

Instruction Manual
45-8060EN
07/08/2013

OMEGA TECHNOLOGIES

Cleco®

21 Series
Single Reduction Rotary Vane Power Motors



For additional product information visit our website at:
<https://dotcotool.com/product-category/cleco-tools/cleco-air-motors/cleco-21-series-rotary-vane-side-exhaust-air-motors/>

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

Identification text:

21 represents all models of the rotary 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

45-8060EN
07/08/2013

Rotation Direction	Housing Style	Output Speed - RPM		Exhaust
		3200	5000	
Right	Round	21-1300	21-1500	Side
Right	Round	21-1340	21-1540	Rear
Right	Flange and Base Mounting	21M1300	21M1500	Side
Right	Flange and Base Mounting	21M1340	21M1540	Rear
Left *	Round	21D1300-49	21D1500-49	Side
Left *	Round	21D1340-49	21D1540-49	Rear
Left *	Flange and Base Mounting	21V1300-49	21V1500-49	Side
Left *	Flange and Base Mounting	21V1340-49	21V1540-49	Rear

* Note: Left hand rotation (not reversible)

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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.

Work Area:

CAUTION!



- 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 21 series tools. The 21 series 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 21 series are designed exclusively as a power source to be integrated into an application.

- Do not modify the 21 series, 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 21 series motor
- 1 45-8060EN instruction manual
- 1 Declaration of Conformity (if applicable)
- 1 Lubrication sheet
- 1 Warranty statement

2.2 Transport

Transport and store the 21 series in the original packaging. The packaging is recyclable.

2.3 Storage

For short term storage (less than 2 hours) and protection against damage:

➔ Secure the 21 series to avoid accidental startup.

For storage longer than 2 hours:

➔ Disconnect the air supply from the 21 series

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

3 Product description

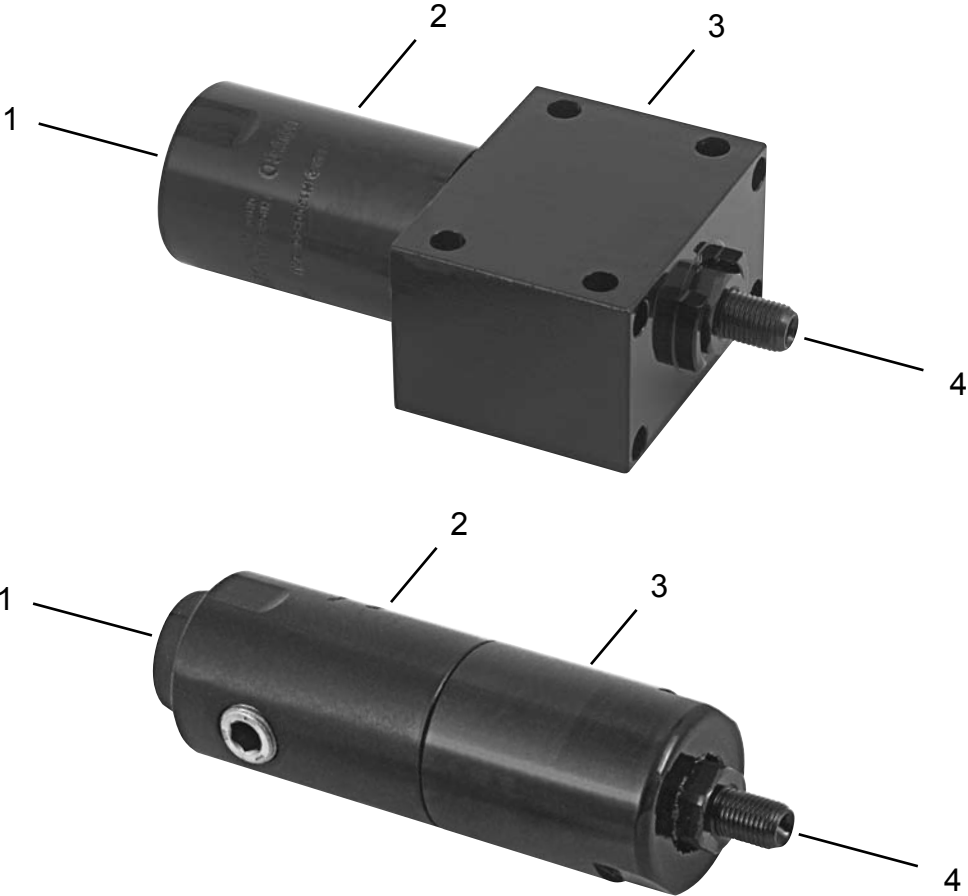
3.1 General description

- Pneumatic powered rotary vane power motor
- 0.3 Horsepower
- Double geared
- Round housing or Flange and Base mounting options

3.2 Operation and functional elements

This section describes the operational and functional elements of the 21 series.

3.2 Operation and functional elements (continued)



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

4 Accessories
None listed

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: 1/4" (6,4 mm) 5/16" I.D. Air Hose: Maximum length run of 10.0' (3 m) 3/8" I.D. Air Hose: Runs over 10.0' (3 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

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

WARNING!



- 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 21 series are rotary vane type motors. 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 21 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 21 series 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 airline lubricator for proper function
	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 airline lubricator for proper function

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

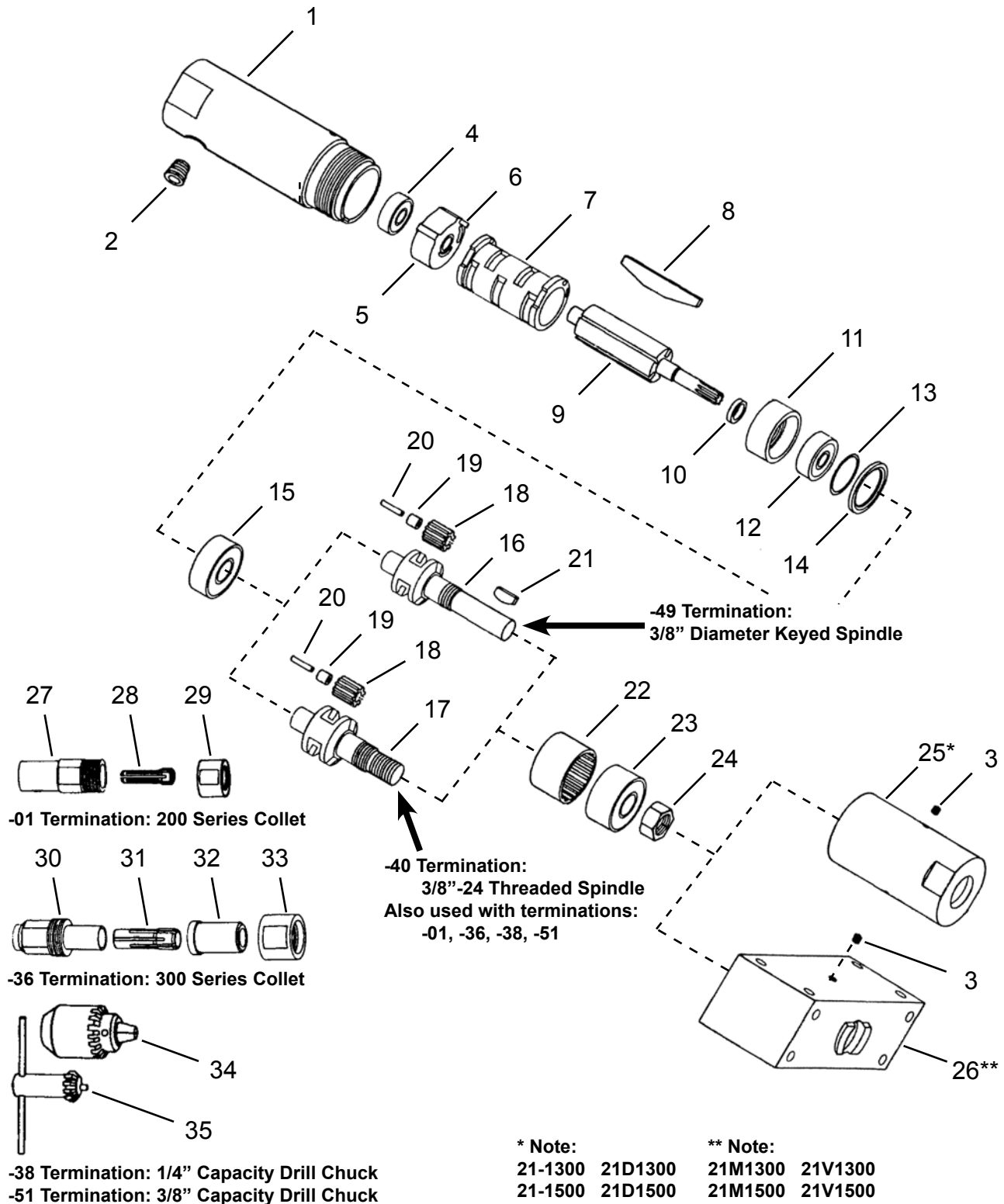
DO NOT SUBSITUTE LUBRICANTS!

