

Service Manual
PL12EN-48ET
02/15/2013

OMEGA TECHNOLOGIES

Cleco®

48ET Series
Electronically Controlled Tube Nut Nutrunner



For additional product information visit our website at:
<https://dotcotool.com/product-category/cleco-tools/cleco-corded-electric-nutrunners-cleco-air-tools/cleco-48-series-transducer-control-tubenut-corded-electric-nutrunners/>

For this Instruction Manual

This Instruction Manual is the Original Instruction Manual intended for all persons who will operate and maintain these tools.

This Instruction Manual

- provides important notes for the safe and efficient use of these tools.
- describes the function and operation of the 48ET series tools.
- serves as a reference guide for technical data, service intervals and spare parts ordering.
- provides information on optional equipment.

Identification text:

48ET represents all models of the DC electric right angle nutrunner as described in this manual



indicates a required action



indicates a list

<..>

indicates a reference number from the exploded parts drawings

Arial

indicates an important feature or instruction written in **Arial Bold**

Identification graphic:



indicates a directional movement



indicates a function or force

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| | 48 | E | T | X | XX | XX | XX | X | X |
|--|----|---|---|---|----|----|----|---|---|
| <u>Tool Series</u> 48 | | | | | | | | | |
| <u>Motor Style</u> E = Brushless Electric Motor | | | | | | | | | |
| <u>Tool Type</u> T = Tube Nut | | | | | | | | | |
| <u>Feature</u> - = Matrix Tool Connector (Standard) E = Air LB Connector | | | | | | | | | |
| <u>Maximum Torque Nm (rounded to nearest Nm)</u> 20 = 20 Nm 30 = 30 Nm 40 = 40 Nm | | | | | | | | | |
| <u>Head Size</u> T2 = 20 Nm (15 ft. lbs.) maximum output T3 = 30 Nm (22 ft. lbs.) maximum output T4 = 40 Nm (30 ft. lbs.) maximum output | | | | | | | | | |
| <u>Socket Size (refer to Socket Tables)</u> T2 = Section 10.6 T3 = Section 10.7 T4 = Section 10.8 | | | | | | | | | |
| <u>Extension Length</u> 0 = Flush 1 = 1/8" 2 = 1/4" 3 = 3/8" 4 = 1/2" 5 = 5/8" 6 = 3/4" | | | | | | | | | |
| <u>Output Type</u> 0 = Partial Thru Hex 1 = Thru Hex 2 = Double Hex 3 = Partial Thru Double Hex | | | | | | | | | |

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1 Safety

1.1 Warnings and notes

Warning notes are identified by a signal word and a pictogram.

- The signal word indicates the severity and probability of the impending danger.
- The pictogram indicates the type of danger.

WARNING!



WARNING identifies a potentially **hazardous** situation which, if not avoided, may result in serious injury.

CAUTION!



CAUTION identifies a potentially **hazardous** situation which, if not avoided, may result in minor or moderate injury or property and environmental damage.

NOTE



NOTE identifies general information which may include application tips or useful information but no hazardous situations.



Important information that must be read and understood by all personnel installing, operating or maintaining this equipment.

1.2 Basic requirements for safe working practices



All personnel involved with the installation, operation or maintenance of these tools must read and understand all safety instructions contained in this manual. Failure to comply with these instructions could result in serious injury or property damage.

These safety instructions are not intended to be all inclusive. Study and comply with all applicable National, State and Local regulations.

CAUTION!



Work Area:

- Ensure there is enough space in the work area.
- Keep the work area clean.
- Keep the work area well ventilated.

Personnel Safety:

- Inspect the power cable for damage.
- Make sure the power cable is securely attached to the tool.
- Ensure a secure standing position and maintain balance.
- Make sure the throttle is positioned relative to the head so the throttle will not become wedged against an adjacent object in the ON position due to torque reaction.
- If the tool is to be reversed, locate the throttle in a neutral position to prevent entrapment.

1.2 Basic requirements for safe working practices (continued)

CAUTION!



- Keep the tool clean and dry to provide the best possible grip.
- Firmly grasp the handle of the 48ET and apply the socket to the application before starting.
- Be prepared for high short-term reaction torques.

Safety working with and around fastening tools:

- Use only power tool sockets available from Apex Tool Group.
- Inspect socket for visible damage and cracks. Replace damaged items immediately.
- Disconnect the power supply before installing or replacing the socket.
- Make sure the socket is fully assembled and locked in position.

1.3 Operator training

All personnel must be properly trained before operating the 48ET tools. The 48ET tools are to be repaired by fully trained personnel only.

1.4 Personal protective equipment



When working

- Wear eye protection to protect against flying metal splinters.
- Wear hearing protection



Danger of injury by being caught by moving equipment.

- Wear a hairnet
- Wear close fitting clothing
- Do not wear jewelry

1.5 Designated use

The 48ET is designed exclusively for fastening and releasing threaded fasteners. The 48ET is used in conjunction with the following controllers:

- Do not modify the 48ET, any guard or accessory.
- Use only with accessory parts which are approved by the manufacturer.

| Nutrunner | Controller |
|--------------|--|
| 48ET series | TME-200 series |
| 48ET series | m-Pro-400 series |
| 48ET series | m-Pro-400GC controller with m-Pro-400-IT isolation transformer |
| 48ETE series | m-Pro-400GC controller |

- Do not use as a hammer, pry-bar or any other improper usage.
- Do not use in areas where there is a risk of explosion.

1.6 Codes and standards

It is mandatory that all national, state and local codes and standards be followed.

1.7 Noise and vibration

Noise level ≤ 68 dB(A) free speed (without load) according to ISO 12100: 2011

Vibration values < 2.5 m/s² according to ISO 12100: 2011

2 Scope of supply, transport and storage

2.1 Items supplied

Check shipment for transit damage and ensure that all items have been supplied:

- 1 48ET
- 1 PL12EN-48ET instruction manual
- 1 Declaration of Conformity
- 1 Lubrication sheet
- 1 Warranty statement

2.2 Transport

Transport and store the 48ET in the original packaging. The packaging is recyclable.

2.3 Storage

For short term storage (less than 2 hours) and protection against damage:

- ➔ Place the 48ET in a location on the workbench to avoid accidental depression of the button.
or
- ➔ Suspend the 48ET from a suitable balancer or tool positioner.

For storage longer than 2 hours:

- ➔ Disconnect the power supply from the 48ET

3 Product description

3.1 General description

- DC electric powered tube nut nutrunner
- Low inertia brushless motor
- Clockwise/counterclockwise rotation
- High visibility LEDs
- 360° positionable head

3.2 Operation and functional elements

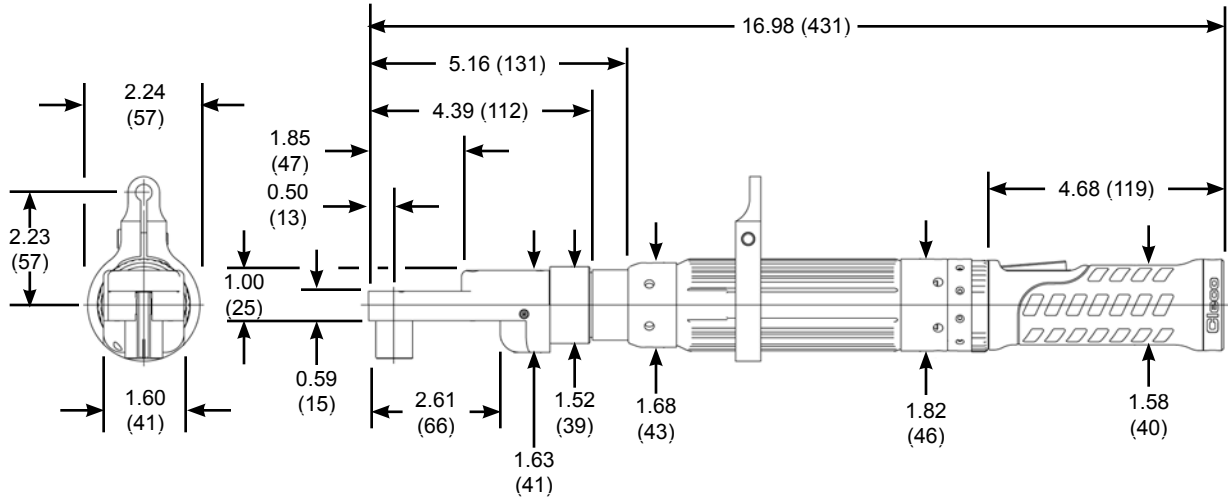
This section describes the operational and functional elements of the 48ET.



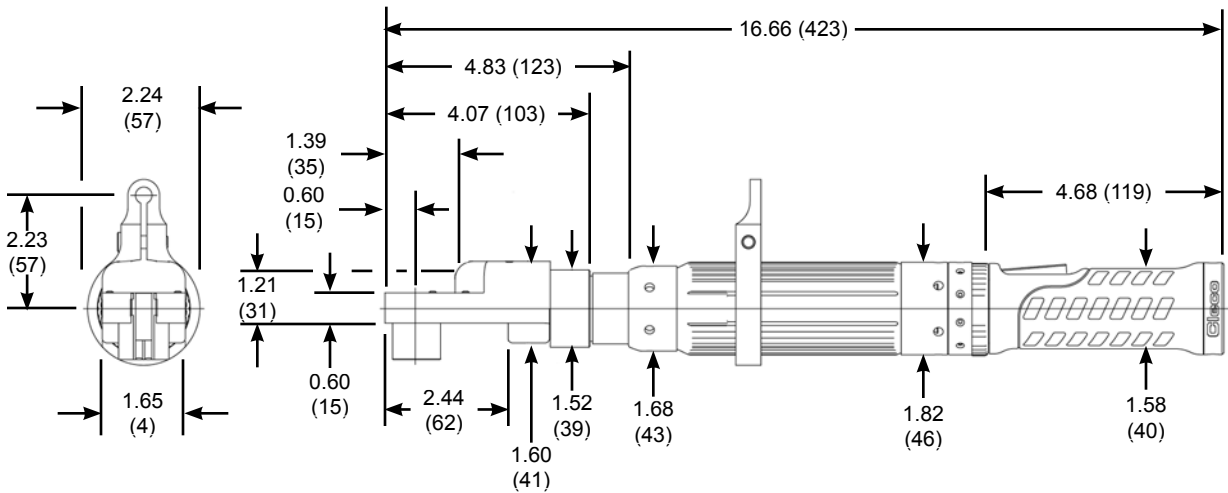
| Ref. | Description |
|------|---------------------|
| 1 | Power Connection |
| 2 | Start Button |
| 3 | Reversing Ring |
| 4 | LED Light Ring |
| 5 | Motor Assembly |
| 6 | Gearing |
| 7 | Tube Nut Attachment |

3.3 Dimensional data

inches (mm)



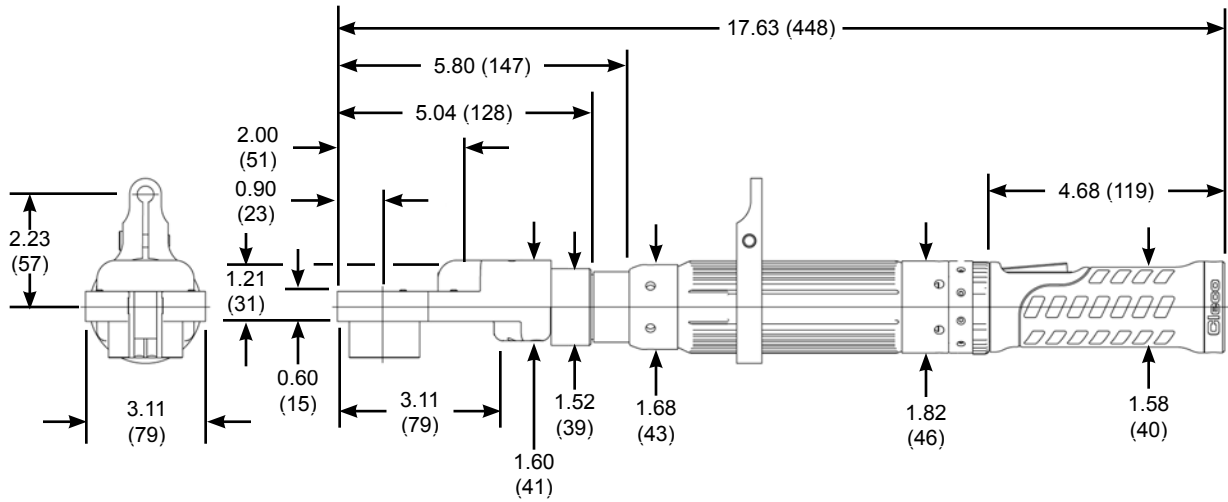
48ET20T2
48ETE20T2



48ET30T3
48ETE30T3

3.3 Dimensional data (continued)

inches (mm)



48ET40T4
48ETE40T4

4 Accessories



Tool Cable (optional length)
Tool Cable - Inline Swivel (optional length)
Tool Cable - Right Angle Swivel (optional length)
Tool Cable Extension (optional length)
Refer to sections 10.1 and 10.2 for part numbers



Tool and Cable Tester
Part Number: 961024
Tool and cable tester (tool memory programming)
Part Number: 542991
Tool and cable tester
*Note: Adapter cable required for Air-LB models.
Contact Apex Tool Group*



Lever Extension Kit
Part Number: 541757 (non-swivel)
Part Number: 543414 (swivel)



Suspension Bail
Part Number: 1110909



Swivel Suspension Bail
Part Number: 541715

4 Accessories (continued)



Test Fixture

Part Number: 536185

Medium to Hard Torque

Belleville washer test fixture is clamped in a vise and used to test tools. Washers can be rearranged to simulate "hard" or "soft" joints.

