

Service Manual
PL12EN-67EA
06/04/2013

Cleco®

67EA Series **Electronically Controlled Right Angle Nutrunner**



For additional product information visit our website at <http://www.apextoolgroup.com>

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 67EA series tools.
- serves as a reference guide for technical data, service intervals and spare parts ordering.
- provides information on optional equipment.

Identification text:

67EA 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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	67	E	A	XXXX	XXX
Tool Series					
67					
Motor Style					
E = Brushless Electric Motor					
Tool Type					
A = Right Angle					
Maximum Torque Nm (rounded to nearest 5 Nm)					
235 = 230 Nm					
255 = 255 Nm					
310 = 310 Nm					
340 = 335 Nm					
460 = 460 Nm					
570 = 570 Nm					
730 = 730 Nm					
860 = 860 Nm					
1035 = 1035 Nm					
1340 = 1340 Nm					
1700 = 1700 Nm					
2010 = 2000 Nm					
Attachment					
AL6 = 3/4" Square Drive - Right Angle					
AM6 = 3/4" Square Drive - Right Angle					
ML6 = 3/4" Square Drive - Right Angle					
AH8 = 1" Square Drive - Right Angle					

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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 67EA and apply the socket or bit 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 and bits available from Apex Tool Group.
- Inspect socket or bit for visible damage and cracks. Replace damaged items immediately.
- Disconnect the power supply before installing or replacing the socket or bit.
- Do not attach the socket or bit at a slant.
- Make sure the socket or bit is fully assembled on the drive and locked in position.

1.3 Operator training

All personnel must be properly trained before operating the 67EA tools. The 67EA 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 67EA is designed exclusively for fastening and releasing threaded fasteners. The 67EA is used in conjunction with the following controllers:

- Do not modify the 67EA, any guard or accessory.

Nutrunner	Controller
67EA series	m-Pro-400GC controller with m-Pro-400-IT isolation transformer

- Use only with accessory parts which are approved by the manufacturer.
- 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 ≤ 75 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 67EA
- 1 PL12EN-67EA instruction manual
- 1 Declaration of Conformity
- 1 Lubrication sheet
- 1 Warranty statement

2.2 Transport

Transport and store the 67EA 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 67EA in a location on the workbench to avoid accidental depression of the button.
or
- ➔ Suspend the 67EA from a suitable balancer or tool positioner.

For storage longer than 2 hours:

- ➔ Disconnect the power supply from the 67EA

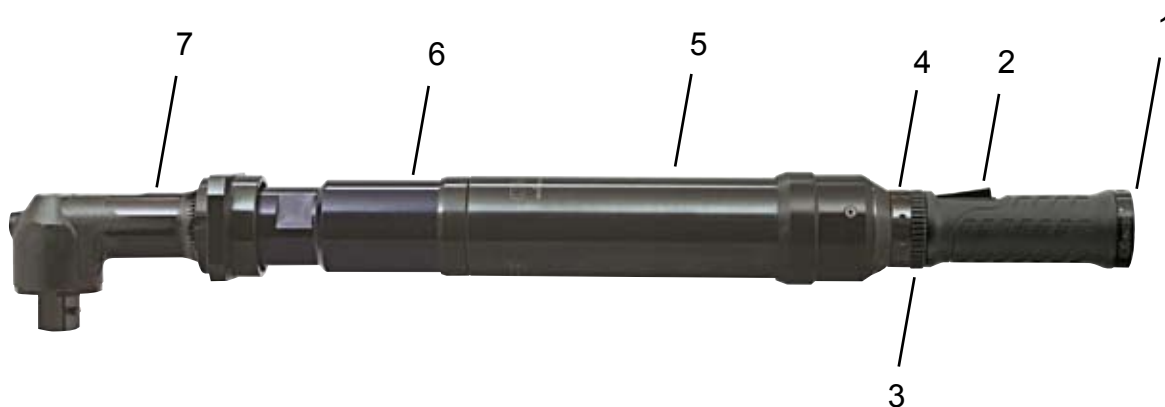
3 Product description

3.1 General description

- Right angle DC electric powered nutrunner
- Low inertia brushless motor
- Clockwise/counterclockwise rotation
- High visibility LEDs

3.2 Operation and functional elements

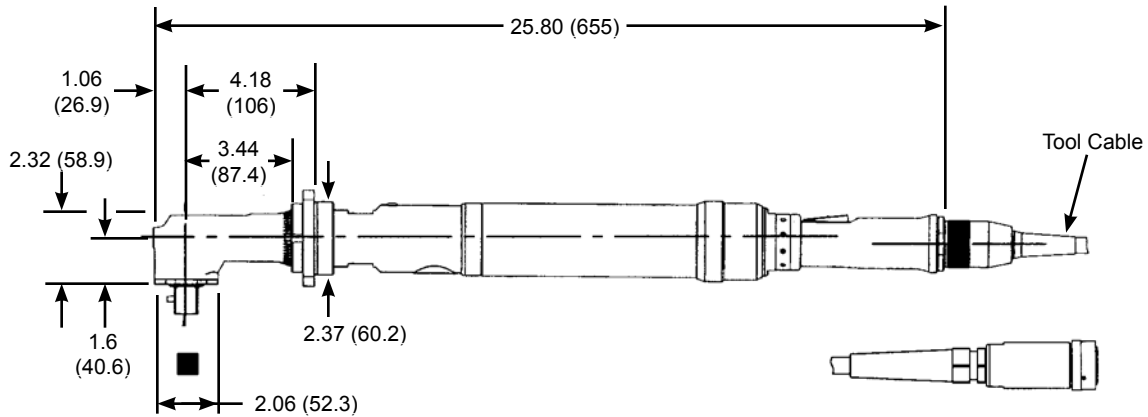
This section describes the operational and functional elements of the 67EA.



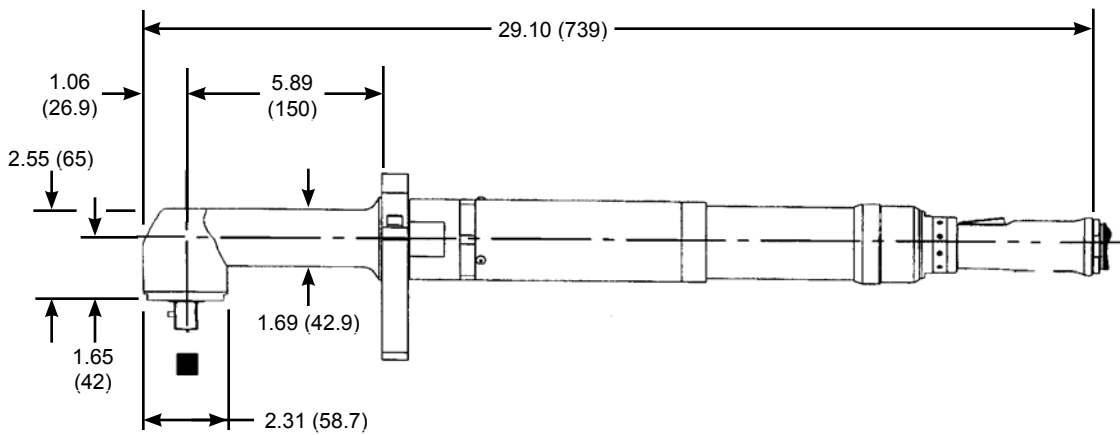
Ref.	Description
1	Power Connection
2	Start Button
3	Reversing Ring
4	LED Light Ring
5	Motor Assembly
6	Gearing
7	Right Angle Attachment

3.3 Dimensional data

inches (mm)



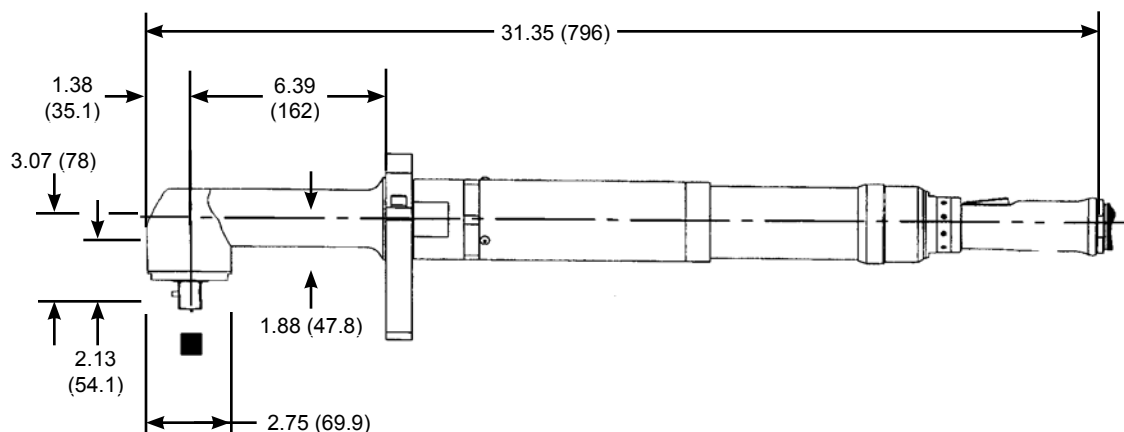
67EA235AL6
67EA255AL6
(3/4" Square Drive Output)



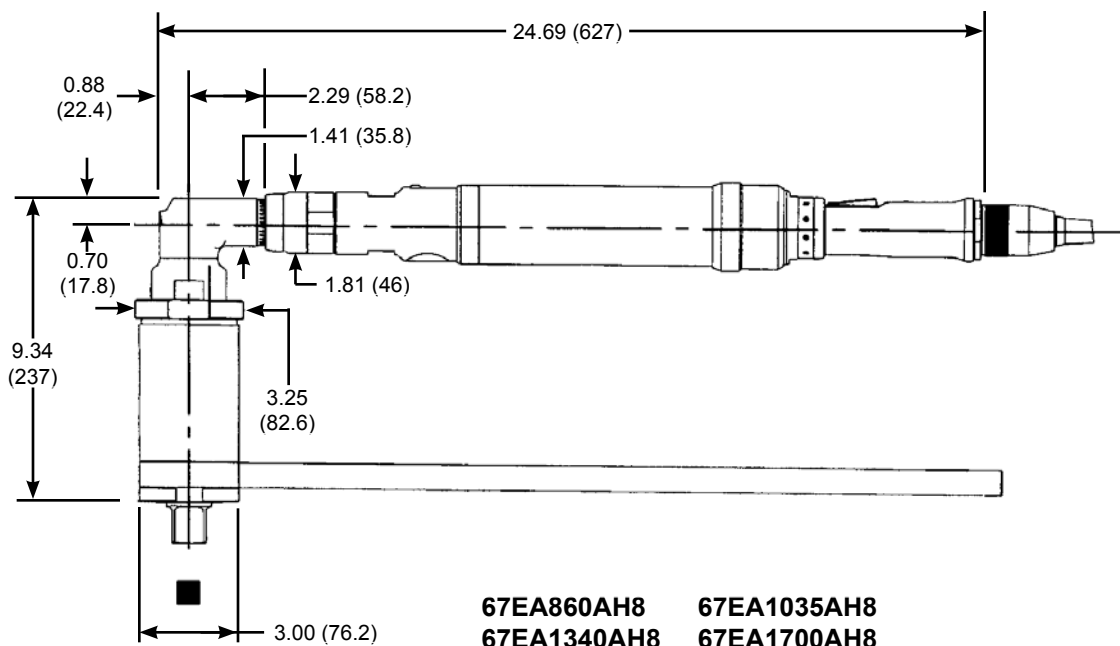
67EA310ML6
(3/4" Square Drive Output)

3.3 Dimensional data (continued)

inches (mm)



67EA340AM6 67EA460AM6
67EA570AM6 67EA730AM6
(3/4" Square Drive Output)



67EA860AH8 67EA1035AH8
67EA1340AH8 67EA1700AH8
67EA2010AH8
(1" Square Drive Output)

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 section 10.4 for part numbers



Tool and Cable Tester
 Part Number: 961024
 Tool and cable tester (tool memory programming)
 Part Number: 542991
 Tool and cable tester



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



Suspension Bail
 Part Number: 1110909



Swivel Suspension Bail
 Part Number: 35007004 (67EA...AL6)
 Part Number: 48A17006 (67EA...ML6)
 Part Number: 48A17006 (67EA...AM6)

4 Accessories (continued)



Angle Head Cover

Part Number: 205838 (67EA...AL6)



Extension Assembly

Part Number: 48316033 (67EA...AL6)



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 67EA series nutrunner is provided by networking it with a tool controller.

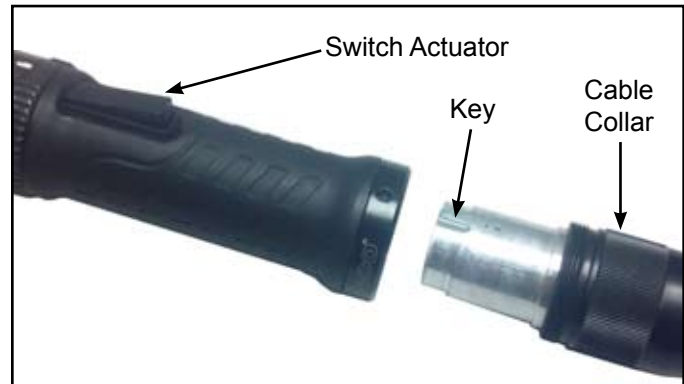
5.2.1 m-Pro-400GC series global controller



5.3 Tool cable connection

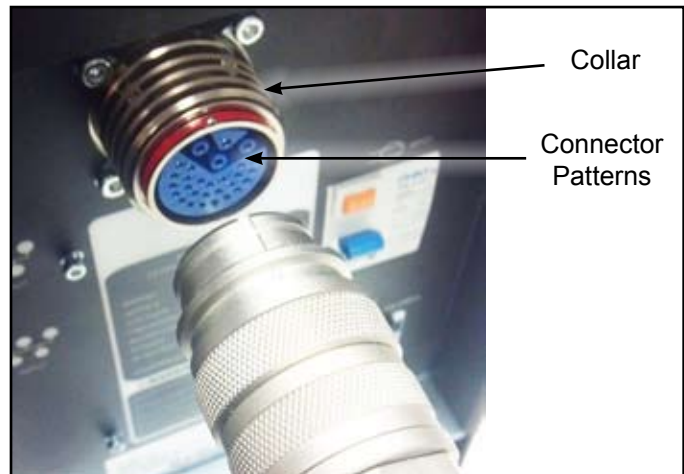
5.3.1 Cable connection to 67EA

Insert the tool connection end of the cable into the 67EA 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.



