Instruction Manual
PL70-1051EN
07/08/2013

Cleco®

A8R-2228

Reversible Axial Piston Power Motors

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 A8R series tools.
- serves as a reference guide for technical data, service intervals and spare parts ordering.
- provides information on optional equipment.

Identification text:

A8R	represents all models of the axial piston power motor 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

Copyright protection:

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
A8R-2228	109	215	226	306	167	226	51	23.1	11.9:1	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.

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Contents

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

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

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 air supply hoses and fittings. Do not use damaged, frayed or deteriorated hoses.
- ➔ Make sure the air supply hose is securely attached to the tool.
- ➔ Install adequate guards for all moving parts of the power motor or it's application.

Safety working with and around power motors:

- ➔ Make sure the motor is securely mounted to the application.
- ➔ Make sure the output spindle is fully engaged with the application.
- ➔ Disconnect the air supply before servicing the motor

1.3 Operator training

All personnel must be properly trained before operating the A8R tools. The A8R 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
- Do not wear close fitting clothing
- Do not wear jewelry

1.5 Designated use

The A8R is designed exclusively as a power source to be intregrated into an application.

- Do not modify the A8R, any guard or accessory.
- Use only with accessory parts which are approved by the manufacturer.
- Do not use in any improper manner that can cause damage to the motor.

1.6 Codes and standards

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

1.7 Noise and vibration

No data available on this equipment.

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 A8R-2228

1 PL70-1051EN instruction manual

1 Declaration of Conformity (if applicable)

1 Lubrication sheet

1 Warranty statement

2.2 Transport

Transport and store the A8R 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 A8R in a location on the workbench to avoid accidental startup.

For storage longer than 2 hours:

→ Disconnect the air supply from the A8R

Object	Time Period	Storage Temperature
A8R without air supply	No guideline	-13°F to 104°F (-25°C to 40°C)

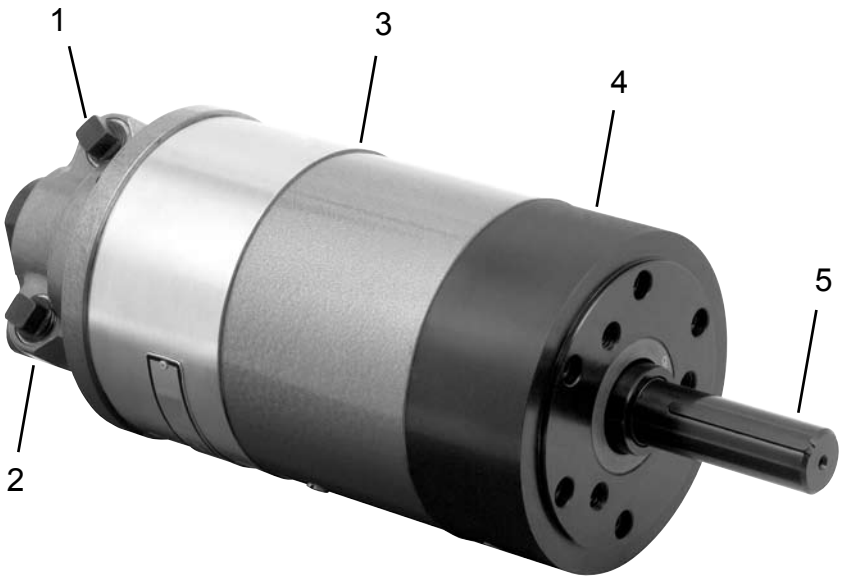
3 Product description

3.1 General description

- Pneumatic powered axial piston power motor
- 2.7 Horsepower
- Reversible valving option
- Rear exhaust

3.2 Operation and functional elements

This section describes the operational and functional elements of the A8R.



