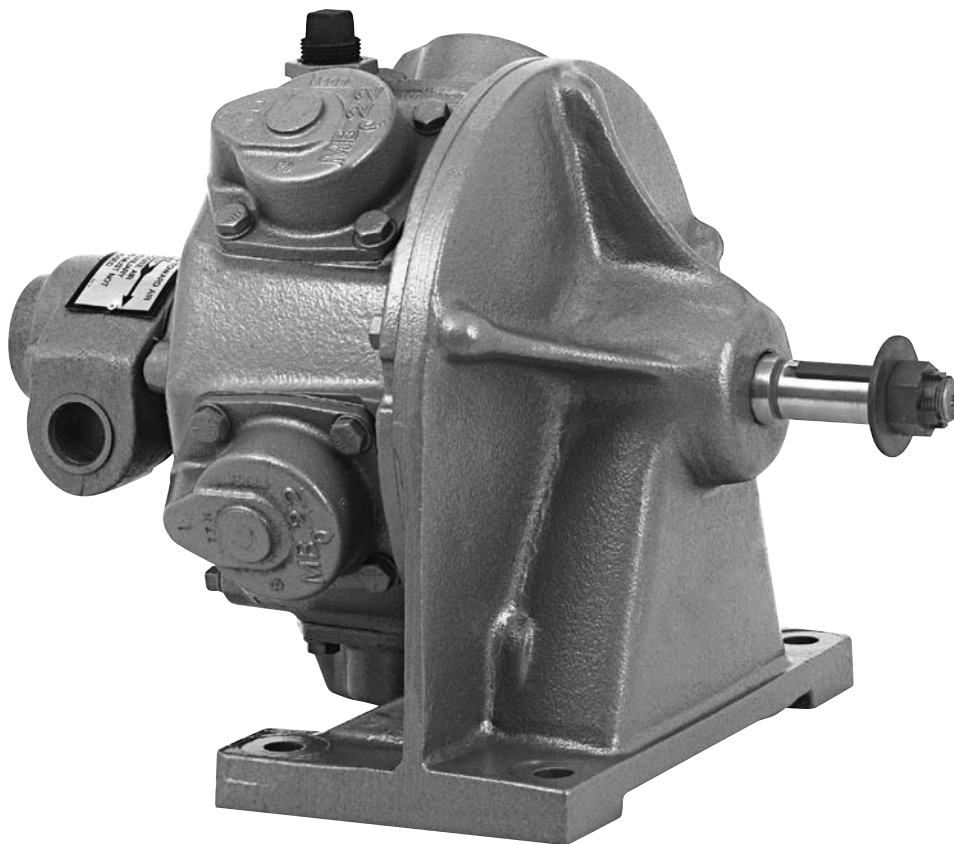


Instruction Manual
PL70-1047EN
07/08/2013

Cleco®

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

Identification text:

MB	represents all models of the radial 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

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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
Single Direction Valving													
MBS374M	1520	3000	34	46	15	20	100	45.4	166	4.70	----	1310	594
MBS380M	270	540	192	260	81	110	145	65.8	144	4.08	5.6:1	2200	998
MBS376M	75	150	700	949	296	401	145	65.8	167	4.73	20.4:1	2200	998
Reversible Valving													
MBR381M	268	540	192	260	81	222	148	67.1	140	3.96	5.6:1	2200	998
MBR379M	133	270	388	526	164	401	148	67.1	148	4.19	11.3:1	2200	998
MBR377M	74	150	700	949	296	20	148	67.1	154	4.36	20.4:1	2200	998
without Valving													
MBW410M	1500	3000	34	46	15	222	103	46.7	152	4.30	----	1310	594
MBW413M	268	540	192	260	81	401	148	67.1	140	3.96	6.5:1	2200	998
MBW412M	133	270	388	526	164	218	148	67.1	148	4.19	11.3:1	2200	998
MBW411M	74	150	700	949	296	430	148	67.1	154	4.36	20.4:1	2200	998

* Note: All models assume overhung load located at 1.000" (25.40mm) from the face of the motor.

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

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 case assembly.....	18
9.2	Direct drive models: assembly.....	18
9.3	Geared models: assembly.....	20

10	Spare parts	
10.1	MB Series Direct Drive Power Motor.....	22
10.2.1	MB Series Geared Power Motor.....	24
10.2.2	MB Series Geared Power Motor.....	26
10.3	Single Direction Valving.....	28
10.4	Reversible Valving.....	28
11	Technical data	30
11.1	MB 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 MB tools. The MB 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 MB is designed exclusively as a power source to be integrated into an application.

- Do not modify the MB, 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 MB
- 1 PL70-1047EN instruction manual
- 1 Declaration of Conformity (if applicable)
- 1 Lubrication sheet
- 1 Warranty statement

2.2 Transport

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

For storage longer than 2 hours:

➔ Disconnect the air supply from the MB

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

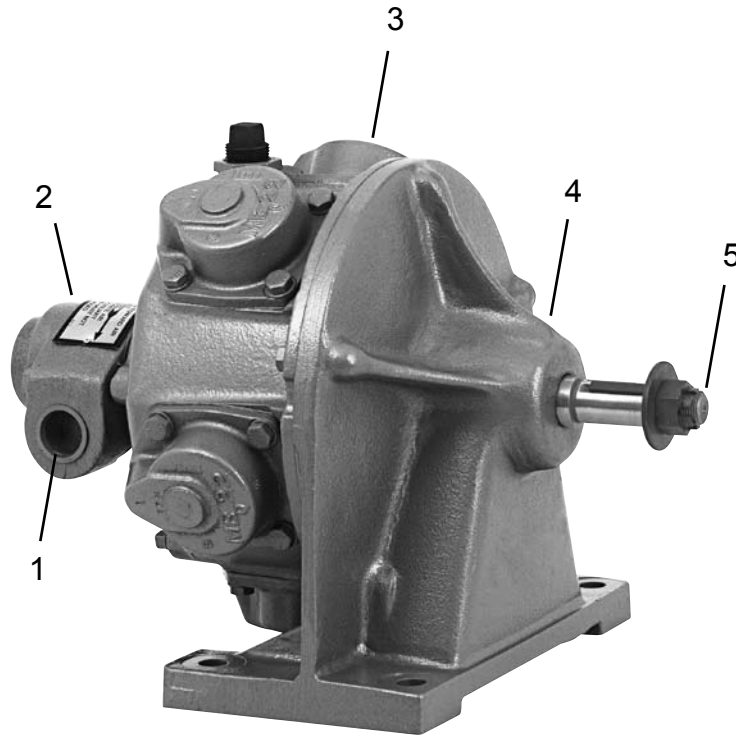
3 Product description

3.1 General description

- Pneumatic powered radial piston power motor
- 5.5 Horsepower
- Direct drive or geared model options
- No valving, single direction valving and reversible valving options