Range: 10 in.lbs (1.13Nm) - 100 ft.lbs. (135.6Nm)



Joint Simulator

Joint simulators are most frequently used to certify the repeatability of nutrunners before being installed on a production line and are also an excellent means of testing nutrunners following repair.

The joint simulator can simulate and test the torque output of nutrunners on both hard and soft joints. Each joint simulator is supplied with a quantity of spring washers which are used to test tool accuracy. Torque per revolution is varied by stacking the spring washers in different combinations.

| Part Number | Torque Range | | Width | | Height | | Length | |
|-------------|--------------|--------|-------|-----|--------|-----|--------|-----|
| | Ft. Lbs. | Nm | in. | mm | in. | mm | in. | mm |
| 550006 | 12-220 | 15-300 | 10.4 | 264 | 16.0 | 406 | 26.5 | 667 |

5 Before initial operation

5.1 Ambient conditions

NOTE




| | |
|-------------------------------|---|
| Ambient temperature: | 32°F (0°C) to a maximum of 104°F (40°C) |
| Acceptable relative humidity: | 0% to 80%, non-condensing |
| Working altitude | up to 3281 ft. (1000m) above sea level |

5.2 Power supply


Power for the 48ET series nutrunner is provided by networking it with a tool controller.

5.2.1 TME-200 or m-Pro-400 series controllers


TME-200 Series



m-Pro-400 Series



Tool Cable



48ET Series Nutrunner

TME-200 Series Controller

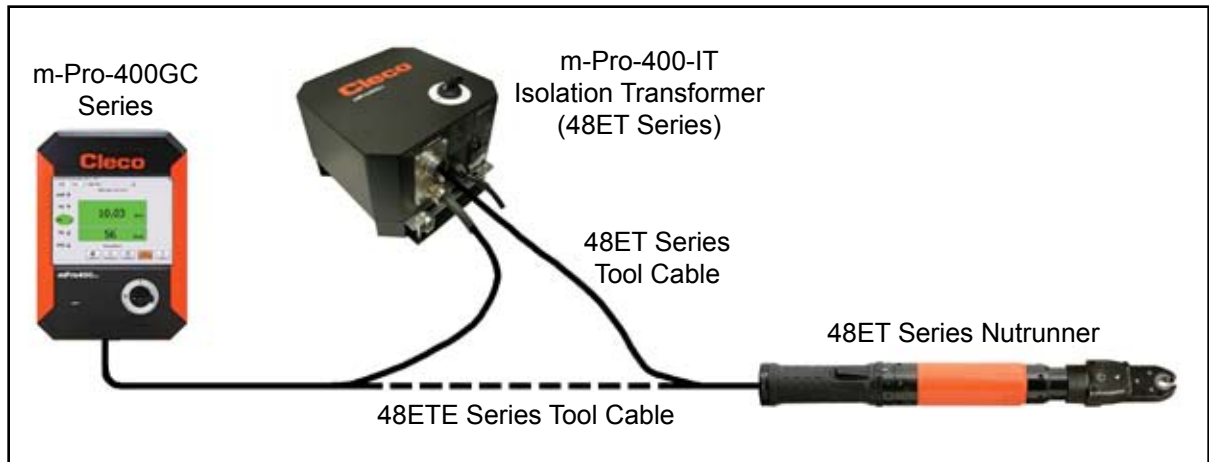
| Supply Voltage | EN |
|----------------|--------------|
| | Order Number |
| 115 VAC | TME-211-15-U |
| 115 VAC | TME-221-15-U |
| 230 VAC | TME-211-30-U |
| 230 VAC | TME-221-30-U |

TME and m-Pro-400 Series Controllers

| 48ET | 48ETE | EN |
|--------------|------------|-----------------------------|
| | | Description |
| 115 VAC | Standard | TMEI-114-15-U |
| 115 VAC | DeviceNet | TMEI-114-15-U-ED |
| 115 VAC | ProfiBus | TMEI-114-15-U-EP |
| TME-200 | m-Pro-400 | Controller |
| PL12()-1300 | * | Programming Notes |
| 575708 | * | Battery |
| 541683-01 | * | Power Cord: 115VAC - USA |
| 541683-02 | * | Power Cord: 230VAC - USA |
| 541683-03 | * | Power Cord: 230VAC - Europe |
| 542779-XXX | 301877-XXX | Extension Cable |
| 544056-XXX | 301904-XXX | Swivel Cable |
| 544055-XXX | 301903-XXX | Swivel Cable - Right Angle |
| 542778-XXX | 301866-XXX | Tool Cable |

* Note: Contact Apex Tool Group

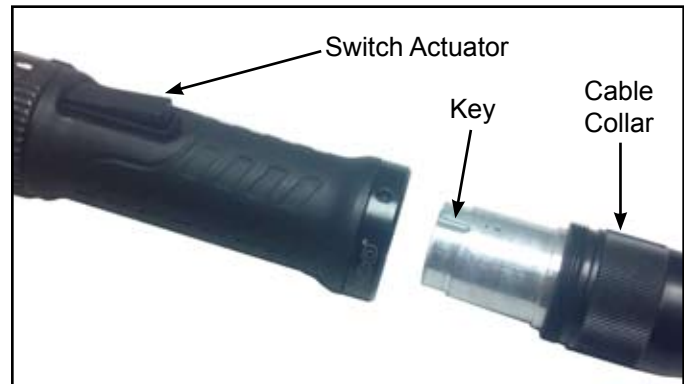
5.2.2 m-Pro-400GC series global controller



5.3 Tool cable connection

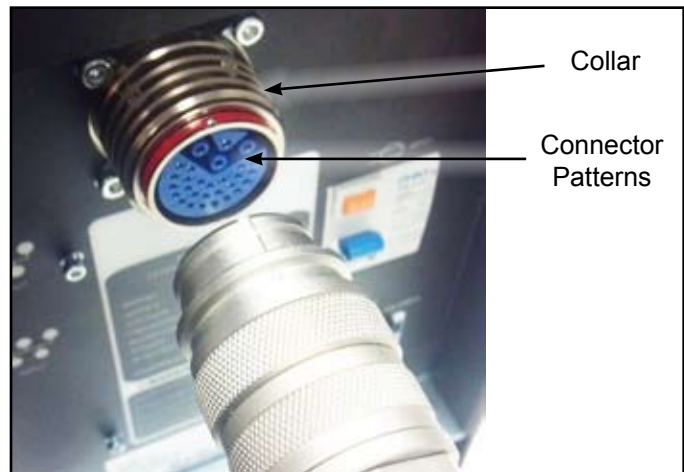
5.3.1 Cable connection to 48ET

Insert the tool connection end of the cable into the 48ET handle. Align the key on the cable connector with the switch actuator on the tool handle. This will allow the key to engage the mating slot inside the handle. Thread the cable collar into the tool handle and tighten securely.



5.3.2 Cable connection to controller

Connect the other end of the cable to the tool connector on the controller. Make certain the collar on the controller tool connector is pushed in towards the controller. Align the connector patterns of the tool cable and controller connector. Push the cable connector into the controller connector and pull the collar towards the cable to lock the cable connector in position.



5.3.3 Apply power to the tool

Refer to the controller manual for tool operation.

6 First operation

6.1 Putting into use

- ➔ Make sure the tool cable is securely attached to the tool and controller.
- ➔ Make sure controller is powered on and properly programmed (refer to controller manual)
- ➔ Make sure the reverse ring is in the correct position.
- ➔ Place the socket on the application and depress the switch actuator to start the rundown.
- ➔ When the tool shuts off, release the switch actuator.
- ➔ Remove the tool from the application.

7 Troubleshooting

| Malfunction | Possible causes | Remedy |
|---|--|--|
| Tool does not start | Start switch faulty | → Replace start switch |
| | No speed (RPM) programmed | → Program a speed for all active stages |
| | Controller is waiting for a Tool Enable | → Make the Tool Enable connection or disable Tool Enable if not required |
| | Faulty cable | → Replace or repair cable |
| | Bent pins in cable or tool | → Straighten pins or replace faulty connector |
| Tool runs forward but not Reverse | No speed programmed for Reverse | → Enter a speed (RPM) for Reverse |
| | Faulty reverse switch | → Replace Start/Reverse switch assembly |
| | Faulty cable | → Replace or repair cable |
| | Bent pins in cable or tool | → Straighten pins or replace faulty connector |
| Tool shuts off prematurely | Operator is releasing the start switch before the controller stops the tool | → Verify that the operator is keeping the start switch depressed through the entire rundown |
| | Rundown time exceeds the default time value of 10 seconds | → Increase the rundown timer to exceed the rundown time required |
| Tool won't change speeds | Speeds are the same in all applicable stages | → Verify that all speeds and shift points are correct in the stages that are being used. |
| All the lights on the tool begin flashing when the reverse collar/switch is put in reverse | This is a normal function as set by the default parameters. If the lights are not flashing when the tool is in reverse the "Blinking Lights in Reverse" check box is not selected. | → Check selections in the ADVANCED menu, Tool Settings tab. |
| Warning message in the RUN screen reports "Transducer Offset Error" | The tool transducer is not returning to a zero torque condition | → Transducer has been over-stressed and needs replacement |
| | Faulty wiring in tool or cable | → Check tool with different cable to see if the condition remains. Transducer offset and full scale voltages can be seen in the DIAGNOSTICS menu. |
| "Tool Not Connected" message appears in the RUN screen | Tool has not been accepted in the TOOL SETUP screen | → Verify that the tool has been accepted in the TOOL SETUP screen. Before accepting the tool, the message "Needs User Acceptance" should appear in the tool overview screen. Verify that the correct tool is highlighted when going to Tool Settings to accept the tool. |
| | Faulty cable is preventing the tool from being "seen" by the controller | → Replace or repair cable |
| Torque reported by the controller doesn't match the torque reported by an external transducer | Torque calibration factor in Tool Settings in the TOOL SETUP menu needs to be adjusted | → Adjust torque calibration factor using the formula below: New Cal Factor = (External Reading/Tool Reading) x Existing Torque Calibration Factor |
| | Custom head has been added to the tool and the tool needs updated tool memory information | → Tool memory must be programmed to accommodate new attachment |
| Tool cable will not fit in tool handle | Wrong cable. Tools used with Global Controller utilize an Air-Ib connector, which has a smaller ID housing in the tool than previous Matrix style connector housings. | → Utilize the correct cable for the tool being used. |

8 Maintenance



Danger of injury from accidental start up or electrical shock.
Disconnect the tool cable from the tool and controller before performing any maintenance.