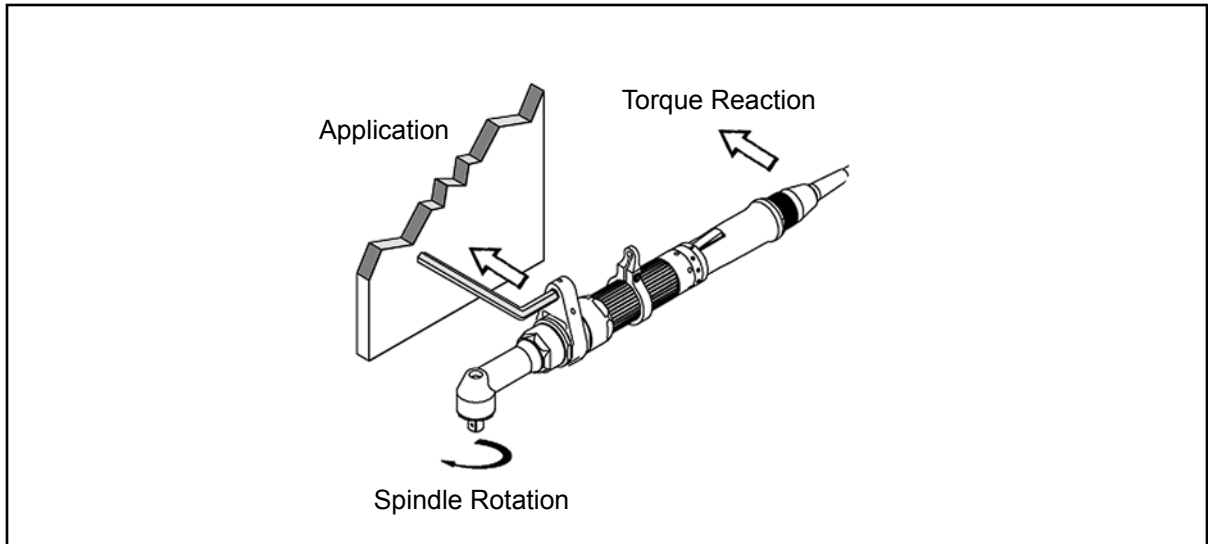
5.3.3 Apply power to the tool

Refer to the controller manual for tool operation.

6 First operation

6.1 Putting into use

A reaction bar and bracket must always be used in high torque applications above 50 ft.-lbs. (68 Nm) or in closed-quarter areas where entrapment and injury to hands or fingers could occur.



- ➔ 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 or bit 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 at desired torque but reports no angle	Angle Threshold value is set to high	→ Correct fastening strategy programming to include a low Angle threshold value
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 has reached Angle High Limit before reaching the Torque target	→ Check the fastening strategy programming to verify that the Torque target and Angle High Limit are correct. If the parameters are correct, see if something has changed in the assembly that would cause an incorrect torque/angle relationship.
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	→ Visual inspection of all cables and connections → Visual inspection of the 67EA tool → Check the tool for excessive vibration or unusual noises → Visual inspection of all external components of the tool
W1	100,000	→ 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	→ Visual inspection of disassembled 67EA 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 (67EA models)
W3	1,000,000	→ Visual inspection of disassembled 67EA 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 (67EA 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.

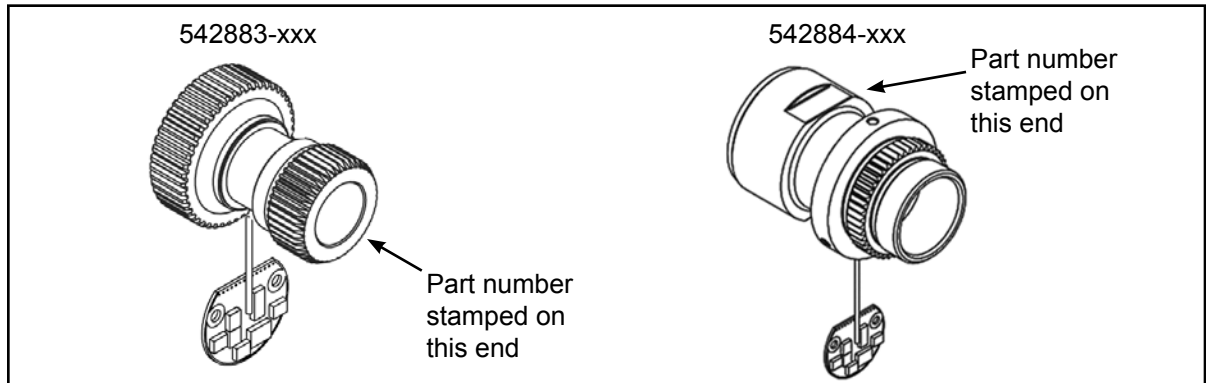
Grease lubricants recommended for this tool.

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 Transducer identification

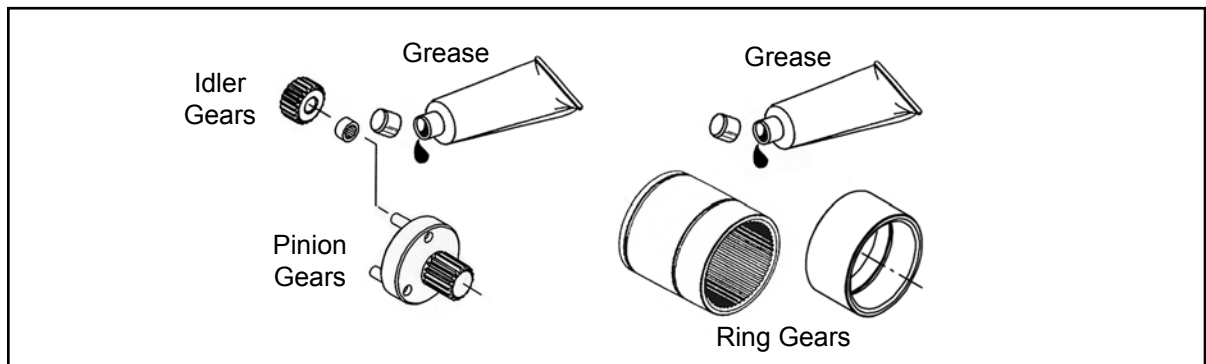
Transducers are not interchangeable. Verify the part number stamped on the transducer with the transducer part number indicated in the parts list to assure the correct transducer is being used.



9.2 Gear train lubrication

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

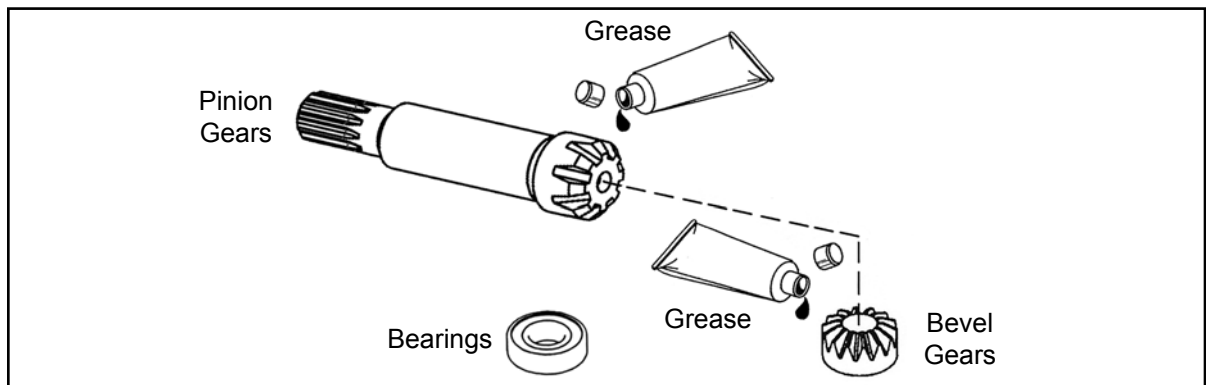
DO NOT SUBSTITUTE GREASES



9.3 Angle head lubrication

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

DO NOT SUBSTITUTE GREASES



9.4 Throttle lever alignment

Assemble shims as required to attain the proper orientation of the handle lever with the angle attachment output spindle.

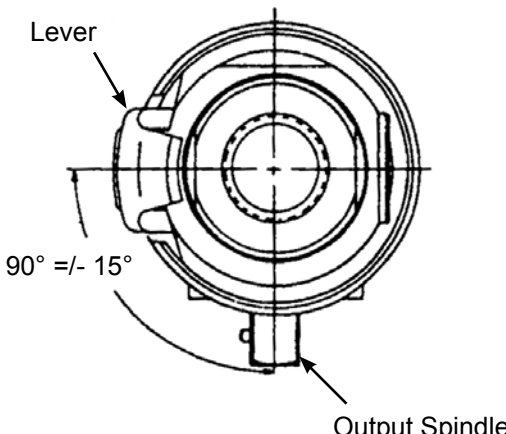
Illustration 10.9: AL6 Attachment (shim number 2)

Illustration 10.10: ML6 Attachment (shim number 1)

Illustration 10.11: AM6 Attachment (shim number 1)

Illustration 10.12: AH8 Attachment (shim number 3)

View from handle end of tool



Output Spindle

Shims Required

Angle Head Threads	16
Shim	10.9: AL6 (shim #2) 10.10: ML6 (shim #1) 10.11: AM6 (shim #1) 10.12: AH8 (shim #3)
Full Turn	0.062
Half Turn	0.031
90°	0.016
45°	0.008
30°	0.005

9.5 Pinion gear setting (right angle attachments)

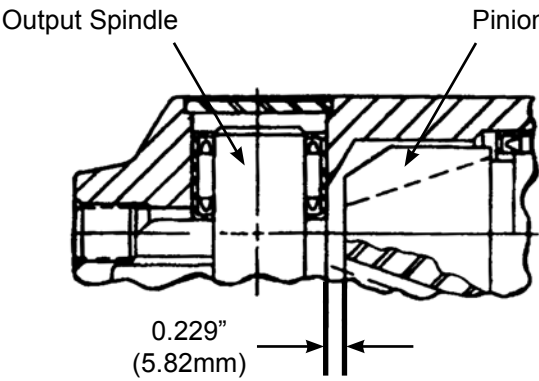
Assemble shims to attain the pinion gear setting of 0.229" (5.82mm) as shown below.

Illustration 10.9: AL6 Attachment (shim numbers 2 and 4)

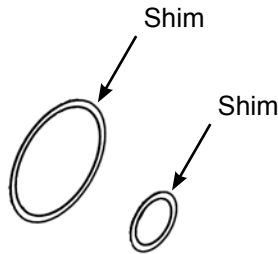
Illustration 10.10: ML6 Attachment (shim numbers 1 and 4)

Illustration 10.11: AM6 Attachment (shim numbers 1 and 4)

Illustration 10.12: AH8 Attachment (shim numbers 3 and 4)



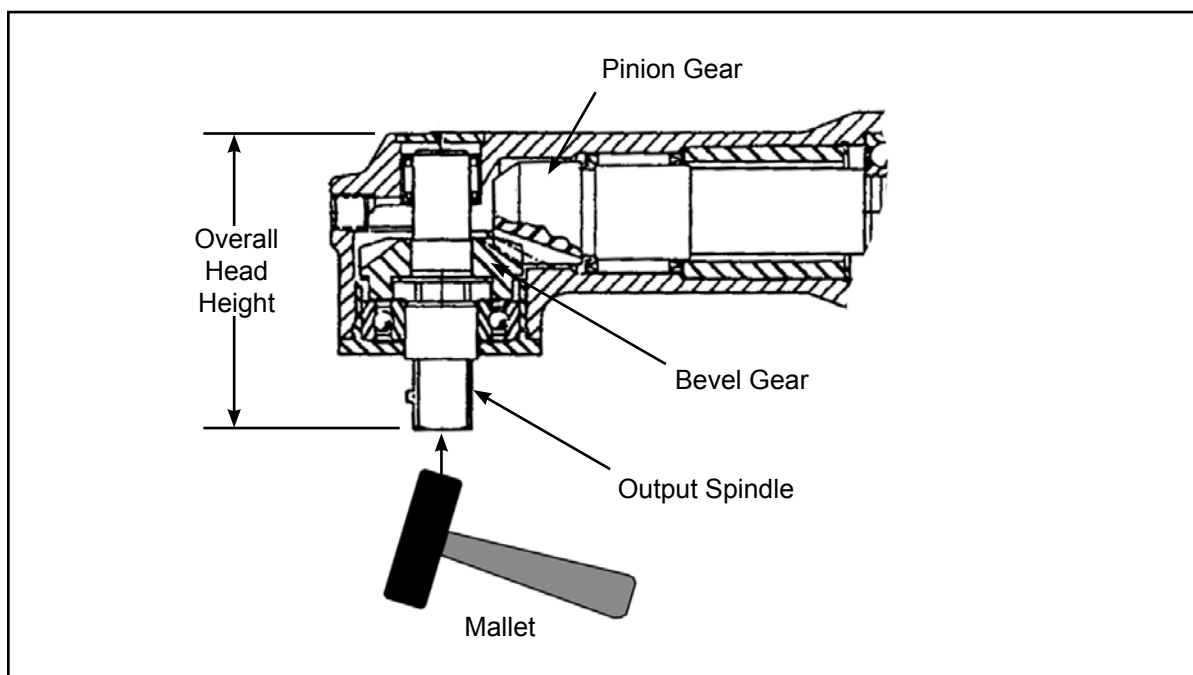
0.229"
(5.82mm)