9 Repair instructions

10.1 21 Series - Side Exhaust Models

Models

21(-)1300(--)
21(-)1500(--)



10.1 21 Series Side Exhaust Motors

Ref	Number	#	X	EN
				Description
1	1185	1		Motor Housing
2	2957	1	2	Pipe Plug (1/4-18 NPTF)
3	2831	1	2	Set Screw (#10-32)
4	504PT	1	2	Ball Bearing
5	Table 10.1	1		Bearing Plate (includes Ref. 6)
6	1041	1	2	Pin
7	1002PT	1		Cylinder
8	1006PT	5	10	Rotor Blade
9	Table 10.1	1		Rotor
10	1017PT	1		Rotor Spacer
11	1176	1		Bearing Plate
12	538PT	1	2	Ball Bearing
13	1355PT	1	2	Shim Packet
14	1563PT	1		Spacer
15	519	1	2	Ball Bearing
16	1922PT	1		Planetary Gear Carrier (-49 Termination)
17	02-1107	1		Planetary Gear Carrier (-01, -36 Termination)
	02-1114	1		Planetary Gear Carrier (-38, -40, -51 Terminations)
18	Table 10.1	2	4	Planetary Gear (includes Ref. 19)
19	1464	2	4	Planetary Gear Needle Bearing
20	1526PT	2	4	Planetary Gear Shaft
21	1920PT	1	2	Woodruff Key (-49 Termination)
22	1529PT	1		Ring Gear
23	558	1	2	Ball Bearing (-49 Termination)
	519	1	2	Ball Bearing (-01, -36, -38, -40, -51 Terminations)
24	1486PT	1	2	Lock Nut (-49 Termination)
	1706PT	1	2	Lock Nut (-38, -40, -51 Terminations)
25	1509PT	1		Round Housing
26	02-1184	1		Flange and Base Mounting Housing
Termination 01				
27	2060PT	1	2	Collet Chuck Body
28	208	1	2	1/4" Collet
29	2058PT	1	2	Collet Cap
--	14-0809	1	2	Wrench (9/16") (not shown)
--	14-0812	1	2	Wrench (3/4") (not shown)
Termination 36				
30	1400PT	1	2	Collet Chuck Body
31	308PT	1	2	1/4" Collet
32	1053PT	1	2	Nosepiece
33	1058PT	1	2	Collet Cap
--	14-0807	1	2	Wrench (7/16") (not shown)
--	14-0811	1	2	Wrench (11/16") (not shown)
Termination 38				
34	14-1485	1	1	1/4" Chuck
35	621PT	1	2	Chuck Key
Termination 40				
--	14-0810	1	2	Wrench (5/8") (not shown)
Termination 51				
34	14-1489	1	1	1/4" Chuck
35	14-2169	1	2	Chuck Key