Ref.	Description
1	Air Inlet
2	Head Assembly
3	Motor Assembly
4	Gearing Assembly
5	Output Spindle

4 Accessories

5 Before initial operation

5.1 Ambient conditions

Ambient temperature: 41°F (5°C) to a maximum of 104°F (40°C)

Acceptable relative humidity: 25% to 90%, non-condensing

5.2 Air supply

Parameter	Description
Air Hose	Minimum inside diameter: 1/2" (12,7 mm) Maximum length: 16.4' (5 m)
Working pressure range	58 to 101.5 psi (400 to 700 kPa) Recommended: 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.

NOTE

To attain consistent results, maintain a constant working pressure using a suitable air line unit consisting of a filter, regulator and lubricator.

- ➔ The inside diameter of the air hose must be free of residue, clean if necessary.
- ➔ Spray a few drops of light air tool oil into the air inlet adapter.
- ➔ Adjust the lubricator to a minimum setting to reduce the amount of excess oil in the exhaust air.

Oil identification

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

5.3 Connecting the air supply to the tool

WARNING!

The air hose can disconnect from the tool by itself and whip around uncontrollably.

- ➔ Turn off the compressed air before connecting to the tool.
- ➔ Securely connect the air hose to the tool.
- ➔ Turn on the compressed air.

5.4 Tool set up

The tool must be configured for the application.

6 First operation

6.1 Putting into use

→ Make sure the air supply is securely attached and the compressor is turned on.

→ Make sure the output spindle is properly engaged with the application.

→ Make sure all necessary guards are in place to protect operator from rotating mechanisms.

7 Troubleshooting

Malfunction	Possible causes	Remedy
Tool does not start	Improper air supply	→ Make sure there is adequate air pressure at the tool air inlet
	Motor dry from lack of lubrication	→ Apply several drops of air tool oil to the air inlet. Using the cam, manually rotate the motor. Reconnect the air supply and run the motor to free it up.
	Broken gears	→ Tool disassembly required (parts replacement)
Tool runs slow and lacks torque	Improper air supply	→ Make sure there is adequate air pressure at the tool air inlet
	Motor dry from lack of lubrication	→ Apply several drops of air tool oil to the air inlet. Using the cam, manually rotate the motor. Reconnect the air supply and run the motor to free it up.

8 Maintenance

CAUTION!

Danger of injury from accidental start up.
Turn off the compressed air 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 safetu 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 air supply hose and connections → Inspect airline filter, regulator and lubricator for proper operation → Check the tool excessive vibration or unusual noises → Visual inspection of all external components of the tool
W1	100,000	→ Inspect the air hose for damage or wear → inspect the output spindle for damage or wear → Inspect the air inlet adapter for a secure fit → Check the maximum free speed
W2	500,000	→ Check individual parts and replace if necessary → Replace O-rings and seals → Clean mufflers
W3	1,000,000	→ Check individual parts and replace if necessary → Throttle valve (if equipped) → Motor → Gearing

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 cycles after a maintenance measure is prescribed by Apex Tool Group.
T1	1.8 seconds	Specific cycle time, measured in life and endurance tests.
T2	2 seconds	Actual cycle time, depending on the application.
S	1; 2; 3	Number of shifts per day.
VS	750	Number of cycles 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 cycles (V),
a specific cycle time of 1.8 seconds (T1)
with an actual cycle time of 3 seconds 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
A123771	16 oz. (0.45 kg)	Alvania® EP 00	Shell
A123771	16 oz. (0.45 kg)	Gadus S2 V220 00	Shell

9 Repair instructions

9.1 Lubrication

"DO NOT SUBSTITURE LUBRICANTS"

The proper grades of oil and grease are essential too the efficient operation of these air motors. Heavy oil will not flow through a lubricator at a satisfactory rate too insure proper lubrication to the motor. Greases that are too stiff will channel and fail to lubricate properly and greases that are tool 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 the gear housing for each stage of gearing. The following quantities of A123771 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 wil loose 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 grease to the motor housing.

CAUTION!

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

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 grease into each gear housing.

