Instruction Manual
PL70-1049EN
07/08/2013

Cleco®

73303DA5

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 A2R series tools.
- serves as a reference guide for technical data, service intervals and spare parts ordering.
- provides information on optional equipment.

Identification text:

A2R	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
73303DA5	169	345	28.0	38.0	21.0	28.0	22	9.98	13.9:1	800	363

* Note: Assume overhung load located at 1.75" (44.45mm) 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 A2R tools. The A2R 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 A2R is designed exclusively as a power source to be intregrated into an application.

- Do not modify the A2R, 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 73303DA5

1 PL70-1049EN instruction manual

1 Declaration of Conformity (if applicable)

1 Lubrication sheet

1 Warranty statement

2.2 Transport

Transport and store the A2R 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 A2R in a location on the workbench to avoid accidental startup.

For storage longer than 2 hours:

➔ Disconnect the air supply from the A2R

Object	Time Period	Storage Temperature
73303DA5 without air supply	No guideline	-13°F to 104°F (-25°C to 40°C)

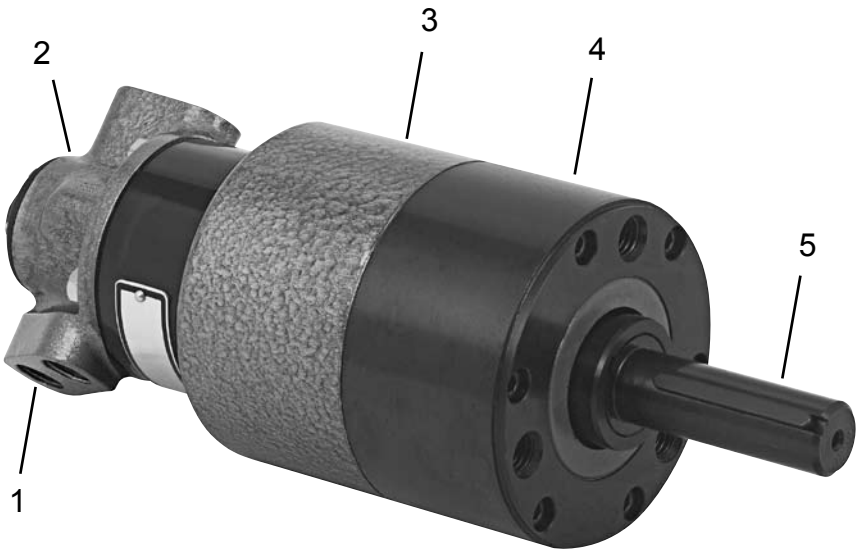
3 Product description

3.1 General description

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

3.2 Operation and functional elements

This section describes the operational and functional elements of the A2R.



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: 2 oz.
- Gearing assembly (each): 2 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 1.0 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 0.5 oz. of A123771 grease into each gear housing.

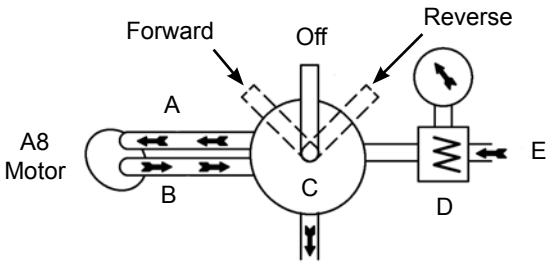
CAUTION!