3.2 Operation and functional elements

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



Ref.	Description
1	Air Inlet
2	Valve Chest
3	Motor Assembly
4	Gearing Assembly
5	Output Shaft

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: 1" (25,4 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

Oil identification

Fill the motor to the proper level before operating.

Use engine oil API Service Classified "SC" in the following weights:

- Above 32° F: SAE 30W
- Below 32° F: SAE 10W

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 MB series motors are a five cylinder radial piston type. This radial design, with its overlap of power impulses, provides even torque at all speeds and full power in either direction of rotation. At least two pistons are always on a power stroke.

These motors are designed for continuous service on 60-100 PSI air pressure. If overloaded beyond their power capacity, the motor will simply stall without causing any damage.

- 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.

Continuous Operation: Do not operate the MB motors faster than 65% of free speed. Install a filter/lubricator unit in the air line as close as possible to the MB motor.

Intermittent Operation: The splash lubrication from the motor case will be adequate.

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 MB 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 breather cap to make sure it is not plugged, clean or replace→ Remove the motor case drain plug to allow water and condensate to drain out→ Check oil levels in the motor case and gear case, add as necessary

8.2 Lubricants

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

Oil identification

Fill the motor to the proper level before operating.

Use engine oil API Service Classified "SC" in the following weights:

- Above 32° F: SAE 30W
- Below 32° F: SAE 10W

If the air line carries an excessive amount of water and a water trap cannot be installed, use a good grade of motor oil that will emulsify with water to prevent damage to vital parts of the motor.

Oil quantity

Approximately 1 quart of oil is required to fill the motor case to the proper oil level. Approximately 1 quart of oil is required to fill the gear case to the proper oil level. The oil must flow at all times to properly lubricate the motor components, gears and bearings.

To check the MB for proper oil level, open the oil level pet cock. If oil does not flow from the pet cock, add the proper oil until oil begins to flow. Securely tighten the oil level pet cock.

Remove the oil drain plug in the motor case occasionally and drain off accumulated water before adding new oil.

Excessive use of oil is usually due to:

- Worn pistons
- Worn piston rings
- Worn distributing valve and bushing
- Damaged oil seals
- Clogged breather cap

9 Repair instructions

9.1 Motor case assembly

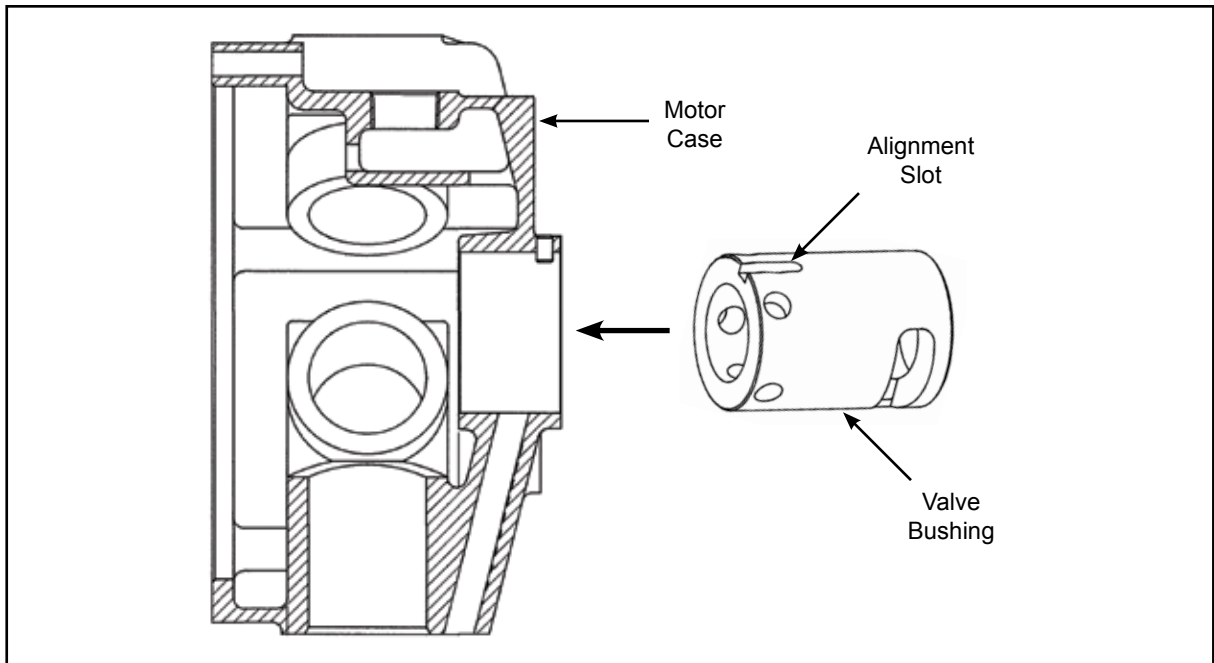
Install the pin (DP114) into the motor case until approximately 1/8" is exposed in the distributing valve bushing hole.

Install the valve bushing (ME11) into the motor case counter bore until it is flush with the inside edge of the counter bore. The valve bushing has a slot to enable proper alignment during assembly.

NOTE



The valve bushing must be placed in a freezer, for a period of time, before assembling into the motor case. This will cause the bushing to contract allowing easier assembly into the motor case.