(#) Quantity

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

Table 10.1

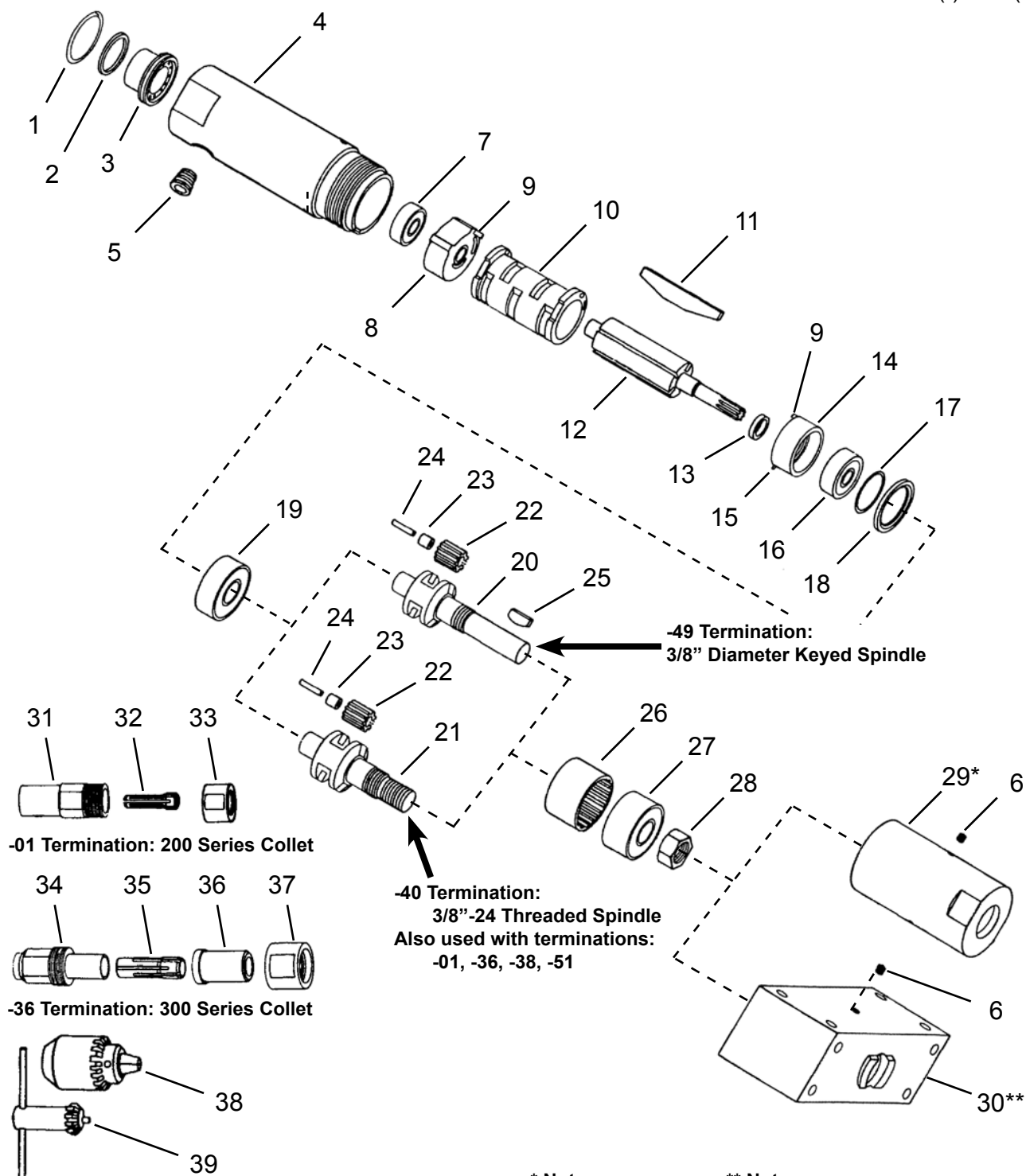
Ref.	Description	#	21-1300 21M1300	#	21-1500 21M1500	#	21D1300 21V1300	#	21D1500 21V1500
5	Bearing Plate	1	1203PT	1	1203PT	1	2157PT	1	2157PT
9	Rotor	1	2912S	1	1959	1	2912S	1	1959
18	Planetary Gear	2	1536 (18T)	2	1540PT (16T)	2	1536 (18T)	2	1540PT (16T)

