

**Instruction Manual**

**PL70-A8-EN**

03/03/2017

**A8R Series**

**Reversible Axial Piston Power Motor**

**Cleco®**



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

## Nomenclature

Model Number	Maximum Allowable RPM *		Stall Torque		Starting Torque		Weight		Gear Ratio	Maximum Overhung Load @ Stall **	
	@ Max. HP	Free Speed	ft. lbs.	Nm	ft. lbs.	Nm	lbs.	kg		lbs.	kg
A8R309M	1300	2600	19	26	14	19	38	17.2	----	1000	454
A8R309M-NS	1300	2600	19	26	14	19	38	17.2	----	1000	454
A8R310M	375	765	64	87	48	65	38	17.2	3.4:1	1000	454
A8R310M-NS	375	765	64	87	48	65	38	17.2	3.4:1	1000	454
A8R311M	225	450	110	149	82	111	38	17.2	5.8:1	1000	454
A8R311M-NS	225	450	110	149	82	111	38	17.2	5.8:1	1000	454
A8R337M	109	215	226	306	167	226	51	23.1	11.9:1	1000	454
A8R338M	64	125	385	522	285	386	51	23.1	20.3:1	1000	454
A8R336M	38	75	638	865	471	639	51	23.1	33.6:1	1000	454

\* Note: These motors must be operated with sufficient load to prevent speed from exceeding the maximum allowable free speed.

\*\* Note: All models assume overhung load located at 2.25" (57.15mm) from the face of the motor.

## For this Instruction Manual

The original language of this manual is English and is intended for all persons who will operate and maintain this equipment.

This instruction manual has the following purposes:

- It provides important instructions for safe and effective operation.
- It describes the function and operation of this equipment.
- It serves as a reference guide for technical data, service intervals, and spare parts ordering.

### Symbols in the text:

- Identifies instructions to be followed.
- Identifies a list.

**Bold** Indicates an important feature or instruction.

### Identification graphic:

- Indicates a directional movement.
- ↓ Indicates a function or force.

### Declaration of Incorporation:

We affirm that this machine complies with the basic requirements of the following directives (2006/42/EC) and is intended for installation / assembly in a / with other machine(s). Commissioning of the incomplete machine is prohibited until such time that the incomplete machine has been incorporated in a machine that complies with the EC Machinery Directive 2006/42/EC and for which there is an EC Declaration of Conformity in accordance with Appendix II A. We furthermore declare that the special technical documentation for the incomplete machine is in accordance with Appendix VII Part B. We undertake to have it passed on to the market surveillance body upon request by our representative for the compilation of technical documentation. The following Sections of Appendix I of Directive 2006/42/EC have been fulfilled: 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, 1.5. Applied harmonized standards are ISO 12100-1: 2004-04, ISO 12100-2:2004-04.

The name, job function and address of the person authorized to compile the technical file.

Mr. William Cain  
Director - Global Engineering Services  
Apex Tool Group  
670 Industrial Drive  
Lexington, SC 29072



Signature: William Cain  
Date: March 03, 2017

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### Safety:

#### 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.

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**WARNING!** Indicates a potentially **hazardous** situation for personal health and safety. If this warning is not observed, death or serious injury may occur.

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

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**GENERAL NOTE** identifies useful information that may include application tips but no hazardous situations.

### Symbols on product

Be sure you understand their meaning before using this equipment.



Read all instructions



Eye protection must be worn at all times during the operation or maintenance of this tool.



Eye protection must be worn at all times during the operation or maintenance of this tool.

## General Safety Instructions

These Safety Instructions are not intended to be all inclusive. The operator should also study and comply with all applicable Federal, State, and Local Regulations.

### Designated Use

This pneumatic motor is to be used exclusively as a power source and integrated into an application or machine.

**WARNING!** Do not modify the motor, any guard, or accessory unless approved in writing by Apex Tool Group, LLC. All safety devices must be properly installed and maintained in good working order.



### Putting into service

Only fully trained personnel should install, adjust, operate, or repair this equipment.

### Personal protective equipment

**WARNING!** Exercise caution, pay attention to what you are doing and act reasonably at all times when working with a pneumatic tool. Never use a pneumatic tool while under the influence of drugs, alcohol or medication. One moment of inattentiveness in the use of a pneumatic tool can cause serious injuries.



Risk of injury by being wound up in and caught by machinery:



When working with rotating parts, it is prohibited to wear gloves.  
→ Wear close fitting clothing.  
→ If necessary, wear a hair net.