8.1 Service schedule

Only qualified and trained personnel are permitted to perform maintenance on these tools.

Regular maintenance reduces operating faults, repair costs and downtime. In addition to the following service schedule, implement a safety related maintenance program that takes the local regulations for repair and maintenance for all operating phases of the tool into account.

| Maintenance Interval | Rundowns | Designation |
|----------------------|-----------|---|
| Daily | Daily | <ul style="list-style-type: none"> → Visual inspection of all cables and connections → Visual inspection of the 48ET tool → Check the tool for excessive vibration or unusual noises → Visual inspection of all external components of the tool |
| W1 | 100,000 | <ul style="list-style-type: none"> → Inspect the tool cable for damage or wear → inspect the square drive output spindle for damage or wear → Inspect the tool cable connection for a secure fit → Check the maximum free speed |
| W2 | 500,000 | <ul style="list-style-type: none"> → Visual inspection of disassembled 48ET tool → Check individual parts for wear or damage and replace if necessary → Clean and lubricate angle head, gearing and motor bearings → Check and recalibrate transducer (48ET models) |
| W3 | 1,000,000 | <ul style="list-style-type: none"> → Visual inspection of disassembled 48ET tool → Check individual parts for wear or damage and replace if necessary → Clean and lubricate angle head, gearing and motor bearings → Check and recalibrate transducer (48ET models) |

This maintenance schedule uses values that are valid for most applications. For a specific maintenance interval, refer to 8.1.1 Calculating a customer-specific maintenance plan.

8.1.1 Calculating a customer specific maintenance plan

A service interval W(1, 2, 3) depends on the following factors:

| Factor | Value assumed in "Service Schedule" | Description |
|-----------|--|--|
| V | V1 = 100,000 V2 = 500,000 V3 = 1,000,000 | Number of rundowns after a maintenance measure is prescribed by Apex Tool Group. |
| T1 | 1.8 seconds | Specific rundown time, measured in life and endurance tests. |
| T2 | 2 seconds | Actual rundown time, depending on the hardness of the joint. |
| S | 1; 2; 3 | Number of shifts per day. |
| VS | 750 | Number of rundowns per shift. |

T2, S and VS are variable factors and can differ depending on the specific application.

Example for service interval W2:



After 500,000 rundowns (V),
a specific rundown time of 1.8 seconds (T1)
with an actual fastening time of 3 seconds (soft joint) and
3 completed shifts per day and 750 rundowns per shift.

$$W(1, 2, 3) = \frac{V \times T1}{T2 \times S \times VS} \qquad W2 = \frac{500000 \times 1.8}{3 \times 3 \times 750} = 133 \text{ (days)}$$

You will need to perform the maintenance indicated as W2 after an operating time of 133 days.)

8.2 Lubricants

For proper function and long service life, use of the correct grease is essential.

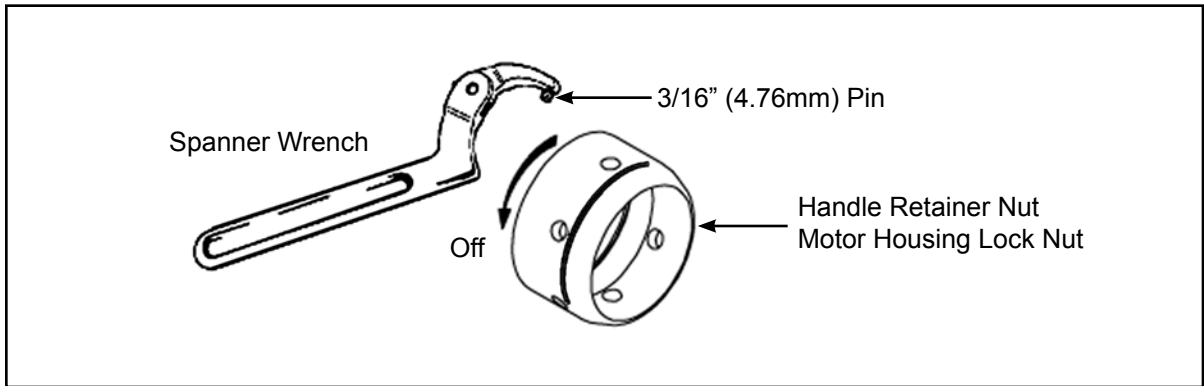
Grease lubricants recommended for this tool.

| Part No. | Packaged | Designation | Vendor |
|----------|------------------|------------------|-----------------------|
| 544076 | 2 oz. (0.06 kg) | Molytex EP2 | Texaco |
| 544077 | 16 oz. (0.45 kg) | Molytex EP2 | Texaco |
| 540395 | 2 oz. (0.06 kg) | Magnalube-G | Carleton-Stuart Corp. |
| 513156 | 16 oz. (0.45 kg) | Magnalube-G | Carleton-Stuart Corp. |
| 541444 | 2 oz. (0.06 kg) | Rheolube 363AX-1 | Nye Lubricants, Inc. |
| 541445 | 16 oz. (0.45 kg) | Rheolube 363AX-1 | Nye Lubricants, Inc. |

9 Repair instructions

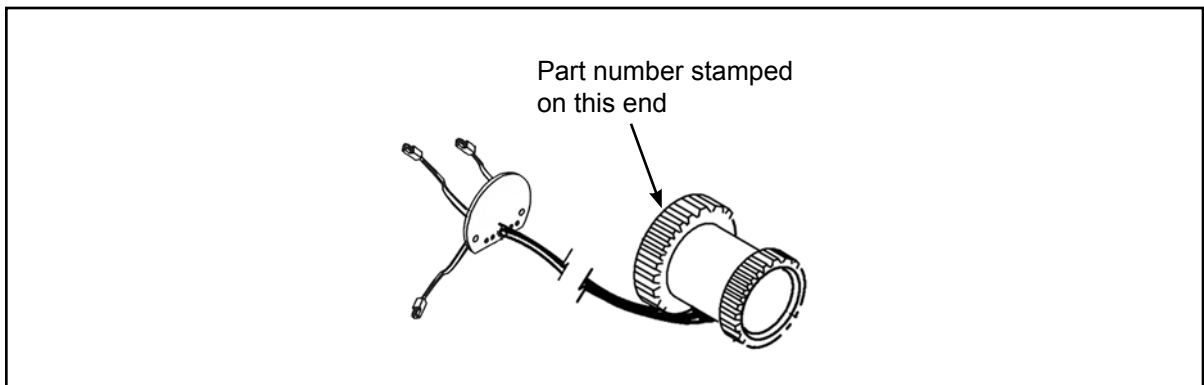
9.1 Retainer nut spanner wrench

Use a spanner wrench with a 3/16" (4.76mm) pin to loosen or tighten the handle retainer nut and motor housing lock nut.



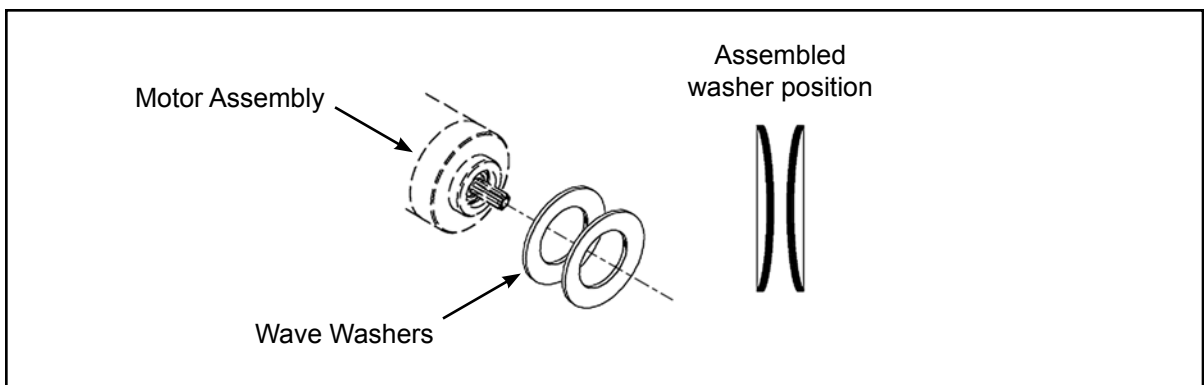
9.2 Transducer identification

Transducers are not interchangeable. Verify the part number stamped on the transducer with the transducer part number indicated in the parts list to assure the correct transducer is being used.



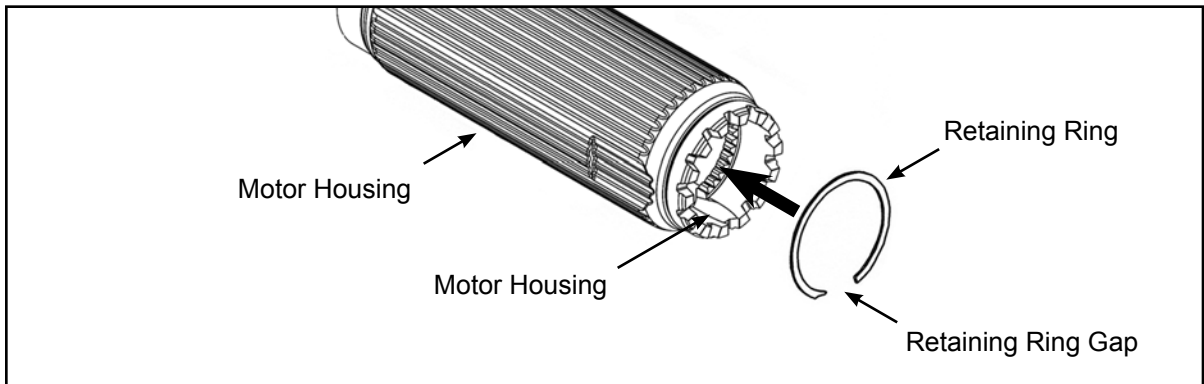
9.3 Wave washer assembly

The two wave washers, located in front of the motor assembly, must be assembled with their convex surfaces facing each other.



9.4 Retaining ring assembly

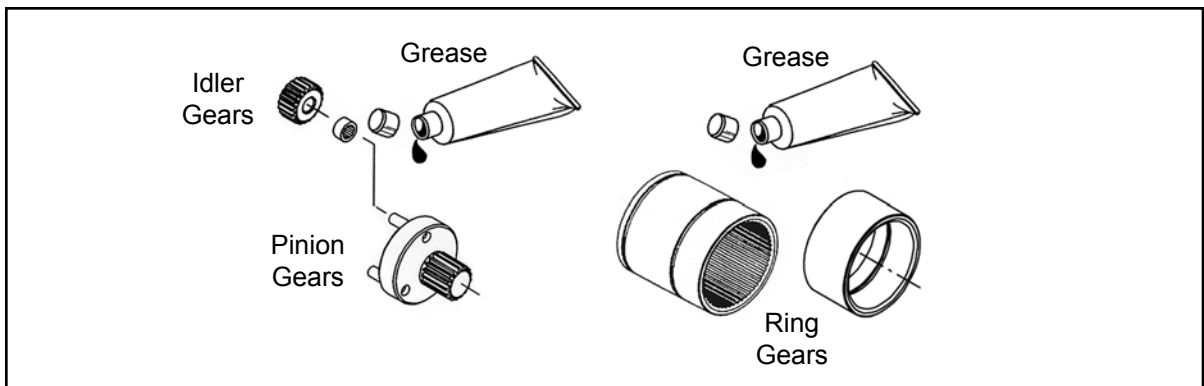
The retaining ring must be assembled into the motor housing as shown.



9.5 Gear train lubrication

Lubricate the gearing components with the grease recommended on the gearing parts list pages.