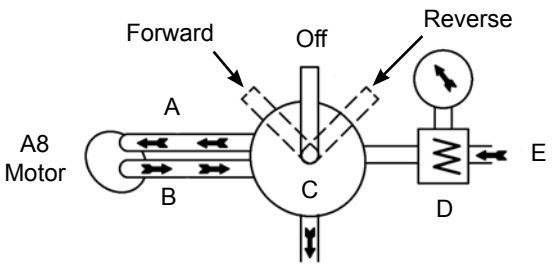
CAUTION!

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

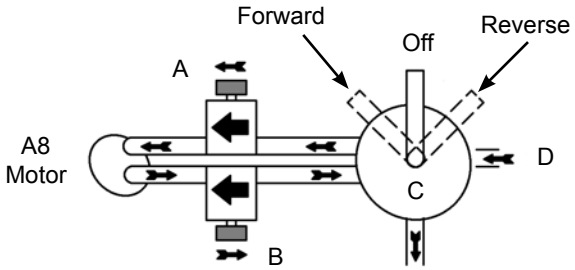
9.2 Valving

If a valve is used, it should have a full flow air passage to utilize full powe 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

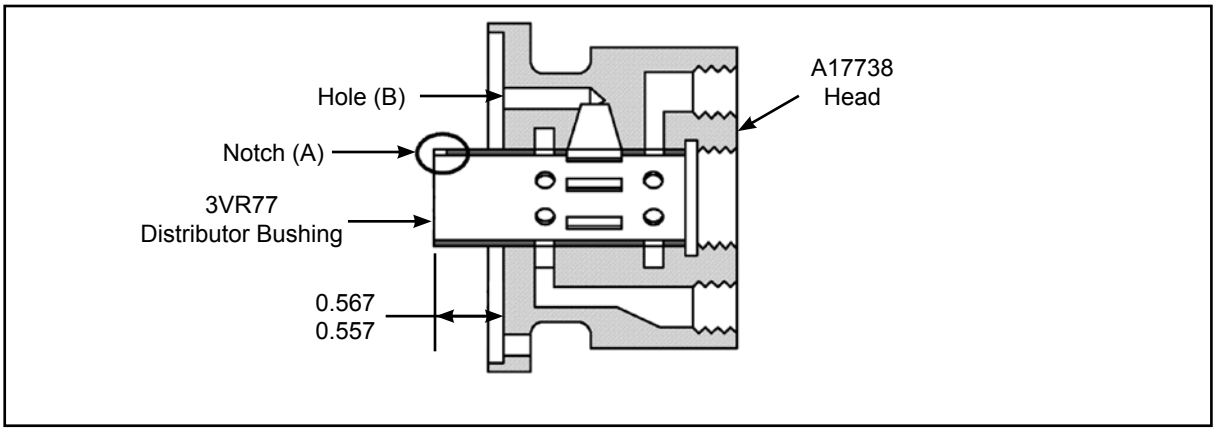


Control Forward and Reverse Speeds
A) Metered flow control (inlet)
B) Free (open) flow control (exhaust)
C) Four-Way valve
D) Air supply