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

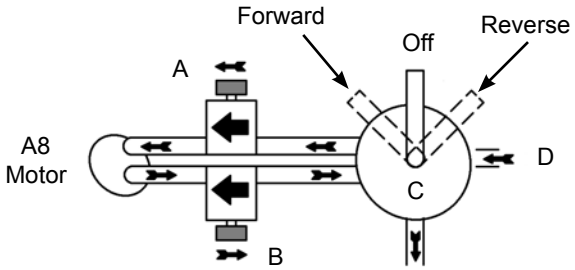
9.2 Valving

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

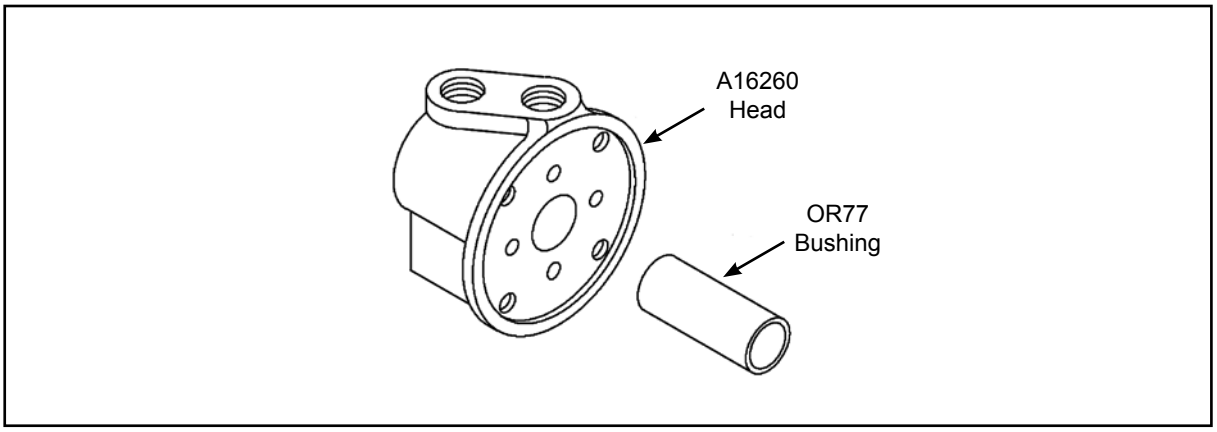


Control Forward and Reverse Speeds
A) Metered flow control (inlet)
B) Free (open) flow control (exhaust)
C) Four-Way valve
D) Air supply

