dia.)	EP4007N–422			
24	Cam Guide	EP4007N–681			

* Not Illustrated

Models EL1510E, EL2607E and ET4004E Electric Screwdrivers *(Continued)*

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
39	Fan Pinion Gear		59	Switch Plate	ET4007N–221
	for EL1510E	EP1510N–18	60	Shut–off Switch	EP4007N–223
	for ET4004E	EP2603N–18	61	Start Switch	ET4007N–222
	for EL2607E	EP2607N–18	62	Switch Screw (12mm) (4)	EP4007N–224
40	Fan Pilot Rod “G” (.385” long)	EP4007N–436	63	Switch Base Screw (5mm) (2)	EP4007N–226
41	Fan	EP4007N–52	65	Switch Base Spacer (2)	EP4007N–225
42	Motor Pilot Rod “J” (2.71” long)	EP4007N–437	66	Insulating Film	EP4007N–227
	Motor Assembly		67	Brush Light Circuit Board	EP4004E–228
	for EL1510E, EL2607E and ET4004E	EP2607E–A53	68	Controller Assembly	EP4004E–424
43	Front End Plate	EP4007N–11		Reverse Switch Circuit Board Assembly	EP4004E–A229
44	Motor Assembly Spring (2)	EP4007N–98	69	Reverse Switch Circuit Board	EP4004E–229
46	Field		70	Reverse Switch	EP4007N–329
	for EL1510E, EL2607E and ET4004E	EP2607N–54	*	Reverse Switch Rocker	EP4007N–330
47	Front Armature Bearing	EP4007N–24	71	Capacitor	EP4007N–230
48	Armature		72	Resistor	EP4004E–231
	for EL1510E, EL2607E and ET4004E	EP2607E–53	73	Receptacle Assembly	EP4004E–44A
49	Rear Armature Bearing	EP4007N–22	74	Ground Screw	EP4007N–42
50	Rear End Plate	EP4004E–12	75	Ground Screw Washer	EP4007N–43
51	Brush Assembly (includes 10 pieces)	EP4004E–BP	75A	Housing Assembly	
52	Brush Cap (2)	EP4007N–25		for EL1510E	EL1510E–A40
53	Motor Ring Coil Assembly	EP4004E–232		for EL2607E	EL2607E–A40
54	Adjusting Screw Nut	EP4007N–593		for ET4004E	EL4004E–A40
55	Pilot Rod Adjusting Screw	EP4007N–592	76	Throttle Lever	EL4007N–273
56	Pilot Rod “D”	EP4007N–438	77	Throttle Spring	EL4007N–274
57	Pilot Rod Spring	EP4007N–595	78	Throttle Lever Pin	EL4007N–275
58	Microswitch Circuit Board	ET4004E–220			