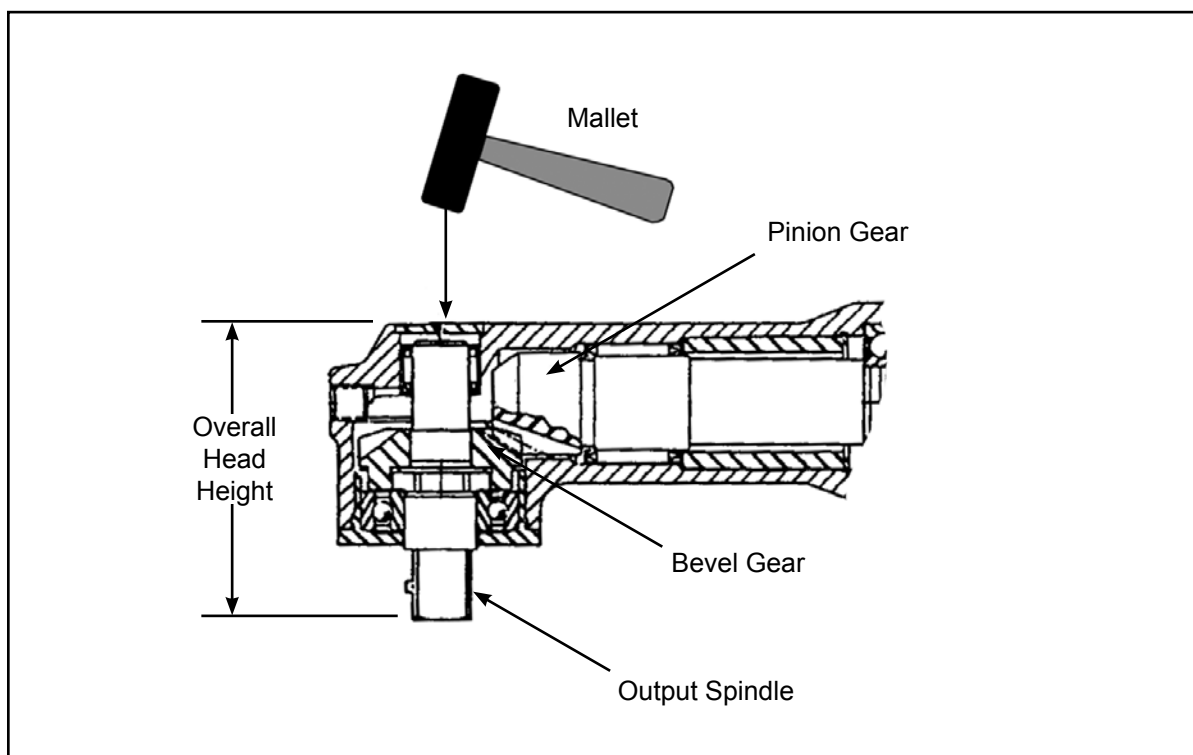
Assemble shims as required
to attain proper setting.

9.6 Backlash shim assembly

Dimension 1: Tap the output spindle with a hard rubber mallet. Measure the overall head height.



Dimension 2: Secure the angle head assembly in a smooth jawed vise. Using a hard rubber mallet, tap the top of the angle housing, near the output spindle. Measure the overall head height.



9.6 Backlash shim assembly (continued)

The difference between dimension 1 and dimension 2 should be 0.010"/0.012" (0.25/0.31mm)

$$\text{Dimension 2} - \text{Dimension 1} = 0.010/0.012 \text{ (0.25/0.31mm)}$$

Assemble the shims, as necessary, to provide this backlash dimension.

Illustration 10.9: AL6 Attachment

Shim number 15 decreases the dimension

Shim number 21 increases the dimension

Illustration 10.10: ML6 Attachment

Shim number 18 decreases the dimension

Shim number 20 increases the dimension

Illustration 10.11: AM6 Attachment

Shim number 20 decreases the dimension

Shim number 22 increases the dimension

Illustration 10.12: AH8 Attachment

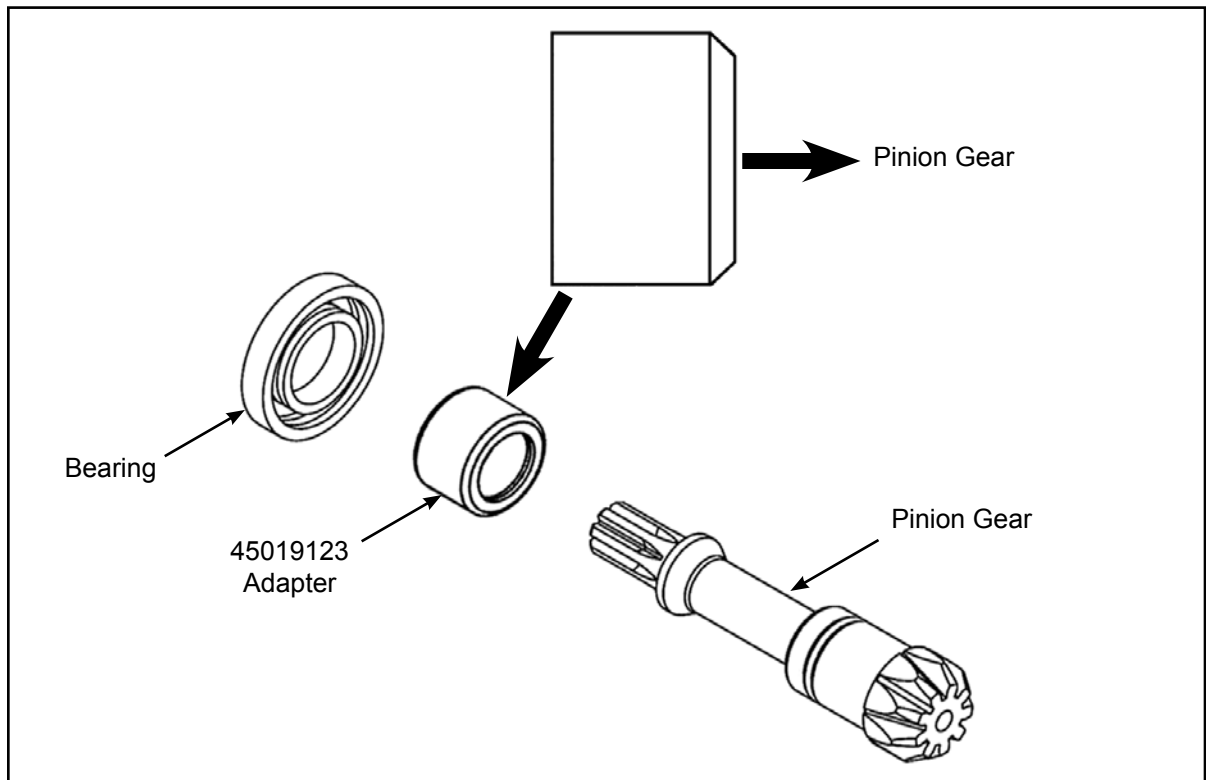
Shim number 15 used as necessary

9.7 45019123 Adapter assembly

Angle Attachment 45037012 (Illustration 10.10)

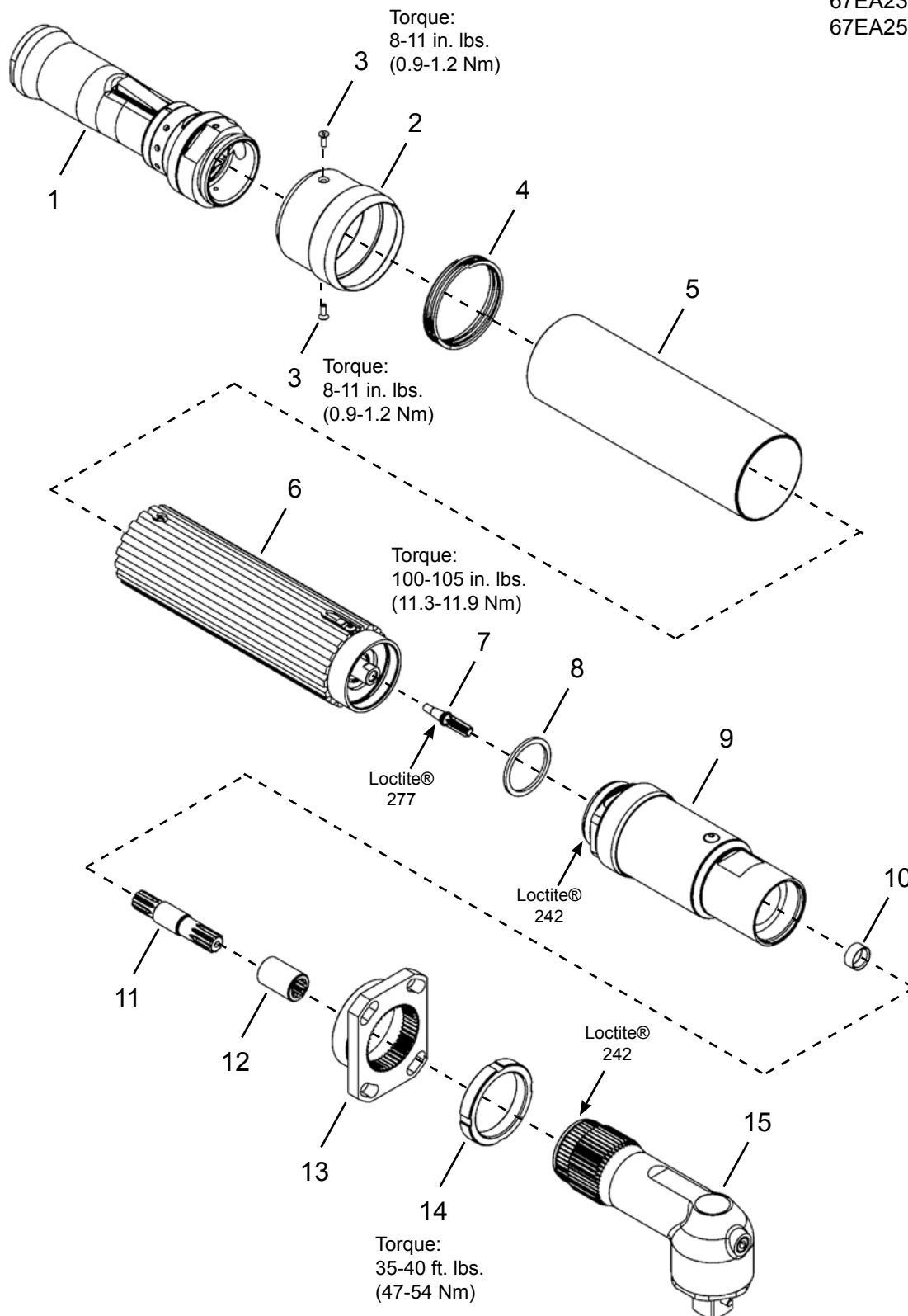
Angle Attachment 45017010 (Illustration 10.11)

Make certain the 45019123 adapter is properly positioned when assembled on the pinion gear. Improper assembly can cause extensive damage to the internal components of the angle head.



