

Pneumatic Power Motors

Durability. Dependability. Industry leading
technology.



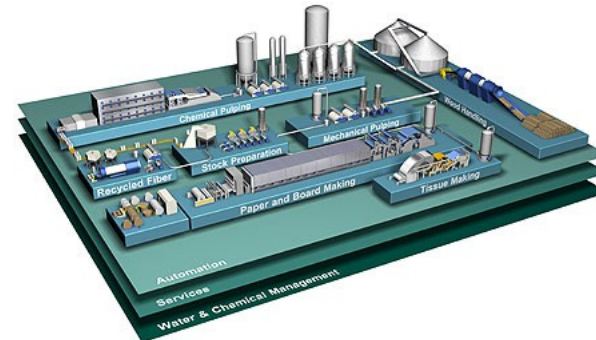
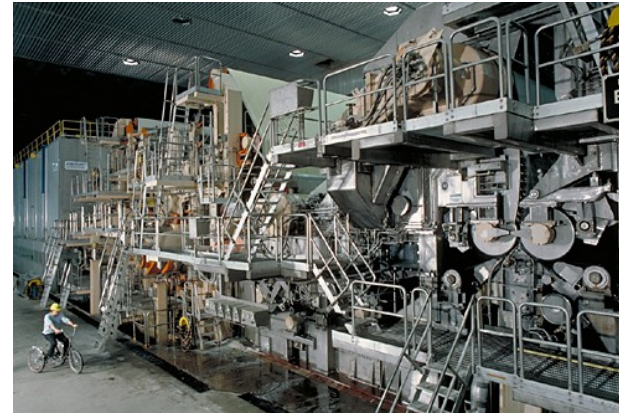
Typical End-Users

- Foundries
- Paper Mills
- Machine Manufacturers
- Power Plants
- Back-Up Units (for electric motors)
- OEM

Applications



OEM Pipeline Installation



Paper Mills



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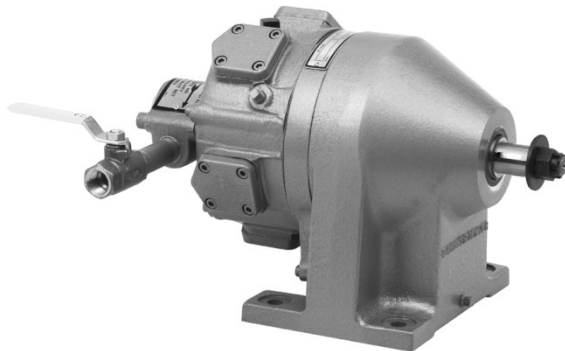
3 Types of Power