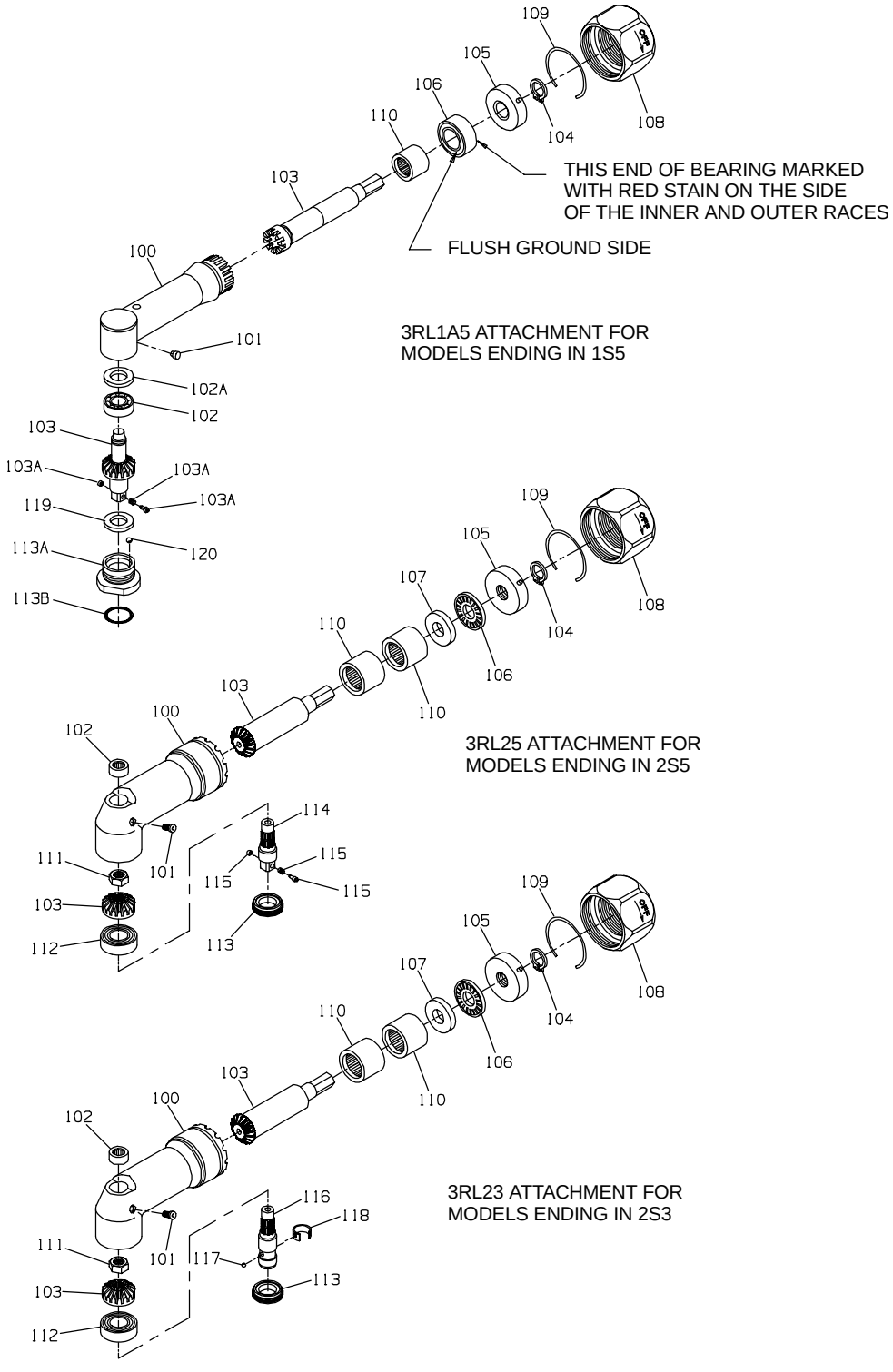
* Not Illustrated

Models EL1510E, EL2607E and ET4004E Electric Screwdrivers *(Continued)*

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
80	Brush Light Cover	EP4007N–45	*	Microswitch Adjusting Wrench Package	ES60T–MSW
81	Nameplate		*	Pistol Grip Assembly	EP4007N–48
	for EL1510E	EL1510E–301	*	Test Brush (230 V)	EP4007N–TB230
	for EL2607E	EL2607E–301	*	Switch Adjustment Gauge (for high torque models)	EP1510N–SG
	for ET4004E	EL4004E–301	*	Gear Case Jig (for high torque models)	EP1510N–J37
82	Warning Label	EP4004E–99	*	Hardware Package (includes illustrated items 6, 10,	
83	Housing Screw (package of 10)	EP4007N–41		17, 19 [2], 44 [2], 52 [2], 54, 55, 62 [4], 63 [2], 66,	
84	Power Cord			74, 75, 77, 78 and 83	EL4007N–HP
	3 m with VDE plug	EP4004E–239A		Maintenance Label	
	3 m with UK plug	EP4004E–239AU	*	English	EP4007N–302
	Noise Suppresser	EP4007N–240		French	EP4007N–302F
85	Angle Head Coupling (for models ending in 1S5,			German	EP4007N–302G
	2S3 or 2S5 only)	EL4007N2S5H–AHC		Spanish	EP4007N–302S
*	Torque Adjusting Wrench	EP4007N–516		Italian	EP4007N–302I
*	Suspension Bail			for all others (fits tool)	EP4007N–365
	for ET4004E (fits Pistol Grip)	EP4007N–366			

***** Not illustrated.

SERIES 3 ANGLE ATTACHMENTS FOR EL1510E1S5, EL1510E2S3, EL1510E2S5, ET4004E2S3 and ET4004E2S5



(Dwg. TPA1514)

