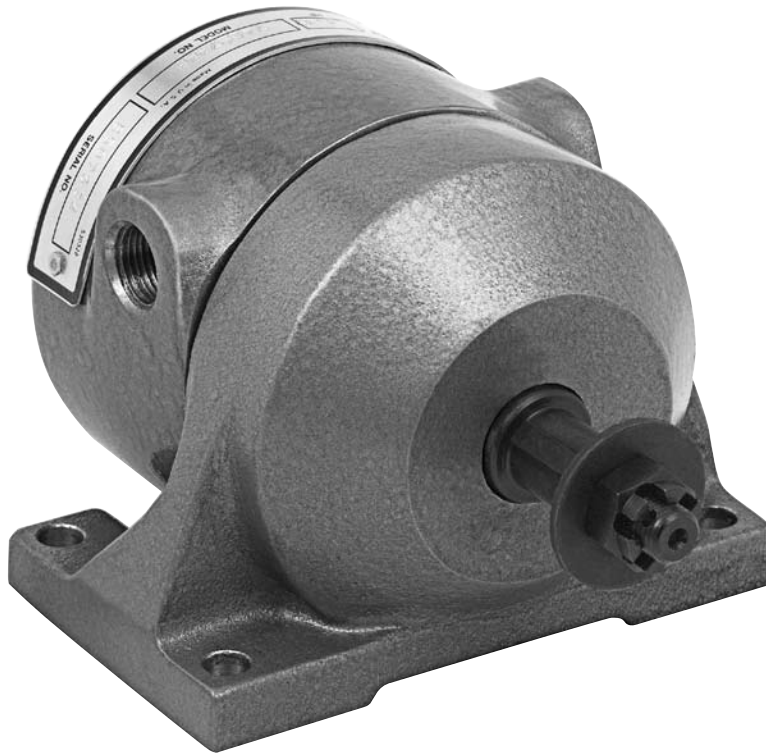


Instruction Manual
PL70-1056EN
07/08/2013

Cleco®

MR10 Series
Rotary Vane Power Motors



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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 MR10 series tools.
- serves as a reference guide for technical data, service intervals and spare parts ordering.
- provides information on optional equipment.

Identification text:

MR10 represents all models of the rotayr vane 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

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Cleco® Nomenclature

PL70-1056EN
07/08/2013

Model Number	Maximum Allowable RPM		Stall Torque		Starting Torque		Weight		Air Consumption		Gear Ratio	Maximum Overhung Load @ Stall *	
	@ Max. HP	Free Speed	ft. lbs.	Nm	ft. lbs.	Nm	lbs.	kg	cfm	m3/min		lbs.	kg
Foot Mounting - 5/8" (Non-Geared) or 7/8" (Geared) Diameter Keyed Spindle													
MR10R097M	8500	17000	2.5	3.4	1.8	2.4	7	3.2	54	1.53	----	680	308
MR10R099M	210	400	61.0	83.0	35.0	47.0	23	10.4	54	1.53	29.7:1	1055	478
MR10R100M	183	350	74.0	100.0	46.0	62.0	23	10.4	54	1.53	34.2:1	1055	478
Flange Mounting - 5/8" (Non-Geared) or 7/8" (Geared) Diameter Keyed Spindle													
MR10R098M	8500	17000	2.5	3.4	1.8	2.4	7	3.2	54	1.53	----	680	308
MR10R101M	210	400	61.0	83.0	35.0	47.0	23	10.4	54	1.53	29.7:1	1055	478
MR10R102M	183	350	74.0	100.0	46.0	62.0	23	10.4	54	1.53	34.2:1	1055	478

* Note: Non-geared models assume overhung load located at 0.5" (12.70mm) from the face of the motor.
 * Note: Geared models assume overhung load located at 0.75" (19.05mm) from the face of the motor.



1	Safety	6
1.1	Warning and notes.....	6
1.2	Basic requirements for safe working practices	7
1.3	Operator training.....	7
1.4	Personal protective equipment	7
1.5	Designated use.....	8
1.6	Codes and standards	8
1.7	Noise and vibration.....	8
2	Scope of supply, transport and storage	9
2.1	Items supplied	9
2.2	Transport	9
2.3	Storage.....	9
3	Product description	10
3.1	General description	10
3.2	Operation and functional elements.....	10
4	Accessories	11
5	Before initial operation	12
5.1	Ambient conditions	12
5.2	Air supply.....	12
5.3	Connecting the air supply to the tool	12
5.4	Tool set up	13
6	First operation	14
6.1	Putting into use.....	14
7	Troubleshooting	15
8	Maintenance	16
8.1	Service schedule	16
8.2	Lubricants.....	17
9	Repair instructions	18
9.1	Motor run-in or test procedure	18
9.2	Disassembly of motor (non-gearred and geared models)	18
9.3	Disassembly of gearing (geared models).....	18
9.4	Inspection of parts	18
9.5	Assembly of gearing (geared models).....	19
9.6	Assembly of motor (non-gearred and geared models).....	20

10	Spare parts	22
10.1	MR10 Series Non-Geared - Foot Mounted.....	22
10.2	MR10 Series Non-Geared - Flange Mounted.....	24
10.3	MR10 Series Geared - Foot Mounted	26
10.4	MR10 Series Geared - Flange Mounted.....	28
11	Technical data	30
11.1	MR10 Specifications.....	30
12	Service	31
12.1	Replacement parts	31
12.2	Tool repairs	31
12.3	Warranty repairs	31
13	Disposal	32

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 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 MR10 tools. The MR10 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 hair net
- Do not wear close fitting clothing
- Do not wear jewelry

1.5 Designated use

The MR10 is designed exclusively as a power source to be integrated into an application.

- Do not modify the MR10, 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.

Scope of Supply, Transport and Storage**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 MR10
- 1 PL70-1056EN instruction manual
- 1 Declaration of Conformity (if applicable)
- 1 Lubrication sheet
- 1 Warranty statement

2.2 Transport

Transport and store the MR10 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 MR10 in a location on the workbench to avoid accidental startup.