Risk of injury due to ejected components:



Wear protective goggles.

### Air supply

Connect the tool to a clean lubricated air supply capable of providing a measured maximum air supply of 90 psig at the tool with the tool running and the lever fully depressed. Make certain an air shut off valve is installed within reach of the motor's workspace.

Parameter	Description
Air Hose	Minimum inside diameter: 1/2" (12.7mm) Maximum length: 16.4' (5 m)
Working pressure range	Performance rated at: 90 psi (620 kPa)
Compressed air	Air quality according to ISO 8573-1, quality class 2.4.3 The compressed air must be clean and dry.

### Air Line Lubrication:

Use Apex Tool Group, LLC or Apex Tool Group GmbH & Co. OHG's lightweight air tool oil 500021 (available in quantities shown in the following chart) or an SAE-5 lightweight spindle oil.

Part No.	Packaged	Designation
540397	1 Quart (0.94 liter)	Airlube 10W/NR-420LB DR
533485	1 US Gallon (3.78 liter)	Airlube 10W/NR-420LB DR

### Recommended Grease:

Part No.	Packaged	Designation
A123771	16 oz. (0.45 kg)	Shell Alvania® EP 00
540450	16 oz. (0.45 kg)	Chevron Black Pearl® EP NLGI

### **"DO NOT SUBSTITUTE LUBRICANTS"**

The proper grades of oil and grease are essential for the efficient operation of these air motors. Heavy oil will not flow through a lubricator at a satisfactory rate to insure proper lubrication of the motor. Greases that are too stiff will channel and fail to lubricate properly and greases that are too thin will blow out of the motor. Improper lubrication or inadequate lubricants can cause extensive motor damage.

Grease fittings are located on the motor housing and gear housing for each stage of gearing. The following quantities of A123771 (High Temp 540450) grease are provided during factory assembly and these same amounts must be provided whenever the air motor is disassembled.

- Motor assembly: 12 oz.
- Gearing assembly (each): 4 oz.

During normal operation, the motor will lose a small amount of grease through the exhaust making it necessary to add grease at regular intervals. After each 50 hours of operation add 2.0 oz. of A123771 (High Temp 540450) grease to the motor housing.

### CAUTION!



Excessive grease in the motor housing will cause a loss of motor performance. Not enough grease will cause premature motor failure.

Too much grease in the gear case will force the seal out of the front housing.

The gear case will lose grease through the motor. The motor will siphon gear grease, saturated with airline oil, through the exhaust. After 200 hours of operation, add 1.0 oz. of A123771 (High Temp 540450) grease into each gear housing

### Service and Repair:

Tool service and repair should be performed by an authorized Apex Tool Group, LLC or Apex Tool Group GmbH Service Center. Refer to the last page of this manual for locations.

Only qualified and trained personnel are to repair this equipment.

Replace worn or damaged parts using only genuine brand replacement parts manufactured or supplied by Apex Tool Group, LLC.

Immediately shut off the tool and disconnect the air supply if you notice unusual sound or excessive vibration. Have a qualified repair technician inspect the tool and repair before placing it back into operation.

## Maintenance

Implement a comprehensive safety maintenance program to provide regular inspection for all phases of motor operation and air supply equipment.

Daily:

- Visual inspection of air supply hose and connections
- Inspect all external motor components
- Inspect the motor mountings for secure and proper assembly.
- Check the motor for excessive vibration or noise.
- Maintain proper lubrication levels.

Weekly:

- Inspect the air supply hose for wear or damage.
- Make sure the air inlet connection is securely tightened.
- Make sure all motor fasteners are properly tightened.
- Inspect any guards (if equipped) for damage.

6 months or sooner if needed:

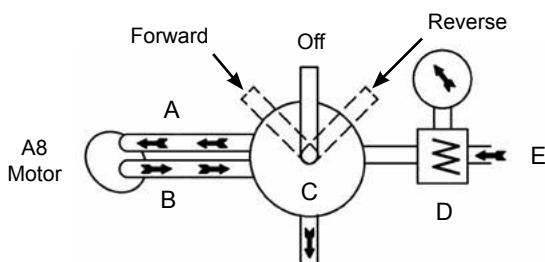
- Check individual parts and replace as necessary.
- Replace all o-rings and seals.

## Valving

If an air valve is used with this motor, it should have a full flow air passage to utilize full power of the motor. For quick motor stops, an all-ports closed-in-neutral type valve with a spring return should be used.