ered



- Rotary Vane

- Axial Piston

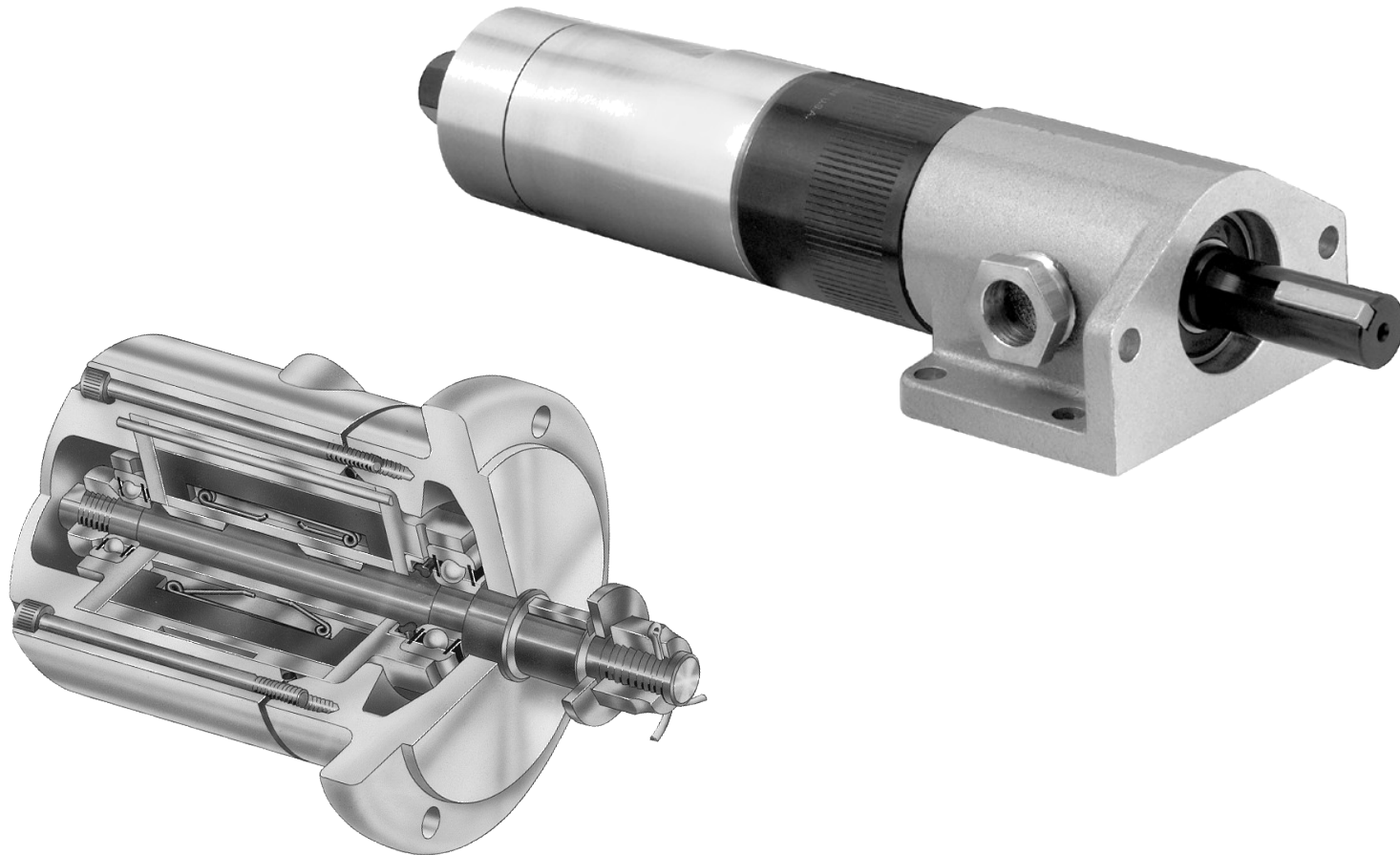


- Radial Piston

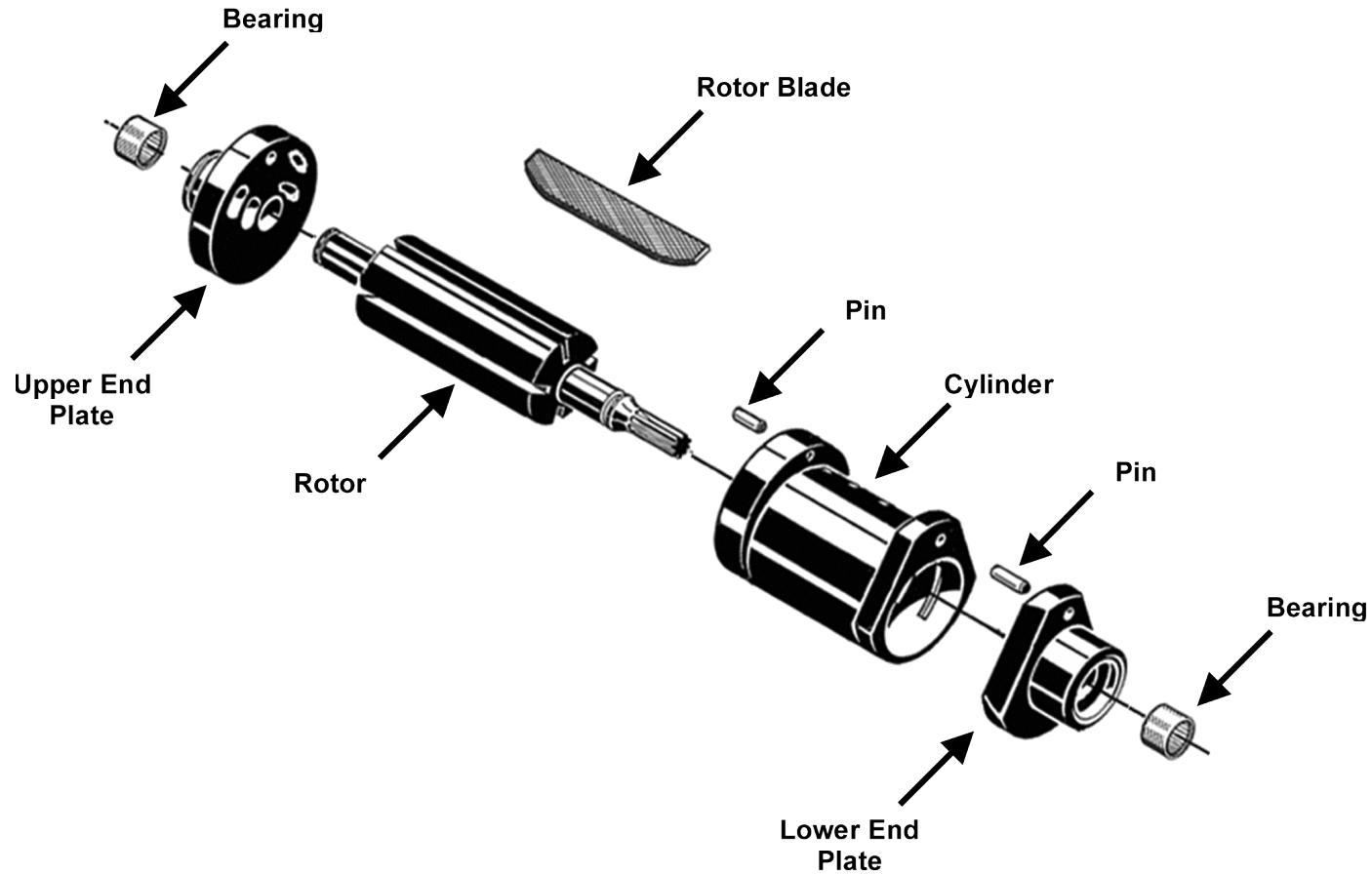
Rotary Vane Motors

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Rotary Vane Motor



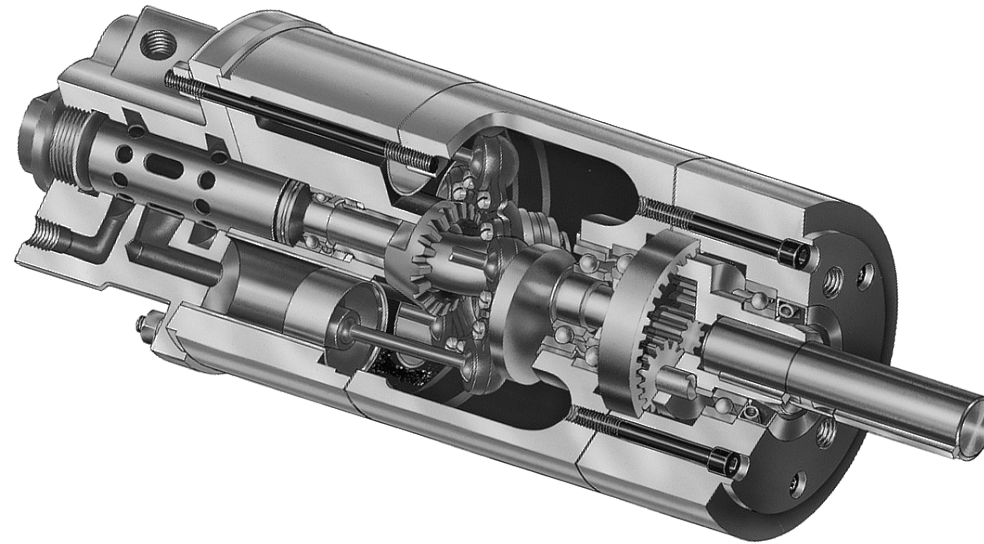
Rotary Vane Motors

- Most common pneumatic power motor type
- High speed units that deliver a high ratio of power to weight
- Available as single-directional or reversible
- Single-directional motors can be in clockwise or counter-clockwise rotation configuration