For storage longer than 2 hours:

→ Disconnect the air supply from the MR10

Object	Time Period	Storage Temperature
MR10 without air supply	No guideline	-13°F to 104°F (-25°C to 40°C)

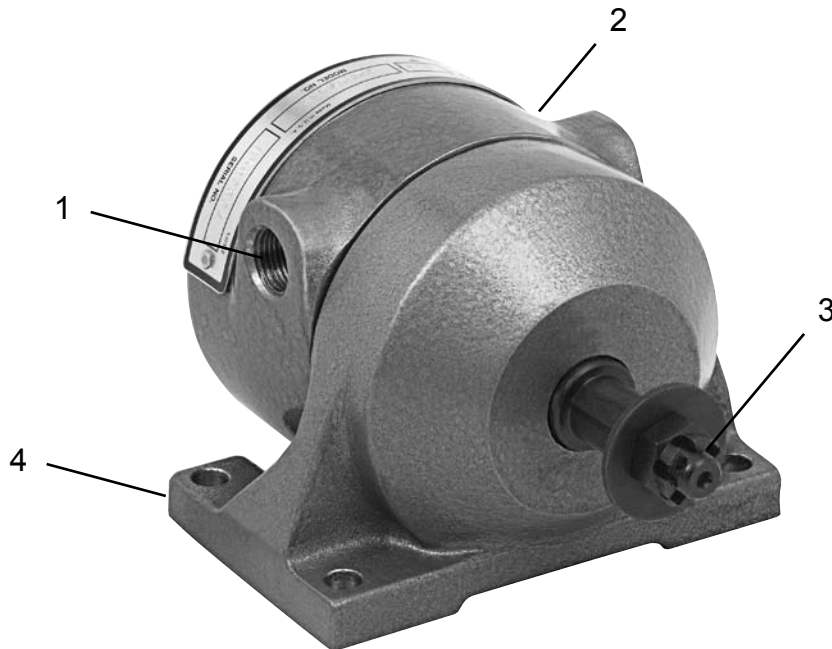
3 Product description

3.1 General description

- Pneumatic powered radial piston power motor
- 1.0 Horsepower
- Non-geared or geared model options
- Foot or flange mounting options

3.2 Operation and functional elements

This section describes the operational and functional elements of the MR10.



Ref.	Description
1	Air Inlet
2	Motor Assembly
3	Output Shaft
4	Foot Mounting

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	Air inlet: 3/8" (9,5 mm) Maximum length: 16.4' (5 m)
Working pressure range	60 to 100 psi (414 to 689 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, lubricator and regulator.

- The inside diameter of the air hose must be free of residue, clean if necessary.
- If a line lubricator is used, it should be filled daily

5.3 Connecting the air supply to the tool

WARNING!



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

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

5.4 Tool set up

The motor must be configured for the application.

6 First operation

6.1 Putting into use

The MR10 series motors are a rotary vane type with spring loaded blades. All motors feature durable construction with precision heavy-duty bearings throughout, and multiple blade rotors for smooth power. These motors require air line lubrication for long, trouble-free service. The MR10 series motors perform satisfactorily in high temperature areas up to 200°F (93°C).

- Make sure the air line is clean and free of scale and dirt before connecting to the motor.
- Make sure all pipe fittings are securely tightened to prevent air leaks.
- 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.

If an excessive amount of water is found in the air line, a water trap should be installed to trap as much as possible before it reaches the MR10 motor.

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	→ Check the oil levels in the motor case and gear case. Add oil as necessary.
	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	→ Check the oil levels in the motor case and gear case. Add oil as necessary.

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 motors.

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 motor into account.

Maintenance Interval	Designation
Daily	<ul style="list-style-type: none">→ Visual inspection of air supply hose and connections→ Inspect airline filter, regulator and lubricator for proper operation→ Check the tool for excessive vibration or unusual noises→ Visual inspection of all external components of the tool
Weekly	<ul style="list-style-type: none">→ Inspect the air hose for damage or wear→ inspect the output spindle for damage or wear→ Inspect the airline lubrication for proper function

8.2 Lubricants

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

Oil identification

Use a light air tool oil, Cleco part number 500021. This oil is available from Apex Tool Group in the following quantities:

533484: 1 pint

533485: 1 gallon

DO NOT SUBSITUTE LUBRICANTS!

9 Repair instructions

9.1 Motor run-in or test procedure

- Connect the power motor to an air supply of 90 psig pressure with no load on the motor output shaft.
- Open the throttle valve so a minimum amount of air will turn the motor slowly, the motor must run free.
- Open the throttle valve until the motor runs at a high even speed.
- No additional run-in time is required to improve the motor performance.

9.2 Disassembly of motor (non-g geared and geared models)

- Remove the four (4) screws from the motor case and carefully remove the motor case by hand. **DO NOT FORCE.**
- Disengage the lockwasher tang from the lock nut and remove the lock nut, lock washer and motor plate (rear) with the ball bearing.
- *Note: The rotor vanes and rotor vane springs can now be serviced without any additional disassembly.*
- Remove the cylinder, rotor vanes, rotor vane springs and dowel pin. The motor shaft and motor plate (front) can now be removed.
- *Note: Non-g geared models have a nut and washer securing the motor shaft to the motor case.*

NOTE



NOTE



9.3 Disassembly of gearing (geared models)

- Remove the six (6) screws securing the motor case plate assembly to the gear case.
- Remove the nut and washer from the output shaft of the upper gear.
- Remove the motor case plate assembly from the gear case. The upper and lower gears should stay assembled to the motor case plate when it is removed from the gear case.
- The bearing on the gear case end of the lower gear shaft must be removed before the upper gear can be disassembled from the motor case plate.
- Remove the lower gear from the motor case plate.
- Remove the four (4) screws and washers securing the bracket to the moto case plate.