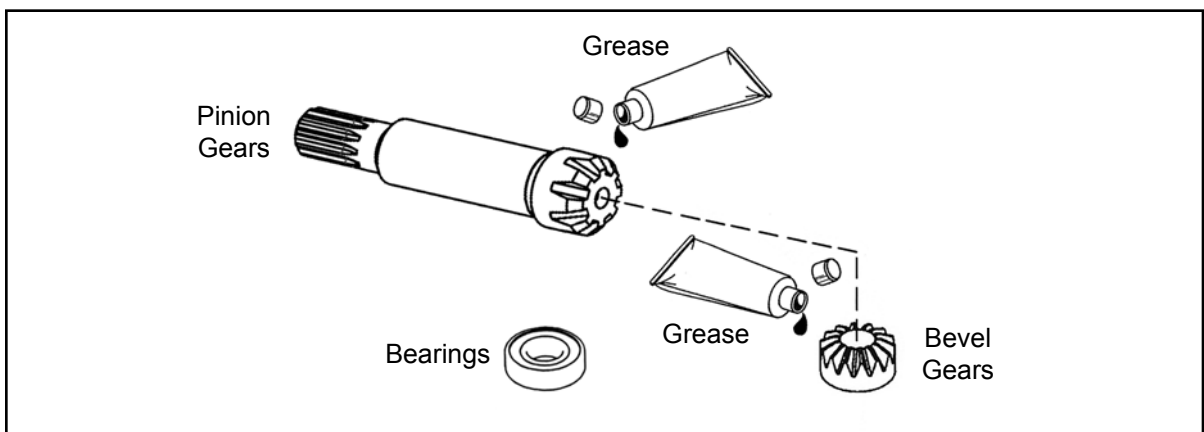
DO NOT SUBSTITUTE GREASES



9.6 Tube Nut attachment lubrication

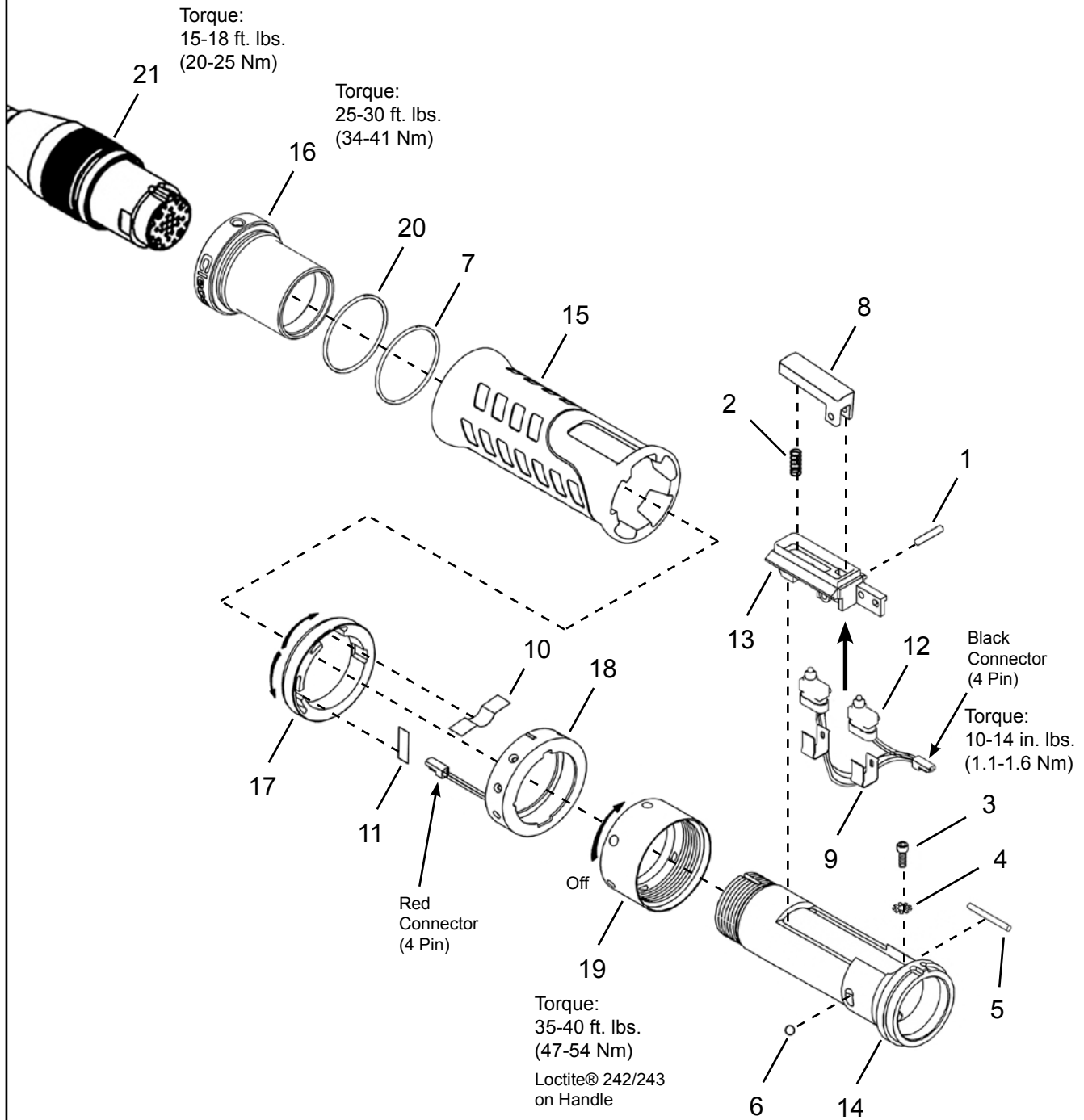
Lubricate the angle head components with the grease recommended on the angle head parts list pages.

DO NOT SUBSTITUTE GREASES



10.1 48ET Series Handle - Matrix Tool Connector

Models
48ET20T2
48ET30T3
48ET40T4



10.1 48ET Series Handle - Matrix Tool Connector

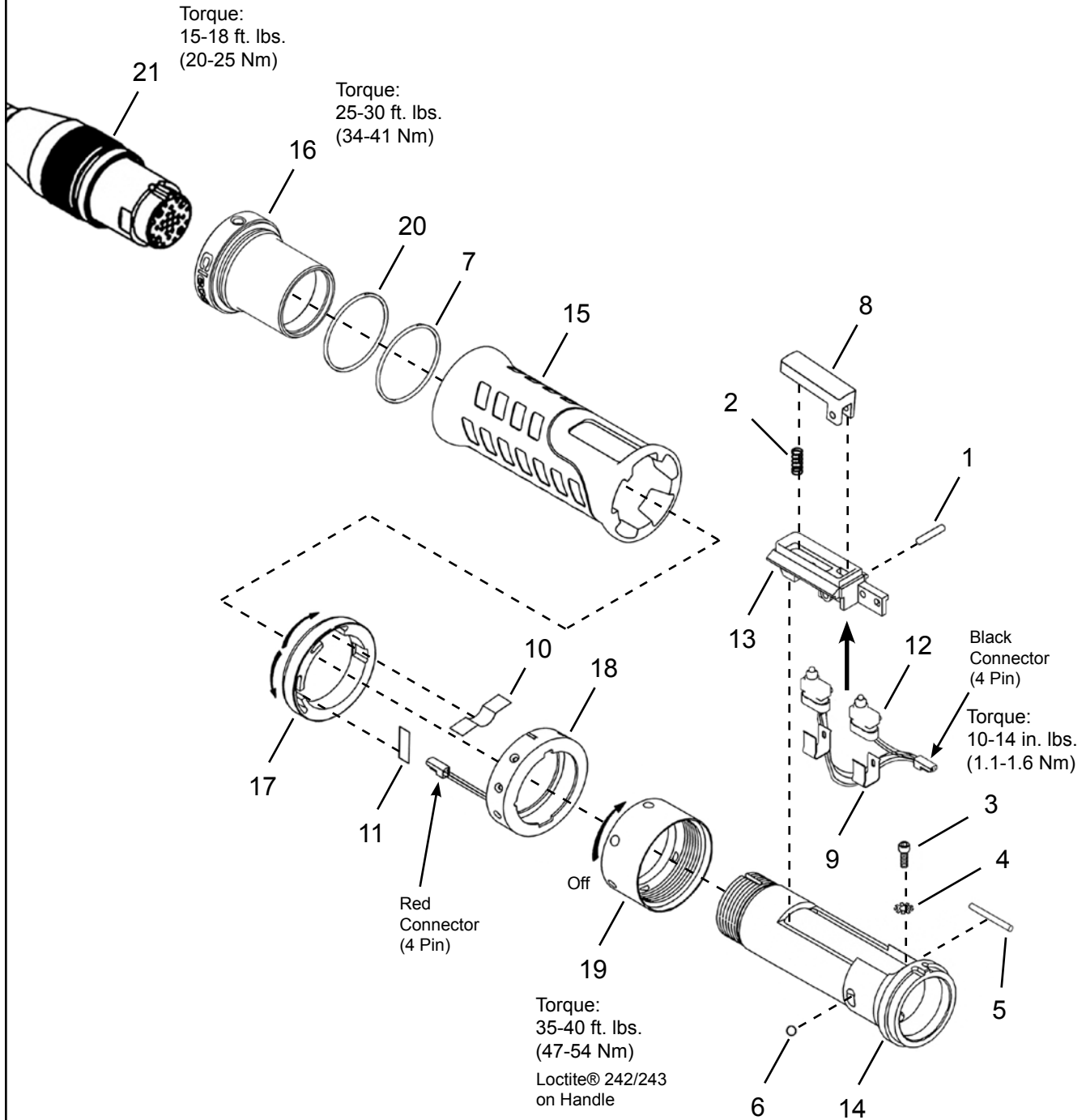
| Ref | Number | # | X | EN |
|--|------------|---|---|------------------------|
| | | | | Description |
| 1 | 541480 | 1 | 3 | Switch Pin |
| 2 | 266255 | 1 | 3 | Switch Spring |
| 3 | B159V | 1 | 3 | Cap Screw - #6-32 |
| 4 | W115 | 1 | 3 | Lock Washer |
| 5 | 1009089 | 1 | 3 | Housing Pin |
| 6 | 1091PT | 1 | 3 | Steel Ball - 3/16" |
| 7 | 22598 | 1 | 3 | O-Ring |
| 8 | F900185 | 1 | | Switch Actuator |
| 9 | 207317 | 2 | 2 | Switch Spring Clip |
| 10 | 541033 | 1 | 2 | Reverse Spring |
| 11 | 541624 | 1 | 2 | Forward/Reverse Spring |
| 12 | F900571 | 1 | 2 | Start/Reverse Switch |
| 13 | 207316 | 1 | | Switch Holder |
| 14 | 541015 | 1 | | Handle |
| 15 | 207323 | 1 | | Handle Sleeve |
| 16 | 207325 | 1 | | Connector Sleeve |
| 17 | 542938 | 1 | | Reverse Ring |
| 18 | 542819 | 1 | | Light Ring Assembly |
| 19 | 541017 | 1 | | Handle Retainer Nut |
| 20 | 524818 | 1 | 3 | O-Ring |
| Tool Cable (Optional Length) | | | | |
| 21 | 542778-1M | 1 | | 1 meter cable |
| | 542778-2M | | | 2 meter cable |
| | 542778-3M | | | 3 meter cable |
| | 542778-6M | | | 6 meter cable |
| | 542778-8M | | | 8 meter cable |
| | 542778-10M | | | 10 meter cable |
| | 542778-15M | | | 15 meter cable |
| | 542778-50M | | | 50 meter cable |
| Inline Swivel Cable (Optional Length) | | | | |
| 21 | 544056-1M | 1 | | 1 meter cable |
| | 544056-2M | | | 2 meter cable |
| | 544056-3M | | | 3 meter cable |
| | 544056-6M | | | 6 meter cable |
| | 544056-8M | | | 8 meter cable |
| | 544056-10M | | | 10 meter cable |
| | 544056-15M | | | 15 meter cable |
| Angle Swivel Cable (Optional Length) | | | | |
| 21 | 544055-1M | 1 | | 1 meter cable |
| | 544055-2M | | | 2 meter cable |
| | 544055-3M | | | 3 meter cable |
| | 544055-6M | | | 6 meter cable |
| | 544055-8M | | | 8 meter cable |
| | 544055-10M | | | 10 meter cable |
| | 544055-15M | | | 15 meter cable |
| Tool Cable Extension (Optional Length) | | | | |
| 21 | 542779-1M | 1 | | 1 meter cable |
| | 542779-2M | | | 2 meter cable |
| | 542779-3M | | | 3 meter cable |
| | 542779-6M | | | 6 meter cable |
| | 542779-10M | | | 10 meter cable |
| | 542779-15M | | | 15 meter cable |
| | 542779-50M | | | 50 meter cable |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