Axial Piston Motors

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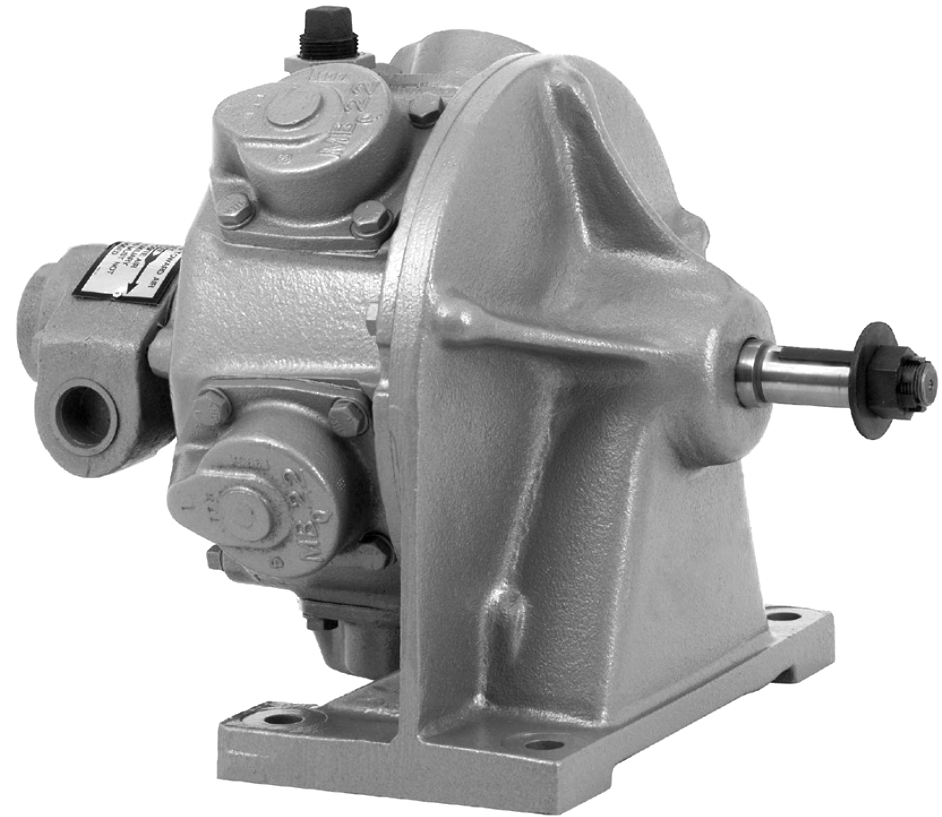
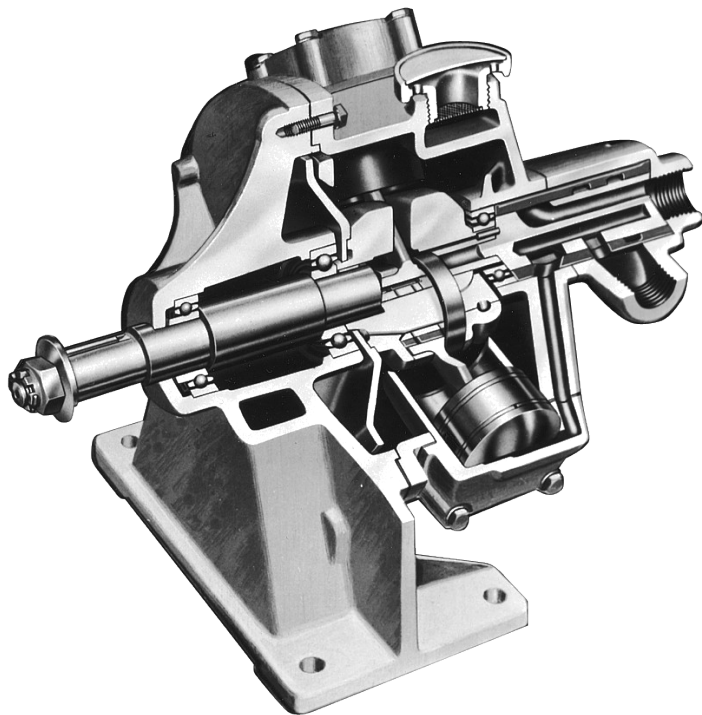
Axial Piston Motors

- Cleco is the exclusive brand of Axial Piston Motors
- Despite their relatively small size, Axial Piston motors develop high speed & power
- High torque is an inherent characteristic of the Axial Piston motor making them especially desirable for applications involving heavy starting loads

Radial Piston Motors

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Radial Piston

Motors

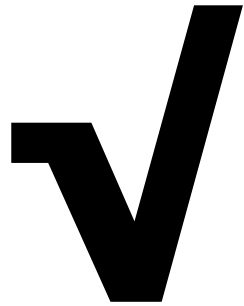
- The Radial Piston air motor is very similar to an early vintage radial piston aircraft engine, except that it is powered by air instead of fuel
- Radial piston motors are available in four, five or six cylinders
- Output torque is developed by pressure on the piston within each cylinder

Air or Electric

Motors

Characteristic	Air Motors	Electric Motors
Size & Weight	Relative light and compact, especially in smaller sizes	Generally heaviest & most bulky
Operating Safety	Explosion proof	Explosion proof housing available at extra costs.
Reversibility	Easily reversed	Reversing limited by inertia and heat build-up
Maintenance Safety	Safe for general maintenance personnel	Shock hazard; maintained by special craftsmen
Temperature Limits	To 121°C; Intermittent use; motor runs below ambient	To 40°C; motor runs hotter than ambient

Sizing the Motor - A



Rule of Thumb!

Choose a motor size that will produce the required torque & horsepower using about 2/3 of the available air line pressure

Rotary Vane Motors

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0,3HP to 7,5HP Range
Many Sizes & Configurations

Rotary Vane Motors

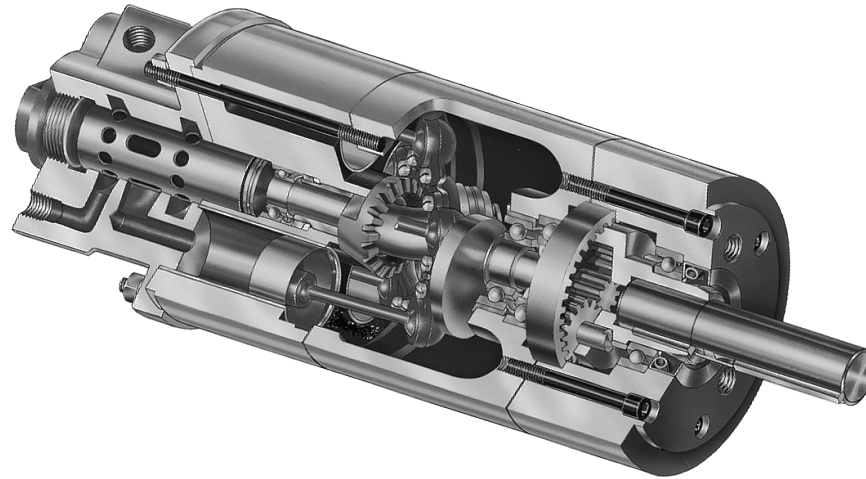
Two types:

- Large (MR Series – 1,0 to 7,5 hp)
 - Small to Medium (Various series – 0,3 to 2,3 hp)
-
- All motors feature durable construction with precision heavy duty bearings throughout & multiple blade rotors for smooth power
 - Wide range of speeds and torque as well as a choice of foot, face or flange mounting

Axial Piston Motors

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0,6HP to 2,7HP Range
4 Sizes (A2, B4, A6 & A8)

Axial Piston Motors

- These small lightweight Cleco motors are ideal for installation in close quarters
- Long life with minimum maintenance
- Generous size spindle bearings permit overhung weight on spindle with no external support
- High torque is an inherent characteristic of

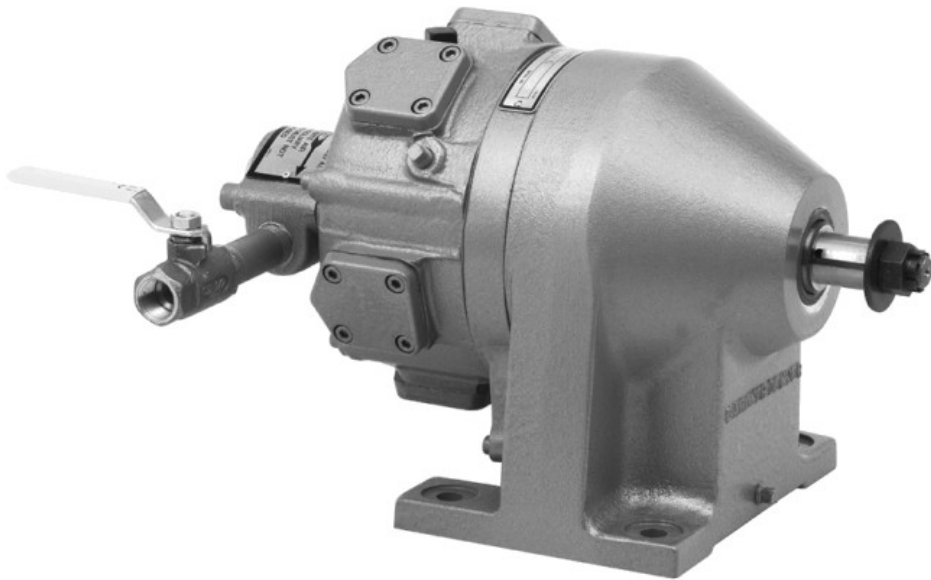
Axial Piston Motors

- Ideal for start-stop operations
- Not recommended to be operated at speeds greater than 75% of free speeds
- Enclosed type construction allows operation in corrosive or dusty environments
- Performs in high temperature environments

Radial Piston Motors

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1,5 HP to 15 HP Range
6 Sizes (MA2, MA3, MB, ME, MK & MM)

Radial Piston

Motors

- Heavy duty construction make these motors suitable for continuous operation
- The counter-balanced crankshaft is supported by anti-friction bearings
- A slinger distributes oil to all moving parts of the motor

Radial Piston

Motors

- Radial Piston motors should be operated under load & in a horizontal position
- It is not recommended that these motors be operated at speeds greater than 75% of free speed
- These motors perform in high temperature areas up to 93 °C

Selecting the right

Mountable Power Motors

easy

Choose the right Air Motor to fit your application

Apex Tool Group's air motors are engine Cleco air motors cover a wide range of advantageous: powering air driven machinery, rotating a turntable, mixing paint, power source for mechanical hands or universal

Mountable Power Motors



Rotary Vane Air Motors

Apex Tool Group offers two types of rotary series (1.0 to 7.5 hp) with spring loaded bearings throughout, and multiple blade wide range of speeds and torques as well as mounting. These motors require air line lubrication. Mount the lubricator as close to the motor as possible in high temperature areas or

Axial Piston

These small, lightweight Cleco motors are rugged construction and precision for long life with minimum maintenance. Get overhung weight on spindle with no external torque is an inherent characteristic, especially desirable for applications involving power impulses in axial piston air motor power in either direction of rotation. The load and horizontally. Axial piston motors is not recommended that they be operated. Their enclosed type construction atmospheres. These motors perform sat 200° (93° C). Grease fittings are provide air lines be equipped with filters and lubricate the motor as possible.