9.4 Inspection of parts

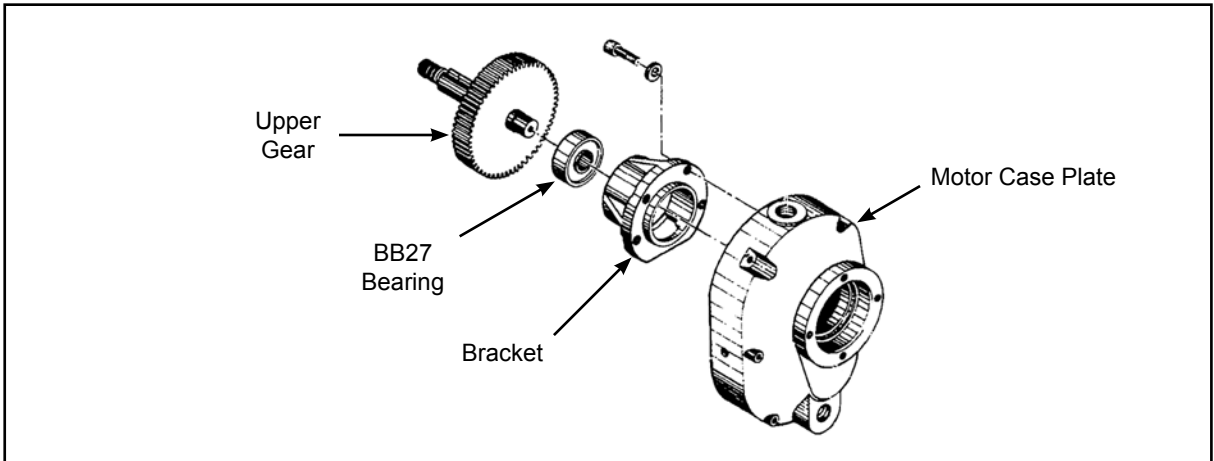
Clean all parts (except bearings, o-rings and rotor vanes) in a solvent and blow dry. Thoroughly inspect all parts for excessive wear or damage and replace as necessary with genuine Cleco replacement parts as specified in Section 10.

Minor scoring in the cylinder and on the motor plates can be removed by honing or resurfacing the parts.

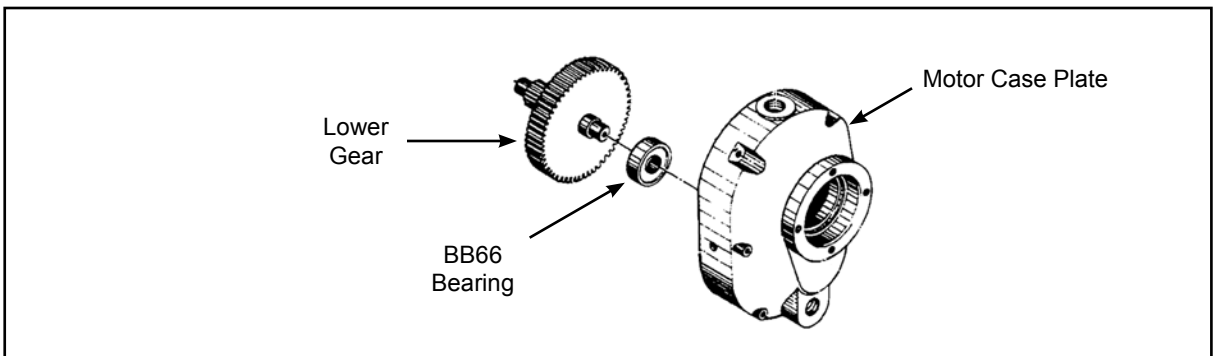
Check the condition and length of the rotor vanes. The length of the vanes should be .002" to .0075" shorter than the cylinder and they must fit freely into the rotor slots.

9.5 Assembly of gearing (geared models)

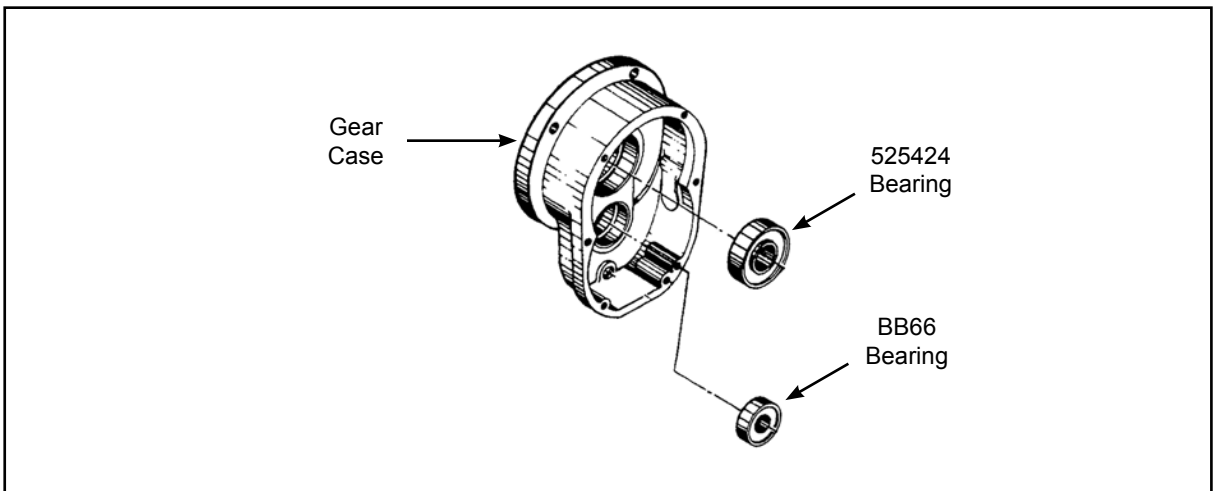
- Place the motor case plate horizontally on a workbench with the large open side facing up.
- Assemble the bearing (BB27) and upper gear into the bracket. Assemble the bracket to the motor case plate using four (4) washers and screws.



- Assemble the bearing (BB6) and lower gear into the motor case plate.



- Press the upper gear bearing (525424) and lower gear bearing (BB66) into the gear case.