10.1 67EA(---)AL6 Series Right Angle Nutrunner

Models
67EA235AL6
67EA255AL6



10.1 67EA(---)AL6 Series Right Angle Nutrunner

Ref	Number	#	X	EN
				Description
1	Illustration 10.4	1		Handle Assembly
2	35177103	1		Sleeve Adapter
3	93380005	2	6	Hex Socket Flat Head Screw (#5-40)
4	35009107	1	2	Spring
5	542937	1		Wire Sleeve
6	542878	1		Motor Assembly
7	Table 10.1	1	3	Spindle Gear
8	35019101	1		Spacer
9	Table 10.1	1		Gear Case Assembly
10	48139113	1		Spacer
11	48138110	1	2	Shaft
12	48068103	1		Splined Coupling
13	49097101	1		Mounting Plate
14	49098103	1		Lock Nut
15	Illustration 10.9	1		Right Angle Attachment

(#) Quantity

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

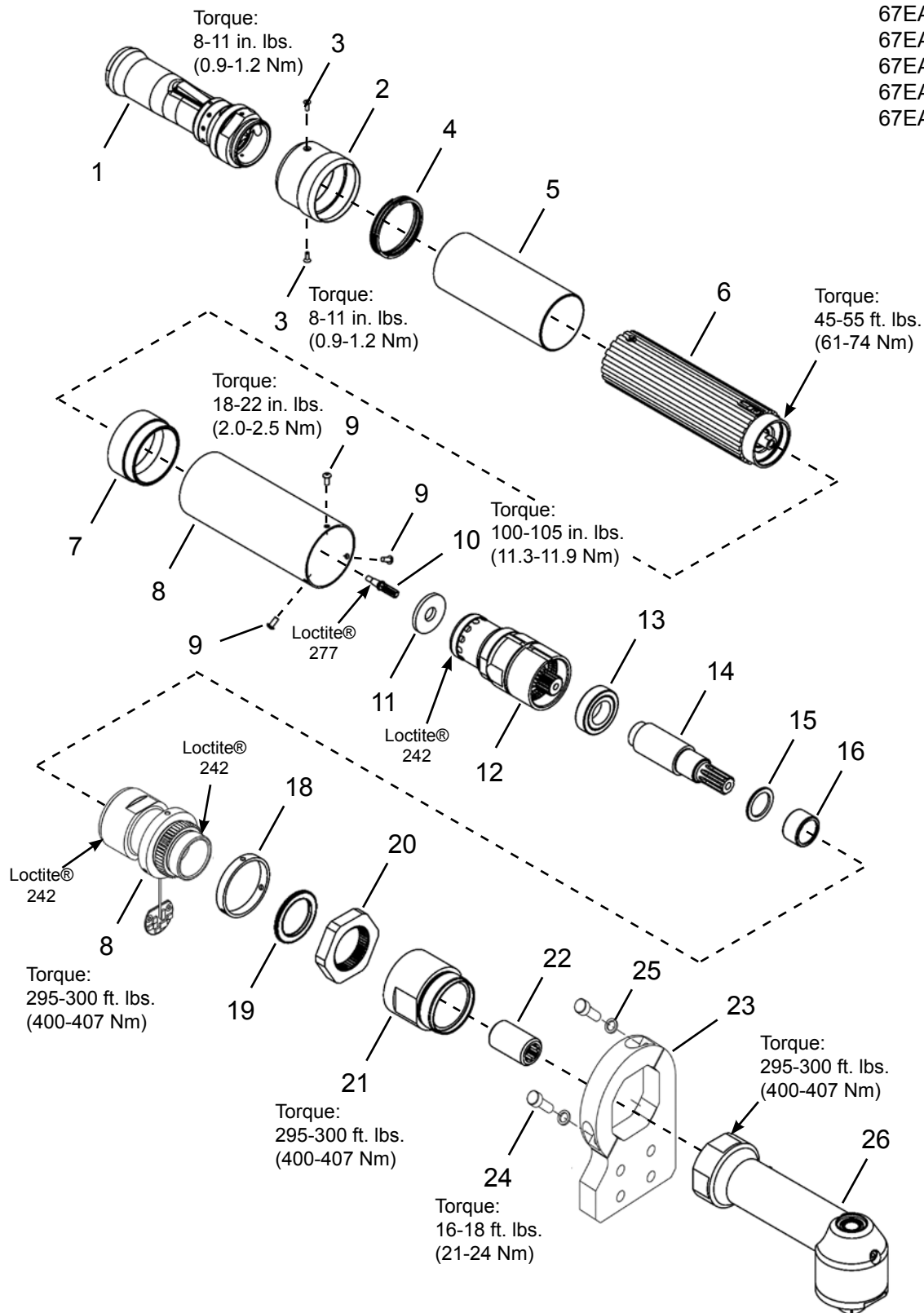
Table 10.1

Ref.	Description	#	67EA235	#	67EA255
7	Spindle Gear	1	43288170 (7T)	1	43288169 (5T)
9	Gear Case Assembly (Illustration 10.5)	1	43526009	1	435260100

10.2 67EA(---)AM6 Series and 67EA310ML6 Right Angle Nutrunner

Models

67EA310ML6
67EA340AM6
67EA460AM6
67EA570AM6
67EA730AM6



10.2 67EA(---)AM6 Series and 67EA310ML6 Right Angle Nutrunner

Ref	Number	#	X	EN
				Description
1	Illustration 10.4	1		Handle Assembly
2	35177103	1		Sleeve Adapter
3	93380005	2	6	Hex Socket Flat Head Screw (#5-40)
4	35009107	1	2	Spring
5	542889	1		Wire Sleeve
6	542878	1		Motor Assembly
7	35098102	1		Sleeve Adapter
8	35127101	1		Wire Adapter
9	93300033	3	9	Button Head Screw (8-32 x 3/8)
10	Table 10.2	1	3	Spindle Gear
11	35129102	1		Spacer
12	Table 10.2	1		Gear Case Assembly
13	92100031	1	2	Ball Bearing
14	48A17114	1		Shaft
15	48039132	1		Spacer
16	92000056	1	2	Needle Bearing
17	Table 10.2	1		Transducer
18	48A18103	1		Spacer
19	542965	1	3	Wave Washer
20	542963	1		Splined Spacer
21	48A17113	1		Adapter
22	45138109	1		Coupling
23	544148PT	1		Mounting Plate (includes Ref. 24-25)
24	93310135	2	6	Socket Head Cap Screw (5/16-18 x 1)
25	94140014	2	6	Lock Washer
26	Illustration 10.10	1		Right Angle Attachment (ML6)
	Illustration 10.11	1		Right Angle Attachment (AM6)

(#) Quantity

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

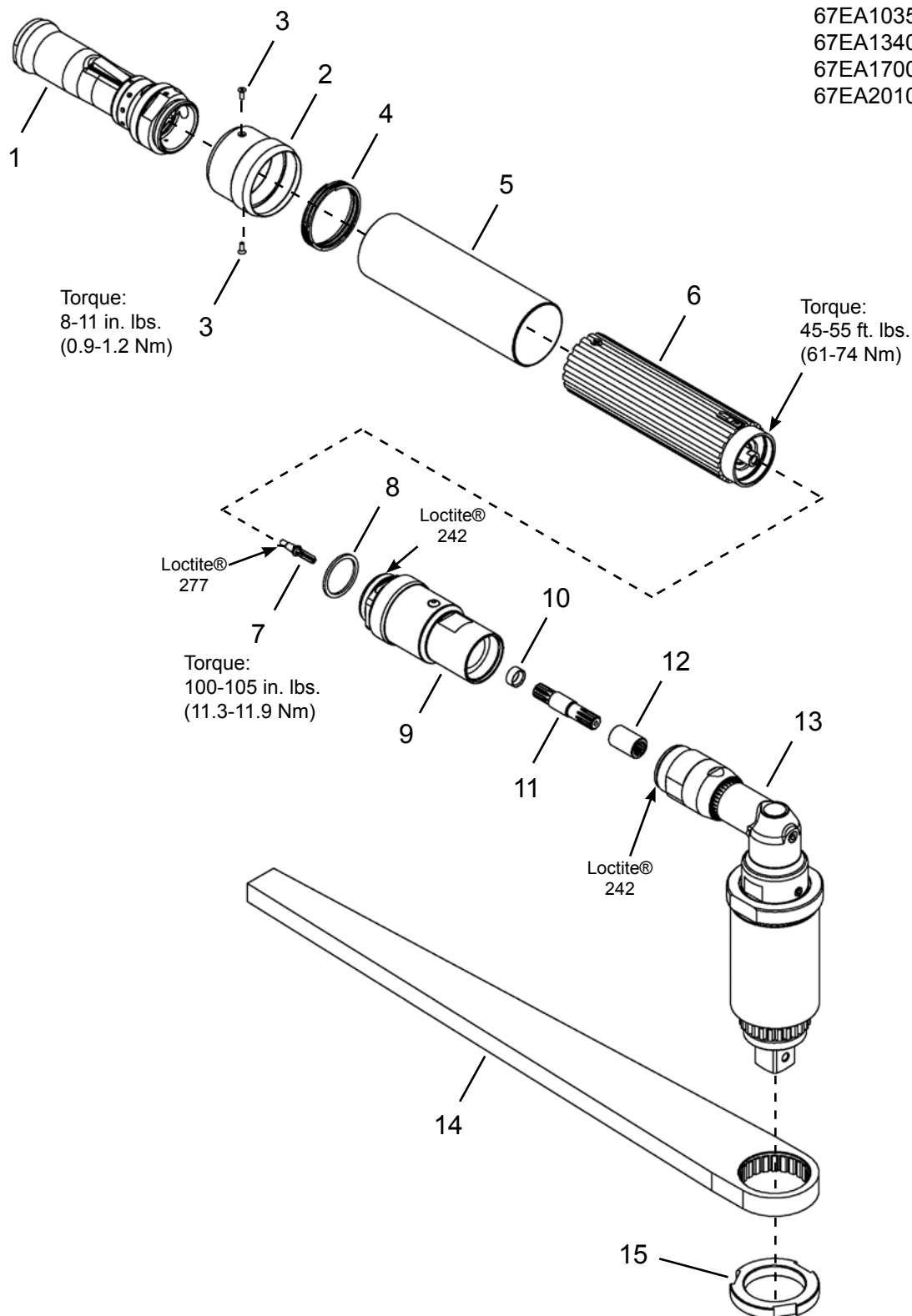
Table 10.2

Ref.	Description	#	67EA310	#	67EA340	#	67EA460	#	67EA570	#	67EA730
10	Spindle Gear	1	43288170 (7T)	1	43288170 (7T)	1	43288170 (7T)	1	43288170 (7T)	1	43288171 (9T)
12	Gear Case Assembly (Illustration 10.6)	1	35646002	1	35646001	1	35646003	1	35646004	1	35646005
17	Transducer	1	542884-232	1	542884-232	1	542884-232	1	542884-353	1	542884-353

10.3 67EA(----)AH8 Series Right Angle Nutrunner

Models

67EA860AH8
67EA1035AH8
67EA1340AH8
67EA1700AH8
67EA2010AH8



10.3 67EA(----)AH8 Series Right Angle Nutrunner

Ref	Number	#	X	EN
				Description
1	Illustration 10.4	1		Handle Assembly
2	35177103	1		Sleeve Adapter
3	93380005	2	6	Hex Socket Flat Head Screw (#5-40)
4	35009107	1	2	Spring
5	542937	1		Wire Sleeve
6	542878	1		Motor Assembly
7	Table 10.3	1	3	Spindle Gear
8	35019101	1		Spacer
9	Table 10.3	1		Gear Case Assembly
10	48139113	1		Spacer
11	48138110	1	2	Shaft
12	48068103	1		Splined Coupling
13	Illustration 10.12	1		Right Angle Attachment
14	46036202	1		Reaction Bar
15	46038134	1		Lock Nut

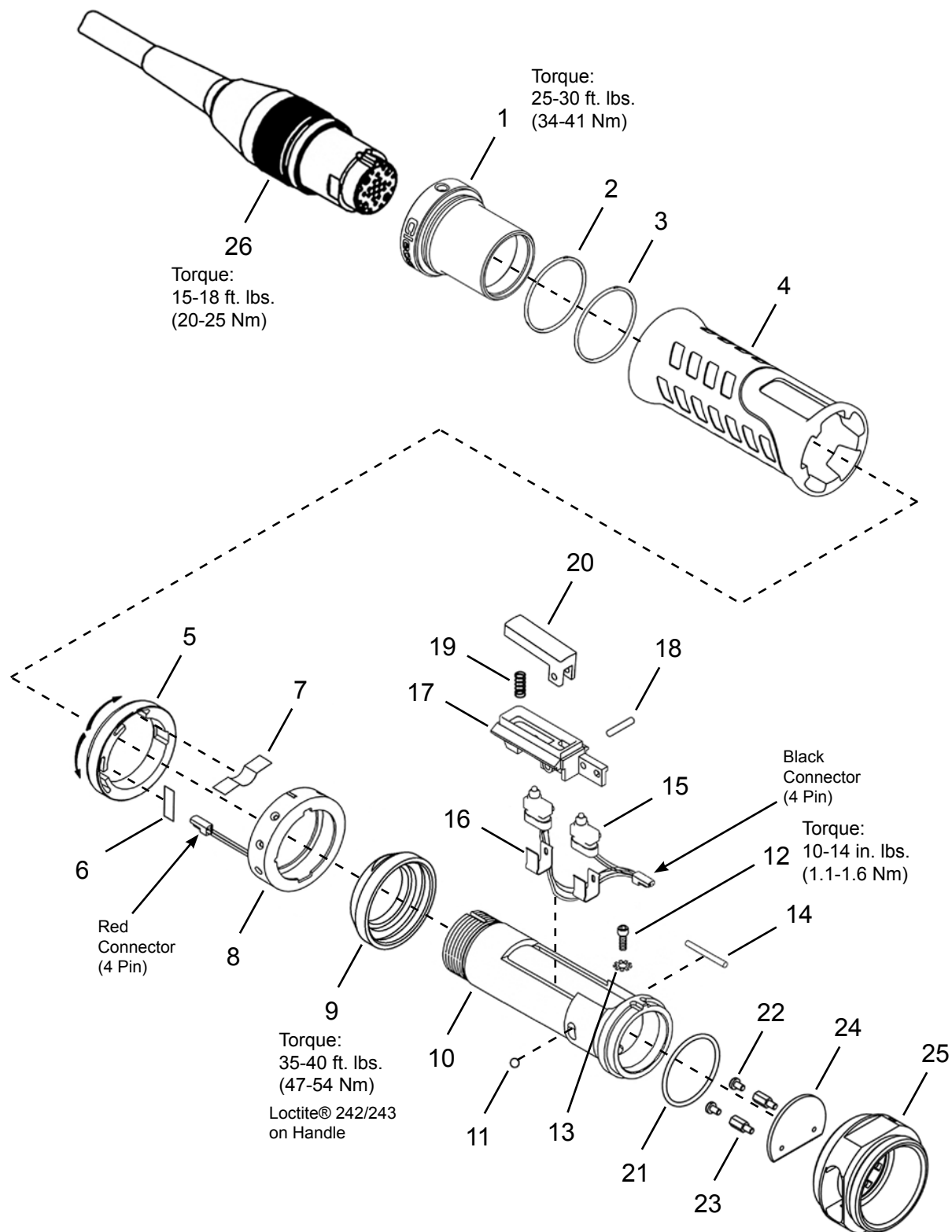
(#) Quantity

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

Table 10.3

Ref.	Description	#	67EA860	#	67EA1035	#	67EA1340	#	67EA1700	#	67EA2010
7	Spindle Gear	1	43288169 (5T)	1	43288170 (7T)	1	43288170 (7T)	1	43288170 (7T)	1	43288171 (9T)
9	Gear Case Assembly (Illustrations 10.7 - 10.8))	1	35646002	1	35646001	1	35646003	1	35646004	1	35646005