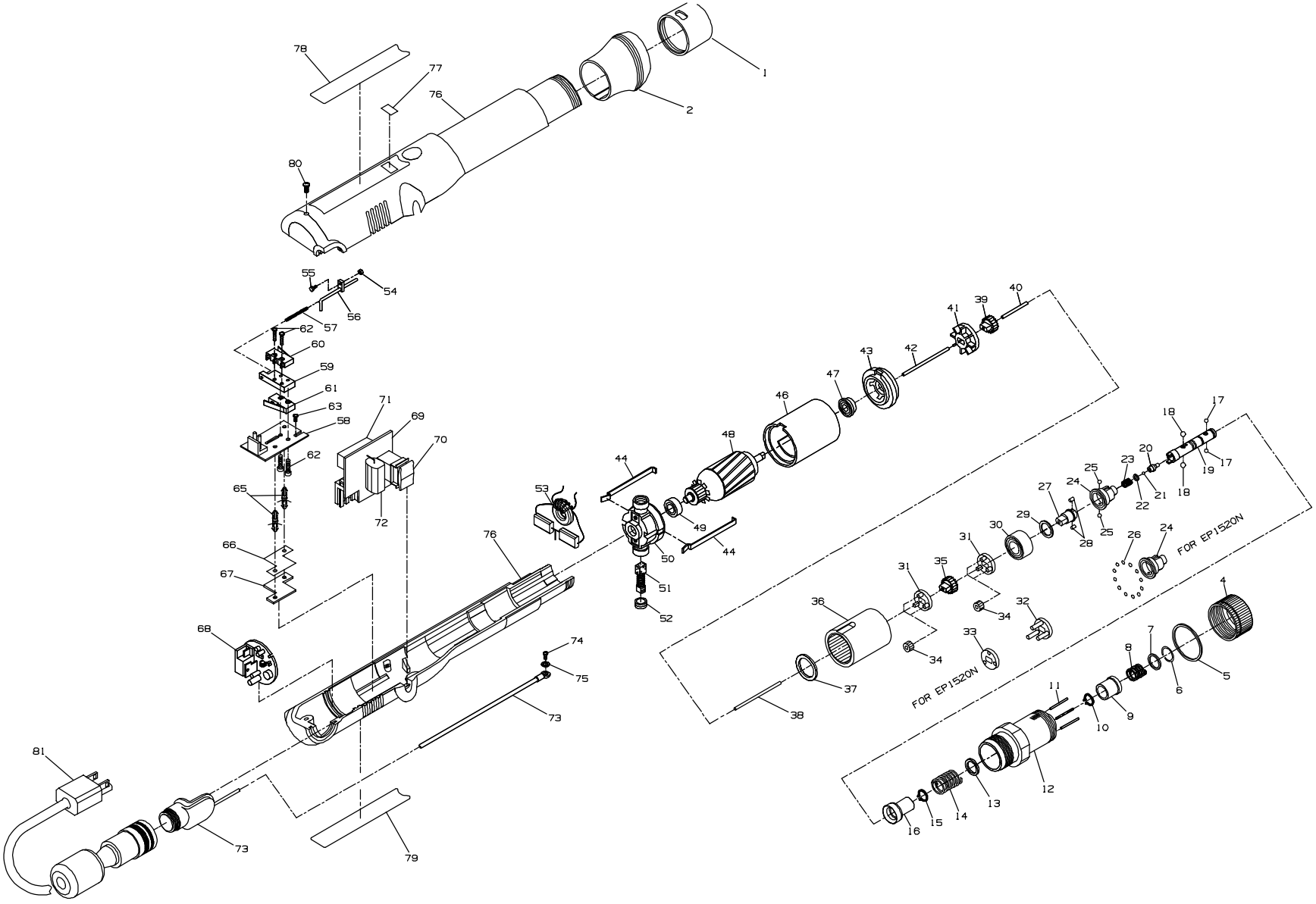
PART NUMBER FOR ORDERING

		For Models Ending in 1S5	For Models Ending in 2S3	For Models Ending in 2S5
	Angle Attachment	3RL1A5	3RL23	3RL25
100	Angle Housing Assembly	3RL1A–A550	3RL2–A550	3RL2–A550
101	Grease Fitting	D0F9–879	D059–879	D0F9–879
102	Spindle Upper Bearing	———	120A4–603	120A4–603
102	Spindle Upper Bearing	7L1A–603	———	———
102A	Shim Packet	7L1A–P448	———	———
103	Matched Gear Set (Bevel Gear and Pinion not sold separately)	3RL1A5–A591	3RL2–A552	3RL2–A552
103A	Socket Retainer Assembly (consists of Plunger, Spring and Washer)	500B–816A	———	———
104	Thurst Bearing Retainer	3RL2–705	3RL2–705	3RL2–705
105	Rear Thrust Bearing Seal	3RL2–682	3RL2–682	3RL2–682
106	Bevel Pinion Thrust Bearing	3RL1A–514	3RL2–105	3RL2–105
107	Front Thrust Bearing Seat	———	3RL2–683	3RL2–683
108	Coupling Nut	3RL2–27	3RL2–27	3RL2–27
109	Coupling Nut Retainer	3RL2–29	3RL2–29	3RL2–29
110	Bevel Pinion Bearing (2 for 3RL23) and 3RL25; 1 for 3RL1A5	7AH–24	H54U–511B	H54U–511B
111	Bevel Gear Retainer Nut	———	120A4–578	120A4–578
112	Spindle Lower Bearing	———	120A4–593	120A4–593
113	Angle Housing Cap	———	120A4–531	120A4–531
113A	Angle Housing Cap Assembly	3RL1A–A531	———	———
113B	Angle Housing Cap Seal	3RL1A–513	———	———
114	1/4” Square Drive Spindle Assembly	———	———	141A9–607–1/4
•115	Socket Retainer (consists of Plunger Spring and Washer)	———	———	500B–816A
116	1/4” Hex Bit Holder Spindle Assembly (for standard bits)	———	5L2C3–B586	
117	Bit Retaining Ball (.125” diameter)	———	AV1–225	———
118	Bit Retaining Spring	———	102A60–241	———
119	Ball Race	3RL1A–532	———	———
120	Steel Ball (1/16” diameter) (20)	3RL1A–512	———	———
*	Housing Cap Wrench	———	141A12–26	141A12–26

* Not illustrated

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a (•) for every four tools in service.

Models EP1510E, EP2607E and EP4004E Electric Screwdrivers



(Dwg. TPA1520–2)

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Retainer Coupling	EP4007N–125	20	Pilot	EP4007N–408
2	Slanted Flange	EP4007N–124	21	Pilot Ball (.062 dia.)	EP4007N–422
*	Straight Flange	EP4007N–123	22	Pilot Push Spring Washer	EP4007N–421
4	Clutch Adjusting Ring	EP4007N–582	23	Pilot Push Spring	EP4007N–420
5	Indicator Ring	EP4007N–682	24	Cam Guide	EP4007N–681
6	Bit Retainer Retaining Ring (Front)	EP4007N–683	25	Cam Guide Ball (2) (.156 dia.)	2U–696
7	Bit Retainer Collar	EP4007N–585	27	Cam	
8	Bit Retainer Spring	EP4007N–931		EP4004E	EP4007N–581
9	Bit Retainer Sleeve	EP4007N–930		for EP1510E and EP2607E	EP1510N–581
10	Bit Retainer Retaining Ring	EP4007N–584	28	Cam Roller (2)	EP4007N–587
11	Clutch Adjusting Pin (3)	EP4007N–416	29	Spindle Washer	EP2607N–509
12	Clutch Housing Assembly	EP4007N–580	30	Spindle Bearing	EP4007N–510
13	Clutch Spring Plate	EP4007N–623	31	Spindle/Gear Head (2)	EP2607N–216
14	Clutch Spring		34	Planet Gear	
	for EP1510E	EP1510N–583		for EP1510E (6)	EP1510N–10
	for EP2607E	EP2607N–583		for EP2607E (6)	EP2607N–10
	for EP4004E	EP4007N–583		for EP4004E (6)	EP2603N–10
15	Taper Ring Retaining Ring	EP4007N–584			
16	Taper Ring Assembly	EP2607N–588			
17	Bit Retaining Ball (.094” dia.) (2)	R000B–263			
18	Pilot Cam Ball (2) (.156 dia.) (4)	2U–696			
19	Bit Holder Assembly	EP4007N–586			

* Not illustrated.

Models EP1510E, EP2607E and EP4004E Electric Screwdrivers *(Continued)*

		PART NUMBER FOR ORDERING
35	Gear Head Pinion Gear	
	for EP1510E	EP1510N–17
	for EP4004E	EP2603N–17
	for EP2607E	EP2607N–17
36	Gear Case	
	for EP1510E	EP1510N–37
	for EP4007E	EP4007N–37
	for EP2607E	EP2607N–37
37	Gear Case Shield	EP4007N–207
38	Clutch Pilot Rod “I” (2.26” long)	EP4007N–435
39	Fan Pinion Gear	
	for EP1510E	EP1510N–18
	for EP4004E	EP2603N–18
	for EP2607E	EP2607N–18
40	Fan Pilot Rod “G” (.385” long)	EP4007N–436
41	Fan	EP4007N–52
42	Motor Pilot Rod “J” (2.71” long)	EP4007N–437
	Motor Assembly	
	for EP1510E, EP2607E and EP4004E	EP2607E–A53
43	Front End Plate	EP4007N–11
44	Motor Assembly Spring (2)	EP4007N–98
46	Field	
	for EP1510E, EP2607E and EP4004E	EP2607N–54

		PART NUMBER FOR ORDERING
47	Front Armature Bearing	EP4007N–24
48	Armature	
	for EP1510E, EP2607E and EP4004E	EP4004E–53
49	Rear Armature Bearing	EP4007N–22
50	Rear End Plate	EP4004E–12
51	Brush Assembly (includes 10 pieces)	EP4004E–BP
52	Brush Cap (2)	EP4007N–25
53	Motor Ring Coil Assembly	EP4004E–232
54	Adjusting Screw Nut	EP4007N–593
55	Pilot Rod Adjusting Screw	EP4007N–592
56	Switch Pilot Rod “D”	EP4007N–438
57	Pilot Rod Spring	EP4007N–595
58	Microswitch Circuit Board	EP4004E–220
59	Switch Plate	EP4007N–221
60	Shut–off Switch	EP4007N–223
61	Start Switch	EP4007N–222
62	Switch Screw (12 mm) (4)	EP4007N–224
63	Switch Base Screw (5 mm) (2)	EP4007N–226
65	Switch Base Spacer (2)	EP4007N–225
66	Insulating Film	EP4007N–227