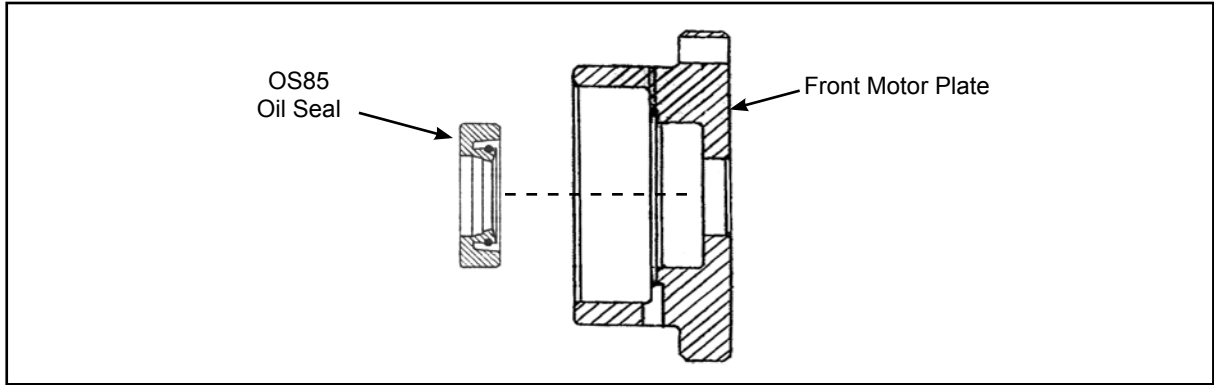


- Position the gasket on the motor case plate and assemble the gear case.

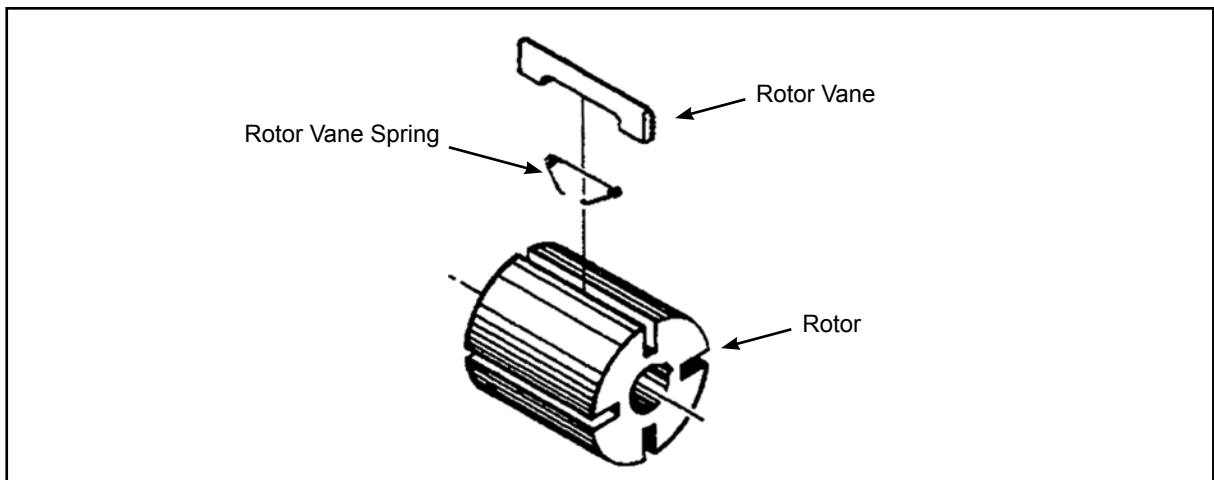
Cleco® Repair Instructions

9.6 Assembly of motor (non-geared and geared models)

- Press the large bearing (BB100) onto the motor shaft.
- Press the oil seal (OS85) into the front motor plate. Note: The seal must be assembled with the lip down, as shown.



- Assemble the front motor plate over the large bearing on the motor shaft.
- Place the two woodruff keys in the key slots of the motor shaft and assemble the rotor and cylinder onto the motor shaft.
- Install the rotor vane springs and rotor vanes into the rotor slots. Note: The spring arms must set in the bottom of each slot.



- **Geared Models:** Make sure the splined end of the motor shaft engages completely with the gears.
- Assemble the small bearing (BB99) into the rear motor plate. Note: The small bearing must be assembled by hand.
- Assemble the rear motor plate, with bearing, onto the motor shaft.
- Install the lock washer and lock nut onto the motor shaft. **CAUTION: Tighten the lock nut to a maximum of 25 ft. lbs. torque. Overtightening can cause damage to the motor components.** Lock one of the washer tangs into the lock nut.
- Insert the dowel pin through the motor plates and cylinder.



9.6 Assembly of motor (non-geared and geared models) (continued)

CAUTION!



- Place the rear motor case over the motor assembly. Align the dowel pin with the hole in the motor case. **CAUTION: Assemble the motor case by hand and do not drive the motor case over the motor assembly. Watch for burrs on the front and rear motor plates as well as the cylinder.**
- Using four (4) screws, secure the rear motor case to the front motor case (non-geared) models or motor case plate (geared models). There should be approximately 1/16" gap between the motor cases when assembly is complete.