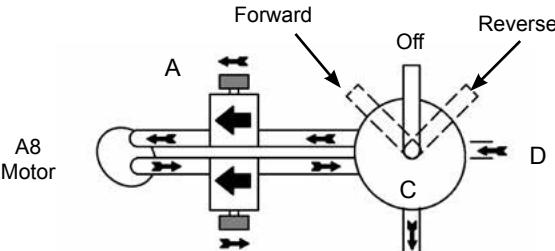
### Torque Output Control

- A) When air enters from this side
- B) it must exhaust without restrictions.
- C) Four-Way valve
- D) Pressure regulator
- E) Air supply



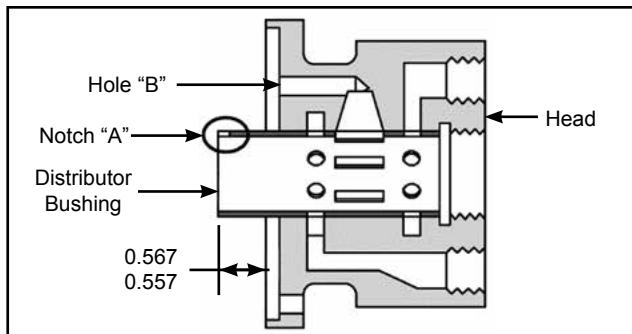
### Control Forward and Reverse Speeds

- A) Metered flow control (inlet)
- B) Free (open) flow control (exhaust)
- C) Four-Way valve
- D) Air supply



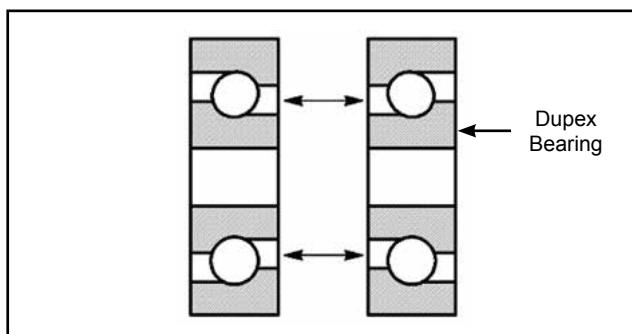
## Distributor bushing assembly

If replacement is necessary, press the new distributor bushing into the head as shown below. For proper alignment, notch "A" in the bushing must be oriented with hole "B" in the head as illustrated.



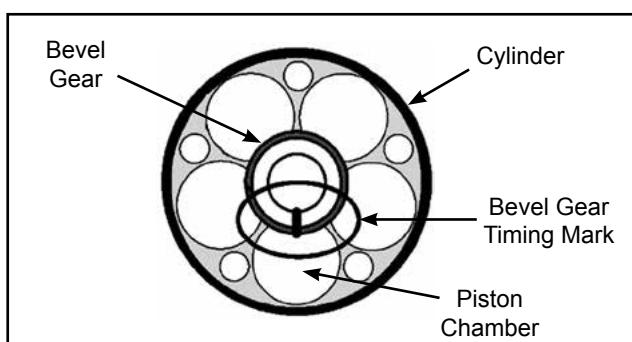
## Duplex bearing assembly

Duplex bearing assembly on the driveshaft. The small diameters of the duplex bearing must face each other when assembled, see below.