Radial Piston

Heavy-duty construction make these motors. The counterbalanced crankshaft is supported by oil to all moving parts of the motor accessible. High torque is an inherent characteristic, especially desirable for applications involving power impulses in radial piston air motor in either direction of rotation. At least two These motors should be operated under recommended that they be operated at These motors perform satisfactorily in high temperature areas. It is recommended that air lines be equipped with filters and lubricate the motor as possible.

Air Motor Selection

To assist in the selection of an air motor, we need any two of the following three items of information:

1. Horsepower required.
2. Speed (RPM) required against load.
3. Work load expressed in foot pounds or inch pounds of dynamic torque (moving torque load).

As air motors are dependent upon input air pressure for performance, these factors must also be considered:

1. Air pressure (psig or bars) at motor location.
2. Pipe size of air supply system to assure adequate volume (cfm or m³/min) so as to minimize line loss (air pressure drop during motor operation).
3. Plant air system pressure may vary during the day due to use by other equipment; therefore, base the selection of the air motor on the lowest psig or bars that can be expected. Then, by using a pressure regulator in the line at the motor, a uniform air supply is assured.

In applications of intermittent short service, Cleco air motors can be operated over the complete range indicated for each without harm or significant wear. In applications involving sustained continuous operation for long periods, however, some guidelines are suggested. **Do not operate piston and MR motors at more than 75% of free speed.** Consult the factory for applications requiring continuous operation of rotary vane motors at maximum HP or for any applications requiring vertical operation of these motors. Review service manuals carefully.

For two known and one unknown, the following formulas can be used:

$$\text{Ft. lbs. Torque} = \frac{1000 \times \text{HP}}{0.19 \times \text{RPM}}$$

$$\text{Horsepower (HP)} = \frac{0.19 \times \text{Torque (ft. lbs.)} \times \text{RPM}}{1000}$$

$$\text{Speed (RPM)} = \frac{1000 \times \text{HP}}{0.19 \times \text{Torque (ft. lbs.)}}$$

When working with Newton meters (Nm), substitute .0258 in place of 0.19 in the formula.

Use the performance charts provided for each motor size and type for obtaining this same data procedure:

1. Select operating pressure.
2. Select torque required from the left hand scale.
3. Extend that point position across chart until it intersects with torque performance curve of the selected pressure.
4. Draw a vertical line from the above mentioned intersection to the corresponding motor scale at the bottom of the chart to determine the operating speed at the required torque and psig pressure.
4. Extend the vertical line until it intersects the horsepower curve of selected operating pressure and read horsepower from the motor scale on the right side of the chart.

Torque and horsepower curves may be interpreted for approximate performance at other psi pressure.

Motor selection information & guides located in catalog & Technical Service Reps only a phone call away for assistance

The screenshot shows the Apex Tool Group website interface. At the top left is the Apex Tool Group logo. To its right are flags for USA, Germany, France, and the UK, along with a search bar and a 'Go' button. Below the navigation bar are links for 'About Us', 'Customer Support', 'Online Catalog', 'Employment', 'Help', and 'C3 Customer Care Center'. The main content area features a 'Motors' section with the Cleco logo and a sub-headline: 'Cleco air motors are engineered for great flexibility, convenience, and reliability.' Below this is a paragraph describing the range of industrial air motors. To the right of the text is an image of various Cleco pneumatic motors. Further right is a vertical sidebar with three categories: 'Cleco Assembly Tools' (with an image of an assembly tool), 'Dotco Material Removal' (with an image of a grinding tool), and 'Apex Geta Fastening Tools' (with images of a fastener and a tool). Below the main content is a 'Product Catalogs and Brochures' section with a 'Power Motors Catalog' link and a 'View Catalog (.PDF) English' button. At the bottom right of the sidebar is a 'Customer Care' section with links for 'Catalogs', 'Service Literature', 'Where To Buy', and 'Sales & Service Centers'.

Service literature, online catalogs & other information is always available on our website

This screenshot shows the 'Product' section of the website. It features a breadcrumb trail 'Index / Power Motors' and a 'Power Motors' heading. Below this heading are four sub-categories: 'Axial Piston Motors', 'General Accessories', 'Radial Piston Motors', and 'Rotary Vane Motors'. At the bottom of the section is a search bar with a 'Search' button. To the right of the search bar is an image of various Cleco pneumatic power motors with the Cleco logo and the text 'Pneumatic Power Motors'.

The screenshot shows the 'Rotary Vane' motor product page. It features the Cleco logo and the product name 'Rotary Vane'. Below the name are three bullet points: 'Medium Power', '2.5 HP', and '100-200 Nm'. To the right of the text is an image of the rotary vane motor. Below the image is a table with technical specifications.