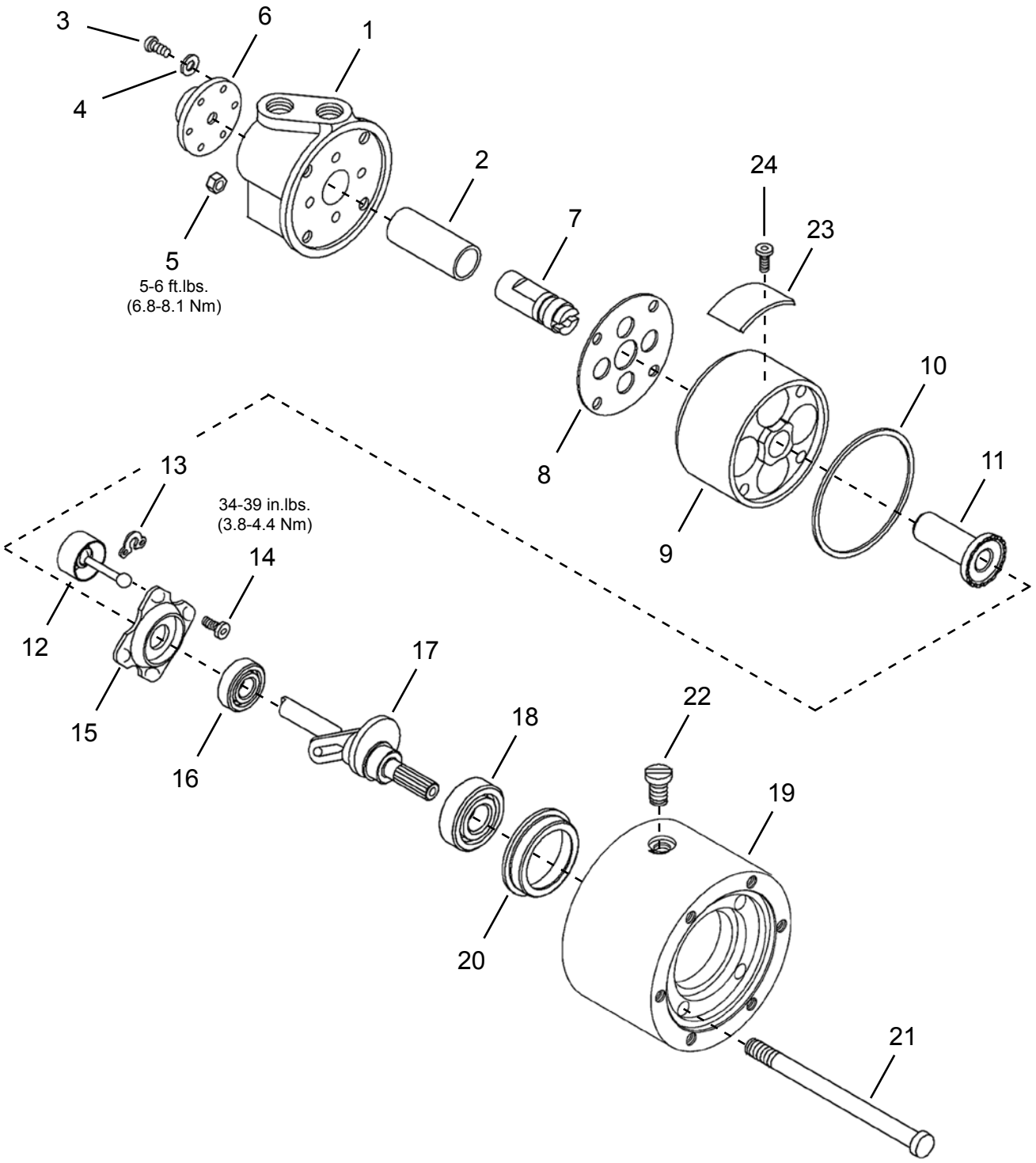


9.3 Distributor bushing assembly

Note the position of the old bushing before pressing it from the head. The new bushing must be positioned in exactly the same manner to prevent blocking the air passage to the cylinder.