9.2 Direct drive models: assembly

- Install the piston rings in the grooves on the pistons. The step on the ring must be toward the open part of the piston.
- Assemble a retainer into one end of the hole in the pistons.
- Slip the bushing (MB33), chamfer down, over the crankshaft (drive end) until it bottoms out. Line up the oil holes with the groove in the crankshaft.
- Put a light coating of oil on the bushing (MB28) and slide it over the bushing (MB33) on the crankshaft.
- Tap the key (35D13) into the keyway on the crankshaft.
- Place one connecting rod retainer over the bushing (MB28). Place the five connecting rods into the connecting rod retainer. Make sure the lettering on the rods are up. Place the other connecting rod retainer over the connecting rods and bushing (MB28).
- Assemble the crankshaft (drive end) to the crankshaft (valve end). Line up the shaft groove with the hole in the crankshaft and insert the screw (75S44). Secure with the nut (50E3) and cotter pin.

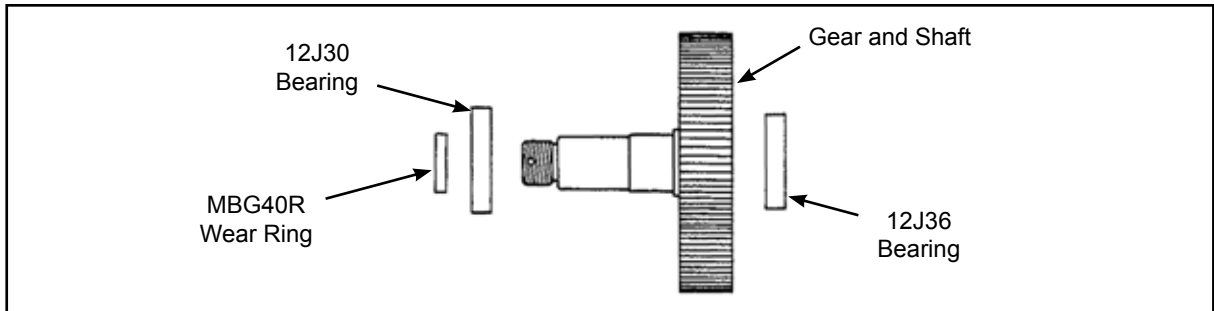
9.2 Direct drive models: assembly (continued)

- Press the bearing (525424) onto the crankshaft assembly until it bottoms out.
- Place the crankshaft assembly into the motor case and tap into position.
- Using the piston pins, attach the five pistons to the connecting rods and secure with the retainers (M26).
- Place a cylinder gasket on each of the cylinders. Oil the inside of the cylinders.
- Compress the piston rings and slide a cylinder over each piston. Secure the cylinders using the washers (95G33) and screws (B113N). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Lightly oil the valve bushing and distributor valve. Insert the distributor valve into the valve bushing (locate in dowel pin).
- Slide the valve chest over the bushing and secure with two washers (95G33) and screws (75A24). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Apply air to the unit and test run in one direction only.
- Press the bearing (12GG1) into the frame until it bottoms out.
- Place the bearing (12J36) onto the non-threaded end of the shaft until it bottoms out.
- Tap the key (35B143) into the motor shaft keyway.
- Place the shaft assembly into the crankshaft assembly and tap in until it bottoms out.
- Place the gasket on the motor case and assemble the motor case to the motor frame, breather hole up. Secure with washers (95G33) and screws (B113N). Tighten the screws to 21 ft. lbs (28.5 Nm) torque.
- Assemble the pipe plugs and drain cock. Fill the motor case with 1 quart of oil.

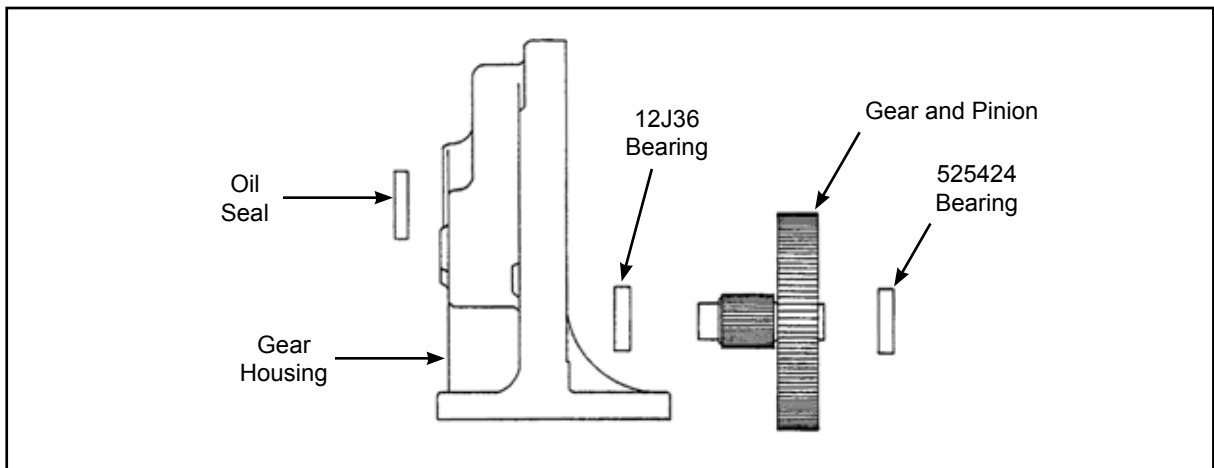
Cleco® Repair Instructions

9.3 Geared models: assembly

- Press the bearing (525424) onto the large gear end of the gear and pinion.
- Press the bearing (12J36) onto the geared end of the gear and shaft until it bottoms out. Press the bearing (12J30) and then the wear ring (MBG40R) onto the threaded end of the gear and shaft until they bottom out.



- Press the oil seal (60G115) into the gear housing until it is flush with the outside edge of the housing.
- Press the gear and pinion bearing (12J36) into the housing until it bottoms out.
- Insert the gear and shaft assembly into the gear housing and tap in until it bottoms out.
- Install the gear and pinion assembly into the gear housing.



- Place the bearing housing (HBD39) on the bearing housing (MBG20) and secure with three washers (W161PT) and screws (B115R). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Place the gasket (MBG25) over the gear housing and assemble the bearing housing. Secure with three washers (95G33) and screws (75A7). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Press the bearing (12GG1) onto the pinion gear until it bottoms out. Tap the key (35B143) into the pinion gear keyway. Insert the pinion gear assembly into the crankshaft assembly until it bottoms out.