10.2 48ETE Series Handle - Air LB Tool Connector

Models
48ETE20T2
48ETE30T3
48ETE40T4



10.2 48ETE Series Handle - Air LB Tool Connector

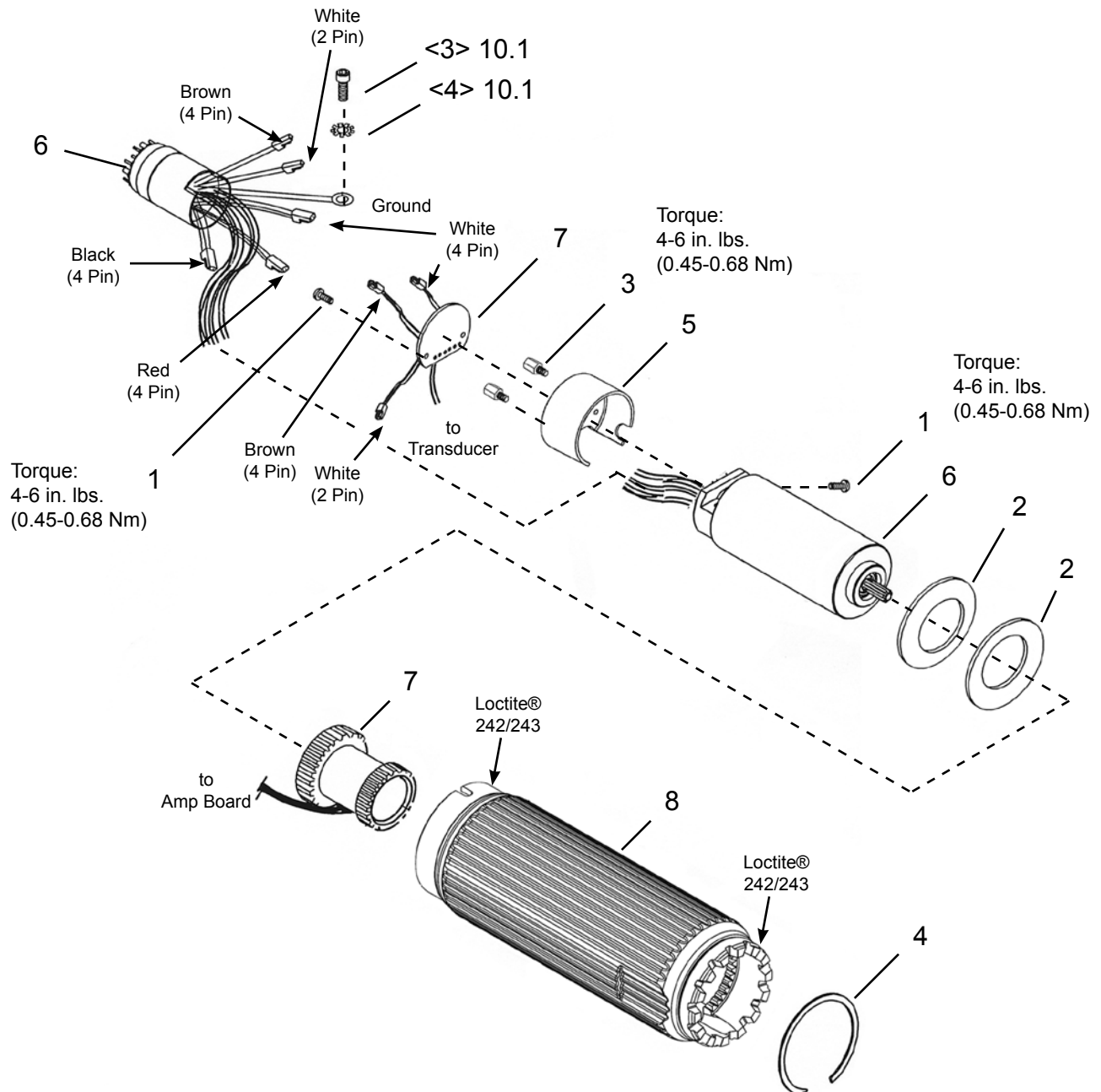
| Ref | Number | # | X | EN |
|--|------------|---|---|------------------------|
| | | | | Description |
| 1 | 541480 | 1 | 3 | Switch Pin |
| 2 | 266255 | 1 | 3 | Switch Spring |
| 3 | B159V | 1 | 3 | Cap Screw - #6-32 |
| 4 | W115 | 1 | 3 | Lock Washer |
| 5 | 1009089 | 1 | 3 | Housing Pin |
| 6 | 1091PT | 1 | 3 | Steel Ball - 3/16" |
| 7 | 22598 | 1 | 3 | O-Ring |
| 8 | F900185 | 1 | | Switch Actuator |
| 9 | 207317 | 2 | 2 | Switch Spring Clip |
| 10 | 541033 | 1 | 2 | Reverse Spring |
| 11 | 541624 | 1 | 2 | Forward/Reverse Spring |
| 12 | F900571 | 1 | 2 | Start/Reverse Switch |
| 13 | 207316 | 1 | | Switch Holder |
| 14 | 207322 | 1 | | Handle |
| 15 | 207323 | 1 | | Handle Sleeve |
| 16 | 207325E | 1 | | Connector Sleeve |
| 17 | 542938 | 1 | | Reverse Ring |
| 18 | 542819 | 1 | | Light Ring Assembly |
| 19 | 541017 | 1 | | Handle Retainer Nut |
| 20 | 524818 | 1 | 3 | O-Ring |
| Tool Cable (Optional Length) | | | | |
| 21 | 301866-2M | 1 | | 2 meter cable |
| | 301866-3M | | | 3 meter cable |
| | 301866-4M | | | 4 meter cable |
| | 301866-6M | | | 6 meter cable |
| | 301866-8M | | | 8 meter cable |
| | 301866-10M | | | 10 meter cable |
| | 301866-15M | | | 15 meter cable |
| Inline Swivel Cable (Optional Length) | | | | |
| 21 | 301904-2M | 1 | | 2 meter cable |
| | 301904-3M | | | 3 meter cable |
| | 301904-8M | | | 8 meter cable |
| | 301904-15M | | | 15 meter cable |
| Angle Swivel Cable (Optional Length) | | | | |
| 21 | 301903-2M | 1 | | 2 meter cable |
| | 301903-3M | | | 3 meter cable |
| | 301903-8M | | | 8 meter cable |
| | 301903-15M | | | 15 meter cable |
| Tool Cable Extension (Optional Length) | | | | |
| 21 | 301877-4M | 1 | | 4 meter cable |
| | 301877-8M | | | 8 meter cable |
| | 301877-10M | | | 10 meter cable |
| | 301877-20M | | | 20 meter cable |
| | 301877-30M | | | 30 meter cable |
| | 301877-40M | | | 40 meter cable |
| | 301877-50M | | | 50 meter cable |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

10.3 48ET Series Motor - Matrix Tool Connector

Models
48ET20T2
48ET30T3
48ET40T4



10.3 48ET Series Motor - Matrix Tool Connector

| Ref | Number | # | X | EN |
|-----|------------|---|---|------------------------------|
| | | | | Description |
| 1 | 17-111 | 3 | 6 | Pan Head Screw - #4-40 x .19 |
| 2 | 541009 | 2 | 2 | Wave Washer |
| 3 | 542244 | 2 | 2 | Stand Off - 5/16" |
| 4 | 505306 | 1 | 2 | Retaining Ring |
| 5 | 542588 | 1 | | Motor Spacer |
| 6 | 301761 | 1 | | Motor Assembly |
| 7 | Table 10.3 | 1 | | Transducer Assembly |
| 8 | 207340 | 1 | | Housing |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

Table 10.3

| Ref. | Description | # | 48ET20T2 | # | 48ET30T3 | # | 48ET40T4 |
|------|---------------------------|---|------------|---|------------|---|------------|
| 7 | Transducer (unprogrammed) | 1 | 542846-17 | 1 | 542846-17 | 1 | 542846-17 |
| | Transducer (programmed) | 1 | 542846-17P | 1 | 542846-17P | 1 | 542846-17P |
| | Transducer Capacity | | 17 Nm | | 17 Nm | | 17 Nm |

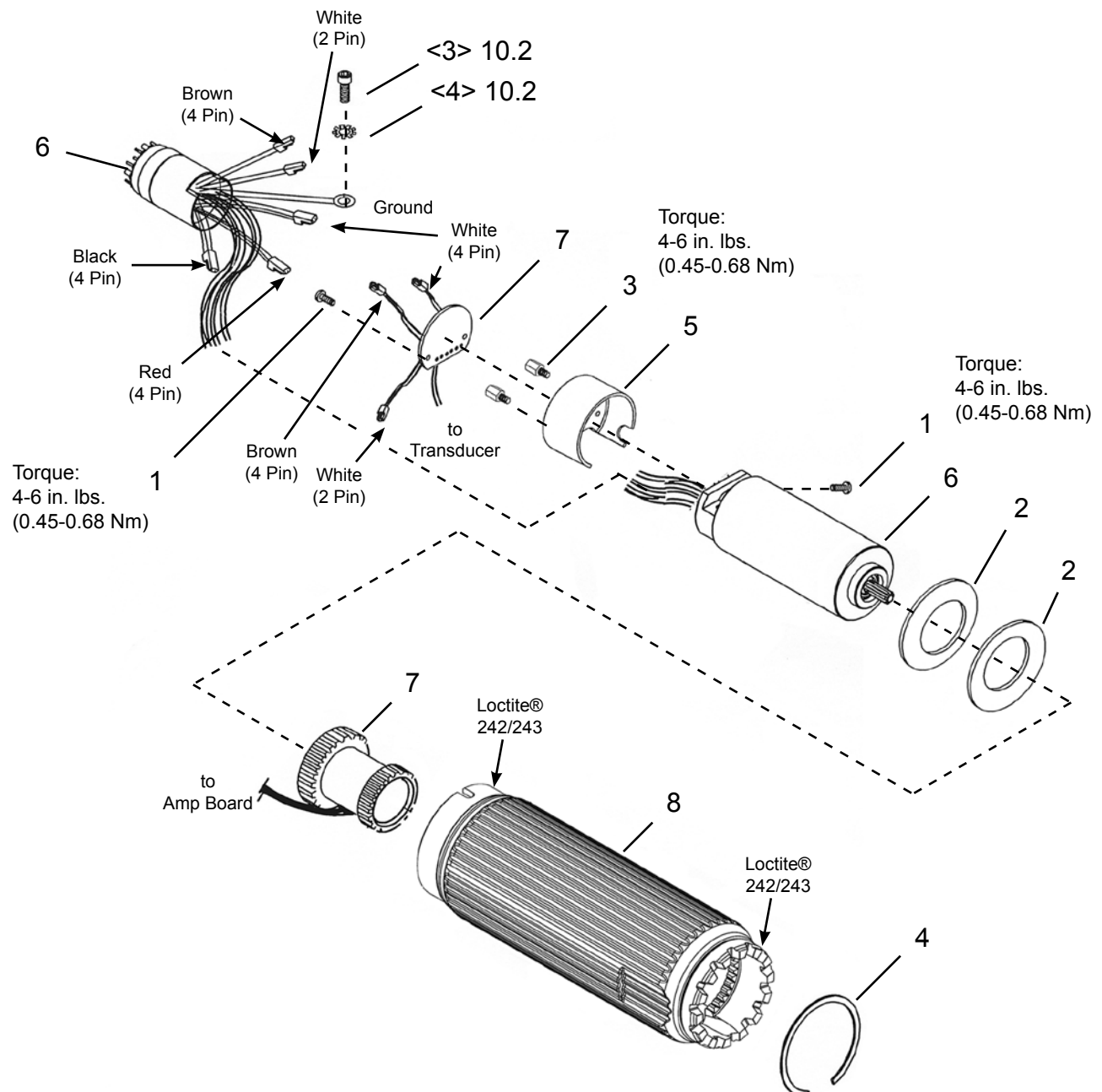
10.4 48ETE Series Motor - Matrix Tool Connector