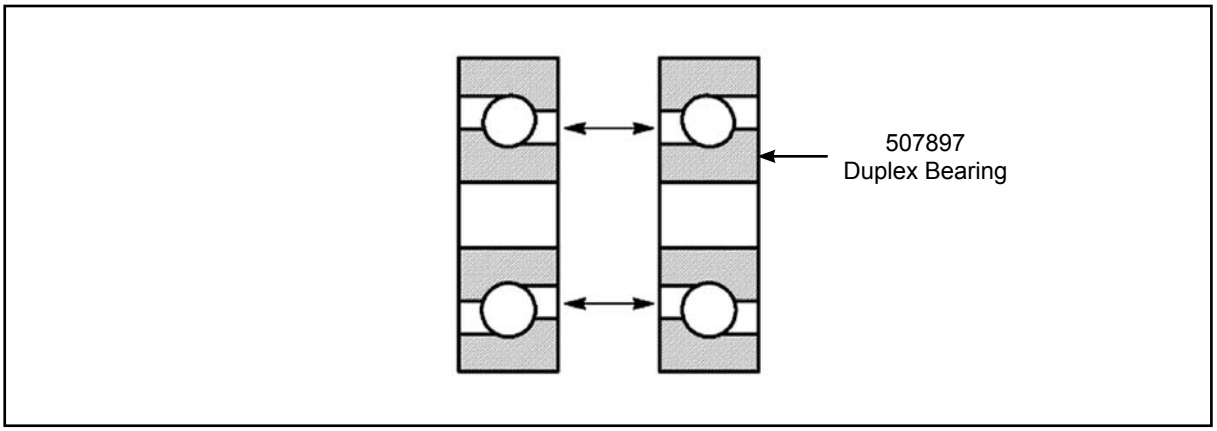
9.3 Distributor bushing assembly

Press the new busing into the head to the dimension shown. The notch (A) in the bushing must align with the hole (B) in the head.



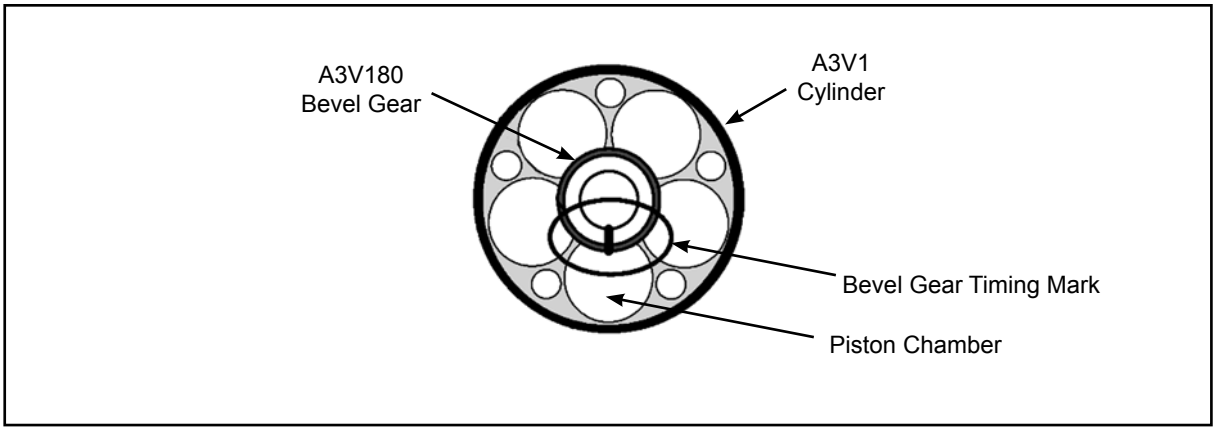
9.4 Duplex bearing assembly

The small diameters of the bearings must face each other when assembled.