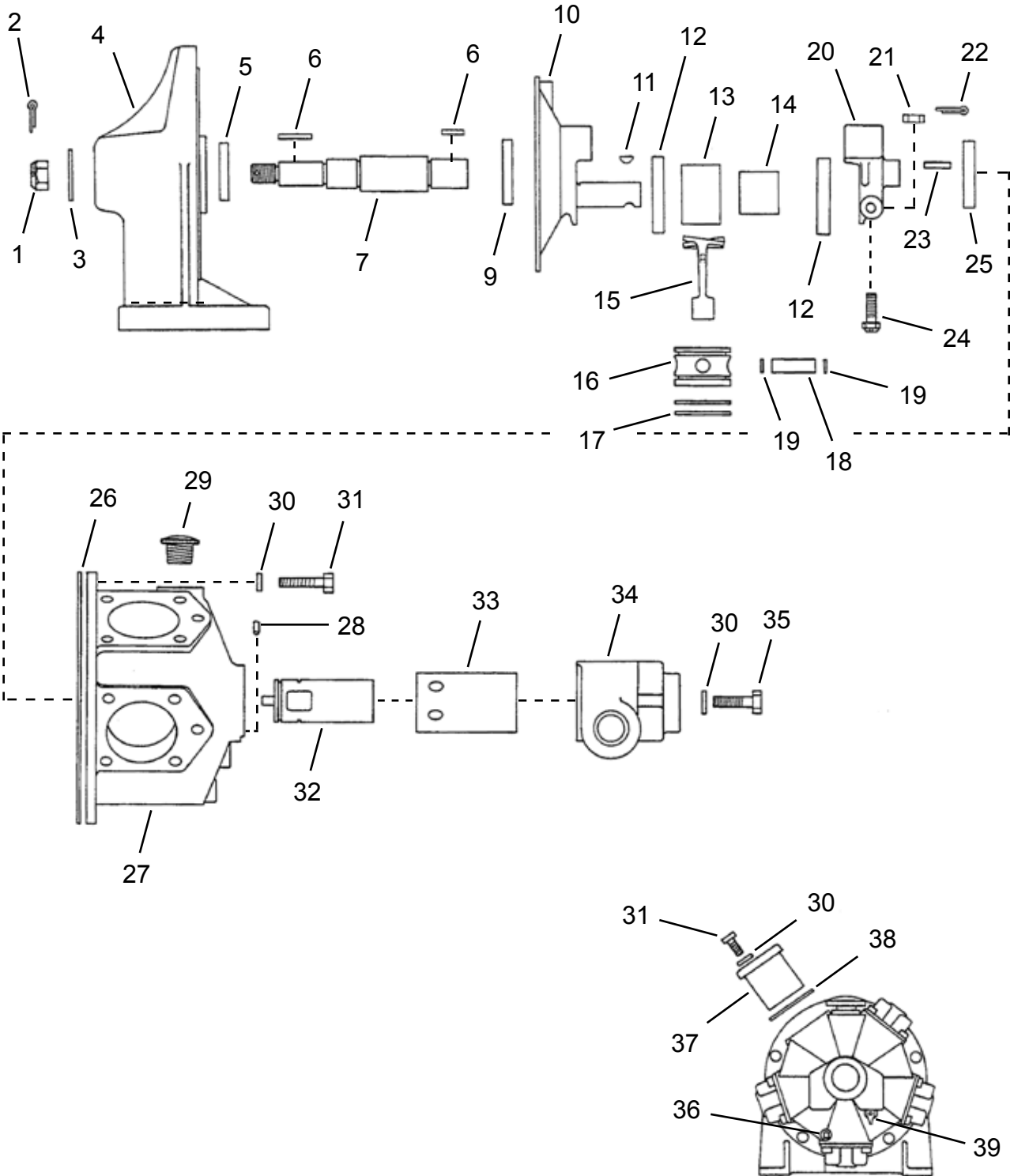
9.3 Geared models: assembly (continued)

- Install the piston rings in the grooves on the pistons. The step on the ring must be toward the open part of the piston.
- Assemble a retainer into one end of the hole in the pistons.
- Slip the bushing (MB33), chamfer down, over the crankshaft (drive end) until it bottoms out. Line up the oil holes with the groove in the crankshaft.
- Put a light coating of oil on the bushing (MB28) and slide it over the bushing (MB33) on the crankshaft.
- Tap the key (35D13) into the keyway on the crankshaft.
- Place one connecting rod retainer over the bushing (MB28). Place the five connecting rods into the connecting rod retainer. Make sure the lettering on the rods are up. Place the other connecting rod retainer over the connecting rods and bushing (MB28).
- Assemble the crankshaft (drive end) to the crankshaft (valve end). Line up the shaft groove with the hole in the crankshaft and insert the screw (75S44). Secure with the nut (50E3) and cotter pin.
- Press the bearing (525424) onto the crankshaft assembly until it bottoms out.
- Place the crankshaft assembly into the motor case and tap into position.
- Using the piston pins, attach the five pistons to the connecting rods and secure with the retainers (M26).
- Place a cylinder gasket on each of the cylinders. Oil the inside of the cylinders.
- Compress the piston rings and slide a cylinder over each piston. Secure the cylinders using the washers (95G33) and screws (B113N). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Lightly oil the valve bushing and distributor valve. Insert the distributor valve into the valve bushing (locate in dowel pin).
- Slide the valve chest over the bushing and secure with two washers (95G33) and screws (75A24). Tighten the screws to 21 ft. lbs. (28.5 Nm) torque.
- Apply air to the unit and test run in one direction only.
- Place the gasket on the motor case and assemble the motor case to the gear housing assembly, breather hole up. Secure with washers (95G33) and screws (B113N). Tighten the screws to 21 ft. lbs (28.5 Nm) torque.
- Assemble the pipe plugs and drain cock. Fill the motor case with 1 quart of oil and the gear housing with 1 quart of oil.