Models EP1510E, EP2607E and EP4004E Electric Screwdrivers *(Continued)*

		PART NUMBER FOR ORDERING			PART NUMBER FOR ORDERING
67	Brush Light Circuit Board	EP4004E–228	*	Torque Adjusting Wrench	EP4007N–516
68	Controller Assembly	EP4004E–424	*	Suspension Bail	
	Reverse Switch Circuit Board Assembly	EP4004E–A229		for EP4004E (fits Pistol Grip)	EP4007N–366
69	Reverse Switch Circuit Board	EP4004E–229		for EP1510E and EP2607E (fits tool)	EP4007N–365
70	Reverse Switch	EP4007N–329	*	Microswitch Adjusting Wrench Package	ES60T–MSW
*	Reverse Switch Rocker	EP4007N–330	*	Pistol Grip Assembly	EP4007N–48
71	Capacitor	EP4007N–230	*	Test Brush (230 V)	EP4004E–TP230
72	Resistor	EP4004E–231	*	Switch Adjustment Gauge (for high torque models)	EP1510N–SG
73	Receptacle Assembly	EP4004E–44A		Gear Case Jig (for high torque models)	EP1510N–J37
74	Ground Screw	EP4007N–42	*	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
75	Ground Screw Washer	EP4007N–43	*	Maintenance Label	
	Housing Assembly			English	EP4007N–302
	for EP1510E	EP1510E–A40		French	EP4007N–302F
	for EP2607E	EP2607E–A40		German	EP4007N–302G
	for EP4004E	EP4004E–A40		Spanish	EP4007N–302S
76	Housing Package	EP4007N–40		3 m long with VDE plug	EP4004E–239
77	Brush Light Cover	EP4007N–45		3 m long with UK plug	EP4004U–239
78	Nameplate				
	for EP1510E	EP1510E–301			
	for EP2607E	EP2607E–301			
	for EP4004E	EP4004E–301			
79	Warning Label	EP4004E–99			
80	Housing Screw (package of 10)	EP4007N–41			
81	Power Cord				
	3 m long with VDE plug	EP4004E–239A			
	3 m long with UK plug	EP4004E–239AU			
	Noise Suppresser	EP4007N–240			

***** Not illustrated.

MAINTENANCE SECTION

⚠ WARNING

Maintenance procedures have the potential for severe shock hazard and should be performed by qualified personnel.

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 or 84) 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 or 83) 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 (75A or 76) apart.
   For Throttle Lever Start Models, remove the Throttle Lever (76), Throttle Spring (77) and Throttle Lever Pin (78).

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

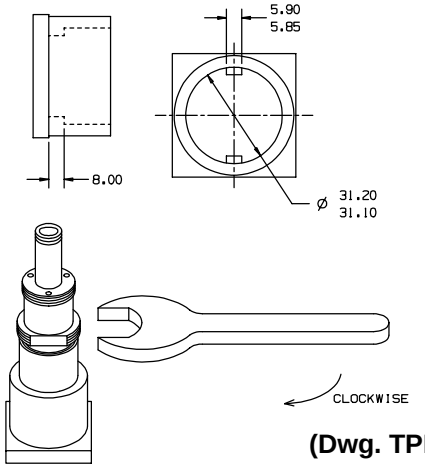
Be sure to hold the Motor Assembly and Gear Case together. Rough handling may damage the Fan Pilot Rod (40) in the Fan (41).

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).



(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).

16a. For push to start models, remove the Pilot Push Spring (23), the Pilot Push Spring Washer (22) and the Pilot (20 or 22) from the Bit Holder Assembly.

17. **For Throttle Lever Start Models,** remove the Front Shim (13) and the Rear Shim (14) first. Then remove the Taper Ring Retaining Ring. Separate the Taper Ring Assembly from the Bit Holder. Remove the two Pilot Cam Balls and the Pilot (22) from the Bit Holder Assembly.

18. Remove the Clutch Pilot Rod (38) and the Cam Guide (24). Remove the two Cam Guide Balls (25) from the Guide.
19. Lift the Gear Case from the Gear Case Jig and push the Spindle Bearing (30) and Cam (27) from the Case.
20. Lift the Cam from the Spindle Bearing and remove the Cam Rollers (28).
21. 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 or 71) 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 Reserve 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. Inspect the Noise Suppressor Assembly EP4004E–232 for any components that might be damaged. Replace if necessary.

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. Test 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).

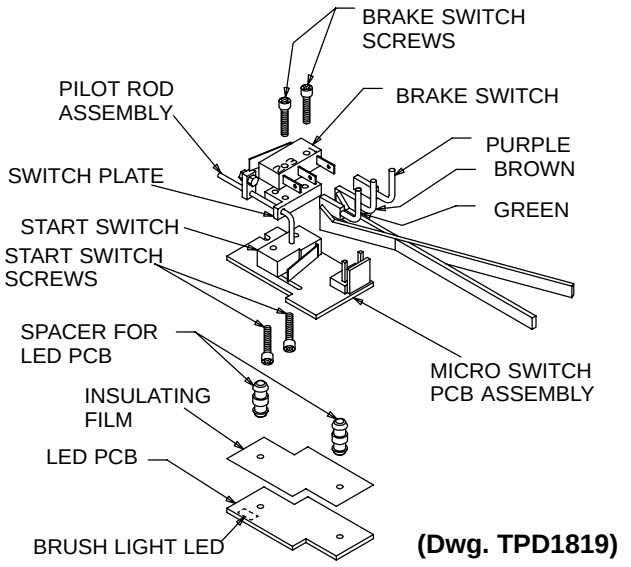
NOTICE

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 of Field 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.
9. **For Throttle Lever Start Models,** put two additional strips of insulation tape, one upon the other, onto the Brush Light Circuit Board (67) side of the Motor Assembly. This insulates the area between the ground wire and the Field.

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 Reserve 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. TRD1819).



(Dwg. TPD1819)

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.