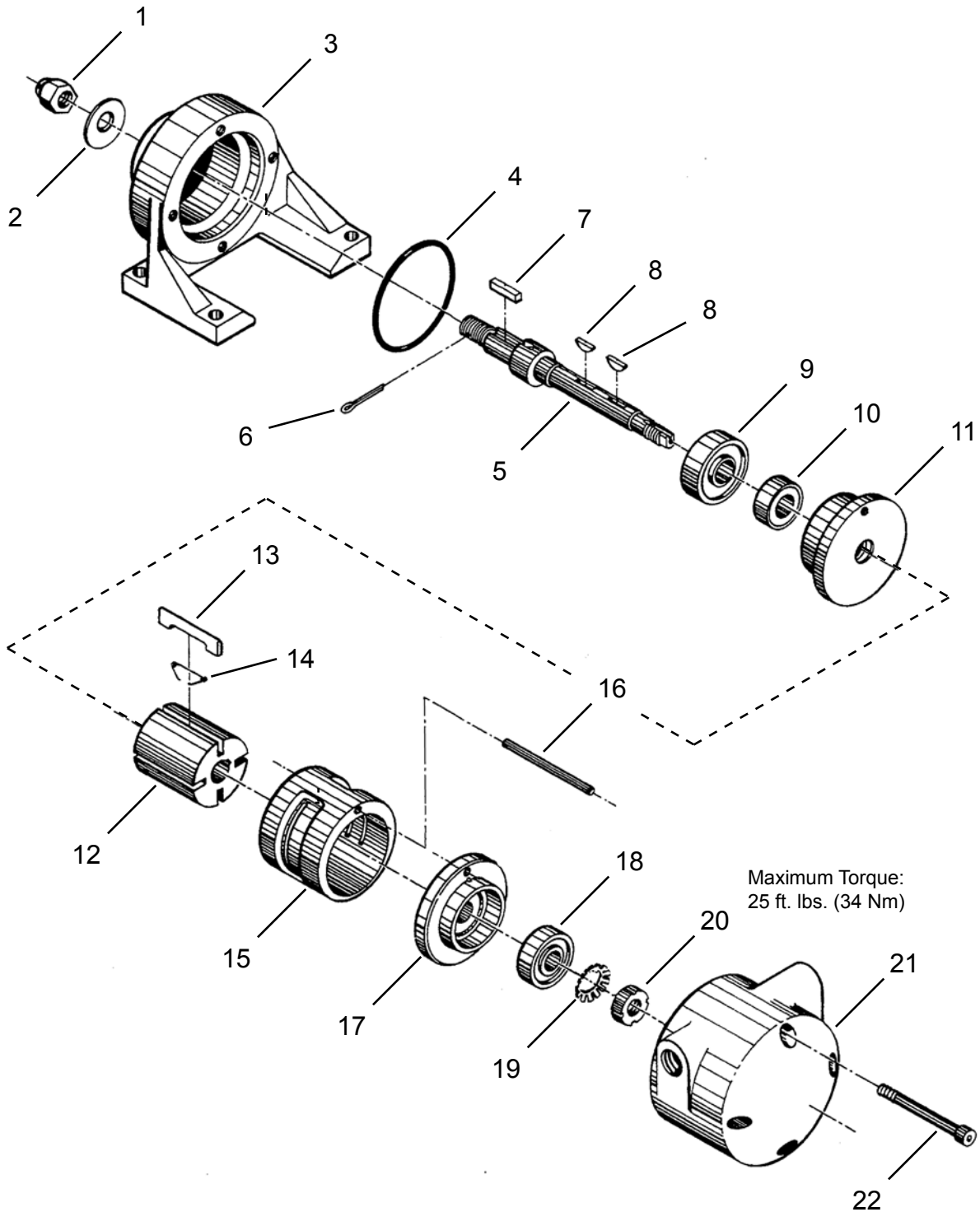
NOTE



- Connect the air line and open the valve slightly to determine if the motor idles freely.
- *Note: If an excessive amount of oil was used during assembly, the motor will run rough until the surplus oil is exhausted.*

10.1 MR10 Series Non-Geared - Foot Mounted

Model
MR10R097M



10.1 MR10 Series Non-Geared Foot Mounted

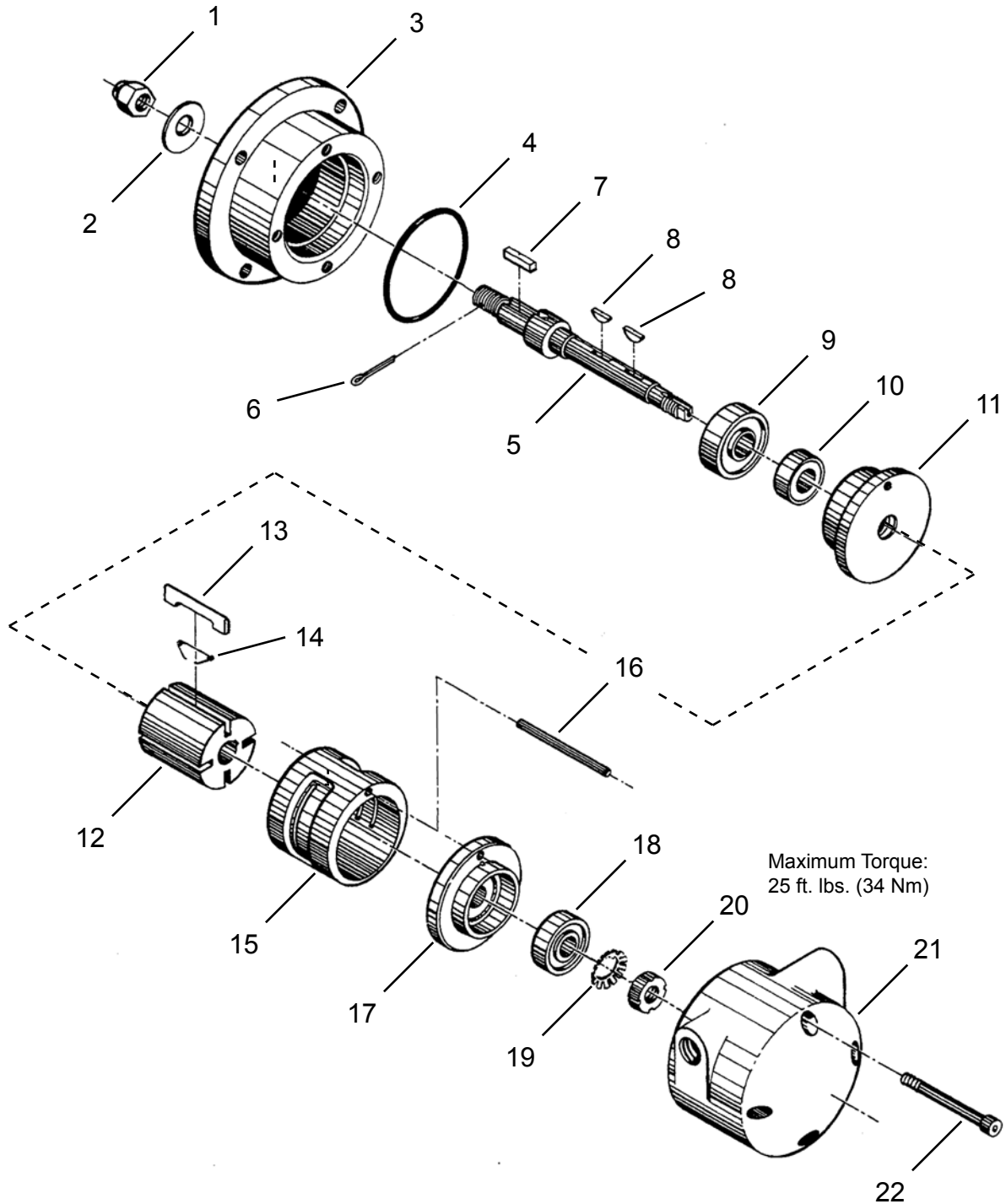
Ref	Number	#	X	EN
				Description
1	NC55	1	2	Output Shaft Hex Nut
2	W220PT	1	2	Output Shaft Washer
3	1035691	1		Motor Case (Front)
4	OG8	1	3	O-Ring
5	MR10A11A	1		Motor Shaft
6	P101J	1	3	Cotter Pin
7	MR10A12	1	3	Motor Shaft Key
8	MR10A11K	2	6	Woodruff Key
9	BB100	1	2	Ball Bearing
10	OS85	1	3	Oil Seal
11	MR10A4	1		Motor Plate (Front)
12	MR10A7	1		Rotor
13	MR10A9M	4	8	Rotor Vane
14	MR10A10	4	8	Rotor Vane Spring
15	1035281	1		Cylinder
16	MR10A6	1		Dowel Pin
17	MR10A5	1		Motor Plate (Rear)
18	BB99	1	2	Ball Bearing
19	NDL8	1	1	Lock Washer
20	NDN6	1	1	Lock Nut
21	1034708	1		Motor Case (Rear)
22	B117B	4		Motor Case Screw
23	530322	1		Name Plate (not shown)
24	534820	2		Drive Screw (not shown)