10.1 MB Series Direct Drive Power Motor

Models

MBW410M (without valving)
MBW374M (single direction)



10.1 MB Series Direct Drive Power Motor

Ref	Number	#	X	EN
				Description
1	C109W	1	2	Output Shaft Hex Nut
2	P101K	1	3	Cotter Pin
3	W10	1	2	Output Shaft Washer
4	MBA7	1		Motor Frame
5	12GG1	1	2	Ball Bearing
6	1035557	1	3	Motor Shaft Key
7	MBA3	1		Motor Shaft
8	35B143	1	3	Woodruff Key
9	12J36	1	2	Ball Bearing
10	1MB30X	1		Crankshaft (Drive End)
11	35D13	1	3	Woodruff Key
12	MB29	2		Connecting Rod Retainer
13	MB28	1		Bushing
14	MB33	1		Bushing
15	MB27	5		Connecting Rod
16	MB24	5		Piston
17	65A219	10	10	Piston Ring
18	MB25	5		Piston Pin
19	MB26	10	10	Piston Pin Retainer
20	1MB31	1		Crankshaft (Valve End)
21	50E3	1	2	Crankshaft Nut
22	P101J	1	3	Cotter Pin
23	20572	1		Crankshaft Pin
24	75S44	1		Screw
25	525424	1	2	Ball Bearing
26	MB19	1	3	Motor Case Gasket
27	MB18	1		Motor Case (includes Ref. 28)
28	DP114	1		Motor Case Pin
29	542139	1	2	Breather Cap
30	95G33	27	27	Flat Washer
31	B113N	25	25	Motor Case Screw
32	ME13	1		Distributor Valve
33	ME11	1		Distributor Valve Bushing
34	533690	1		Valve Chest
35	75A24	2	2	Valve Chest Screw
36	64AA5	3		Pipe Plug
37	MB22PT	5		Cylinder
38	MB23	5	15	Cylinder Gasket
39	90C12	1	2	Drain Cock

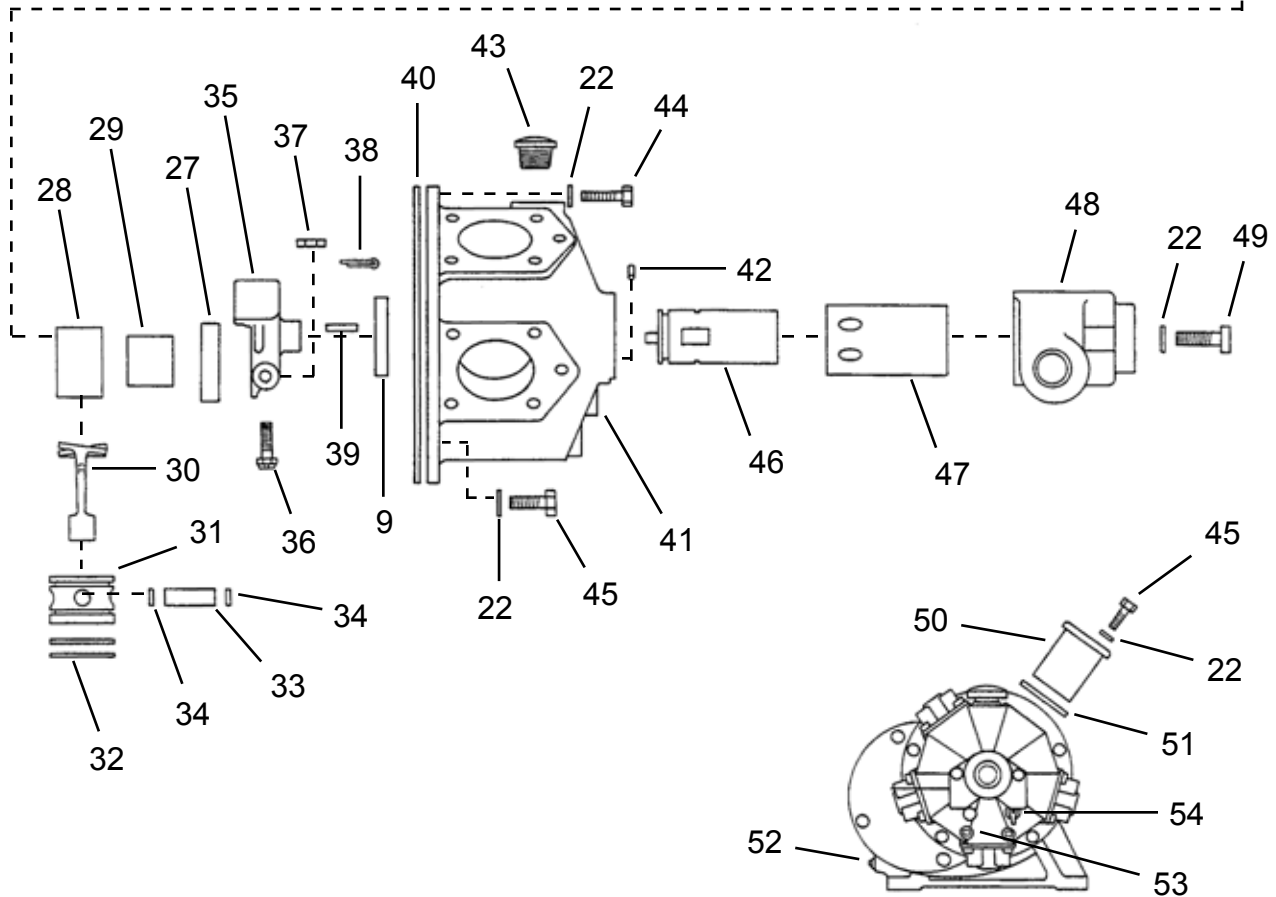
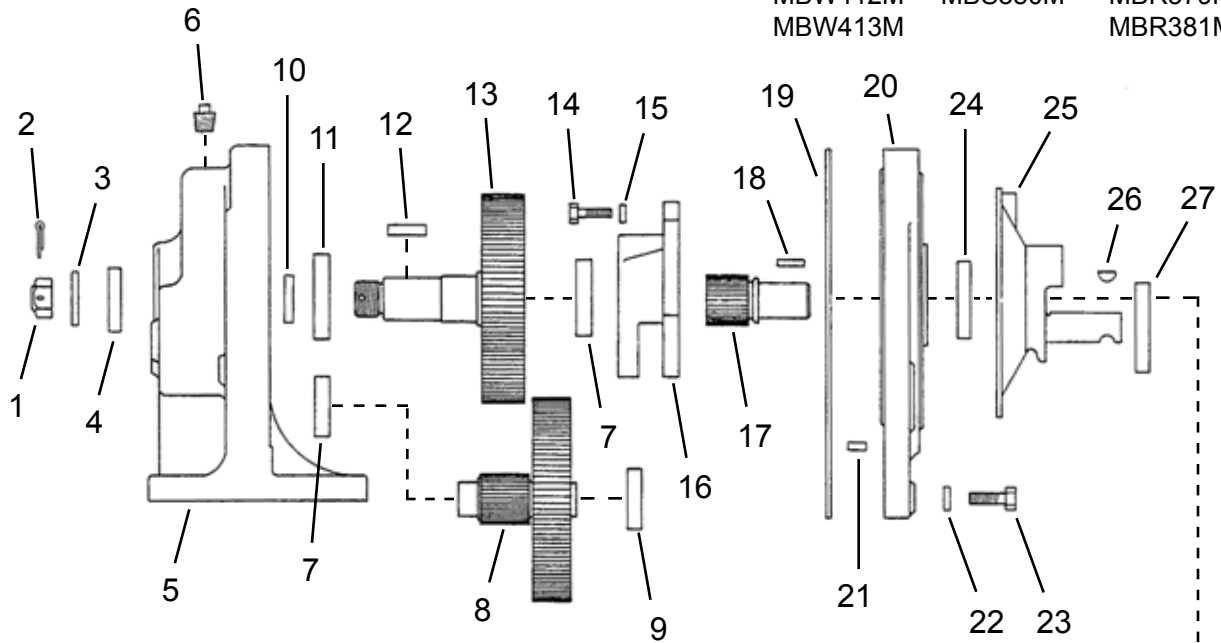
(#) Quantity