10.4 67EA Series Handle Assembly



10.4 67EA Series Handle Assembly

Ref	Number	#	X	EN
				Description
1	207325	1		Connector Sleeve
2	524818	1	3	O-Ring
3	22598	1	3	O-Ring
4	207323	1		Handle Sleeve
5	542938	1		Reverse Ring
6	541624	1	2	Forward/Reverse Spring
7	541033	1	2	Reverse Spring
8	542819	1		Light Ring Assembly
9	542875	1		Screw Cap
10	541015	1		Inner Handle
11	1091PT	1	3	Steel Ball - 3/16"
12	B159V	1	3	Cap Screw (#6-32)
13	W115	1	3	Lock Washer
14	1009089	1	3	Housing Pin
15	F900571	1	2	Start/Reverse Switch
16	207317	2	2	Switch Spring Clip
17	207316	1		Switch Holder
18	541480	1	3	Switch Pin
19	266255	1	3	Switch Spring
20	F900185	1		Switch Actuator
21	902362	1	3	O-Ring
22	17-111	2	6	Screw
23	542244	2	6	Standoff
24	542874	1		Mounting Plate
25	542877	1		Handle Adapter
Tool Cable (Optional Length)				
26	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
Inline Swivel Cable (Optional Length)				
26	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)				
26	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)				
26	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

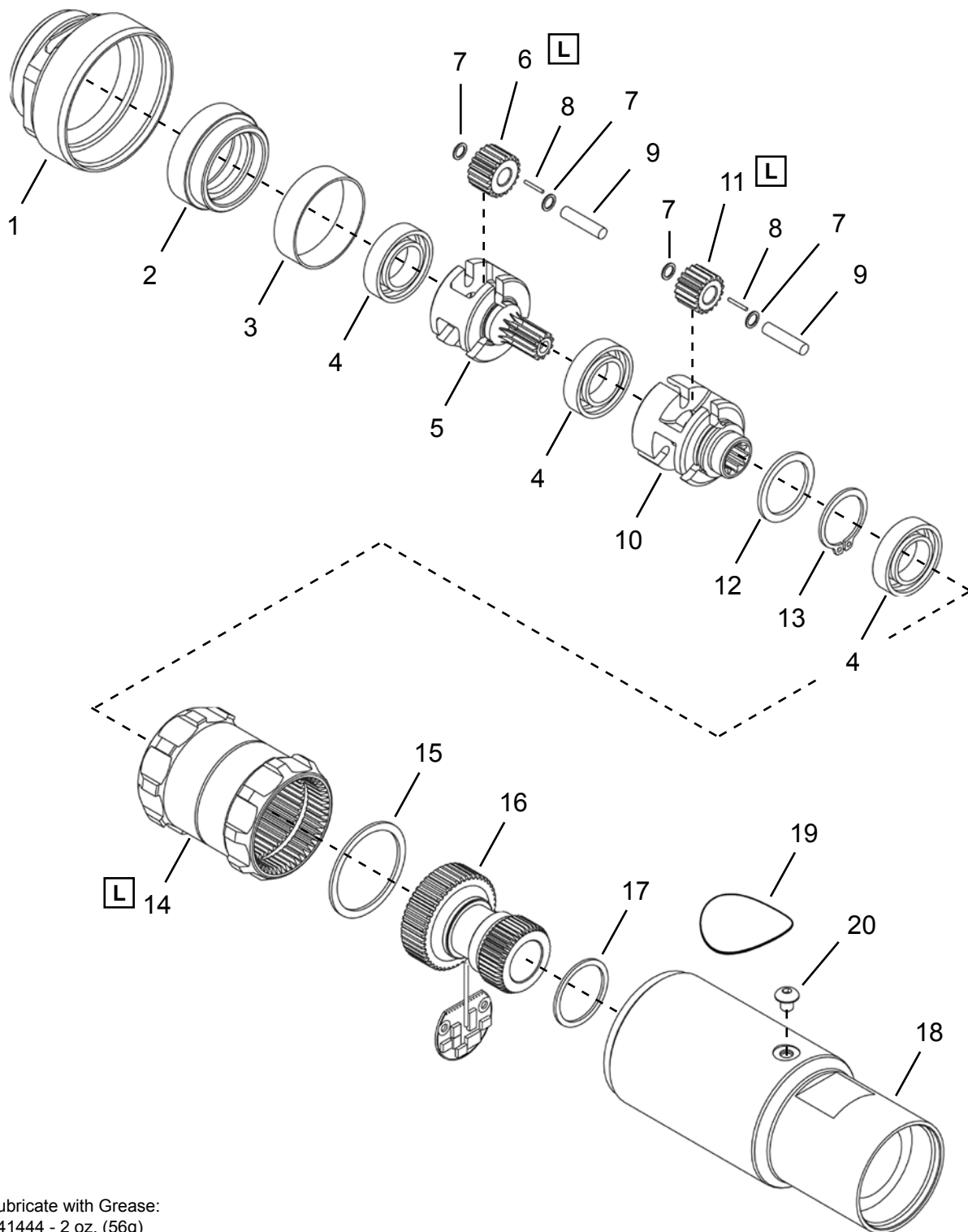
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

10.5 67EA(---)AL6 Double Stage Gearing Assembly

Models

67EA235AL6

67EA255AL6



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

10.5 67EA(---)AL6 Series Double Stage Gearing

Ref	Number	#	X	EN
				Description
1	542876	1		Adapter
2	48138114	1		Bearing Housing
3	43259102	1		Protector Sleeve
4	92100071	3	6	Ball Bearing
5	Table 10.5	1		Upper Gear Cage
6	Table 10.5	3	6	Upper Planetary Gear
7	48019118	12	24	Planetary Gear Washer
8	92880015	90	180	Planetary Gear Needle Roller
9	48019110	6	12	Planetary Gear Pin
10	Table 10.5	1		Lower Gear Cage
11	Table 10.5	3	6	Lower Planetary Gear
12	48019119	1		Washer
13	92840009	1	2	Retaining Ring
14	46067104	1		Gear Housing
15	92830026	1		Retainer
16	542883-135	1		Transducer
17	92830018	1		Retainer
18	43527118	1		Housing
19	43329171	1		Decal
20	93300040	1	3	Button Head Screw (10-32 x 1/4)

(#) Quantity

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

Table 10.5

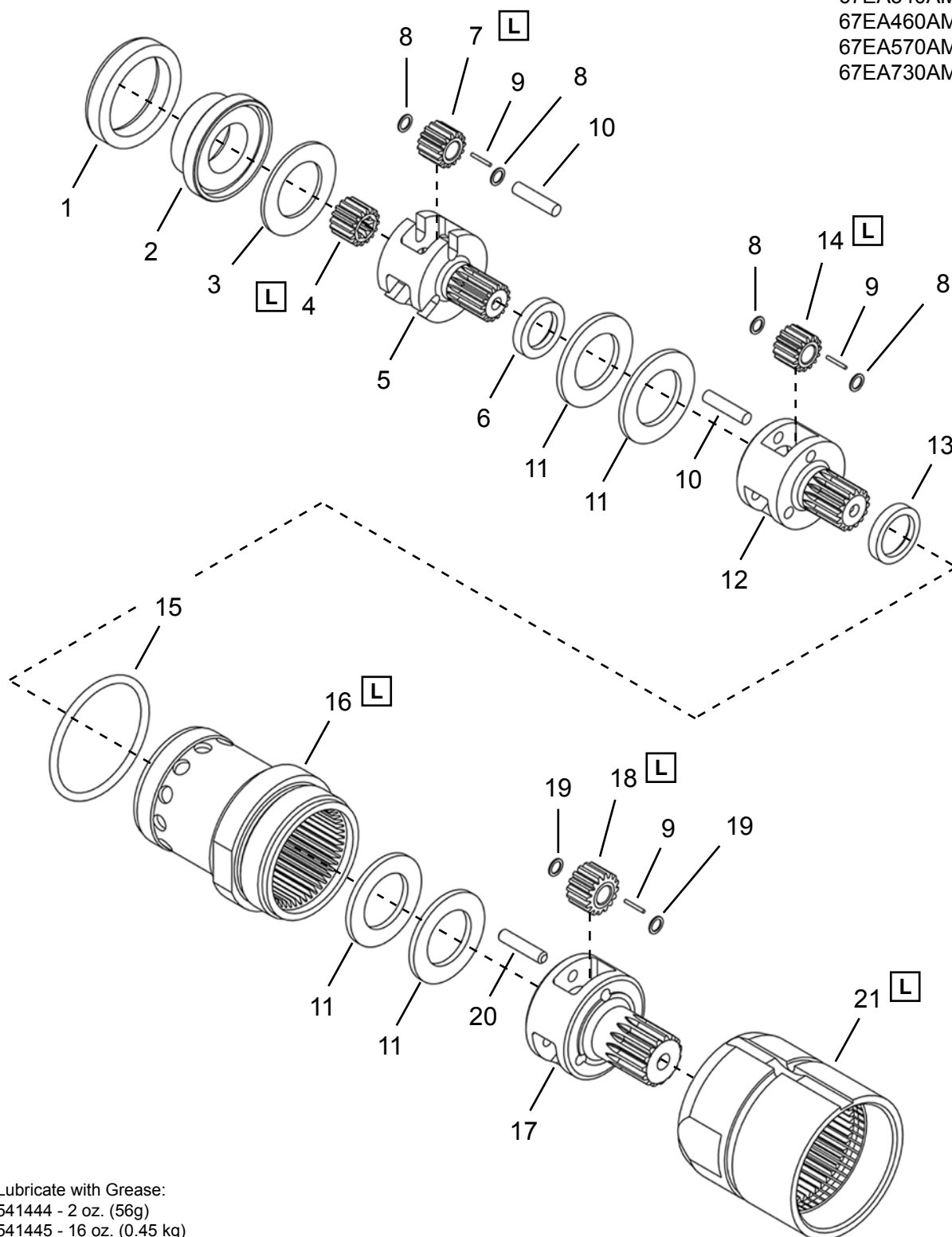
Ref.	Description	#	67EA235	#	67EA255
--	Gear Case Assembly	1	43526099	1	435260100
5	Upper Gear Cage	1	43527128	1	43527158
6	Upper Planetary Gear	3	48048110 (20T)	3	48038149 (21T)
10	Lower Gear Cage	1	48138104	1	48138106
11	Lower Planetary Gear	3	48018194 (18T)	3	48048111 (17T)

(T) Teeth

10.6 67EA(---)AM6 Series and 67EA310ML6 Triple Stage Gearing

Models

67EA310ML6
67EA340AM6
67EA460AM6
67EA570AM6
67EA730AM6



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

10.6 67EA(----)AM6 Series and 67EA310ML6 Triple Stage Gearing

Ref	Number	#	X	EN
				Description
1	11801172B	1	3	Muffler
2	48038117	1		Deflector Ring
3	92060023	1		Thrust Race
4	Table 10.6	1	2	Splined Pinion Gear
5	Table 10.6	1		Upper Gear Cage (includes Ref. 6)
6	Table 10.6	1		Spacer
7	Table 10.6	3	6	Upper Planetary Gear
8	48019118	12	24	Planetary Gear Washer
9	92880015	45	90	Upper Planetary Gear Roller (all models)
	92880015	45	90	Middle Planetary Gear Roller (all models)
	92880015	45	90	Lower Planetary Gear Roller (67EA340)
	92880015	60	120	Lower Planetary Gear Roller (67EA310, 67EA460, 67EA570, 67EA730)
10	48019110	6	12	Planetary Gear Pin
11	92060018	4		Thrust Race
12	Table 10.6	1		Middle Gear Cage (includes Ref. 13)
13	Table 10.6	1		Spacer
14	Table 10.6	3	6	Middle Planetary Gear
15	93040014	1	3	O-Ring
16	48037107	1		Gear Housing
17	Table 10.6	1		Lower Gear Cage / Output Spindle
18	Table 10.6	3	6	Lower Planetary Gear
19	Table 10.6	6	12	Lower Planetary Gear Washer
20	Table 10.6	3	6	Lower Planetary Gear Pin
21	35647101	1		Gear Housing