## Bevel gear timing mark

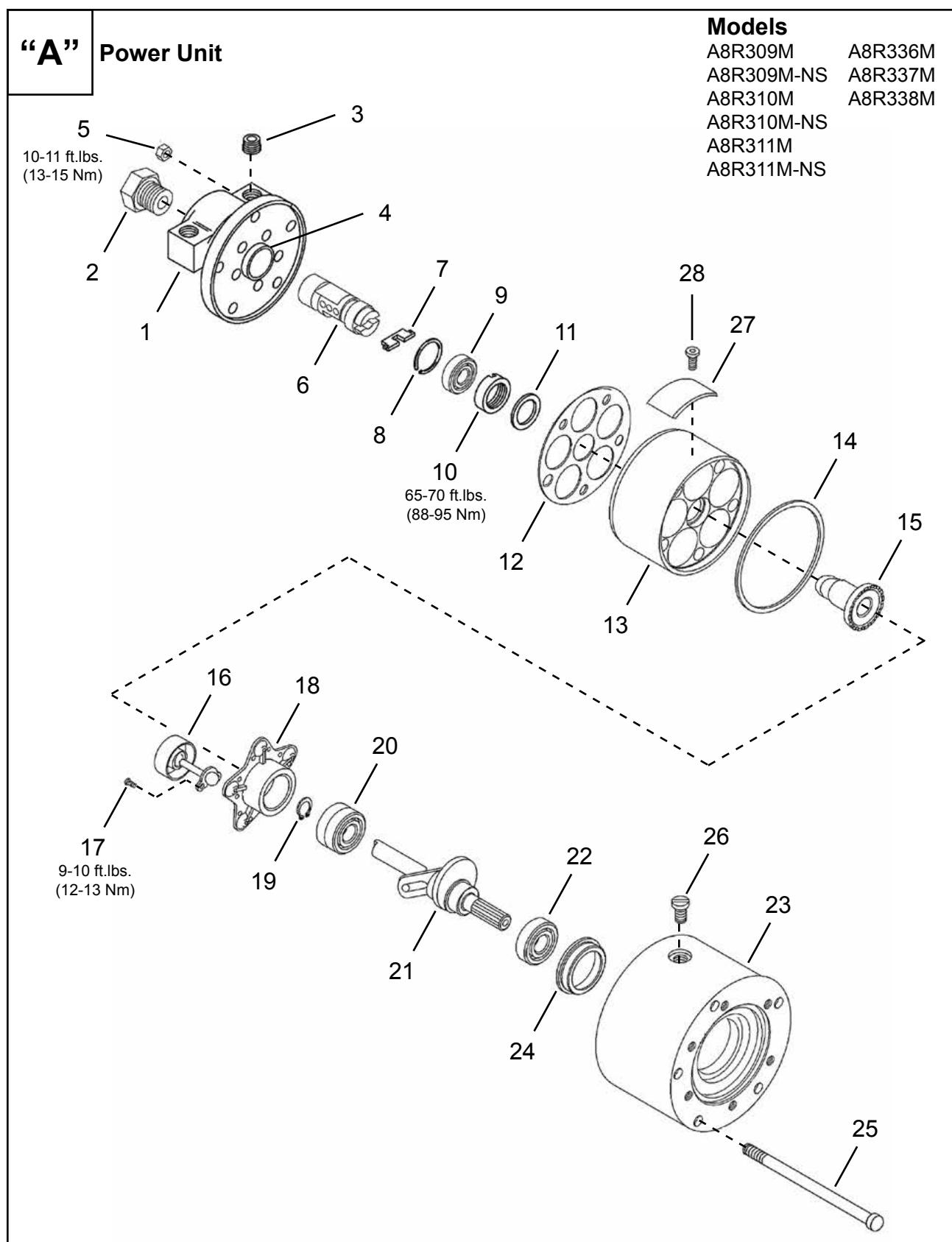
Make sure the timing mark on the bevel gear is aligned with the center of a piston chamber before installing the driveshaft assembly into the cylinder.



## Disposal



Observe and comply with all local disposal guidelines for all components of this equipment and its packaging.



**Illustration "A": Power Unit**

Ref	Number	#	X	EN
				Description
--	507491	1		Power Unit (includes Ref. 1-26)
1	A17738	1		Head Assembly (includes Ref. 2-4)
2	17749	1	1	Reducer Bushing
3	B110E	2	2	Square Head Pipe Plug (1/2-14 NPT)
4	3VR77	1	1	Distributor Bushing
5	C108S	5	10	Head Assembly Nut
6	508321	1		Distributor (includes Ref. 7-8)
7	3V43	1	1	Drive Key
8	3V235	1	3	Distributor Spring
9	OG196	1	2	Ball Bearing
10	3V169	1		Lock Nut
11	3V272	1		Washer
12	10012PT	1	3	Head Gasket
13	A3V1	1		Cylinder
14	10011	1	3	Cylinder Gasket
15	A3V180	1	1	Bevel Gear
--	542241	1		Socket Plate Assembly (includes Ref. 16-18)
16	542240	5	5	Piston Assembly
17	3V188	10	20	Socket Head Cap Screw (12-24 NC-2 x 5/16)
18	507742	1		Socket Plate
19	500741	1	3	Retaining Ring
20	507897	1	2	Duplex Ball Bearing
21	508056	1		Driveshaft
22	22G155	1	2	Ball Bearing
23	526546	1		Rear Housing (includes Ref. 24-25)
24	18364PT	1	1	Rear Housing Bearing Liner
25	526543	5	5	Rear Housing Stud (5/16-24 x 7.81)
26	30775PT	1	1	Flush Type Grease Fitting
27	530322	1		Nameplate (not included in 507491 power unit)
28	534820	2		Drive Screw (not included in 507491 power unit)