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

10.2.1 MB Series Geared Power Motor

Models

MBW411M	MBS376M	MBR377M
MBW412M	MBS380M	MBR379M
MBW413M		MBR381M



10.2.1 MB Series Geared Power Motor

Ref	Number	#	X	EN
				Description
1	MKU52	1	2	Output Shaft Hex Nut
2	62E66	1	3	Cotter Pin
3	95A11	1	2	Output Shaft Washer
4	60G115	1	3	Oil Seal
5	MBG1	1		Gear Housing
6	64A5	1	2	Pipe Plug
7	12J36	2	4	Ball Bearing
8	Table 10.2	1		Gear and Pinion
9	525424	2	4	Ball Bearing
10	MBG40R	1	3	Wear Ring
11	12J30	1	2	Ball Bearing
12	35C113	1	2	Gear and Shaft Key
13	Table 10.2	1		Gear and Shaft
14	B115R	3	3	Bearing Housing Screw
15	W161PT	3	3	Flat Washer
16	HBD39			Bearing Housing
17	Table 10.2	1		Pinion Gear
18	35B143	1	3	Pinion Gear Key
19	MBG25	1	3	Bearing Housing Gasket
20	MBG20	1		Bearing Housing (includes Ref. 22)
21	DP162	1		Pin
22	93G33	30	30	Flat Washer
23	75A7	3	3	Bearing Housing Screw
24	12GG1	1	2	Ball Bearing
25	1MB30X	1		Crankshaft (Gear End)
26	35D13	1	3	Crankshaft Key
27	MB29	2		Connecting Rod Retainer
28	MB28	1		Bushing
29	MB33	1		Crankshaft Bushing
30	MB27	5		Connecting Rod
31	MB24	5		Piston
32	65A219	10	10	Piston Ring
33	MB25	5		Piston Pin
34	MB26	10	10	Piston Pin Retainer