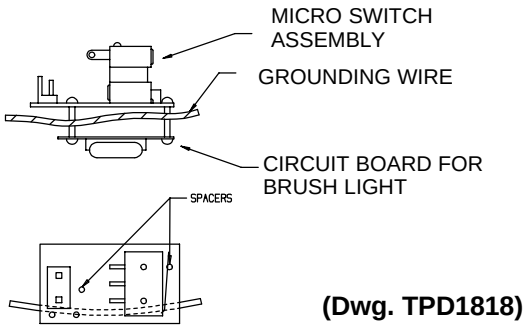
9. Using needle nose pliers, install the three connectors from the Controller Assembly (68) onto the Shut–off Switch.

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.

ROUTE OF GROUNDING WIRE



(Dwg. TPD1818)

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 (75A or 76).
    For Throttle Lever Start Models, lay the ground wire between the Motor and the Housing Package.
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 in the correct position. 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 (41) 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 (31) 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.

17. **For Push to Start Models,** insert the Pilot Push Spring Washer (22) and the Pilot Push Spring (23) into the bit Holder.
    Throttle Lever Start Models do not use a Push Spring and Washer.
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 edge side. 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. The third is for Throttle Lever Start Models.

22. **For Throttle Lever Start Models,** place the Shims (13 and 14), onto the Bit Holder.
23. Place the Clutch Spring (14 or 16) and the Clutch Spring Plate (13 or 15) over the Bit Holder.
24. 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.

25. Using an open end torque wrench on the flats of the Clutch Housing, tighten the Clutch Housing to 28.5 Nm.
26. Apply grease to both ends of the Clutch Pilot Rod (38) and insert it into the Gear Case.
27. **For Throttle Lever Start Models,** inspect the clearance of the bit Holder Assembly. Touch the end of the Clutch Pilot Rod and push on the Bit Holder Assembly. If the Clutch Pilot Rod is moved by the Bit Holder at this time, add additional Shims.
28. Install the Bit Retainer Retaining Ring (10), sharp edge side first, into the second groove from the bit end of the Bit holder.
29. Apply grease to the holes of the Bit Holder and insert the two bit Retaining Balls (17 or 19) into the holes.
30. Apply grease to one end of each Clutch Adjusting Pin (11) and insert the three Pins into the Clutch Housing.
31. 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.
32. Install the Bit Retainer Sleeve (9), the Bit Retainer Spring (8) and the Bit Retainer Collar (7) onto the Bit Holder.
33. Using a thin blade screwdriver, install the Front Bit Retainer Retaining Ring (6).
34. 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.
35. Lift the Motor slightly and slide the Gear Case onto the Motor with the Ground Screw hole adjacent to the ground wire.
36. Attach the ground wire to the Gear Case with the Ground Screw (74) and Washer (75). Tighten to 4 KG–cm.
37. Turn the Gear Case until the notch in the Gear Case matches the tab in the Housing.
38. 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 thePilot 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.
4. **For Throttle Lever Start Models,** there is no need to push the Bit Holder. Slide the gauges between the Pilot Rod Adjusting Screw and the Throttle Lever (76).

Assembly of the Tool

1. **For Push to Start Models,** made sure the ground wire is inserted in the groove in the housing.
2. **For Throttle Lever Start Models,** make sure the Ground Wire is between the Motor Assembly and the Housing.
3. Snap the Housing halves together.
4. **For Throttle Lever Start Models,** insert the Throttle Lever Pin (78) into the Housing. Insert the Throttle Spring (77) into the Throttle Lever. While compressing the Throttle Spring, install the Throttle Lever onto the throttle Lever Pin. Snap the Housing halves together.

5. Install the Housing Screws (80 or 83) into the Housing and tighten to 4 KG–cm.
6. Slide the Flange (2) onto the Housing. Screw the Retainer Coupling (1) onto the Housing until it clicks into place.

NOTICE

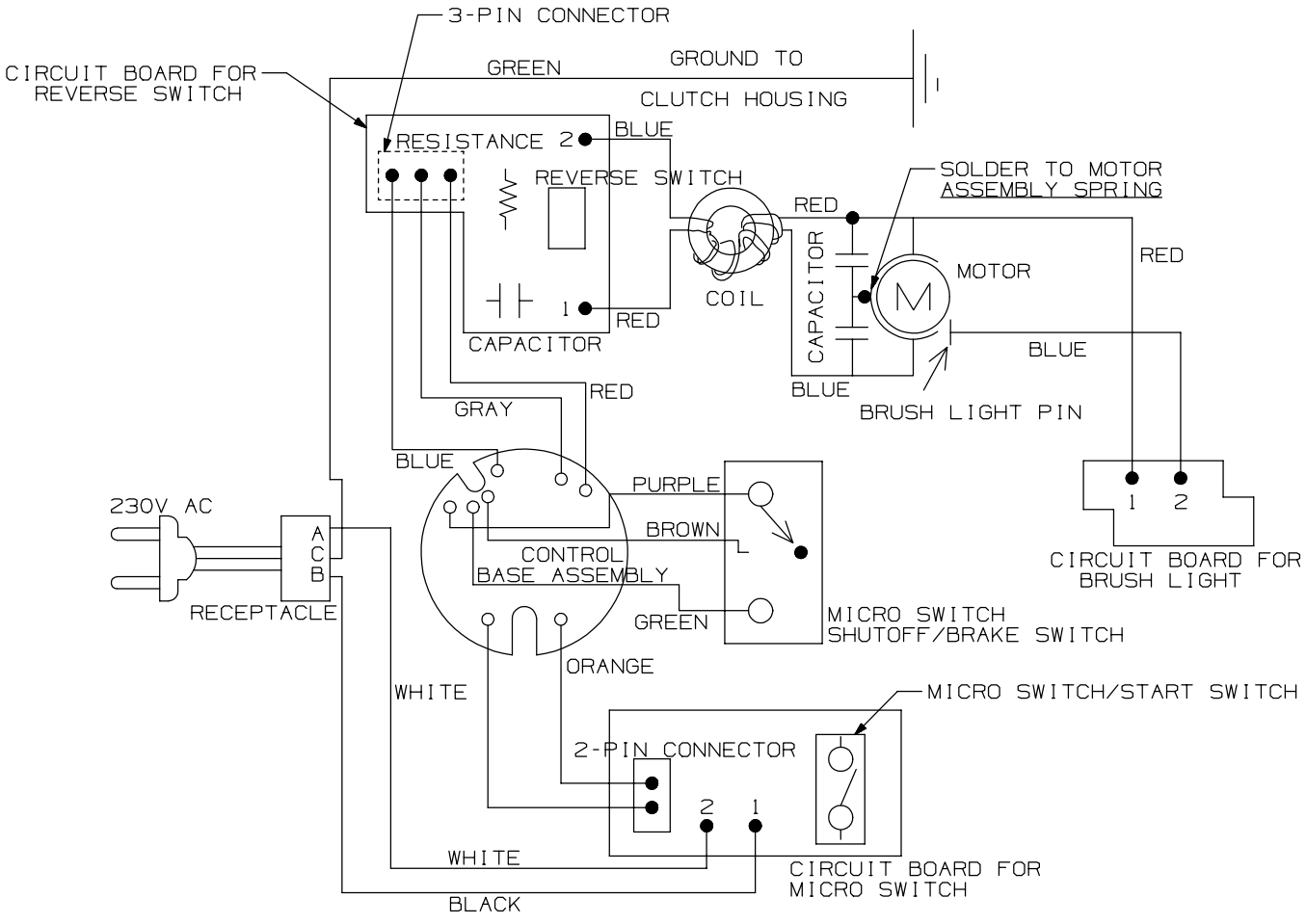
These are left–hand threads.