Models

48ETE20T2

48ETE30T3

48ETE40T4



10.4 48ETE Series Motor - Air LB Tool Connector

| Ref | Number | # | X | EN |
|-----|------------|---|---|------------------------------|
| | | | | Description |
| 1 | 17-111 | 3 | 6 | Pan Head Screw - #4-40 x .19 |
| 2 | 541009 | 2 | 2 | Wave Washer |
| 3 | 542244 | 2 | 2 | Stand Off - 5/16" |
| 4 | 505306 | 1 | 2 | Retaining Ring |
| 5 | 542588 | 1 | | Motor Spacer |
| 6 | 301761E | 1 | | Motor Assembly |
| 7 | Table 10.4 | 1 | | Transducer Assembly |
| 8 | 207340 | 1 | | Housing |

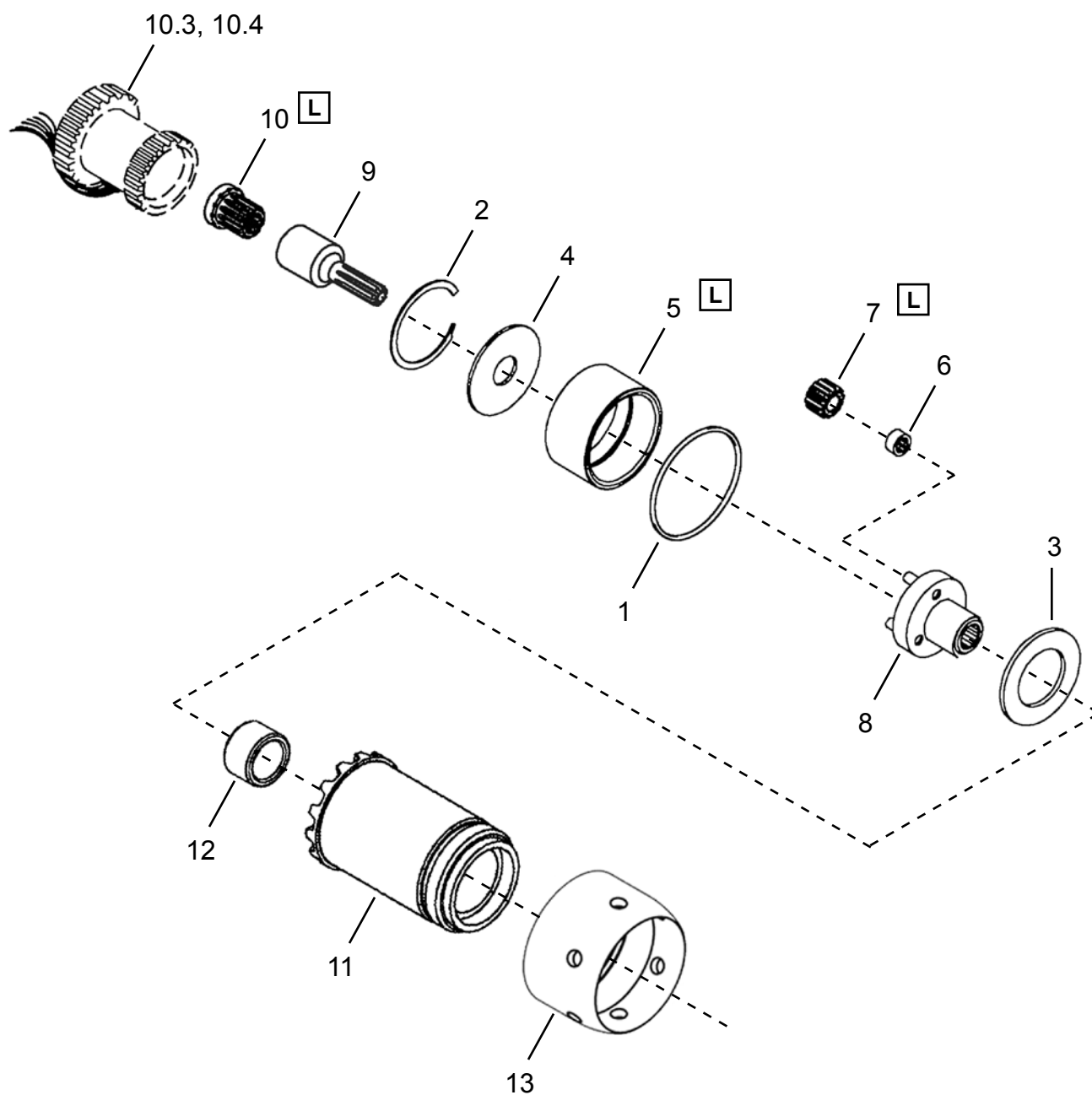
(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

Table 10.4

| Ref. | Description | # | 48ETE20T2 | # | 48ETE30T3 | # | 48ETE40T4 |
|------|---------------------------|---|------------|---|------------|---|------------|
| 7 | Transducer (unprogrammed) | 1 | 542846-17 | 1 | 542846-17 | 1 | 542846-17 |
| | Transducer (programmed) | 1 | 542846-17P | 1 | 542846-17P | 1 | 542846-17P |
| | Transducer Capacity | | 17 Nm | | 17 Nm | | 17 Nm |

10.5 Single Stage Gearing Assembly



[L] Lubricate with Grease:
541444 - 2 oz. (56g)
541445 - 16 oz. (0.45 kg)

10.5 Single Stage Gearing Assembly

| Ref | Number | # | X | EN |
|-----|---------|---|---|---------------------------------------|
| | | | | Description |
| 1 | 1011732 | 1 | 4 | O-Ring |
| 2 | 800116 | 1 | 2 | Retaining Ring |
| 3 | 502983 | 1 | 2 | Thrust Washer |
| 4 | 541887 | 1 | | Washer |
| 5 | 542090 | 1 | | Ring Gear |
| 6 | 203749 | 3 | 6 | Needle Bearing |
| 7 | 541893 | 3 | 6 | Planet Gear (21T) |
| 8 | 542793 | 1 | | Planet Carrier |
| 9 | 541898 | 1 | 2 | Extension Pinion |
| 10 | 541044 | 1 | 2 | Pinion Adapter |
| 11 | 542794 | 1 | | Attachment Adapter (includes Ref. 12) |
| 12 | 500528 | 1 | 2 | Needle Bearing |
| 13 | 541904 | 1 | | Gear Case Nut |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

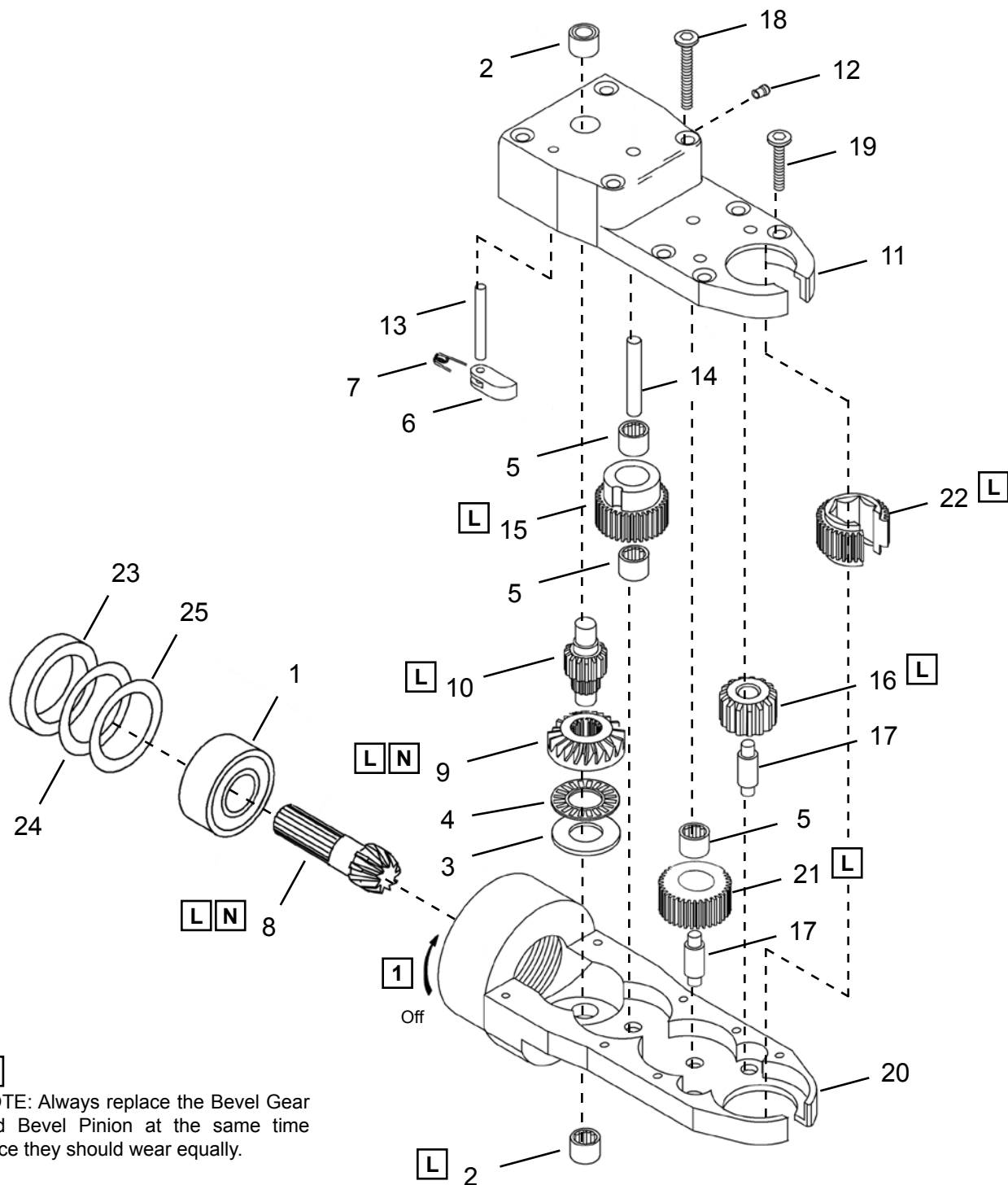
(T) Teeth

10.6 T2 Tube Nut Head Assembly

Models

48ET20T2

48ETE20T2



N

NOTE: Always replace the Bevel Gear and Bevel Pinion at the same time since they should wear equally.