(#) Quantity

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

Table 10.2.1

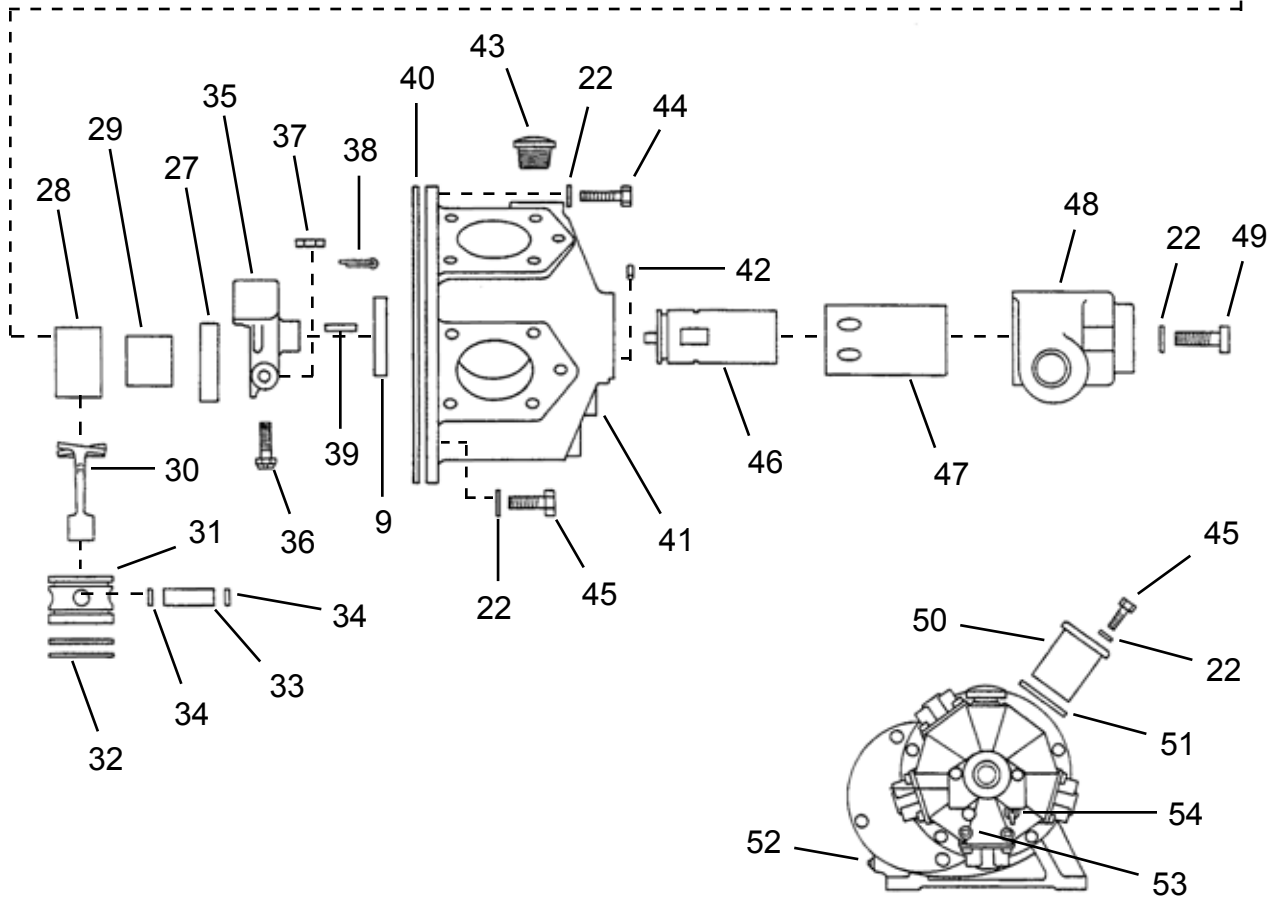
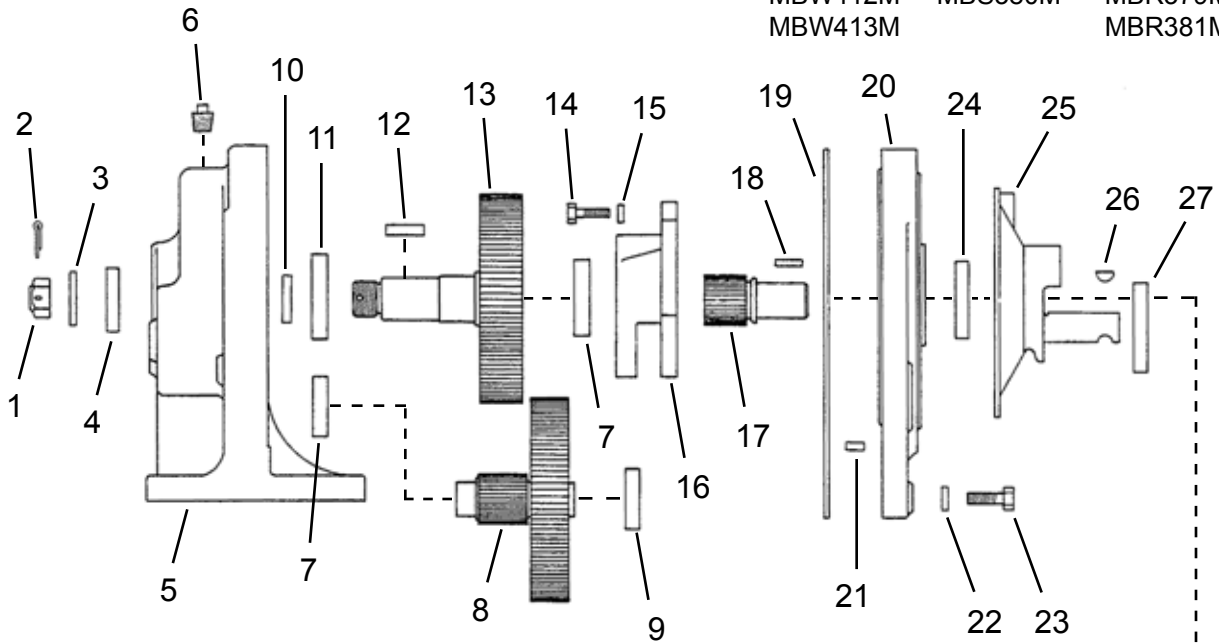
Ref.	Description	#	MBS376M MBR377M MBW411M	#	MBR379M MBW412M	#	MBS380M MBR381M MBW413M
--	Gear Ratio		20.4:1		11.3:1		5.6:1
--	Valving		Note 1		Note 1		Note 1
8	Gear and Pinion	1	HBD38	1	MEH38	1	MEG38
13	Gear and Shaft	1	MBG40A	1	MEH40	1	MEG40A
17	Pinion Gear	1	HBD13A	1	HBD13A	1	MEG13A

Note 1: MBW = no valving, MBS = Single Direction, MBR = Reversible

10.2.2 MB Series Geared Power Motor

Models

MBW411M	MBS376M	MBR377M
MBW412M	MBS380M	MBR379M
MBW413M		MBR381M



10.2.2 MB Series Geared Power Motor (continued)

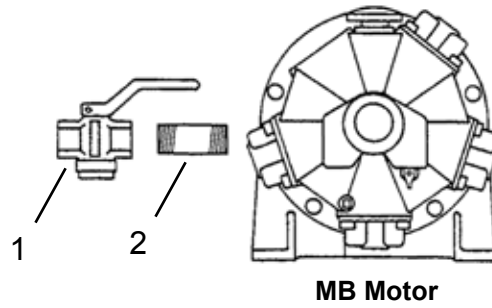
Ref	Number	#	X	EN
				Description
35	1MB31	1		Crankshaft (Valve End) (includes Ref. 39)
36	75S44	1		Crankshaft Screw
37	50E3	1		Crankshaft Screw Nut
38	P101J	1	3	Cotter Pin
39	20572	1	2	Crankshaft Pin
40	MB19	1	3	Motor Case Gasket
41	MB18	1		Motor Case (includes Ref. 42)
42	DP114	1		Motor Case Pin
43	542139	1	2	Breather Cap
44	75A23	3	3	Motor Case Screw
45	B113N	22	22	Screw
46	ME13	1		Distributor Valve
47	ME11	1		Distributor Valve Bushing
48	533690	1		Valve Chest
49	75A24	2	2	Valve Chest Screw
50	MB22PT	5		Cylinder
51	MB23	5	15	Cylinder Gasket
52	64AA4	1		Pipe Plug
53	64AA5	3		Pipe Plug
54	90C12	2	2	Drain Cock