(#) Quantity

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

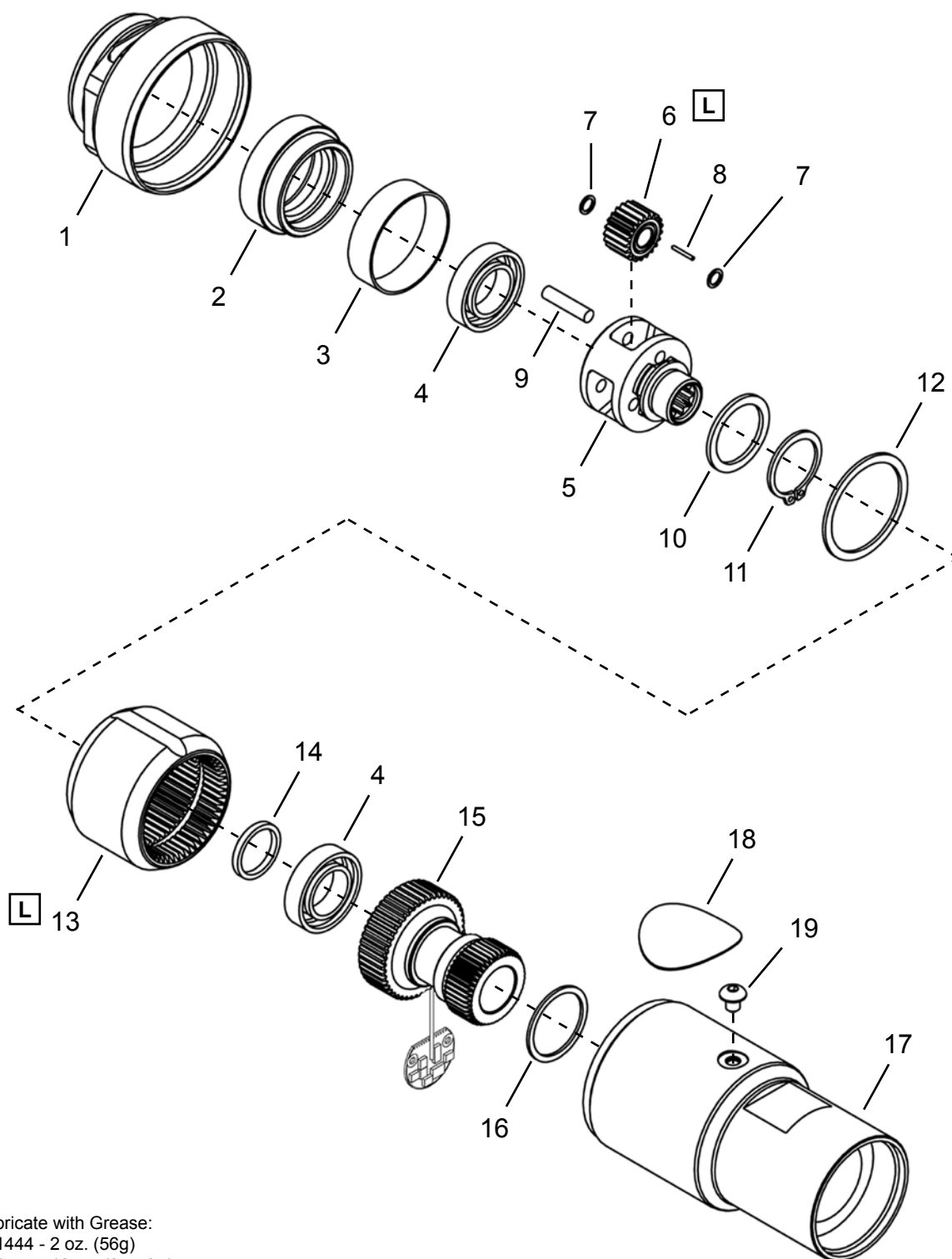
Table 10.6

Ref.	Description	#	67EA310	#	67EA340	#	67EA460	#	67EA570	#	67EA730
--	Gear Case Assembly	1	35646002	1	35646001	1	35646003	1	35646004	1	35646005
4	Splined Pinion Gear	1	48038118 (16T)	1	48038118 (16T)	1	48038118 (16T)	1	48038118 (16T)	1	-----
5	Upper Gear Cage	1	48037175	1	48037125	1	48037124	1	48037123	1	48037175
6	Spacer	1	48039178	1	48039178	1	48039176	1	48039177	1	48039176
7	Upper Planetary Gear	3	48038129 (15T)	3	48038129 (15T)	3	48038129 (15T)	3	48038129 (15T)	3	48018117 (19T)
12	Middle Gear Cage	1	48037172	1	48037114	1	48037120	1	48037119	1	48037120
13	Spacer	1	48039157	1	48039158	1	48039157	1	48039157	1	48039157
14	Middle Planetary Gear	3	48038129 (15T)	3	48038129 (15T)	3	48048111 (17T)	3	48038128 (18T)	3	48048111 (17T)
17	Lower Gear Cage / Spindle	1	48037110	1	48037111	1	48037110	1	48037110	1	48037110
18	Lower Planetary Gear	3	48038104 (17T)	3	48038112 (16T)	3	48038104 (17T)	3	48038104 (17T)	3	48038104 (17T)
19	Lower Planetary Gear Washer	6	48039115	6	48019118	6	48039115	6	48039115	6	48039115
20	Lower Planetary Gear Pin	3	48039116	3	48039130	3	48039116	3	48039116	3	48039116

(T) Teeth

10.7 67EA860AH8 Single Stage Gearing

Models
67EA860AH8



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

10.7 67EA860AH8 Single Stage Gearing

Ref	Number	#	X	EN
				Description
1	542876	1		Adapter
2	48138114	1		Bearing Housing
3	43259102	1		Protector Sleeve
4	92100071	2	4	Ball Bearing
5	43527160	1		Gear Cage
6	48038149	3	6	Planetary Gear
7	48019118	6	12	Planetary Gear Washer
8	92880015	45	90	Planetary Gear Needle Roller
9	48019110	3	6	Planetary Gear Pin
10	48019119	1		Washer
11	92840009	1	2	Retaining Ring
12	92830026	1		Retainer
13	43527114	1		Gear Housing
14	48139112	1		Spacer
15	542883-65	1		Transducer
16	92830018	1		Retainer
17	43527117	1		Housing
18	43329171	1		Decal
19	93300040	1	3	Button Head Screw (10-32 x 1/4)

(#) Quantity

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

(T) Teeth

10.8 67EA(----)AH8 Series Double Stage Gearing

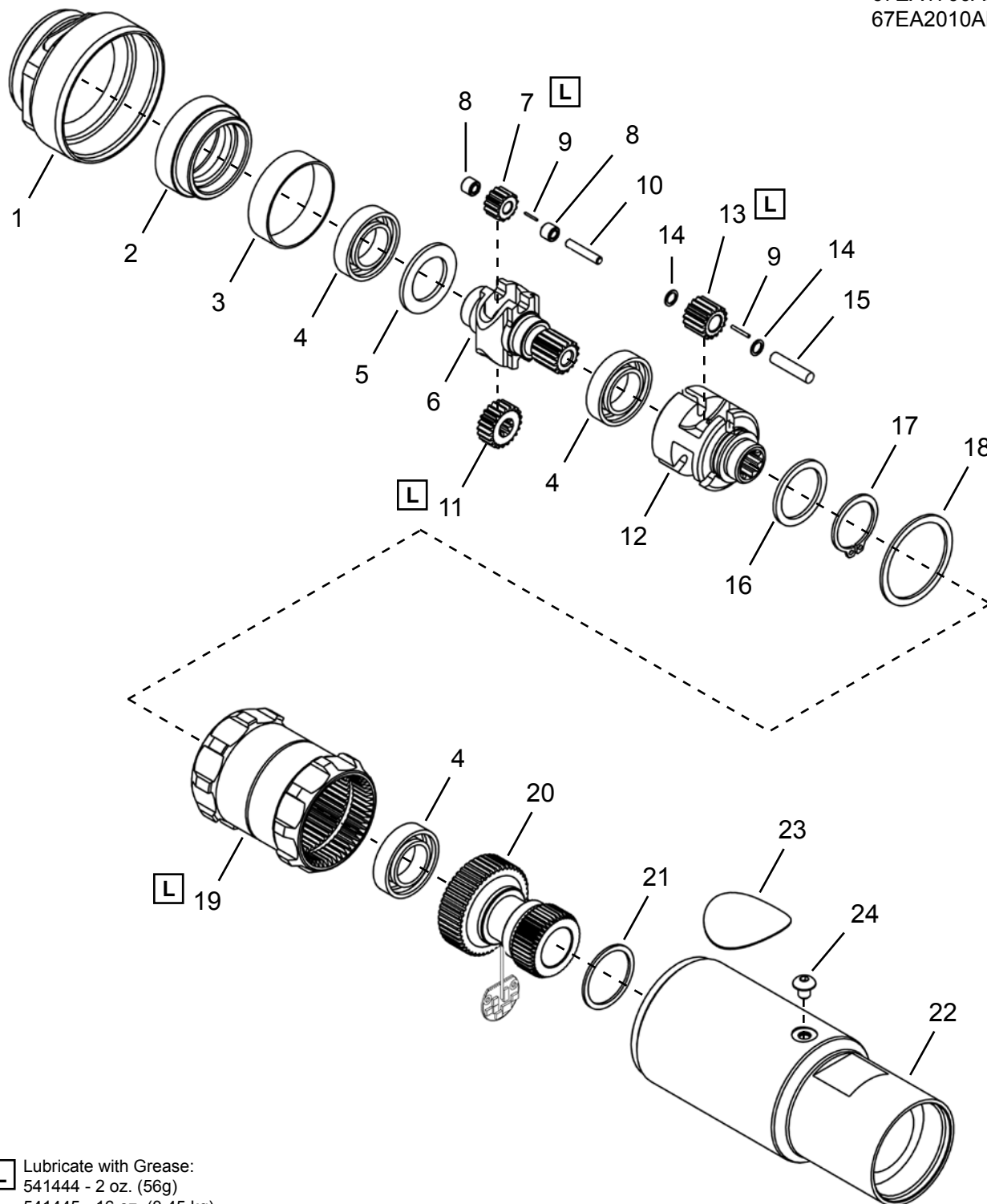
Models

67EA1035AH8

67EA1340AH8

67EA1700AH8

67EA2010AH8



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

10.8 67EA(----)AH8 Series Double Stage Gearing

Ref	Number	#	X	EN
				Description
1	542876	1		Adapter
2	48138114	1		Bearing Housing
3	43259102	1		Protector Sleeve
4	92100071	3	6	Ball Bearing
5	Table 10.8	1		Spacer
6	Table 10.8	1		Upper Gear Cage
7	Table 10.8	3	6	Upper Planetary Gear
8	43289151	4	8	Upper Planetary Gear Bushing (67EA1035)
	48019118	4	8	Upper Planetary Gear Washer (67EA1340, 67EA1700, 67EA2010)
9	92880006	32	64	Upper Planetary Gear Needle Roller (67EA1035)
	92880015	30	60	Upper Planetary Gear Needle Roller (67EA1340, 67EA1700, 67EA2010)
	92880015	45	90	Lower Planetary Gear Needle Roller (all models)
10	Table 10.8	2	4	Upper Planetary Gear Pin
11	Table 10.8	1	2	Splined Pinion Gear
12	Table 10.8	1		Lower Gear Cage
13	Table 10.8	3	6	Lower Planetary Gear
14	48019118	6	12	Lower Planetary Gear Washer
15	48019110	3	6	Lower Planetary Gear Pin
16	48019119	1		Washer
17	92840009	1	2	Retaining Ring
18	92830026	1	2	Retainer
19	46067104	1		Gear Housing
20	Table 10.8	1		Transducer
21	92830018	1		Retainer
22	43527118	1		Housing
23	43329171	1		Decal
24	93300040	1	3	Button Head Screw (10-32 x 1/4)

(#) Quantity

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

Table 10.8

Ref.	Description	#	67EA1035	#	67EA1340	#	67EA1700	#	67EA2010
5	Spacer	1	11221098		-----		-----		-----
6	Upper Gear Cage	1	43287153	1	48046129	1	48016112	1	48046129
7	Upper Planetary Gear	2	43288152 (13T)	2	48018113 (16T)	2	48018113 (16T)	2	48018117 (19T)
10	Upper Planetary Gear Pin	2	43289150	2	48019110	2	48019110	2	48019110
11	Splined Pinion Gear	1	43288115	1	11801184	1	11801184		-----
14	Middle Planetary Gear	3	48038129 (15T)	3	48038129 (15T)	3	48048111 (17T)	3	48038128 (18T)
12	Lower Gear Cage	1	48138105	1	48138105	1	48138104	1	48138105
13	Lower Planetary Gear	3	48018113 (16T)	3	48018113 (16T)	3	48018194 (18T)	3	48018113 (16T)
20	Transducer	1	542883-65	1	542883-65	1	542883-65	1	542883-135

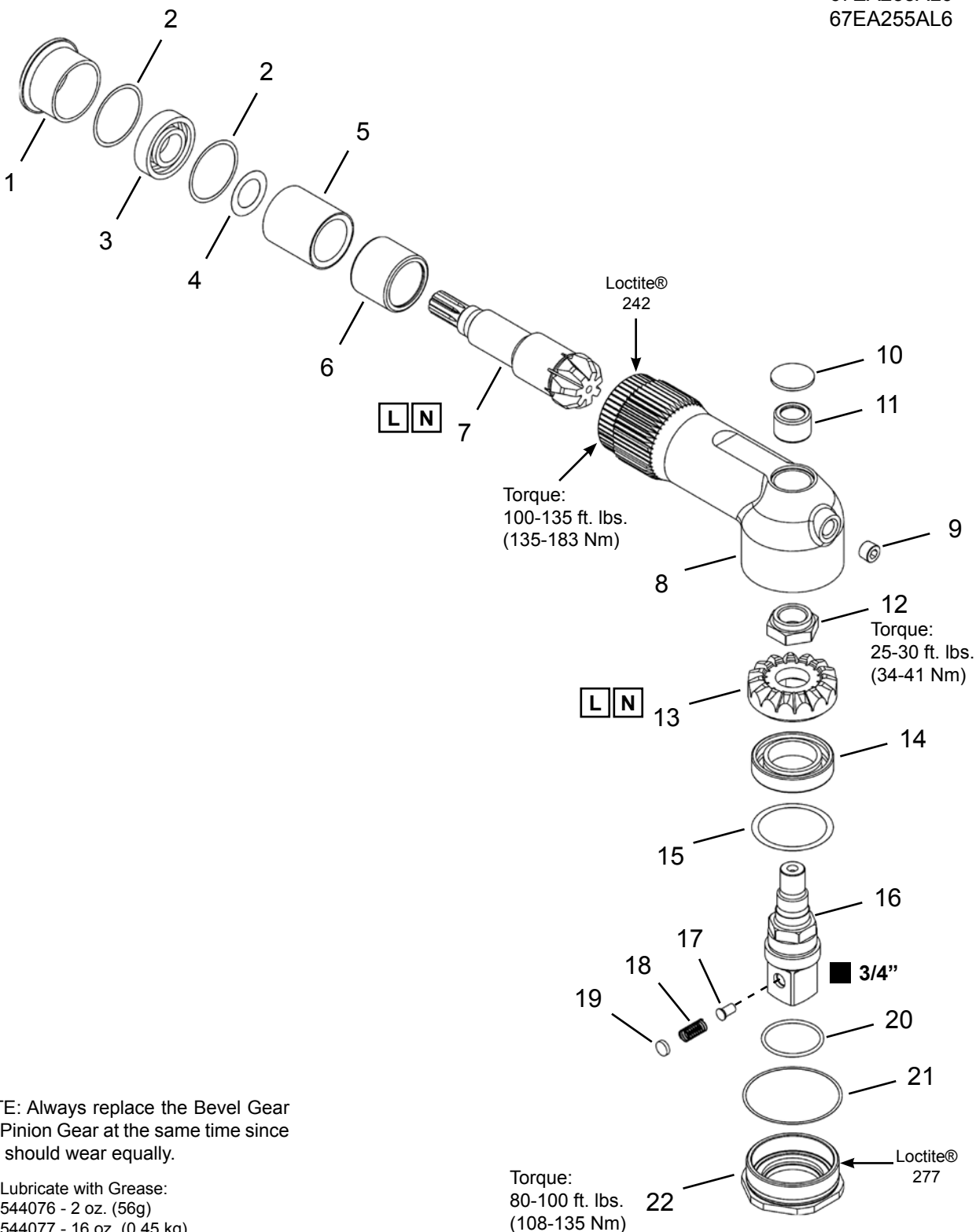
(T) Teeth

10.9 48056032 AL6 Attachment (3/4" Square Drive)