(#) Quantity

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

10.2 MR10 Series Non-Geared - Flange Mounted

Model
MR10R098M



10.2 MR10 Series Non-Geared Flange Mounted

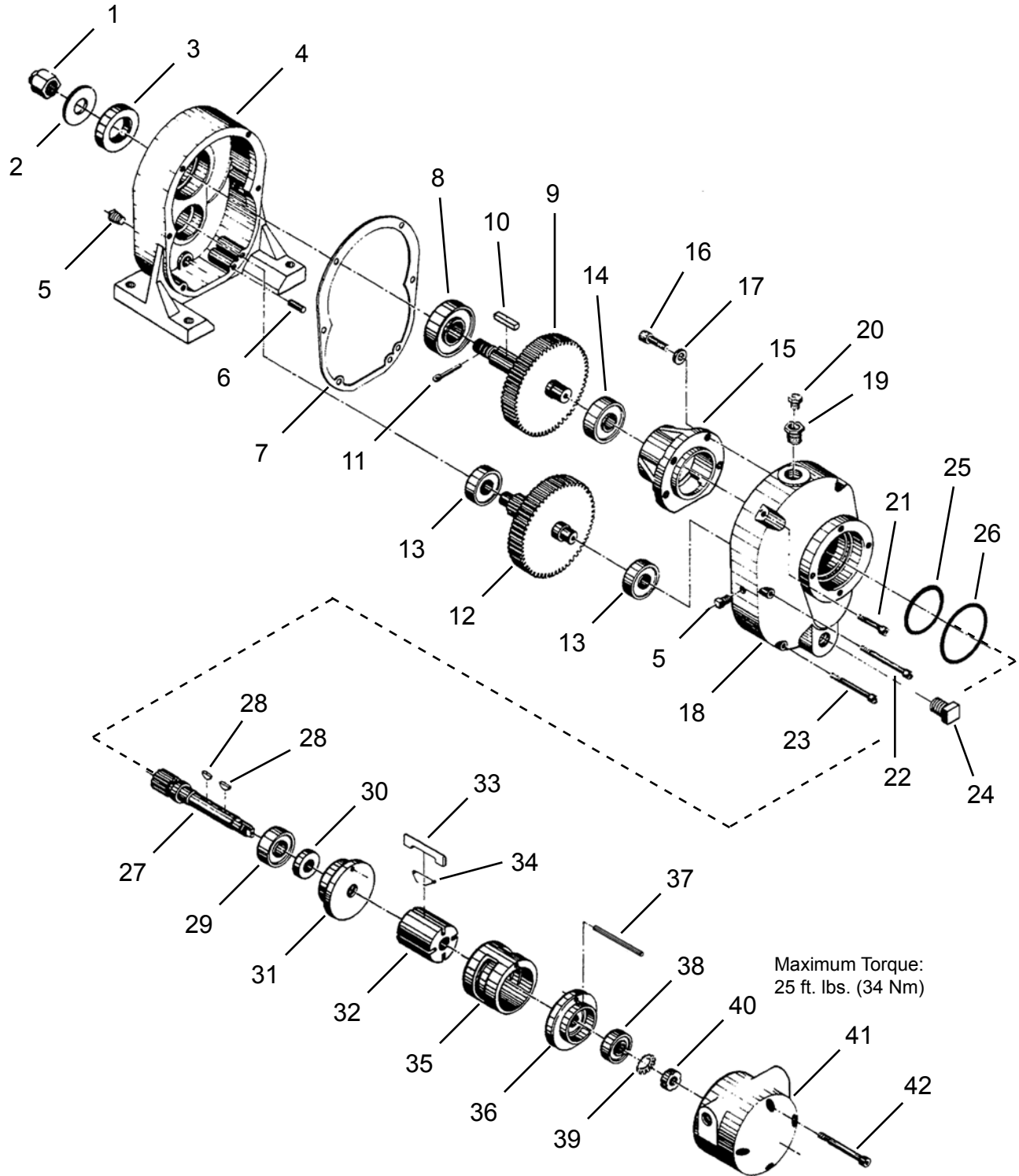
Ref	Number	#	X	EN
				Description
1	NC55	1	2	Output Shaft Hex Nut
2	W220PT	1	2	Output Shaft Washer
3	1035167	1		Motor Case (Front)
4	OG8	1	3	O-Ring
5	MR10A11A	1		Motor Shaft
6	P101J	1	3	Cotter Pin
7	MR10A12	1	3	Motor Shaft Key
8	MR10A11K	2	6	Woodruff Key
9	BB100	1	2	Ball Bearing
10	OS85	1	3	Oil Seal
11	MR10A4	1		Motor Plate (Front)
12	MR10A7	1		Rotor
13	MR10A9M	4	8	Rotor Vane
14	MR10A10	4	8	Rotor Vane Spring
15	1035281	1		Cylinder
16	MR10A6	1		Dowel Pin
17	MR10A5	1		Motor Plate (Rear)
18	BB99	1	2	Ball Bearing
19	NDL8	1	1	Lock Washer
20	NDN6	1	1	Lock Nut
21	1034708	1		Motor Case (Rear)
22	B117B	4		Motor Case Screw
23	530322	1		Name Plate (not shown)
24	534820	2		Drive Screw (not shown)