(T) Teeth

10.2 21 Series - Rear Exhaust Models
Models

21(-)1340(--)

21(-)1540(--)



* Note:

21-1340 21D1340

21-1540 21D1540

** Note:

21M1340 21V1340

21M1540 21V1540

10.2 21 Series Rear Exhaust Motors

Ref	Number	#	X	EN
				Description
1	2690PT	1	3	Retaining Ring
2	1838PT	1	3	O-Ring
3	2685	1	2	Muffler
4	02-1183	1		Motor Housing
5	2957	1	2	Pipe Plug (1/4-18 NPTF)
6	2831	1	2	Set Screw (#10-32)
7	504PT	1	2	Ball Bearing
8	Table 10.2	1		Bearing Plate (includes 1 Ref. 9)
9	1041	2	4	Pin
10	1002PT	1		Cylinder
11	1006PT	5	10	Rotor Blade
12	Table 10.2	1		Rotor
13	1017PT	1		Rotor Spacer
14	Table 10.2	1		Bearing Plate (includes 1 Ref. 9 and 15)
15	2964	1	2	Pin
16	538PT	1	2	Ball Bearing
17	1355PT	1	2	Shim Packet
18	1563PT	1		Spacer
19	519	1	2	Ball Bearing
20	1922PT	1		Planetary Gear Carrier (-49 Termination)
21	02-1107	1		Planetary Gear Carrier (-01, -36 Termination)
	02-1114	1		Planetary Gear Carrier (-38, -40, -51 Terminations)
22	Table 10.2	2	4	Planetary Gear (includes Ref. 23)
23	1464	2	4	Planetary Gear Needle Bearing
24	1526PT	2	4	Planetary Gear Shaft
25	1920PT	1	2	Woodruff Key (-49 Termination)
26	1529PT	1		Ring Gear
27	558	1	2	Ball Bearing (-49 Termination)
	519	1	2	Ball Bearing (-01, -36, -38, -40, -51 Terminations)
28	1486PT	1	2	Lock Nut (-49 Termination)
	1706PT	1	2	Lock Nut (-38, -40, -51 Terminations)
29	1509PT	1		Round Housing
30	02-1184	1		Flange and Base Mounting Housing
Termination 01				
31	2060PT	1	2	Collet Chuck Body
32	208	1	2	1/4" Collet
33	2058PT	1	2	Collet Cap
--	14-0809	1	2	Wrench (9/16") (not shown)
--	14-0812	1	2	Wrench (3/4") (not shown)
Termination 36				
34	1400PT	1	2	Collet Chuck Body
35	308PT	1	2	1/4" Collet
36	1053PT	1	2	Nosepiece
37	1058PT	1	2	Collet Cap
--	14-0807	1	2	Wrench (7/16") (not shown)
--	14-0811	1	2	Wrench (11/16") (not shown)
Termination 38				
38	14-1485	1	1	1/4" Chuck
39	621PT	1	2	Chuck Key
Termination 40				
--	14-0810	1	2	Wrench (5/8") (not shown)
Termination 51				
38	14-1489	1	1	1/4" Chuck
39	14-2169	1	2	Chuck Key