(##) Quantity

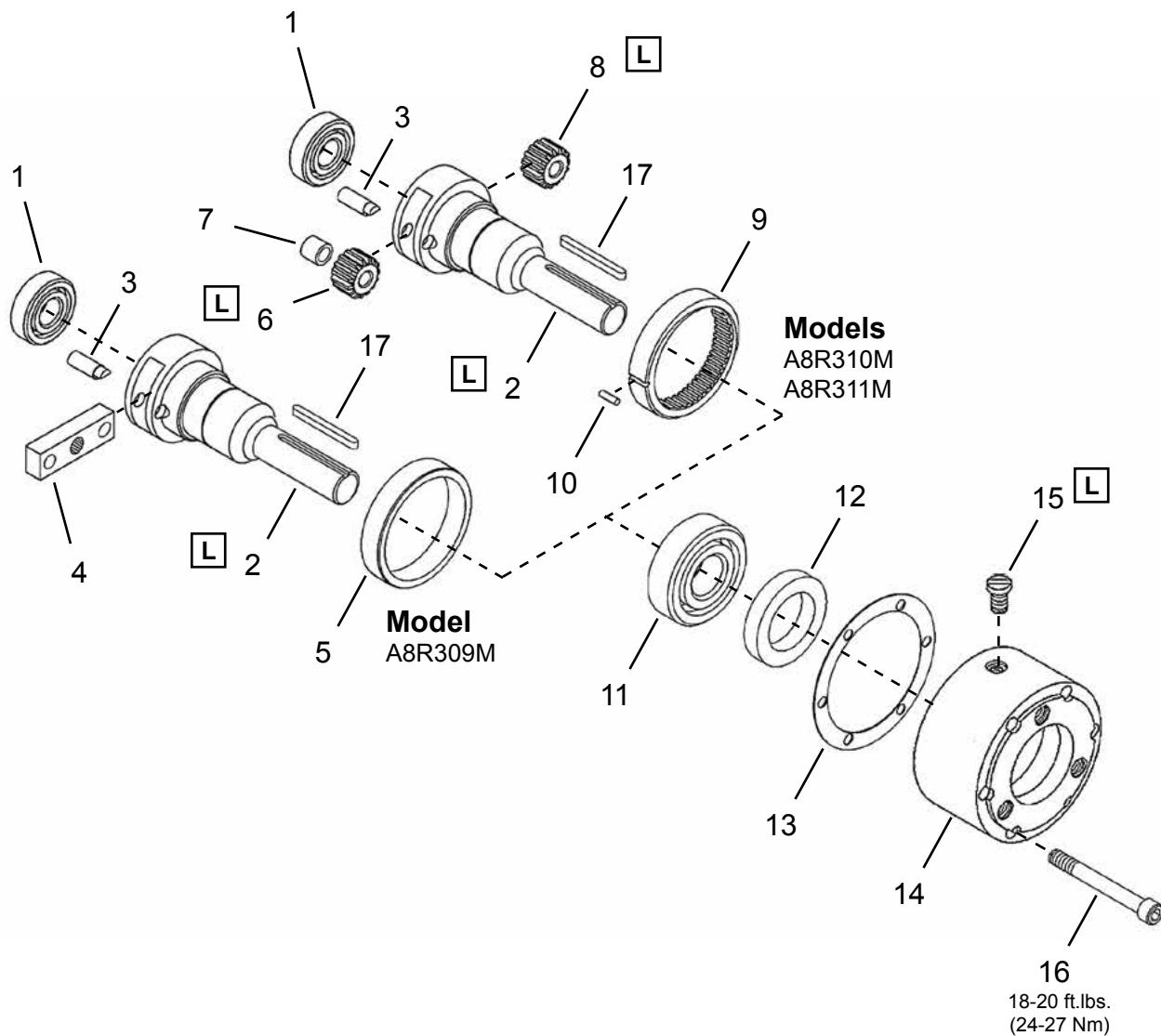
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