Model	Power	Speed	Stroke	Weight	Length	Height
RV-0010	1.0	1500	100	0.5	100	100
RV-0020	2.0	1500	100	1.0	100	100
RV-0030	3.0	1500	100	1.5	100	100
RV-0040	4.0	1500	100	2.0	100	100
RV-0050	5.0	1500	100	2.5	100	100
RV-0060	6.0	1500	100	3.0	100	100
RV-0070	7.0	1500	100	3.5	100	100
RV-0080	8.0	1500	100	4.0	100	100
RV-0090	9.0	1500	100	4.5	100	100
RV-0100	10.0	1500	100	5.0	100	100

The screenshot shows the 'Axial Piston' motor product page. It features the Cleco logo and the product name 'Axial Piston'. Below the name are three bullet points: 'Medium Power', '1.5 HP', and '10-200 Nm'. To the right of the text is an image of the axial piston motor. Below the image is a graph showing performance characteristics and a table with technical specifications.

Model	Power	Speed	Stroke	Weight	Length	Height
AP-0010	1.0	1500	100	0.5	100	100
AP-0020	2.0	1500	100	1.0	100	100
AP-0030	3.0	1500	100	1.5	100	100
AP-0040	4.0	1500	100	2.0	100	100
AP-0050	5.0	1500	100	2.5	100	100
AP-0060	6.0	1500	100	3.0	100	100
AP-0070	7.0	1500	100	3.5	100	100
AP-0080	8.0	1500	100	4.0	100	100
AP-0090	9.0	1500	100	4.5	100	100
AP-0100	10.0	1500	100	5.0	100	100

Appendix

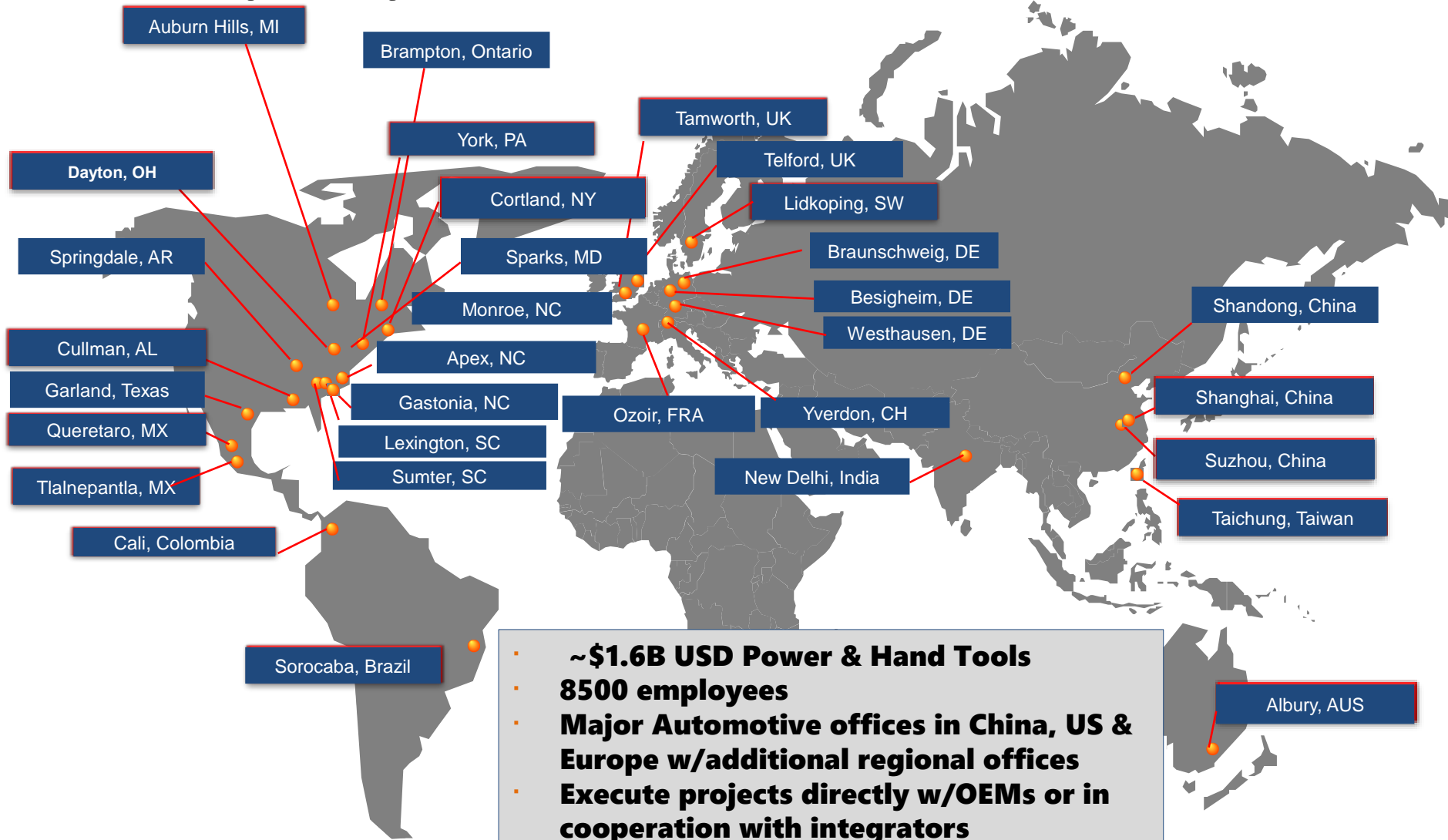
Vision & Values



Durability. Dependability. Industry
leading technology.