(#) Quantity

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

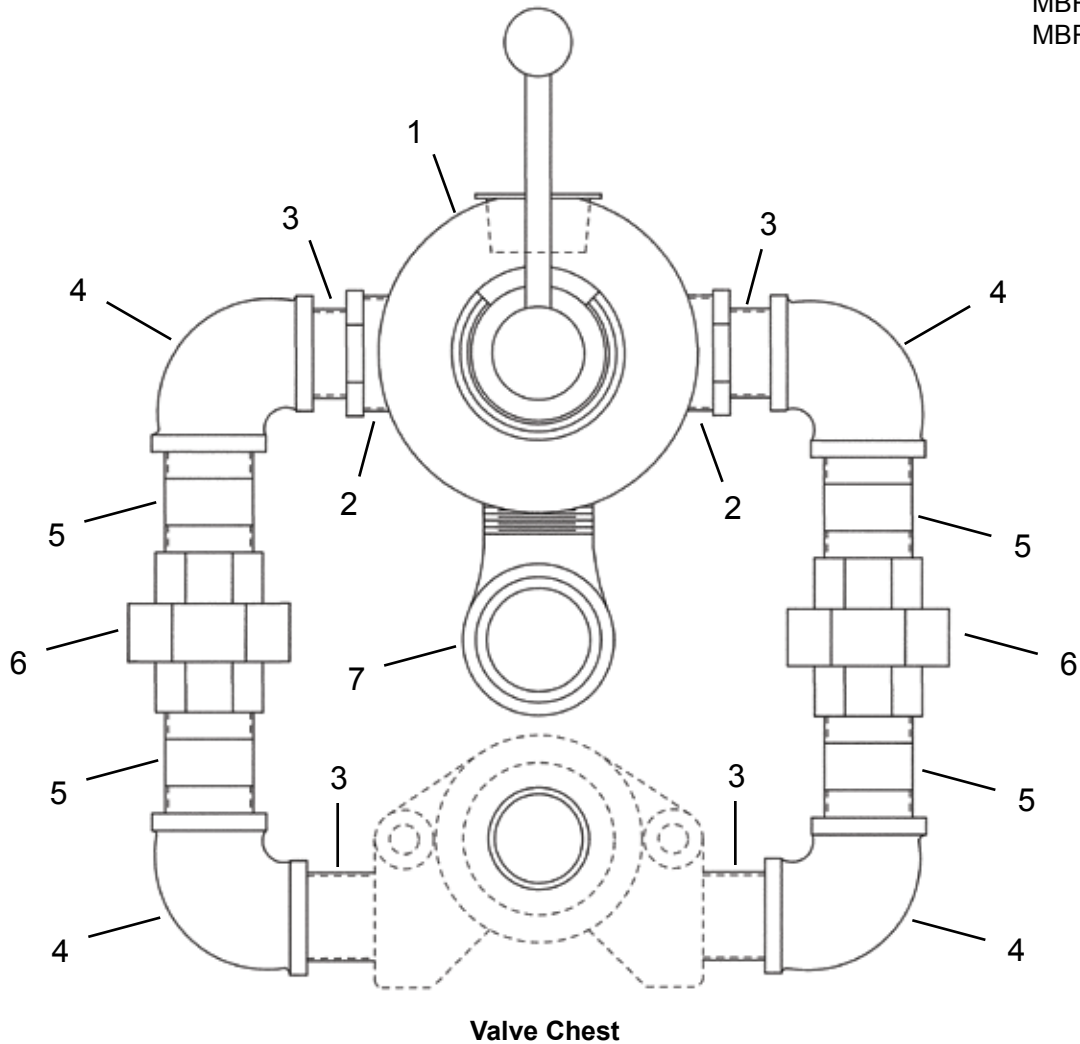
10.3 Single Direction Valving

Models
MBS376M
MBS380M



10.4 Reversible Valving

Models
MBR377M
MBR379M
MBR381M



10.3 Single Direction Valving

Ref	Number	#	X	EN
				Description
1	90A36	1		Air Control Valve
2	63H4	1		Pipe Nipple

(#) Quantity

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

10.4 Reversible Valving

Ref	Number	#	X	EN
				Description
1	539527	1		4-Way Air Control Valve
2	F533	2		Pipe Bushing (1-1/4" to 1" NPT)
3	F528	4		Pipe Nipple (1" NPT)
4	818450	4		90° Street Elbow (1" NPT)
5	63H3	4		Pipe Nipple (1" NPT)
6	64Z7	2		Union (1" NPT)
7	64D7	1		90° Street Elbow (1-1/4" NPT)

(#) Quantity

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

11 Technical data

11.1 MB 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
Single Direction Valving													
MBS374M	1520	3000	34	46	15	20	100	45.4	166	4.70	----	1310	594
MBS380M	270	540	192	260	81	110	145	65.8	144	4.08	5.6:1	2200	998
MBS376M	75	150	700	949	296	401	145	65.8	167	4.73	20.4:1	2200	998
Reversible Valving													
MBR381M	268	540	192	260	81	222	148	67.1	140	3.96	5.6:1	2200	998
MBR379M	133	270	388	526	164	401	148	67.1	148	4.19	11.3:1	2200	998
MBR377M	74	150	700	949	296	20	148	67.1	154	4.36	20.4:1	2200	998
without Valving													
MBW410M	1500	3000	34	46	15	222	103	46.7	152	4.30	----	1310	594
MBW413M	268	540	192	260	81	401	148	67.1	140	3.96	6.5:1	2200	998
MBW412M	133	270	388	526	164	218	148	67.1	148	4.19	11.3:1	2200	998
MBW411M	74	150	700	949	296	430	148	67.1	154	4.36	20.4:1	2200	998

* Note: All models assume overhung load located at 1.000" (25.40mm) from the face of the motor.

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

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**
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Auburn Hills, MI 48326
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Lexington, South Carolina

Apex Tool Group
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