Models

67EA235AL6

67EA255AL6



N

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

L

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

10.9 48056032 AL6 Attachment (3/4" Square Drive)

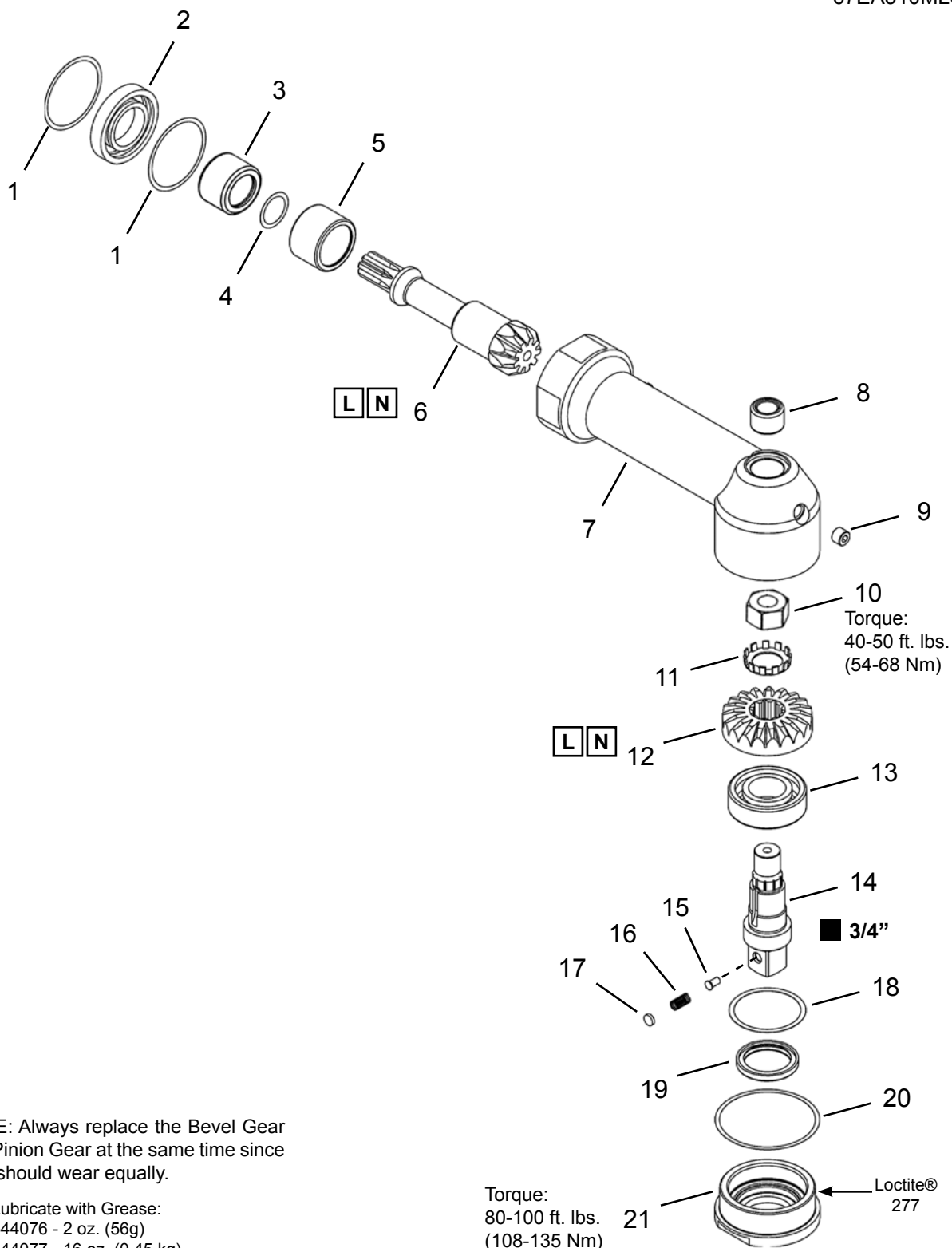
Ref	Number	#	X	EN
				Description
1	48018105	1		Spacer
2	12601137A2	AR	AR	Shim (.002)
	12601137A3	AR	AR	Shim (.003)
	12601137A5	AR	AR	Shim (.005)
3	92100133	1	2	Ball Bearing
4	94200020	AR	AR	Shim (.002)
	94200021	AR	AR	Shim (.003)
	94200022	AR	AR	Shim (.005)
5	48019142	1		Bearing Spacer
6	92000057	1	2	Needle Bearing
7	48017139	1	2	Pinion Gear
8	49096102	1		Angle Housing (includes Ref. 9)
9	93440006	1		Plug
10	94190044	1		Plug
11	92000145	1	2	Needle Bearing
12	93200022	1	2	Lock Nut
13	48017140	1	2	Bevel Gear
14	92100120	1	2	Ball Bearing
15	94200037	AR	AR	Shim (.002)
	94200038	AR	AR	Shim (.003)
	94200039	AR	AR	Shim (.005)
16	48057107	1		Output Spindle (includes Ref. 17-19)
17	12031048	1	3	Pin
18	94070240	1	3	Spring
19	12601479A	1	3	Plug
20	93010024	1	3	O-Ring
21	48019148	AR	AR	Shim (.002)
	48019149	AR	AR	Shim (.003)
	48019150	AR	AR	Shim (.005)
22	48017138	1		Retaining Nut

(#) Quantity

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

10.10 45037012 ML6 Attachment (3/4" Square Drive)

Model
67EA310ML6



N

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

L

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

10.10 45037012 ML6 Attachment (3/4" Square Drive)

Ref	Number	#	X	EN
				Description
1	74028123	AR	AR	Shim (.002)
	74028124	AR	AR	Shim (.003)
	74028125	AR	AR	Shim (.005)
2	92100118	1	2	Ball Bearing
3	45019123	1		Spacer
4	1684HS152A2	AR	AR	Shim (.002)
	1684HS152A3	AR	AR	Shim (.003)
	1684HS152A5	AR	AR	Shim (.005)
5	92190022	1	2	Needle Bearing
6	45037106	1	2	Pinion Gear
7	45036102	1		Angle Housing
8	882661	1	2	Needle Bearing
9	93440004	1		Plug
10	45039121	1	2	Lock Nut
11	45039123	1	2	Lock Washer
12	45037105	1	2	Bevel Gear
13	92100121	1	2	Ball Bearing
14	45037126	1		Output Spindle (includes Ref. 15-17)
15	12031048	1	3	Pin
16	94070240	1	3	Spring
17	12601479A	1	3	Plug
18	94200037	AR	AR	Shim (.002)
	94200038	AR	AR	Shim (.003)
	94200039	AR	AR	Shim (.005)
19	93110033	1	3	Seal
20	94200043	AR	AR	Shim (.002)
	94200044	AR	AR	Shim (.003)
	94200045	AR	AR	Shim (.005)
21	45037103	1		Retaining Nut

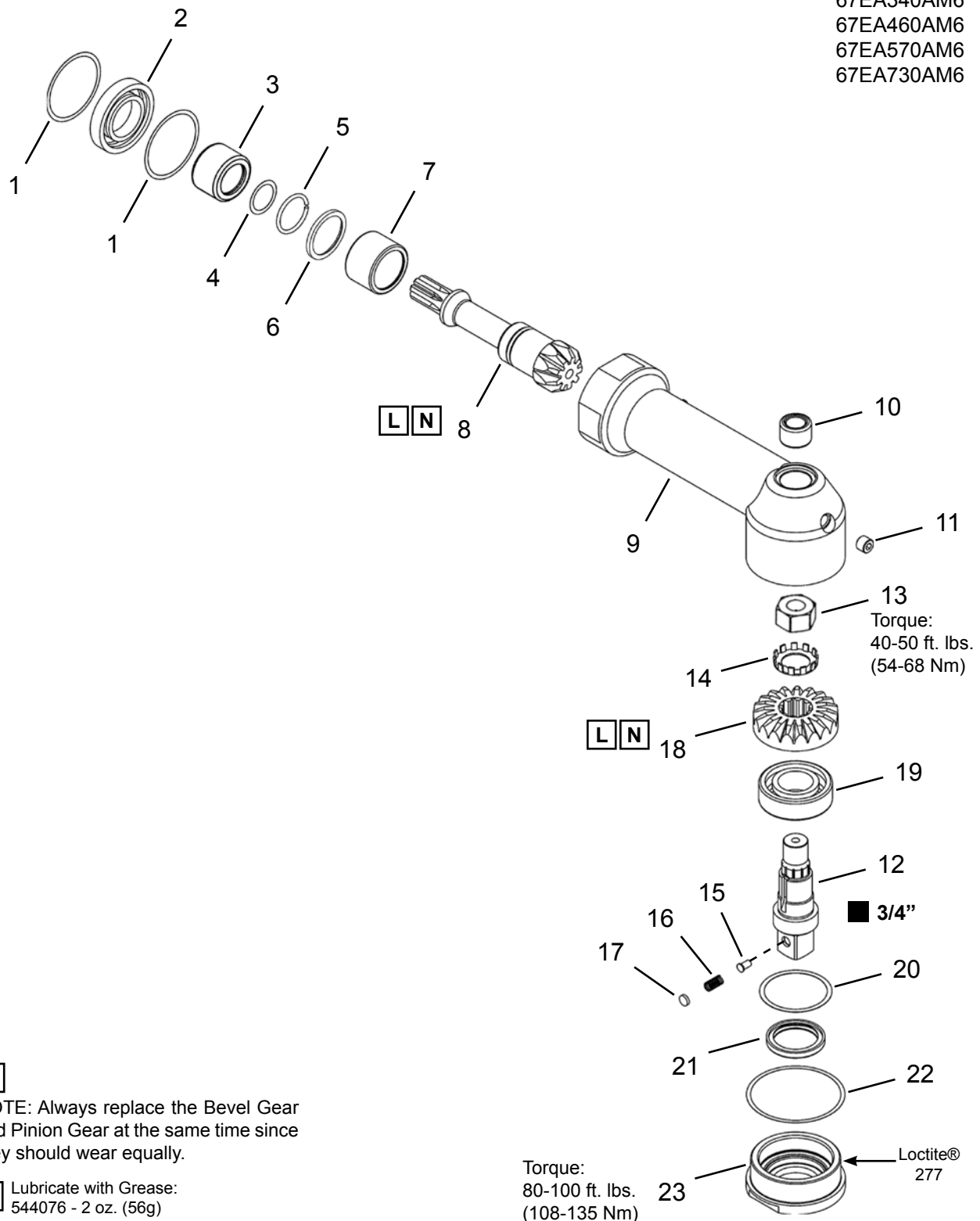
(#) Quantity

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

10.11 45017010 AL6 Attachment (3/4" Square Drive)

Models

67EA340AM6
67EA460AM6
67EA570AM6
67EA730AM6



10.11 45017010 AM6 Attachment (3/4" Square Drive)

Ref	Number	#	X	EN
				Description
1	74028123	AR	AR	Shim (.002)
	74028124	AR	AR	Shim (.003)
	74028125	AR	AR	Shim (.005)
2	92100118	1	2	Ball Bearing
3	45019123	1		Spacer
4	1684HS152A2	AR	AR	Shim (.002)
	1684HS152A3	AR	AR	Shim (.003)
	1684HS152A5	AR	AR	Shim (.005)
5	45019197	1	2	Retaining Ring
6	45018196	1	2	Locking Ring
7	92000064	1	2	Needle Bearing
8	45017122	1	2	Pinion Gear
9	45016118	1		Angle Housing
10	92010038	1	2	Needle Bearing
11	93440004	1		Plug
12	45017161	1		Output Spindle (includes Ref. 13-17)
13	B111PT	1	2	Lock Nut
14	94160005	1	2	Lock Washer
15	12031048	1	3	Pin
16	94070240	1	3	Spring
17	12601479A	1	3	Plug
18	45017121	1	2	Bevel Gear
19	92100044	1	2	Ball Bearing
20	90751137B	AR	AR	Shim (.002)
	90751137C	AR	AR	Shim (.003)
	90751137D	AR	AR	Shim (.005)
	90751137E	AR	AR	Shim (.010)
21	93110043	1	3	Seal
22	94200027	AR	AR	Shim (.002)
	94200028	AR	AR	Shim (.003)
	94200029	AR	AR	Shim (.005)
23	45018119	1		Retaining Nut