**"B"****Direct Drive and Single Stage Gearing****Models**

A8R309M

A8R310M

A8R311M



**Illustration "B": Direct Drive and Single Stage Gearing Assemblies**

Ref	Number	#	X	EN
				Description
1	525424	1	2	Ball Bearing
2	Table "B"	1		Gear Cage Output Spindle
3	10032	2	4	Planetary Gear Pin
4	18324	1		Drive Block
5	18320	1		Locating Ring
6	Table "B"	2	4	Planetary Gear (includes Ref. 7)
7	Table "B"	2	4	Planetary Gear Needle Bearing (Bushing)
8	Table "B"	1	2	Pinion Gear
9	10019	1		Ring Gear
10	DP120PT	1	2	Ring Gear Pin
11	18304	1	2	Ball Bearing
12	18307	1	3	Oil Seal
13	10010	1	3	Front Housing Gasket
14	18313	1		Front Housing
15	30775PT	1	1	Flush Type Grease Fitting
16	B119S	6	6	Socket Head Cap Screw (5/16-18 x 2-1/2)
17	18326	1	3	Output Spindle Key

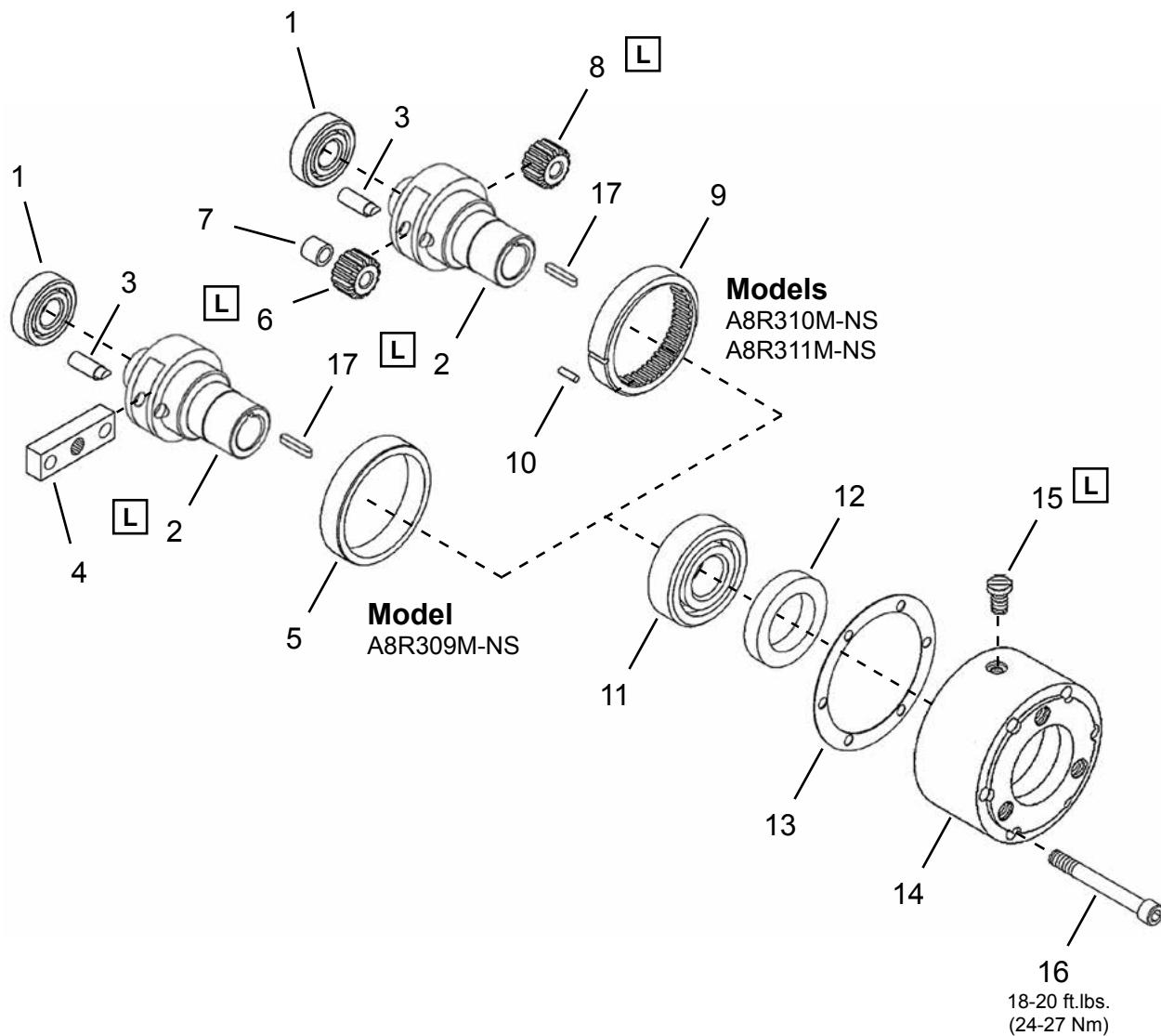
( #) Quantity

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

**Table "B"**

Ref.	Description	#	A8R309M	#	A8R310M	#	A8R311M
2	Gear Cage Output Spindle	1	544039	1	544039	1	544024
6	Planetary Gear		----	2	A18322 (14T)	2	540766 (19T)
7	Needle Bearing (Bushing)		----	2	21155	2	845845
8	Pinion Gear		----	1	18323		----

(T) Teeth

**"C"****Direct Drive and Single Stage Gearing****Models**  
A8R309M-NS  
A8R310M-NS  
A8R311M-NS**L** Lubricate with A123771 Grease (16 oz. can)

**Illustration "C": Direct Drive and Single Stage Gearing Assemblies - No Spindle**

Ref	Number	#	X	EN	
				Description	
1	525424	1	2	Ball Bearing	
2	Table "C"	1		Gear Cage	
3	10032	2	4	Planetary Gear Pin	
4	18324	1		Drive Block	
5	18320	1		Locating Ring	
6	Table "C"	2	4	Planetary Gear (includes Ref. 7)	
7	Table "C"	2	4	Planetary Gear Needle Bearing (Bushing)	
8	Table "C"	1	2	Pinion Gear	
9	10019	1		Ring Gear	
10	DP120PT	1	2	Ring Gear Pin	
11	18304	1	2	Ball Bearing	
12	18307	1	3	Oil Seal	
13	10010	1	3	Front Housing Gasket	
14	18313	1		Front Housing	
15	30775PT	1	1	Flush Type Grease Fitting	
16	B119S	6	6	Socket Head Cap Screw (5/16-18 x 2-1/2)	
17	512089	1	3	Gear Cage Key	