(#) Quantity

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

10.3 MR10 Series Geared - Foot Mounted

Model
MR10R099M
MR10R100M



10.3 MR10 Series Geared Foot Mounted

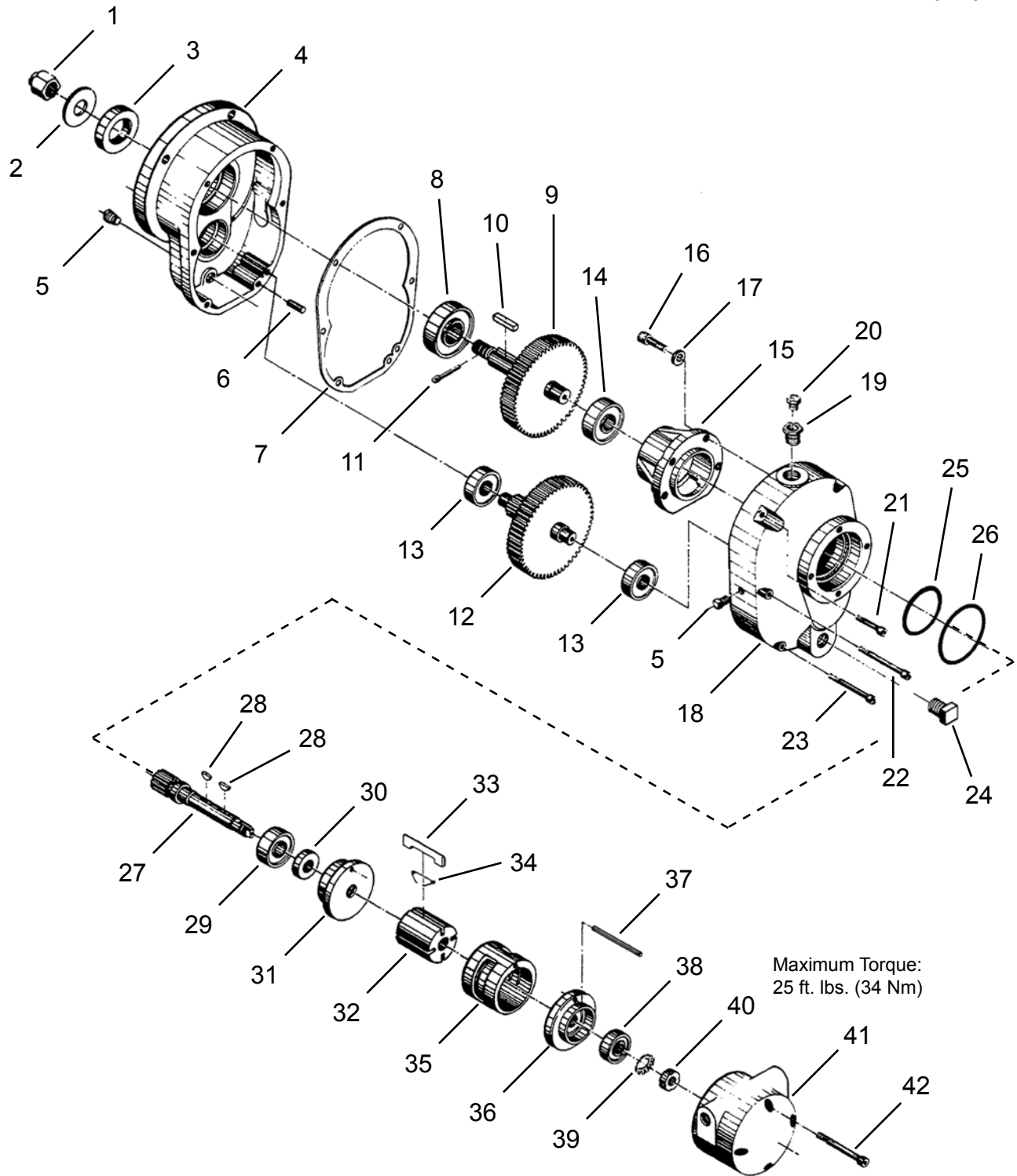
Ref	Number	#	X	EN
				Description
1	C109Z	1	2	Output Shaft Hex Nut
2	W218PT	1	2	Output Shaft Washer
3	OS25	1	3	Oil Seal
4	MR10C18A	1		Gear Case
5	F504PT	2	2	Pipe Plug
6	20572	1		Dowel Pin
7	MR10C19A	1	3	Gear Case Gasket
8	525424	1	2	Ball Bearing
9	MR10C22	1		Gear (Model: MR10R099M)
	MR10C22E	1		Gear (Model: MR10R100M)
10	MR10C23	1	3	Gear Shaft Key
11	P101J	1	3	Cotter Pin
12	MR10C24	1		Gear (Model: MR10R099M)
	MR10C24E	1		Gear (Model: MR10R100M)
13	BB66	2	4	Ball Bearing
14	BB27	1	2	Ball Bearing
15	MR10C21B	1		Bracket
16	B102C	4	4	Bracket Screw
17	W222	4	4	Bracket Washer
18	MR10C20A	1		Motor Case Plate (includes Ref. 6)
19	F579	1		Relief Valve Bushing
20	500189	1	1	Relief Valve
21	B129N	2	2	Screw
22	B117B	2	2	Screw
23	B119R	2	2	Screw
24	B112E	1	1	Pipe Plug
25	508364	1	3	O-Ring
26	OG8	1	3	O-Ring
27	MR10C11A	1		Motor Shaft
28	MR10A11K	2	6	Woodruff Key
29	BB100	1	2	Ball Bearing
30	OS85	1	3	Oil Seal
31	MR10A4	1		Motor Plate (Front)
32	MR10A7	1		Rotor
33	MR10A9M	4	8	Rotor Vane
34	MR10A10	4	8	Rotor Vane Spring
35	1035281	1		Cylinder
36	MR10A5	1		Motor Plate (Rear)
37	MR10A6	1		Dowel Pin
38	BB99	1	2	Ball Bearing
39	NDL8	1	1	Lock Washer
40	NDN6	1	1	Lock Nut
41	1034708	1		Motor Case (Rear)
42	B117B	4		Motor Case Screw
43	530322	1		Name Plate (not shown)
44	534820	2		Drive Screw (not shown)