L

Lubricate with Grease:
544076 - 2 oz. (56g)
544077 - 16 oz. (0.45 kg)

10.6 T2 Tube Nut Head

| Ref | Number | # | X | EN |
|-----|------------|---|---|----------------------------|
| | | | | Description |
| 1 | 500PT | 1 | 2 | Ball Bearing |
| 2 | 617600 | 2 | 4 | Needle Bearing |
| 3 | 303161 | 1 | | Thrust Race |
| 4 | 249145PT | 1 | 2 | Thrust Bearing |
| 5 | 382253 | 3 | 6 | Needle Bearing |
| 6 | 524958 | 1 | | Pawl |
| 7 | 542922 | 1 | 3 | Pawl Spring |
| 8 | 537316 | 1 | 1 | Bevel Pinion |
| 9 | 537385 | 1 | 1 | Bevel Gear |
| 10 | 537386 | 1 | 1 | Spindle Gear |
| 11 | 542931 | 1 | | Cover |
| 12 | 1463PT | 1 | 2 | Grease Fitting |
| 13 | 543205 | 1 | 2 | Dowel Pin |
| 14 | 543209 | 1 | 2 | Dowel Pin |
| 15 | 542959 | 1 | 1 | Ratchet Gear |
| 16 | 537303 | 2 | 2 | Idler Gear (13T) |
| 17 | 542924 | 3 | 3 | Pin |
| 18 | 543202 | 4 | 4 | Flat Head Screw |
| 19 | 543203 | 4 | 4 | Flat Head Screw |
| 20 | 542895 | 1 | | Housing (includes Ref. 12) |
| 21 | 542962 | 1 | 1 | Idler Gear (26T) |
| 22 | Table 10.6 | 1 | 1 | Output Gear |
| 23 | 541821 | 1 | | Spacer |
| 24 | 541426 | 1 | 2 | Shim (.002") |
| 25 | 541427 | 1 | 2 | Shim (.010") |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

Table 10.6

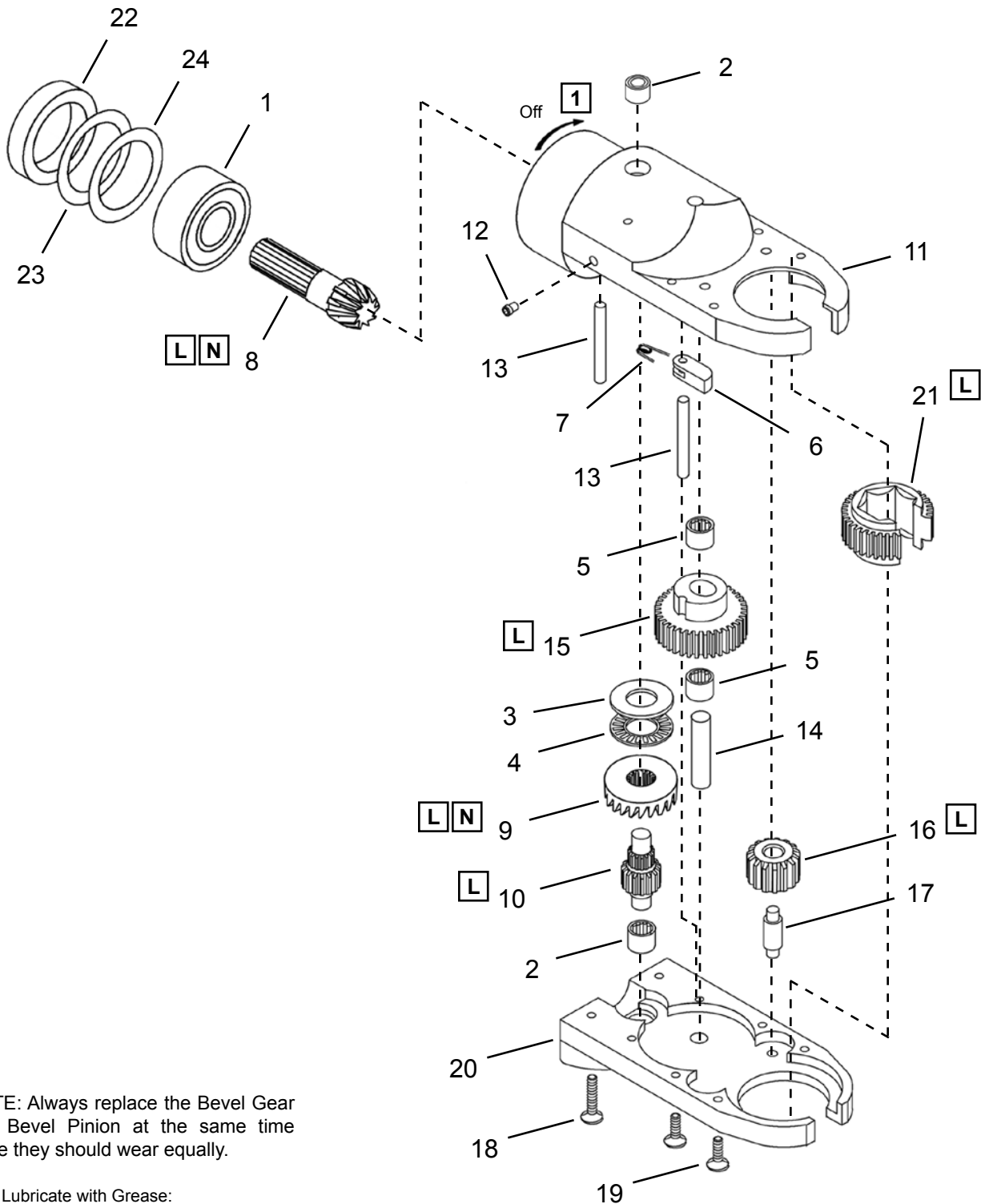
| Ref. | Output Gear (Socket Hex Size) | Flush Type - No Extension | | |
|------|----------------------------------|---------------------------|----------|-----------------|
| | | Partial Thru Hex | Thru Hex | Double Thru Hex |
| 22 | 1/4" | KS2EA00 | KS2EA01 | KS2EA02 |
| | 5/16" | KS2EB00 | KS2EB01 | KS2EB02 |
| | 3/8" | KS2EC00 | KS2EC01 | KS2EC02 |
| | 7/16" | KS2ED00 | KS2ED01 | KS2ED02 |
| | 1/2" | KS2EE00 | KS2EE01 | KS2EE02 |
| | 7 mm | KS2MA00 | KS2MA01 | KS2MA02 |
| | 8 mm | KS2MB00 | KS2MB01 | KS2MB02 |
| | 9 mm | KS2MC00 | KS2MC01 | KS2MC02 |
| | 10 mm | KS2MD00 | KS2MD01 | KS2MD02 |
| | 11 mm | KS2ME00 | KS2ME01 | KS2ME02 |
| | 12 mm | KS2MF00 | KS2MF01 | KS2MF02 |
| | 13 mm | KS2MG00 | KS2MG01 | KS2MG02 |

10.7 T3 Tube Nut Head Assembly

Models

48ET30T3

48ETE30T3



N

NOTE: Always replace the Bevel Gear and Bevel Pinion at the same time since they should wear equally.

L

Lubricate with Grease:
544076 - 2 oz. (56g)
544077 - 16 oz. (0.45 kg)

10.7 T3 Tube Nut Head

| Ref | Number | # | X | EN |
|-----|------------|---|---|----------------------------|
| | | | | Description |
| 1 | 500PT | 1 | 2 | Ball Bearing |
| 2 | 617600 | 2 | 4 | Needle Bearing |
| 3 | 303161 | 1 | | Thrust Race |
| 4 | 249145PT | 1 | 2 | Thrust Bearing |
| 5 | 382253 | 2 | 4 | Needle Bearing |
| 6 | 542921 | 1 | | Pawl |
| 7 | 542922 | 1 | 3 | Pawl Spring |
| 8 | 537316 | 1 | 1 | Bevel Pinion |
| 9 | 537385 | 1 | 1 | Bevel Gear |
| 10 | 537386 | 1 | 1 | Spindle Gear |
| 11 | 542917 | 1 | | Housing (includes Ref. 12) |
| 12 | 1463PT | 1 | 2 | Grease Fitting |
| 13 | 543207 | 1 | 2 | Dowel Pin |
| 14 | 543208 | 1 | 2 | Dowel Pin |
| 15 | 542960 | 1 | 1 | Ratchet Gear |
| 16 | 537303 | 2 | 2 | Idler Gear (13T) |
| 17 | 542924 | 3 | 3 | Pin |
| 18 | 543202 | 4 | 4 | Flat Head Screw |
| 19 | 617166 | 4 | 4 | Flat Head Screw |
| 20 | 542918 | 1 | | Cover |
| 21 | Table 10.7 | 1 | 1 | Output Gear |
| 22 | 541821 | 1 | | Spacer |
| 23 | 541426 | 1 | 2 | Shim (.002") |
| 24 | 541427 | 1 | 2 | Shim (.010") |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

Table 10.7

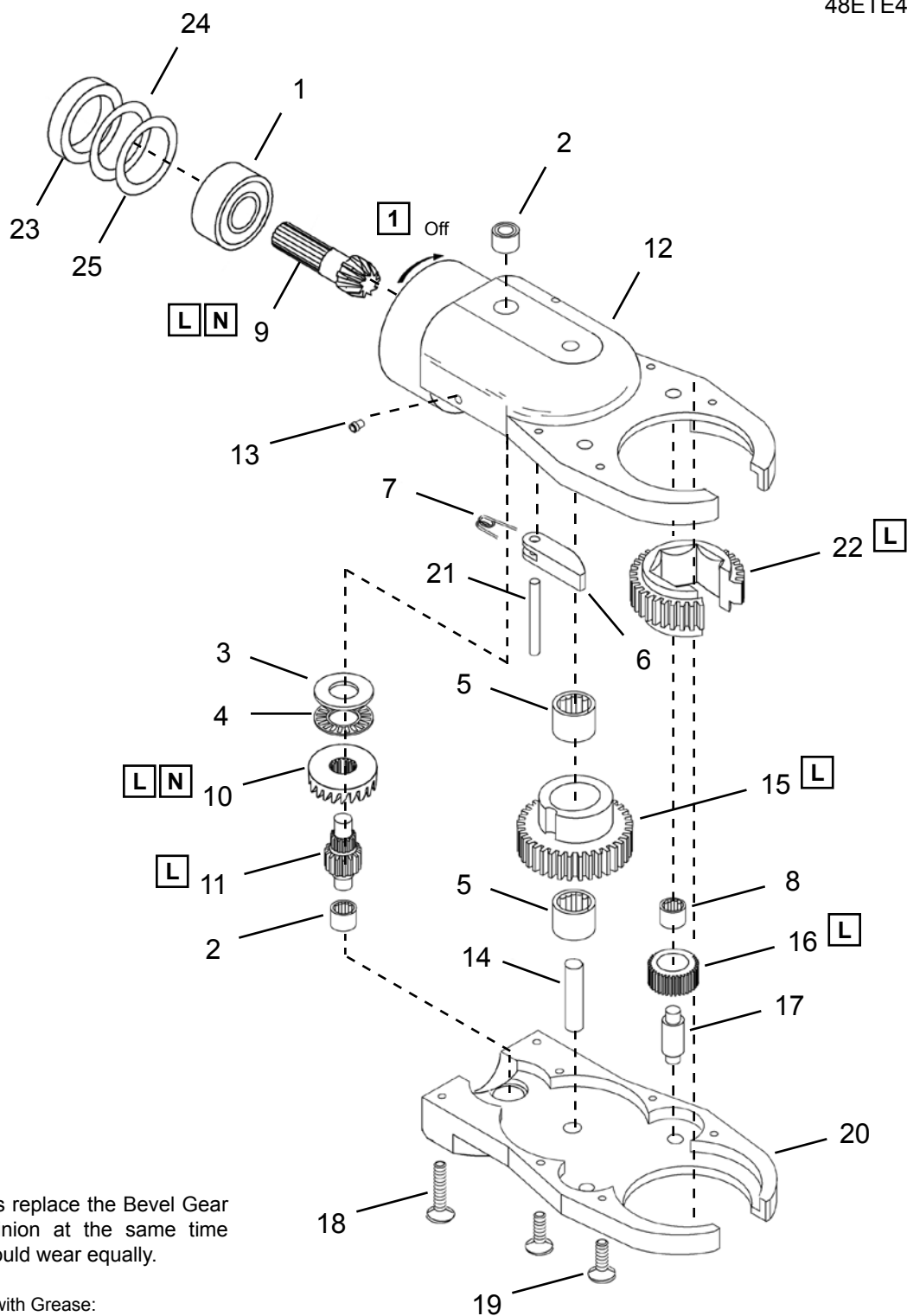
| Ref. | Output Gear (Socket Hex Size) | Flush Type - No Extension | | | |
|------|----------------------------------|---------------------------|----------|-----------------|----------------------------|
| | | Partial Thru Hex | Thru Hex | Double Thru Hex | Partial Thru Double Hex |
| 22 | 3/8" | KS3EC00 | KS3EC01 | KS3EC02 | KS3EC03 |
| | 7/16" | KS3ED00 | KS3ED01 | KS3ED02 | KS3ED03 |
| | 1/2" | KS3EE00 | KS3EE01 | KS3EE02 | KS3EE03 |
| | 9/16" | KS3EF00 | KS3EF01 | KS3EF02 | KS3EF03 |
| | 5/8" | KS3EG00 | KS3EG01 | KS3EG02 | KS3EG03 |
| | 11/16" | KS3EH00 | KS3EH01 | KS3EH02 | KS3EH03 |
| | 3/4" | KS3EI00 | KS3EI01 | KS3EI02 | KS3EI03 |
| | 10 mm | KS3MD00 | KS3MD01 | KS3MD02 | KS3MD03 |
| | 11 mm | KS3ME00 | KS3ME01 | KS3ME02 | KS3ME03 |
| | 12 mm | KS3MF00 | KS3MF01 | KS3MF02 | KS3MF03 |
| | 13 mm | KS3MG00 | KS3MG01 | KS3MG02 | KS3MG03 |
| | 14 mm | KS3MH00 | KS3MH01 | KS3MH02 | KS3MH03 |
| | 15 mm | KS3MI00 | KS3MI01 | KS3MI02 | KS3MI03 |
| | 16 mm | KS3MJ00 | KS3MJ01 | KS3MJ02 | KS3MJ03 |
| | 17 mm | KS3MK00 | KS3MK01 | KS3MK02 | KS3MK03 |
| | 18 mm | KS3ML00 | KS3ML01 | KS3ML02 | KS3ML03 |
| | 19 mm | KS3MM00 | KS3MM01 | KS3MM02 | KS3MM03 |

10.8 T3 Tube Nut Head Assembly

Models

48ET40T4

48ETE40T4



[N]

NOTE: Always replace the Bevel Gear and Bevel Pin at the same time since they should wear equally.