( #) Quantity

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

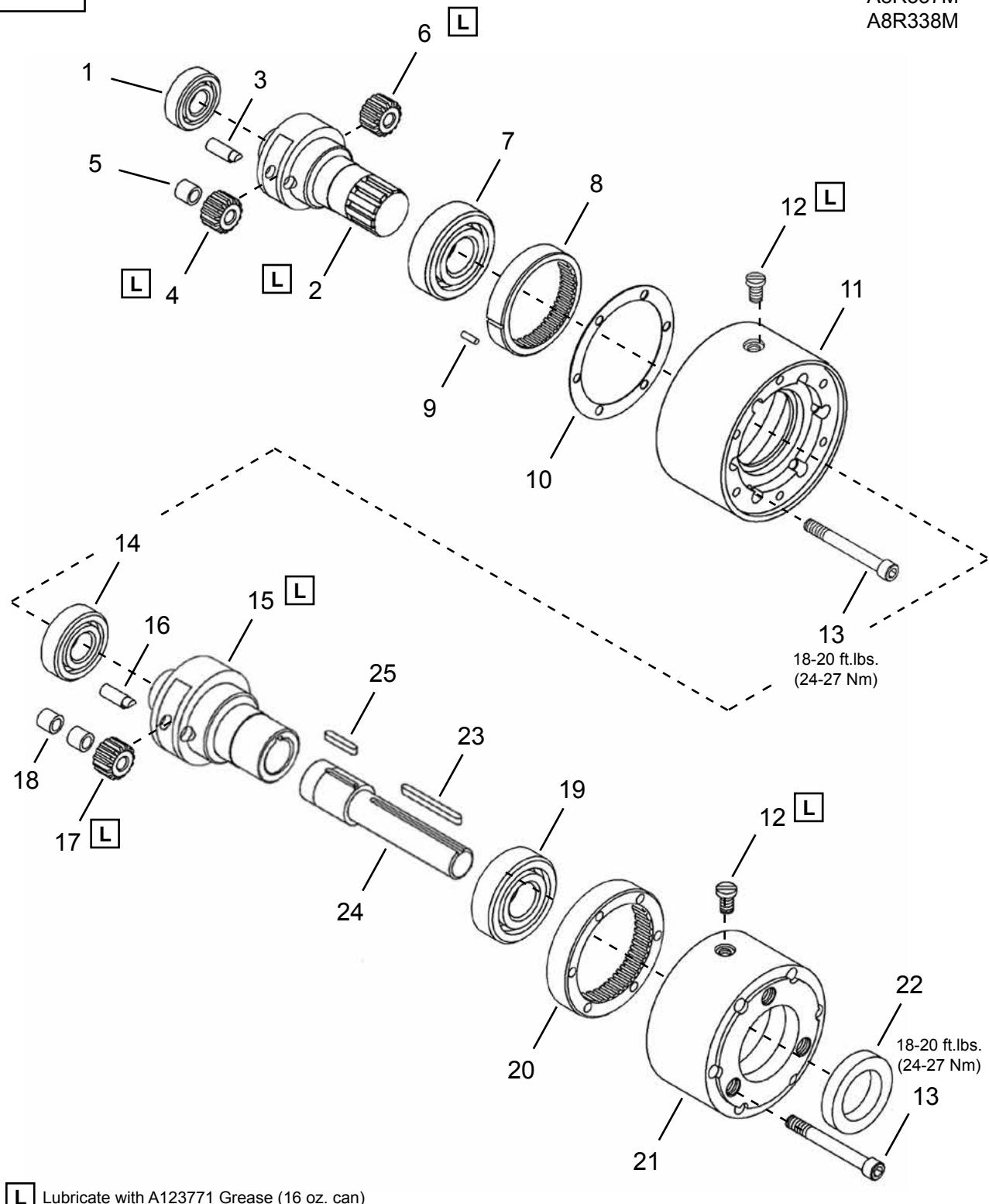
**Table "C"**

Ref.	Description	#	A8R309M-NS	#	A8R310M-NS	#	A8R311M-NS
2	Gear Cage	1	18318	1	18318	1	18321
6	Planetary Gear		----	2	A18322 (14T)	2	540766 (19T)
7	Needle Bearing (Bushing)		----	2	21155	2	845845
8	Pinion Gear		----	1	18323		----

(T) Teeth

**“D” Double Stage Gearing**

**Models**  
A8R336M  
A8R337M  
A8R338M



**Illustration "D": Double Stage Gearing Assembly**

Ref	Number	#	X	EN	
				Description	
1	525424	1	2	Ball Bearing	
2	Table "D"	1		Gear Cage	
3	10032	2	4	Planetary Gear Pin	
4	Table "D"	2	4	Planetary Gear (includes Ref. 5)	
5	Table "D"	2	4	Planetary Gear Needle Bearing (Bushing)	
6	Table "D"	1	2	Pinion Gear	
7	30075	1	2	Ball Bearing	
8	10019	1		Ring Gear	
9	DP120PT	1	2	Ring Gear Pin	
10	10010	1	3	Center Housing Gasket	
11	30050	1		Center Housing	
12	30775PT	2	2	Flush Type Grease Fitting	
13	B127D	12	12	Socket Head Cap Screw (5/16-18 x 3)	
14	30076PT	1	2	Ball Bearing	
15	Table "D"	1		Output Gear Cage	
16	30058PT	2	4	Planetary Gear Pin	