(#) Quantity

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

10.4 MR10 Series Geared - Flange Mounted

Model
MR10R101M
MR10R102M



10.4 MR10 Series Geared Flange Mounted

Ref	Number	#	X	EN
				Description
1	C109Z	1	2	Output Shaft Hex Nut
2	W218PT	1	2	Output Shaft Washer
3	OS25	1	3	Oil Seal
4	MR10D18	1		Gear Case
5	F504PT	2	2	Pipe Plug
6	20572	1		Dowel Pin
7	MR10C19A	1	3	Gear Case Gasket
8	525424	1	2	Ball Bearing
9	MR10C22	1		Gear (Model: MR10R101M)
	MR10C22E	1		Gear (Model: MR10R102M)
10	MR10C23	1	3	Gear Shaft Key
11	P101J	1	3	Cotter Pin
12	MR10C24	1		Gear (Model: MR10R101M)
	MR10C24E	1		Gear (Model: MR10R102M)
13	BB66	2	4	Ball Bearing
14	BB27	1	2	Ball Bearing
15	MR10C21B	1		Bracket
16	B102C	4	4	Bracket Screw
17	W222	4	4	Bracket Washer
18	MR10C20A	1		Motor Case Plate (includes Ref. 6)
19	F579	1		Relief Valve Bushing
20	500189	1	1	Relief Valve
21	B129N	2	2	Screw
22	B117B	2	2	Screw
23	B119R	2	2	Screw
24	B112E	1	1	Pipe Plug
25	508364	1	3	O-Ring
26	OG8	1	3	O-Ring
27	MR10C11A	1		Motor Shaft
28	MR10A11K	2	6	Woodruff Key
29	BB100	1	2	Ball Bearing
30	OS85	1	3	Oil Seal
31	MR10A4	1		Motor Plate (Front)
32	MR10A7	1		Rotor
33	MR10A9M	4	8	Rotor Vane
34	MR10A10	4	8	Rotor Vane Spring
35	1035281	1		Cylinder
36	MR10A5	1		Motor Plate (Rear)
37	MR10A6	1		Dowel Pin
38	BB99	1	2	Ball Bearing
39	NDL8	1	1	Lock Washer
40	NDN6	1	1	Lock Nut
41	1034708	1		Motor Case (Rear)
42	B117B	4		Motor Case Screw
43	530322	1		Name Plate (not shown)
44	534820	2		Drive Screw (not shown)

(#) Quantity

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

11 Technical data

11.1 MR10 Specifications

Model Number	Maximum Allowable RPM		Stall Torque		Starting Torque		Weight		Air Consumption		Gear Ratio	Maximum Overhung Load @ Stall *	
	@ Max. HP	Free Speed	ft. lbs.	Nm	ft. lbs.	Nm	lbs.	kg	cfm	m3/min		lbs.	kg
Foot Mounting - 5/8" (Non-Geared) or 7/8" (Geared) Diameter Keyed Spindle													
MR10R097M	8500	17000	2.5	3.4	1.8	2.4	7	3.2	54	1.53	----	680	308
MR10R099M	210	400	61.0	83.0	35.0	47.0	23	10.4	54	1.53	29.7:1	1055	478
MR10R100M	183	350	74.0	100.0	46.0	62.0	23	10.4	54	1.53	34.2:1	1055	478
Flange Mounting - 5/8" (Non-Geared) or 7/8" (Geared) Diameter Keyed Spindle													
MR10R098M	8500	17000	2.5	3.4	1.8	2.4	7	3.2	54	1.53	----	680	308
MR10R101M	210	400	61.0	83.0	35.0	47.0	23	10.4	54	1.53	29.7:1	1055	478
MR10R102M	183	350	74.0	100.0	46.0	62.0	23	10.4	54	1.53	34.2:1	1055	478

* Note: Non-geared models assume overhung load located at 0.5" (12.70mm) from the face of the motor.

* Note: Geared models assume overhung load located at 0.75" (19.05mm) 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 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.





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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
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Fax: (248) 391-6295

Houston, Texas

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Lexington, South Carolina

Apex Tool Group
670 Industrial Drive
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