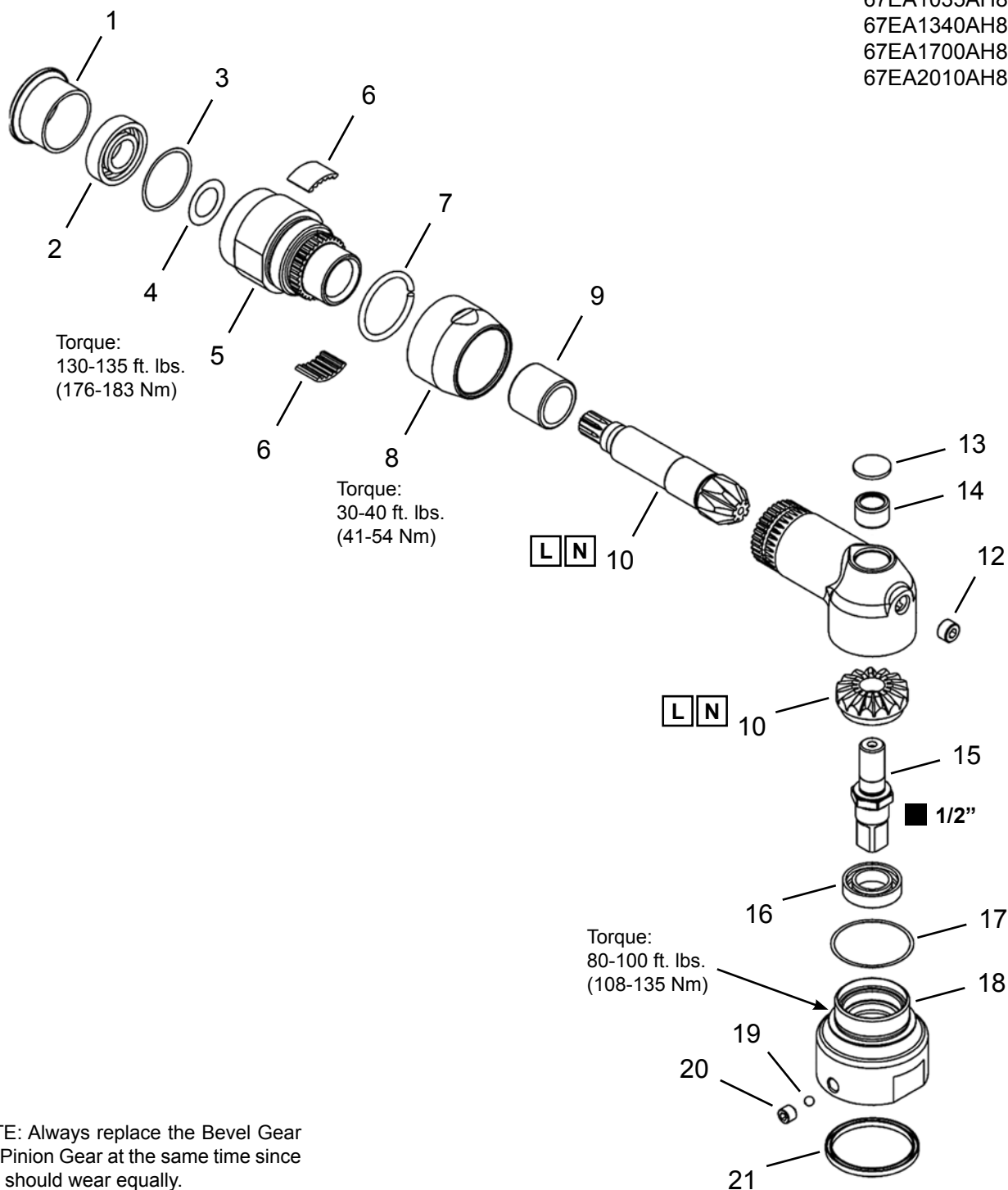
(#) Quantity

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

**10.12.1 35A56033 AH8 Attachment (1/2" Square Drive)
Angle Head Assembly**

Models

67EA860AH8
67EA1035AH8
67EA1340AH8
67EA1700AH8
67EA2010AH8



N

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

L

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

10.12.1 35A56033 AH8 Attachment - Angle Head Assembly (1/2" Square Drive)

Ref	Number	#	X	EN
				Description
1	48018105	1		Spacer
2	92100133	1	2	Ball Bearing
3	12601137A2	AR	AR	Shim (.002)
	12601137A3	AR	AR	Shim (.003)
	12601137A5	AR	AR	Shim (.005)
4	94200020	AR	AR	Shim (.002)
	94200021	AR	AR	Shim (.003)
	94200022	AR	AR	Shim (.005)
5	57206142	1		Right Angle Head Adapter
6	57207144	2		Split Coupler
7	57209145	1	2	Retaining Clip
8	57207143	1		Adapter Nut
9	92020046	1	2	Needle Bearing
10	301586	1	2	Pinion Gear / Bevel Gear Set
11	57206141	1		Angle Housing (includes Ref. 12)
12	93440006	1		Plug
13	12601479	1		Plug
14	92000021	1	2	Needle Bearing
15	46607142	1		Output Spindle
16	92100071	1	2	Ball Bearing
17	12601137B2	AR	AR	Shim (.002)
	12601137B3	AR	AR	Shim (.003)
	12601137B5	AR	AR	Shim (.005)
18	46606141	1		Right Angle Swivel Head
19	94010008	27	27	Steel Ball
20	12601432	1		Plug
21	93050015	1	3	Seal

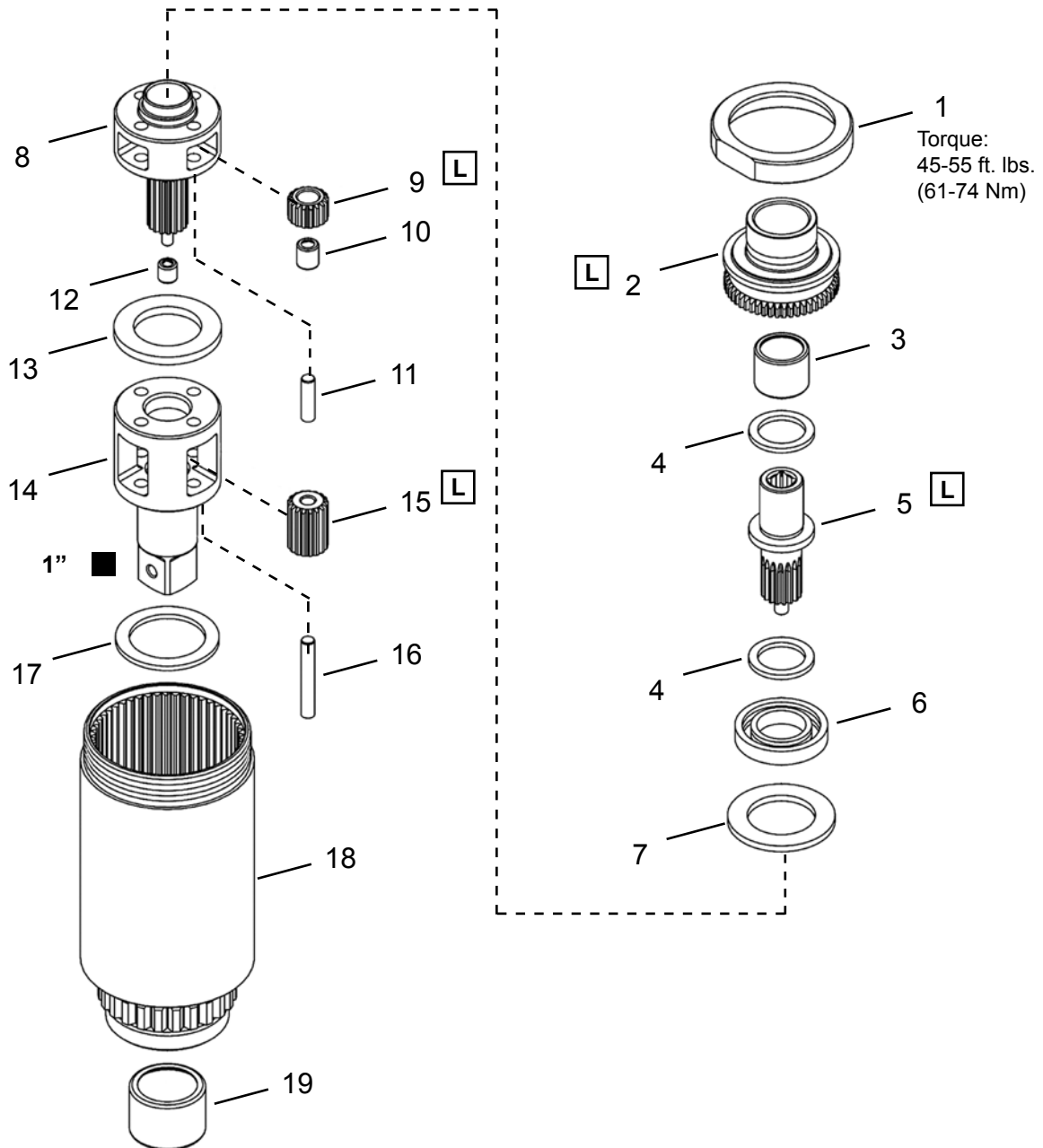
(#) Quantity

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

**10.12.2 35A56033 AH8 Attachment (1" Square Drive)
Output Gearing Assembly**

Models

67EA860AH8
67EA1035AH8
67EA1340AH8
67EA1700AH8
67EA2010AH8



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

10.12.2 35A56033 AH8 Attachment - Output Gearing Assembly (1" Square Drive)

Ref	Number	#	X	EN
				Description
1	46608148	1		Clamp Nut
2	46607149	1		Swivel Gear
3	92000057	1	2	Needle Bearing
4	46609146	2		Thrust Washer
5	46607147	1		Square Drive Shaft
6	92100118	1	2	Ball Bearing
7	46609150	1		Spacer
8	46606151	1		Upper Planetary Gear Cage Spindle
9	46608152	4	8	Upper Planetary Gear (17T)
10	92000012	4	8	Upper Planetary Gear Needle Bearing
11	46609153	4	8	Upper Planetary Gear Pin
12	92000008	1	2	Needle Bearing
13	46609154	1		Thrust Washer
14	46606156	1		Lower Planetary Gear Cage Output Spindle
15	46608121	4	8	Lower Planetary Gear (17T)
16	46608122	4	8	Lower Planetary Gear Pin
17	46609119	1		Thrust Washer
18	46606155	1		Gear Housing
19	92190034	1	2	Needle Bearing

(#) Quantity

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

(T) Teeth

11 Technical data

11.1 67EA Specifications

Right Angle DC Electric Nutrunner

Model Number	Tool Range				Max. Speed (rpm)	Length		Weight		Head Height		Side to Center		Ouput Drive Size
	Max Tq		Min Tq			in	mm	lbs	kg	in	mm	in	mm	
	ft-lb	Nm	ft-lb	Nm										
67EA235AL6	169.6	230	33.9	46	135	25.8	655	12.9	5.9	2.30	58	1.03	26	3/4"
67EA255AL6	188.1	255	40.6	55	115	25.8	655	12.9	5.9	2.30	58	1.03	26	3/4"
67EA310ML6	229.0	310	44.0	60	100	29.1	739	20.2	9.2	2.55	65	1.06	27	3/4"
67EA340AM6	247.1	335	51.6	70	90	31.6	803	21.0	9.5	3.10	79	1.38	35	3/4"
67EA460AM6	339.3	460	70.1	95	66	31.6	803	21.0	9.5	3.10	79	1.38	35	3/4"
67EA570AM6 *	420.4	570	84.8	115	53	31.6	803	21.0	9.5	3.10	79	1.38	35	3/4"
67EA730AM6 *	538.4	730	110.6	150	46	31.6	803	21.0	9.5	3.10	79	1.38	35	3/4"
67EA860AH8	634.3	860	129.1	175	33	25.3	643	22.7	10.3	9.32	237	1.50	38	1"
67EA1035AH8	763.3	1035	154.9	210	25	26.3	668	23.0	10.5	9.32	237	1.50	38	1"
67EA1340AH8	988.3	1340	199.1	270	20	26.3	668	23.0	10.5	9.32	237	1.50	38	1"
67EA1700AH8	1253.8	1700	250.8	340	16	26.3	668	23.0	10.5	9.32	237	1.50	38	1"
67EA2010AH8	1475.0	2000	295.0	400	13	26.3	668	23.0	10.5	9.32	237	1.50	38	1"

* Note: Contact Apex Tool Group for implementation assistance.

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 auxiliary materials of the tool pose risks to health and the environment.

- ➔ Capture auxiliary 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, Michigan

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

Houston, Texas

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

Lexington, South Carolina

Apex Tool Group
670 Industrial Drive
Lexington, SC 29072
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Fax: (803) 358-7681

Los Angeles, California

**Apex Tool Group
Sales & Service Center**
6881 Stanton Avenue
Unit B
Buena Park, CA 90621
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Fax: (714) 994-9576

Seattle, Washington

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Sales & Service Center**
2865 152nd Avenue N.E.
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Fax: (425) 497-0496

York, Pennsylvania

**Apex Tool Group
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3990 East Market Street
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Fax: +55 15 2383260

Canada

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