7. 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 and ten times.
4. For repair and troubleshooting of the high torque low voltage Controller, refer to the operation and maintenance manual.

WIRING DIAGRAM FOR EP1510E 230V



(Dwg. TPA1531)

MAINTENANCE SECTION

TROUBLESHOOTING GUIDE

1.

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?

No →
1. Starting microswitch is defective; replace the microswitch.
2. Pilot Rod "H" is binding; clear obstruction or replace Rod.
3. Pilot Rod "G" or Pilot Rod "H" is defective; repair or replace Rod.
4. Bit Holder is binding; clear the obstruction.
5. Incorrect Pilot Rod; check each rod length and place each length in its proper position.
6. Incorrect assembly of Clutch; check clutch parts and balls for proper assembly.
7. Stop Ring out of position; install the Stop Ring correctly.

Yes ↓

Is the brush light turned on?

Yes → Brushes are worn; replace the brush assemblies.

No ↓

With tool unplugged, can bit be rotated manually?

No →
1. Defective planetary gearing; replace the defective parts.
2. Defective clutch; replace the defective parts.
3. Defective motor; replace the motor.

Yes ↓

Are the brush assemblies in good condition?

No →
1. Brushes are cracked; replace the Brush Assemblies.
2. Commutator worn; replace the motor.

Yes ↓

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. 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.

Is there voltage to the Motor?

Yes →
1. Motor is defective; replace the Motor.
2. Brushes are defective; replace the Brush Assemblies.

No ↓

Is there voltage out of the reverse switch?

Yes →
1. Coil is defective; replace the Coil.
2. Wiring is defective; replace any broken wires and resolder any defective solder connections.

No ↓

Is there voltage to the Reverse Switch?

Yes →
1. Reverse Switch is defective; replace the Reverse Switch.
2. Solder connections are defective; resolder any defective solder connections.

No ↓

Is there voltage out of the Power Cord?

No →
1. Power Cord is defective; replace the power Cord.
2. Solder connections defective; resolder any defective solder connections.