(#) Quantity

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

Table 10.2

Ref.	Description	#	21-1340 21M1340	#	21-1540 21M1540	#	21D1340 21V1340	#	21D1540 21V1540
8	Bearing Plate	1	1204	1	1204	1	02-1209	1	02-1209
12	Rotor	1	2912S	1	1959	1	2912S	1	1959
14	Bearing Plate	1	1531PT	1	1531PT	1	1262PT	1	1262PT
22	Planetary Gear	2	1536 (18T)	2	1540PT (16T)	2	1536 (18T)	2	1540PT (16T)

(T) Teeth

21 Series Rotary Vane Motors

11 Technical data**11.1 21 Series Specifications**

Model Number	Maximum Allowable RPM		Stall Torque		Weight		Overall Length		Air Consumption		Gear Ratio	Exhaust
	@ Max. HP	Free Speed	ft. lbs.	Nm	lbs.	kg	in.	mm	cfm	m3/min		
Round Housing - Right Hand Rotation - See Termination Options												
21-1300	1600	3200	1.8	2.44	1.7	0.77	4.34	110	12	0.34	8.3:1	Side
21-1340	1600	3200	1.8	2.44	1.6	0.73	4.34	110	12	0.34	8.3:1	Rear
21-1500	2500	5000	1.2	1.63	1.7	0.77	4.34	110	12	0.34	5.4:1	Side
21-1540	2500	5000	1.2	1.63	1.6	0.73	4.34	110	12	0.34	5.4:1	Rear
Round Housing - Left Hand Rotation - 3/8" Diameter Keyed Spindle (only)												
21D1300-49	1600	3200	1.8	2.44	1.7	0.77	4.34	110	12	0.34	8.3:1	Side
21D1340-49	1600	3200	1.8	2.44	1.6	0.73	4.34	110	12	0.34	8.3:1	Rear
21D1500-49	2500	5000	1.2	1.63	1.7	0.77	4.34	110	12	0.34	5.4:1	Side
21D1540-49	2500	5000	1.2	1.63	1.6	0.73	4.34	110	12	0.34	5.4:1	Rear
Flange and Base Mounting - Right Hand Rotation - See Termination Options												
21M1300	1600	3200	1.8	2.44	2.6	1.18	4.34	110	12	0.34	8.3:1	Side
21M1340	1600	3200	1.8	2.44	2.5	1.13	4.34	110	12	0.34	8.3:1	Rear
21M1500	2500	5000	1.2	1.63	2.6	1.18	4.34	110	12	0.34	5.4:1	Side
21M1540	2500	5000	1.2	1.63	2.5	1.13	4.34	110	12	0.34	5.4:1	Rear
Flange and Base Mounting - Left Hand Rotation - 3/8" Diameter Keyed Spindle (only)												
21V1300-49	1600	3200	1.8	2.44	2.6	1.18	4.34	110	12	0.34	8.3:1	Side
21V1340-49	1600	3200	1.8	2.44	2.5	1.13	4.34	110	12	0.34	8.3:1	Rear
21V1500-49	2500	5000	1.2	1.63	2.6	1.18	4.34	110	12	0.34	5.4:1	Side
21V1540-49	2500	5000	1.2	1.63	2.5	1.13	4.34	110	12	0.34	5.4:1	Rear

Termination Options for Right Hand Rotation Models:

- 01 Series 200 Collet Chuck (for milling and routing)
- 36 Series 300 Collet Chuck (for milling and routing)
- 38 0"-1/4" Capacity Drill Chuck
- 40 3/8"-24 Threaded Spindle
- 49 3/8" Diameter Keyed Spindle
- 51 1/16"-3/8" Capacity Drill Chuck

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.

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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