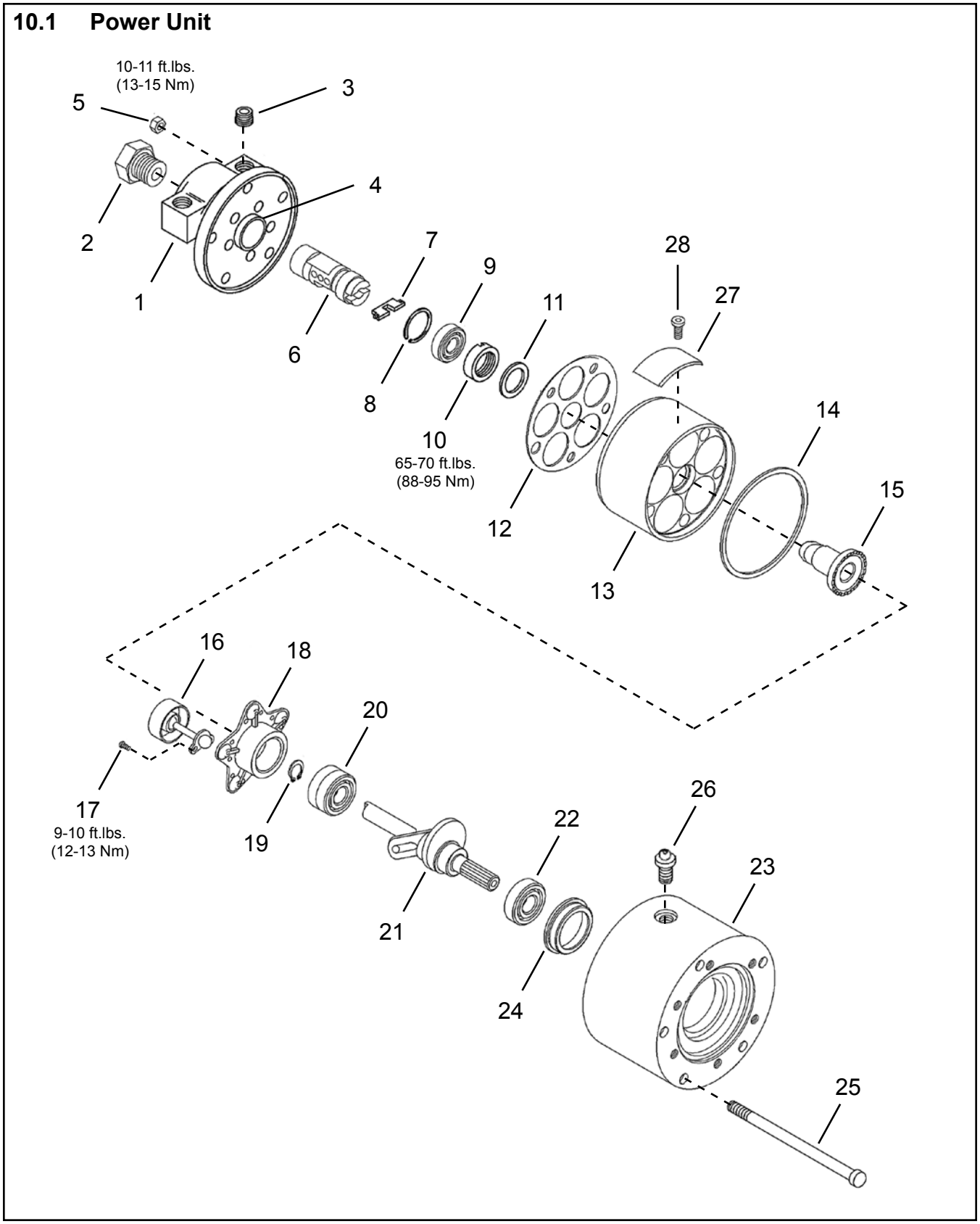


9.5 Bevel gear timing mark

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



10.1 Power Unit

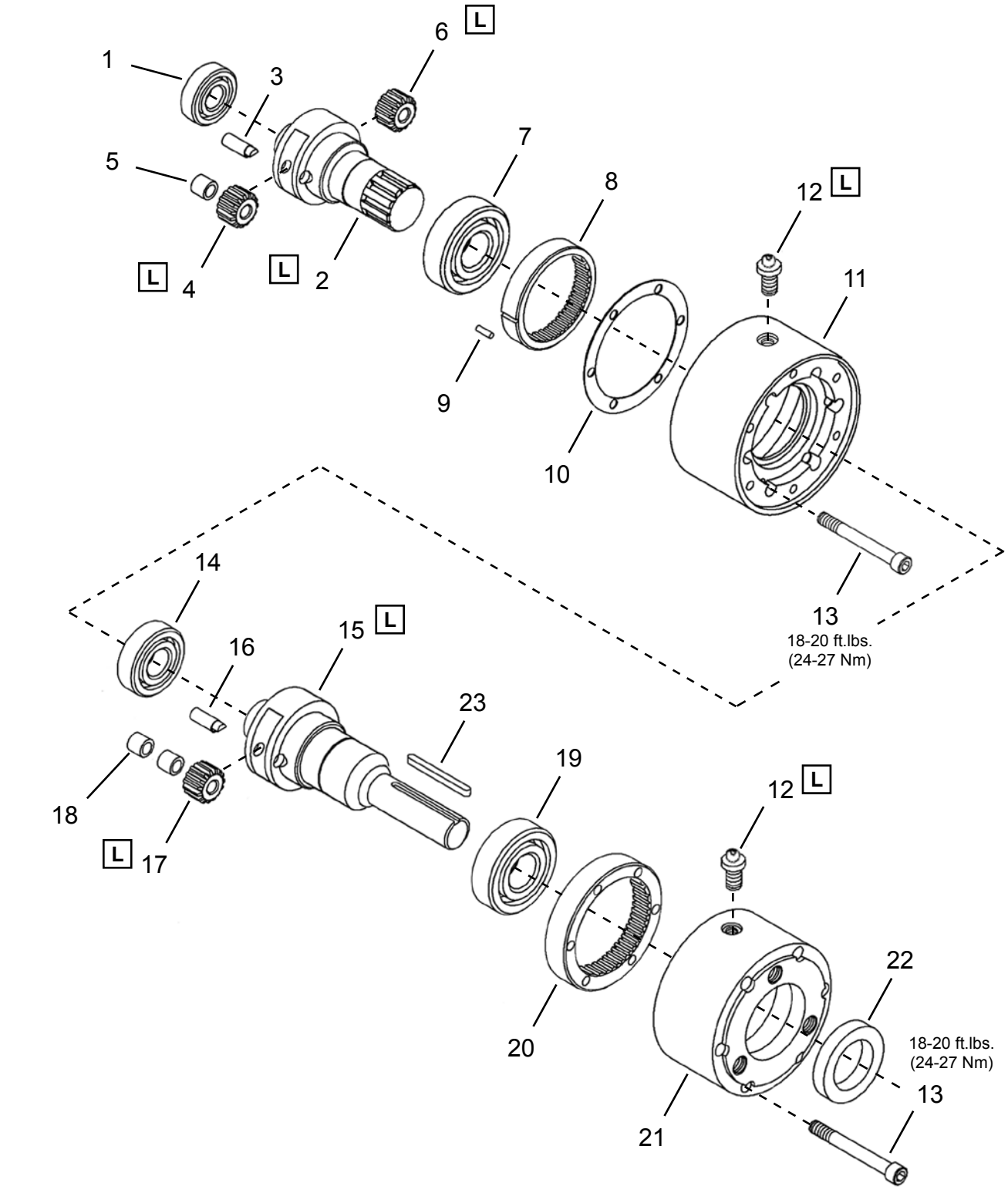


10.1 Power Unit

Ref	Number	#	X	EN Description
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	RG78	1	1	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)

10.2 Double Stage Gearing Assembly



L Lubricate with A123771 Grease (16 oz. can)

10.2 Double Stage Gearing Assembly

Ref	Number	#	X	EN Description
1	525424	1	2	Ball Bearing
2	30052PT	1		Gear Cage
3	10032	2	4	Planetary Gear Pin
4	A18322	2	4	Planetary Gear (14T) (includes Ref. 5)
5	21155	2	4	Planetary Gear Needle Bearing (Bushing)
6	18323	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	RG78	2	2	Grease Fitting
13	B127D	12	12	Socket Head Cap Screw (5/16-18 x 3)
14	30076PT	1	2	Ball Bearing
15	544124PT	1		Gear Cage Output Spindle
16	30058PT	2	4	Planetary Gear Pin
17	A30055	2	4	Planetary Gear (16T) (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	539157	1	3	Hi Temp Oil Seal
23	30072PT	1	3	Output Spindle Key

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

11 Technical data

11.1 A8R-2228 Specifications

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
A8R-2228	109	215	226	306	167	226	51	23.1	11.9:1	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.

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, 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
Tel: (713) 849-2364
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
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