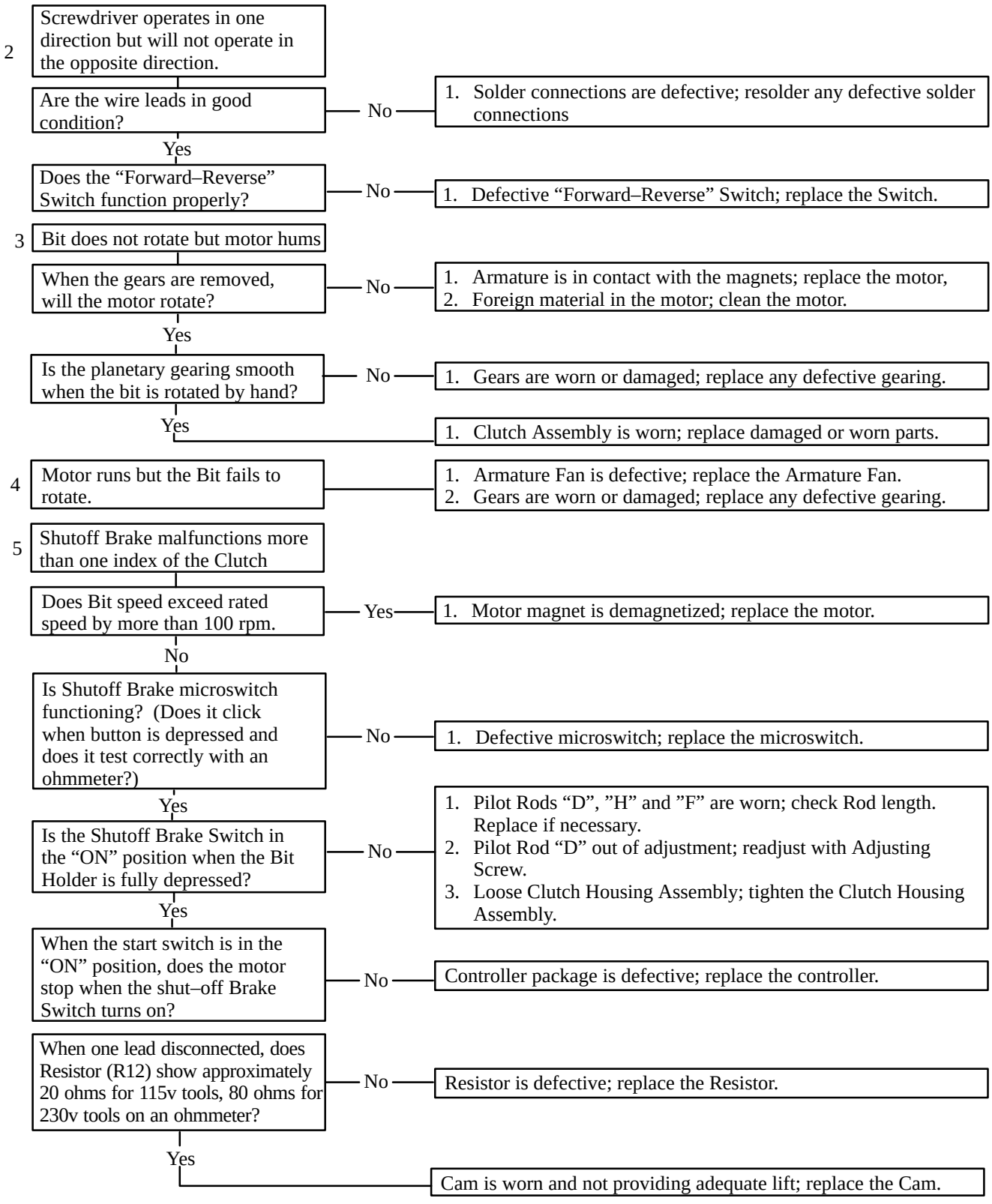
Yes ↓

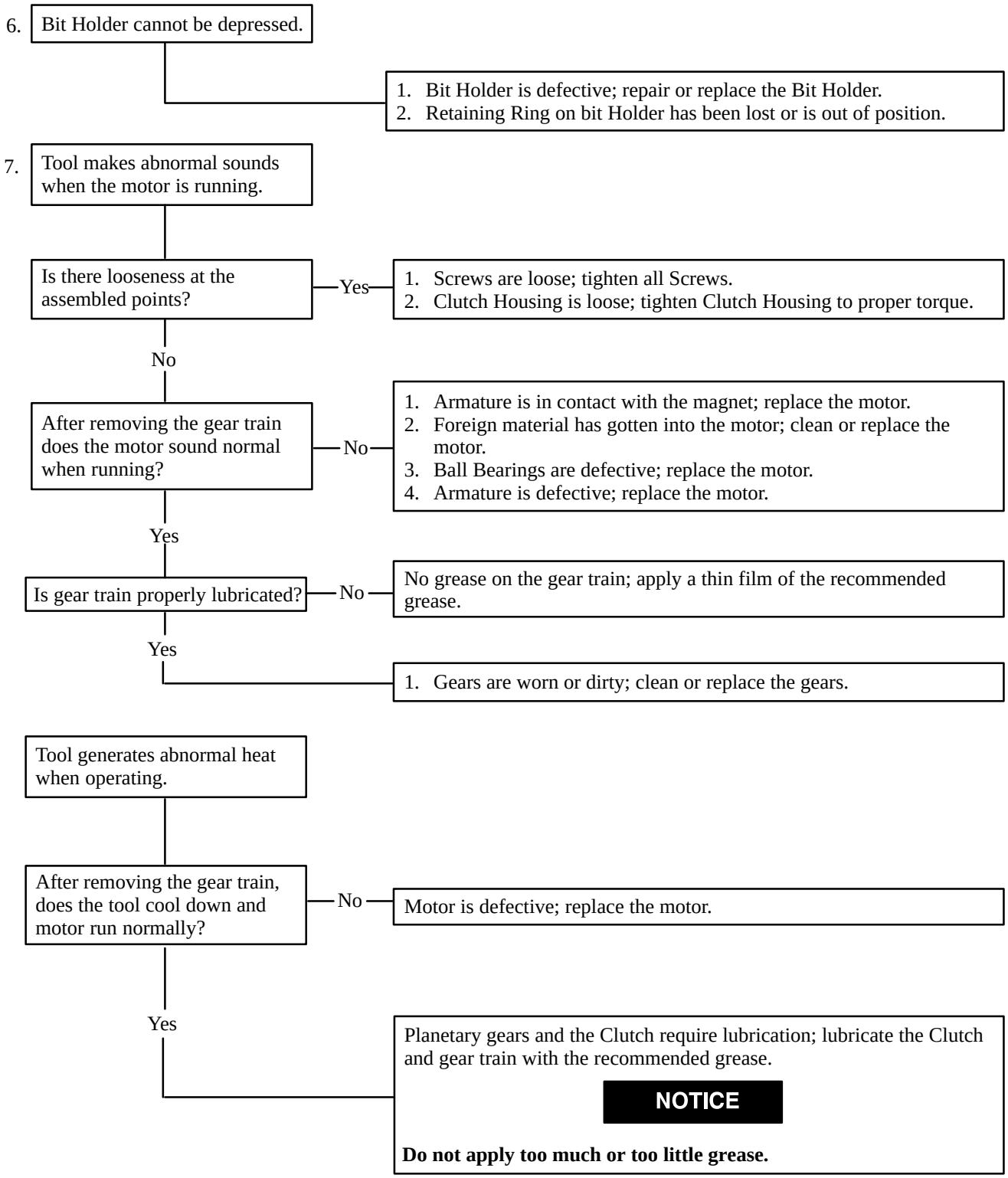
Is there voltage to the controller?