10.1 Power Unit

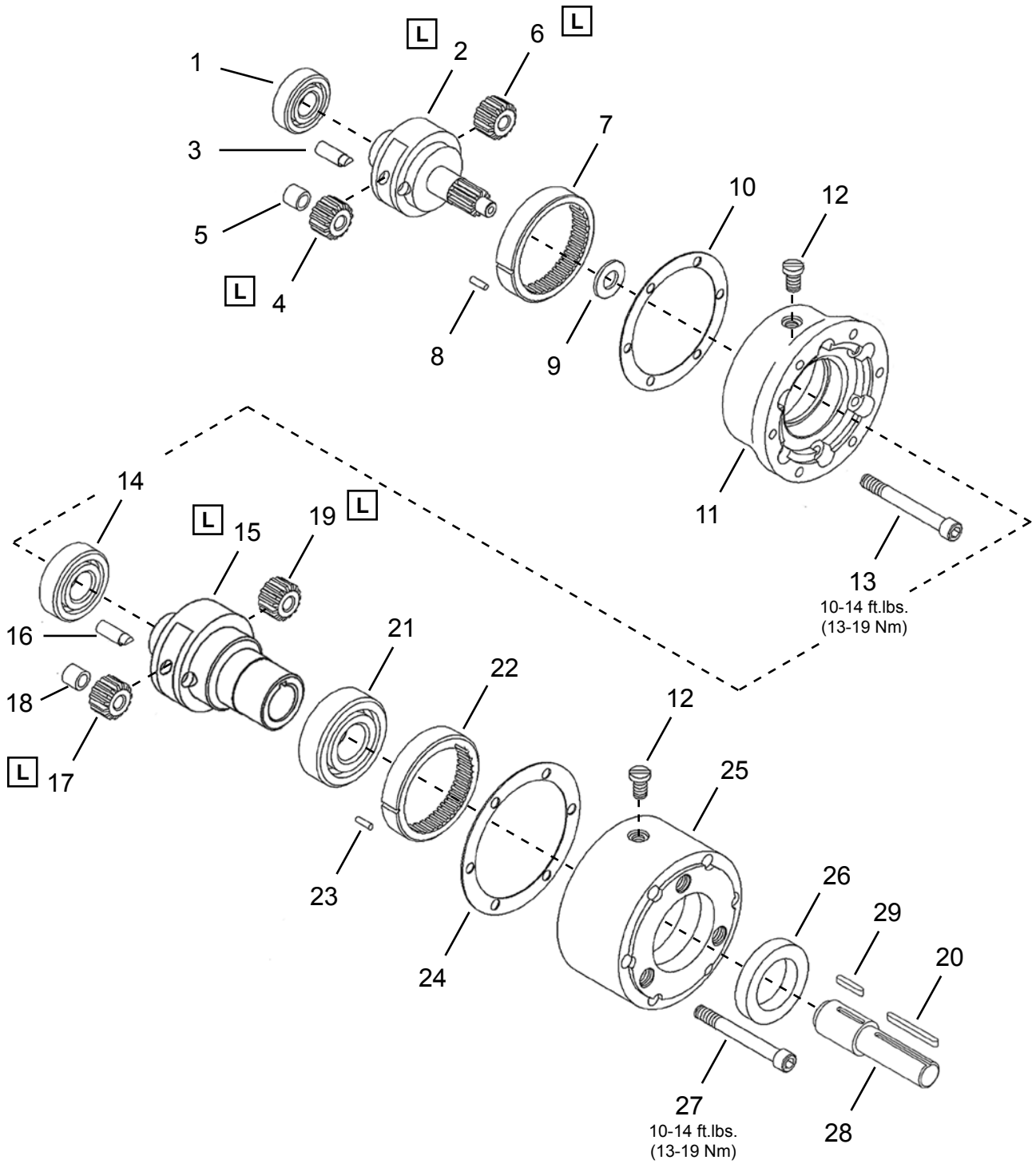


10.1 Power Unit

Ref	Number	#	X	EN Description
--	507488	1		Power Unit (includes Ref. 1-22)
1	A16260	1		Head Assembly (includes Ref. 2)
2	OR77	1	1	Distributor Bushing
3	B111G	6	12	Screw
4	W115	6	12	Washer
5	C109C	4	8	Head Assembly Nut
6	16242	1		Cover Plate
7	10101	1		Distributor
8	10098	1	3	Head Gasket
9	A9D7912	1		Cylinder
10	9D7917	1	3	Cylinder Gasket
11	AO180	1	1	Bevel Gear
--	534531	1		Socket Plate Assembly (includes Ref. 12-15)
12	AO2	4	4	Piston Assembly
13	508136	4	4	Cover Plate
14	B122R	8	8	Screw
15	507729	1		Socket Plate
16	9D5834	1	2	Ball Bearing
17	507727	1		Driveshaft
18	1V155	1	2	Ball Bearing
19	526544	1		Rear Housing (includes Ref. 20-21)
20	22761	1	1	Bearing Liner
21	526541	4	4	Stud
22	30775PT	1	1	Flush Type Grease Fitting
23	530322	1		Nameplate (not included in 507488 power unit)
24	1443700	2		Drive Screw (not included in 507488 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	RS196	1	2	Ball Bearing
2	30079PT	1		Gear Cage
3	9D7890	2	4	Planetary Gear Pin
4	A18301	2	4	Planetary Gear (19T) (includes Ref. 5)
5	16113	2	4	Planetary Gear Needle Bearing
6	18302	1	2	Pinion Gear
7	9D7892	1		Ring Gear
8	80G216	1	2	Ring Gear Pin
9	12686	1	2	Washer
10	9D7908	1	3	Center Housing Gasket
11	30078PT	1		Center Housing
12	30775PT	2	2	Flush Type Grease Fitting
13	B115M	6	6	Socket Head Cap Screw
14	525424	1	2	Ball Bearing
15	30079PT	1		Output Gear Cage
16	10032	2	4	Planetary Gear Pin
17	A18322	2	4	Planetary Gear (14T) (includes Ref. 18)
18	21155	2	4	Planetary Gear Needle Bearing
19	18323	1	2	Pinion Gear
20	18308	1	3	Output Spindle Key
21	18304	1	2	Ball Bearing
22	10019	1		Ring Gear
23	DP120PT	1	2	Ring Gear Pin
24	29719PT	1	3	Front Housing Gasket
25	29715PT	1		Front Housing
26	536188	1	3	Oil Seal
27	B117B	6	6	Socket Head Cap Screw
28	29717	1		Output Spindle
29	29716PT	1	2	Key

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

11 Technical data

11.1 73303DA5 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
73303DA5	169	345	28.0	38.0	21.0	28.0	22	9.98	13.9:1	800	363

* Note: Assume overhung load located at 1.75" (44.45mm) 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
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Fax: (248) 391-6295

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