[L]

Lubricate with Grease:
544076 - 2 oz. (56g)
544077 - 16 oz. (0.45 kg)

10.8 T4 Tube Nut Head

| Ref | Number | # | X | EN |
|-----|------------|---|---|----------------------------|
| | | | | Description |
| 1 | 500PT | 1 | 2 | Ball Bearing |
| 2 | 617600 | 2 | 4 | Needle Bearing |
| 3 | 303161 | 1 | | Thrust Race |
| 4 | 249145PT | 1 | 2 | Thrust Bearing |
| 5 | 1010920 | 2 | 4 | Needle Bearing |
| 6 | 542929 | 1 | | Pawl |
| 7 | 542922 | 1 | 3 | Pawl Spring |
| 8 | 382253 | 2 | 4 | Needle Bearing |
| 9 | 537316 | 1 | 1 | Bevel Pinion |
| 10 | 537385 | 1 | 1 | Bevel Gear |
| 11 | 537386 | 1 | 1 | Spindle Gear |
| 12 | 542926 | 1 | | Housing (includes Ref. 13) |
| 13 | 1463PT | 1 | 2 | Grease Fitting |
| 14 | 543206 | 1 | 2 | Dowel Pin |
| 15 | 542961 | 1 | 1 | Ratchet Gear |
| 16 | 542928 | 2 | 2 | Idler Gear (21T) |
| 17 | 542924 | 3 | 3 | Pin |
| 18 | 543202 | 4 | 4 | Flat Head Screw |
| 19 | 617166 | 4 | 4 | Flat Head Screw |
| 20 | 542925 | 1 | | Cover |
| 21 | 543205 | 1 | 2 | Dowel Pin |
| 22 | Table 10.8 | 1 | 1 | Output Gear |
| 23 | 541821 | 1 | | Spacer |
| 24 | 541426 | 1 | 2 | Shim (.002") |
| 25 | 541427 | 1 | 2 | Shim (.010") |

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

Table 10.8

| Ref. | Output Gear (Socket Hex Size) | Flush Type - No Extension | | | |
|------|----------------------------------|---------------------------|----------|-----------------|----------------------------|
| | | Partial Thru Hex | Thru Hex | Double Thru Hex | Partial Thru Double Hex |
| 22 | 1/2" | KS4EE00 | KS4EE01 | KS4EE02 | KS4EE03 |
| | 9/16" | KS4EF00 | KS4EF01 | KS4EF02 | KS4EF03 |
| | 5/8" | KS4EG00 | KS4EG01 | KS4EG02 | KS4EG03 |
| | 11/16" | KS4EH00 | KS4EH01 | KS4EH02 | KS4EH03 |
| | 3/4" | KS4EI00 | KS4EI01 | KS4EI02 | KS4EI03 |
| | 13/16" | KS4EJ00 | KS4EJ01 | KS4EJ02 | KS4EJ03 |
| | 7/8" | KS4EK00 | KS4EK01 | KS4EK02 | KS4EK03 |
| | 15/16" | KS4EL00 | KS4EL01 | KS4EL02 | KS4EL03 |
| | 1" | KS4EM00 | KS4EM01 | KS4EM02 | KS4EM03 |
| | 13 mm | KS4MG00 | KS4MG01 | KS4MG02 | KS4MG03 |
| | 14 mm | KS4MH00 | KS4MH01 | KS4MH02 | KS4MH03 |
| | 15 mm | KS4MI00 | KS4MI01 | KS4MI02 | KS4MI03 |
| | 16 mm | KS4MJ00 | KS4MJ01 | KS4MJ02 | KS4MJ03 |
| | 17 mm | KS4MK00 | KS4MK01 | KS4MK02 | KS4MK03 |
| | 18 mm | KS4ML00 | KS4ML01 | KS4ML02 | KS4ML03 |
| | 19 mm | KS4MM00 | KS4MM01 | KS4MM02 | KS4MM03 |
| | 20 mm | KS4MN00 | KS4MN01 | KS4MN02 | KS4MN03 |
| | 21 mm | KS4MO00 | KS4MO01 | KS4MO02 | KS4MO03 |
| | 22 mm | KS4MP00 | KS4MP01 | KS4MP02 | KS4MP03 |
| | 23 mm | KS4MQ00 | KS4MQ01 | KS4MQ02 | KS4MQ03 |
| | 24 mm | KS4MR00 | KS4MR01 | KS4MR02 | KS4MR03 |
| | 25 mm | KS4MS00 | KS4MS01 | KS4MS02 | KS4MS03 |
| | 26 mm | KS4MT00 | KS4MT01 | KS4MT02 | KS4MT03 |
| | 27 mm | KS4MU00 | KS4MU01 | KS4MU02 | KS4MU03 |

11 Technical data

11.1 48ET Specifications

Tube Nut DC Electric Nutrunner - Matrix Tool Connector

| Model Number | Max. Drive Size | Torque Range | | Max. Speed (rpm) | Length | | Weight | | Head Dimensions | | | | | | | |
|--------------|-----------------|--------------|-------|------------------|--------|-----|--------|-----|-----------------|----|-------------|----|-----------|----|-------------|----|
| | | | | | | | | | A Width | | B Blade Ht. | | C Opening | | D End/Cntr. | |
| | | ft-lb | Nm | | in | mm | lbs | kg | in. | mm | in. | mm | in. | mm | in. | mm |
| 48ET20T2 | 1/2" | 7.4-14.8 | 10-20 | 1425 | 16.9 | 430 | 4.4 | 2.0 | 1.42 | 36 | 0.55 | 14 | 0.280 | 7 | 0.53 | 13 |
| 48ET30T3 | 3/4" | 11.1-22.1 | 15-30 | 1030 | 16.6 | 422 | 4.5 | 2.0 | 1.65 | 42 | 0.59 | 15 | 0.475 | 13 | 0.73 | 19 |
| 48ET40T4 | 1-1/16" | 14.8-29.5 | 20-40 | 770 | 17.9 | 454 | 5.3 | 2.3 | 2.36 | 60 | 0.59 | 15 | 0.675 | 18 | 0.93 | 24 |

11.2 48ETE Specifications

Tube Nut DC Electric Nutrunner - AirLB Tool Connector

| Model Number | Max. Drive Size | Torque Range | | Max. Speed (rpm) | Length | | Weight | | Head Dimensions | | | | | | | |
|--------------|-----------------|--------------|-------|------------------|--------|-----|--------|-----|-----------------|----|-------------|----|-----------|----|-------------|----|
| | | | | | | | | | A Width | | B Blade Ht. | | C Opening | | D End/Cntr. | |
| | | ft-lb | Nm | | in | mm | lbs | kg | in. | mm | in. | mm | in. | mm | in. | mm |
| 48ETE20T2 | 1/2" | 7.4-14.8 | 10-20 | 1425 | 16.9 | 430 | 4.4 | 2.0 | 1.42 | 36 | 0.55 | 14 | 0.280 | 7 | 0.53 | 13 |
| 48ETE30T3 | 3/4" | 11.1-22.1 | 15-30 | 1030 | 16.6 | 422 | 4.5 | 2.0 | 1.65 | 42 | 0.59 | 15 | 0.475 | 13 | 0.73 | 19 |
| 48ETE40T4 | 1-1/16" | 14.8-29.5 | 20-40 | 770 | 17.9 | 454 | 5.3 | 2.3 | 2.36 | 60 | 0.59 | 15 | 0.675 | 18 | 0.93 | 24 |

11.3 48ET Tool Memory Parameters

| Model Number | Max Speed [RPM] | Max Torque [Nm] | Torque Cal [Nm] | Transducer Type | Angle Cal [PPD] | Static Current Factor [Nm/A] |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------------|
| 48ET20T2 | 1425 | 20 | 35.9914 | 542846-17 | 59.7333 | 0.9790 |
| 48ET30T3 | 1025 | 30 | 49.8343 | 542846-17 | 82.7077 | 1.3556 |
| 48ET40T4 | 775 | 40 | 66.4457 | 542846-17 | 110.2769 | 1.8075 |

11.4 48ETE Tool Memory Parameters

| Model Number | Max Speed [RPM] | Max Torque [Nm] | Torque Cal [Nm] | Transducer Type | Angle Cal [PPD] | Static Current Factor [Nm/A] |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------------|
| 48ETE20T2 | 1425 | 20 | 35.9914 | 542846-17 | 59.7333 | 0.9790 |
| 48ETE30T3 | 1025 | 30 | 49.8343 | 542846-17 | 82.7077 | 1.3556 |
| 48ETE40T4 | 775 | 40 | 66.4457 | 542846-17 | 110.2769 | 1.8075 |

12 Service

12.1 Replacement parts

NOTE



Use only original Cleco replacement parts. Failure to comply can result in reduced power and increased service requirements. The tool warranty may be voided if replacement parts are not manufactured or approved by Apex Tool Group.

12.2 Tool repairs

Only qualified and trained personnel are to repair this equipment.

12.3 Warranty repairs

All warranty repairs are to be performed by an authorized Apex Tool Group service center. Contact your local representative for assistance with warranty repair claims.

13 Disposal

CAUTION!



Injuries and environmental damage from improper disposal.

Components and auxillary materials of the tool pose risks to health and the environment.

- ➔ Capture auxillary materials (oils, greases) when drained and dispose of them properly.
- ➔ Separate the packaging components and dispose of them properly.
- ➔ Comply with all applicable local regulations.



Observe local disposal guidelines for all components of this tool and its packaging.

Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

Detroit, MI

**Apex Tool Group
Sales & Service Center**
2630 Superior Court
Auburn Hills, MI 48326
Tel: 248-393-5640
Fax: 248-391-6295

Houston, TX

**Apex Tool Group
Sales & Service Center**
6550 West Sam Houston
Parkway North, Suite 200
Houston, TX 77041
Tel: 713-849-2364
Fax: 713-849-2047

Lexington, SC

Apex Tool Group
670 Industrial Drive
Lexington, SC 29072
Tel: 800-845-5629
Tel: 803-951-7544
Fax: 803-358-7681

Los Angeles, CA

**Apex Tool Group
Sales & Service Center**
6881 Stanton Avenue
Unit B
Buena Park, CA 90621
Tel: 562-623-4457
Fax: 562-802-1718

Seattle, WA

**Apex Tool Group
Sales & Service Center**
2865 152nd Avenue N.E.
Redmond, WA 98052
Tel: 425-497-0476
Fax: 425-497-0496

York, PA

**Apex Tool Group
Sales & Service Center**
3990 East Market Street
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