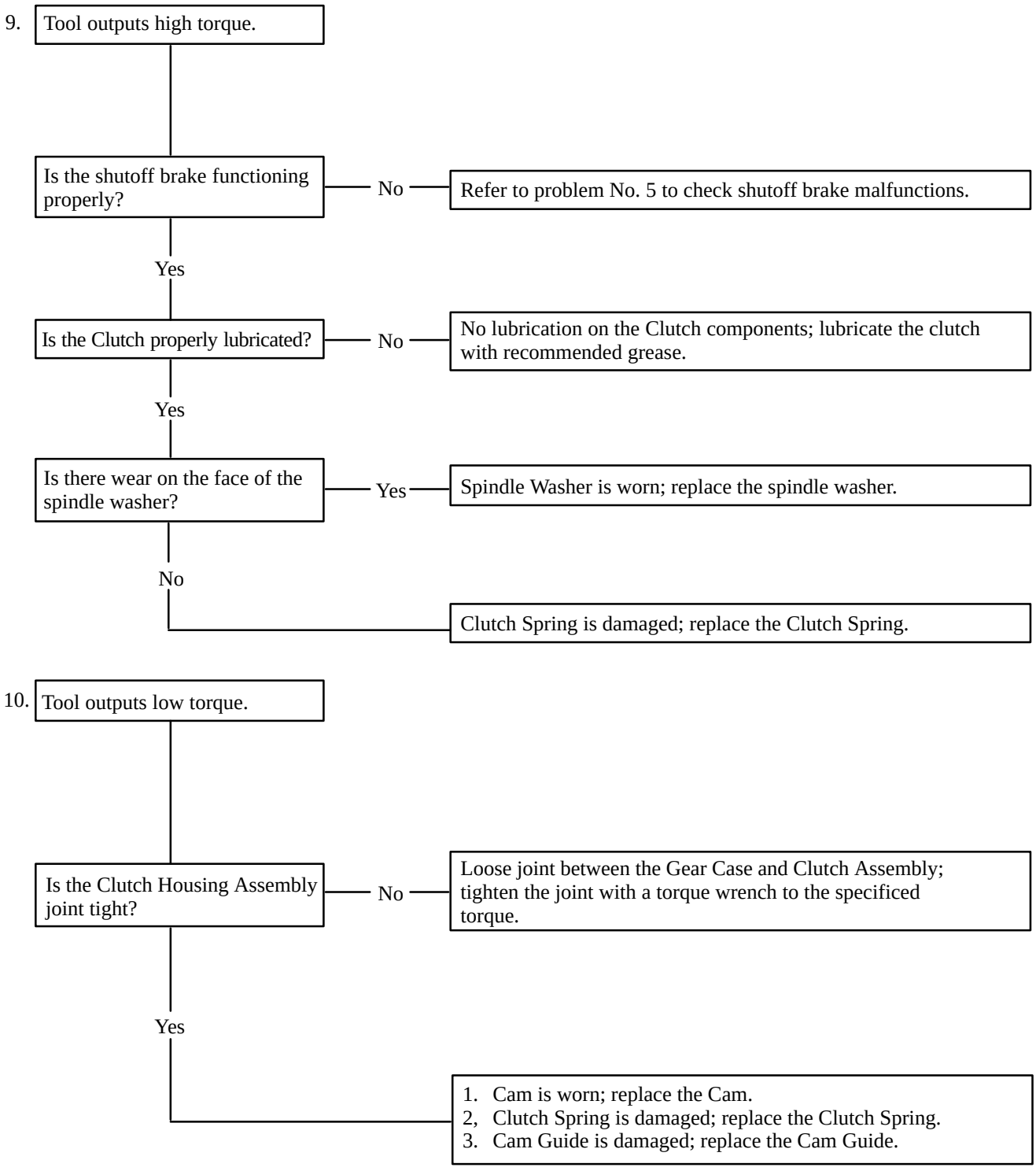
Yes →
1. Controller is defective; replace the Controller.
2. Solder connections are defective; resolder any defective solder connections.
3. The connectors are mis–connecting; connect properly.

No ↓

Replace the On/Off Switch.


2
Screwdriver operates in one direction but will not operate in the opposite direction.
Are the wire leads in good condition?
No
1. Solder connections are defective; resolder any defective solder connections
Yes
Does the "Forward–Reverse" Switch function properly?
No
1. Defective "Forward–Reverse" Switch; replace the Switch.
3
Bit does not rotate but motor hums
When the gears are removed, will the motor rotate?
No
1. Armature is in contact with the magnets; replace the motor,
2. Foreign material in the motor; clean the motor.
Yes
Is the planetary gearing smooth when the bit is rotated by hand?
No
1. Gears are worn or damaged; replace any defective gearing.
Yes
1. Clutch Assembly is worn; replace damaged or worn parts.
4
Motor runs but the Bit fails to rotate.
1. Armature Fan is defective; replace the Armature Fan.
2. Gears are worn or damaged; replace any defective gearing.
5
Shutoff Brake malfunctions more than one index of the Clutch
Does Bit speed exceed rated speed by more than 100 rpm.
Yes
1. Motor magnet is demagnetized; replace the motor.
No
Is Shutoff Brake microswitch functioning? (Does it click when button is depressed and does it test correctly with an ohmmeter?)
No
1. Defective microswitch; replace the microswitch.
Yes
Is the Shutoff Brake Switch in the "ON" position when the Bit Holder is fully depressed?
No
1. Pilot Rods "D", "H" and "F" are worn; check Rod length. Replace if necessary.
2. Pilot Rod "D" out of adjustment; readjust with Adjusting Screw.
3. Loose Clutch Housing Assembly; tighten the Clutch Housing Assembly.
Yes
When the start switch is in the "ON" position, does the motor stop when the shut–off Brake Switch turns on?
No
Controller package is defective; replace the controller.
When one lead disconnected, does Resistor (R12) show approximately 20 ohms for 115v tools, 80 ohms for 230v tools on an ohmmeter?
No
Resistor is defective; replace the Resistor.
Yes
Cam is worn and not providing adequate lift; replace the Cam.


6. Bit Holder cannot be depressed.
1. Bit Holder is defective; repair or replace the Bit Holder.
2. Retaining Ring on bit Holder has been lost or is out of position.
7. Tool makes abnormal sounds when the motor is running.
Is there looseness at the assembled points?
Yes
1. Screws are loose; tighten all Screws.
2. Clutch Housing is loose; tighten Clutch Housing to proper torque.
No
After removing the gear train does the motor sound normal when running?
No
1. Armature is in contact with the magnet; replace the motor.
2. Foreign material has gotten into the motor; clean or replace the motor.
3. Ball Bearings are defective; replace the motor.
4. Armature is defective; replace the motor.
Yes
Is gear train properly lubricated?
No
No grease on the gear train; apply a thin film of the recommended grease.
Yes
1. 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?
No
Motor is defective; replace the motor.
Yes
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.


9.
Tool outputs high torque.
Is the shutoff brake functioning properly?
No
Refer to problem No. 5 to check shutoff brake malfunctions.
Yes
Is the Clutch properly lubricated?
No
No lubrication on the Clutch components; lubricate the clutch with recommended grease.
Yes
Is there wear on the face of the spindle washer?
Yes
Spindle Washer is worn; replace the spindle washer.
No
Clutch Spring is damaged; replace the Clutch Spring.
10.
Tool outputs low torque.
Is the Clutch Housing Assembly joint tight?
No
Loose joint between the Gear Case and Clutch Assembly; tighten the joint with a torque wrench to the specificed torque.
Yes
1. Cam is worn; replace the Cam.
2, Clutch Spring is damaged; replace the Clutch Spring.
3. Cam Guide is damaged; replace the Cam Guide.

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