17	Table "D"	2	4	Planetary Gear (includes Ref. 18)	
18	11700	4	8	Planetary Gear Needle Bearing	
19	30063PT	1	2	Ball Bearing	
20	30056PT	1		Ring Gear	
21	30049	1		Front Housing	
22	30057PT	1	3	Oil Seal	
23	30072PT	1	3	Output Gear Cage Key	
24	30053PT	1		Output Spindle	
25	30071PT	1	3	Output Spindle Key	

( # ) Quantity

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

**Table "D"**

Ref.	Description	#	A8R336M	#	A8R337M	#	A8R338M
2	Gear Cage	1	30060	1	30052PT	1	30739PT
4	Planetary Gear	2	540766 (19T)	2	A18322 (14T)	2	540766 (19T)
5	Needle Bearing (Bushing)	4	845845	4	21155	4	845845
6	Pinion Gear		----	1	18323		----
15	Gear Cage Output Spindle	1	30059	1	30051	1	30051
17	Planetary Gear	2	A30061 (21T)	2	A30055 (16T)	2	A30055 (16T)

(T) Teeth

# POWER TOOLS SALES & SERVICE CENTERS

Please note that all locations may not service all products.

Contact the nearest Apex Tool Group Sales & Service Center for the appropriate facility to handle your service requirements.

-  Sales Center
-  Service Center

## NORTH AMERICA | SOUTH AMERICA

### Detroit, Michigan

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