- Customers come first
- Integrity in all we do
- Continuous improvement
- Innovation for growth

Company Overview



- **~\$1.6B USD Power & Hand Tools**
- **8500 employees**
- **Major Automotive offices in China, US & Europe w/additional regional offices**
- **Execute projects directly w/OEMs or in cooperation with integrators**
- **Additional Sales/Support in other regions**

Company Overview



Durability. Dependability. Industry
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- Apex Tool Group Management foundations in Danaher and Cooper Industries (2010)
- Industrial, commercial, and do-it-yourself customers
- Unparalleled selection of over 30 leading brands with over 100 years of tools experience: DGD, Cleco, Dotco, Apex, Recoules, Quackenbush and more
- Over \$1.6B in annual sales
- Over 8500 employees
- World's largest tools company

Brands Portfolio

Cleco[®]

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History of Apex Tool

Standard Business Tools Group Business

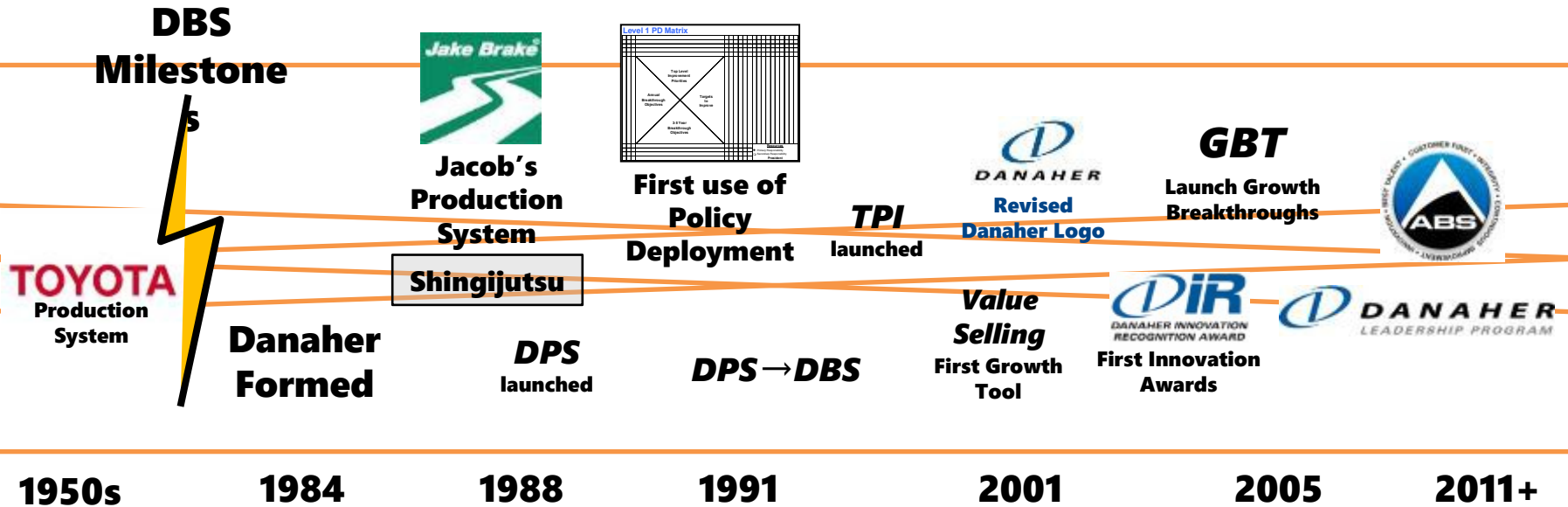
DBS/ABS Evolution

Lean Manufacturing only

Lean Manufacturing + Transactional

Lean + Growth

Growth + Lean + Leadership



History of Apex Tool

Group Business

The European Power Tools headquarter in Westhausen System provides the development and production of the Cleco pulse tools series, the Cleco LiveWire- and the DGD series. Additionally, it is a sales and service center for the complete portfolio of the Power Tools sector.

The concentrated know-how at this site is complemented by the software development center for DGD- and Cleco tightening technology



History of Apex Tool

Group Business

With more than 50 years of experience in compressed air and electric tools and the thoroughness as well as know-how of technicians and engineers, the Apex Tool Group Competence Center has risen to a serious benchmark.

Our portfolio includes hand- and electric solutions for torque measurement, drilling applications and ventilation as professional electronic tools.

