HERMES
THE TOOL COMPANY
Kompania Narzędziowa "HERMES" Sp. z o.o.
ul. Sarni Stok 73 a, 43-300 Bielsko-Biała, Polska; tel: +48 33 821 41 90-91
e-mail: biuro@hermestools.eu www.hermestools.eu

Pneumatic Power Motors

Durability. Dependability. Industry leading technology.

APEX TOOL GROUP

Typical End-Users

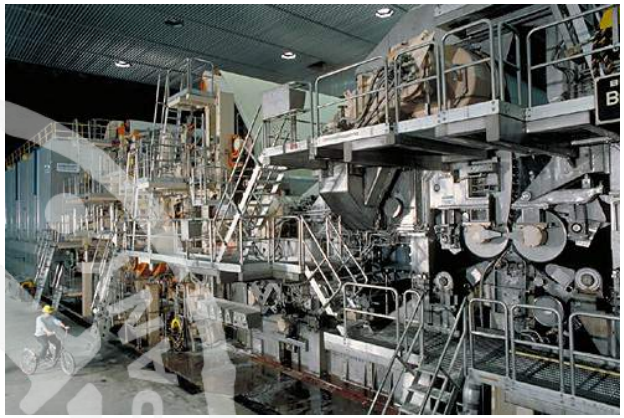
Durability. Dependability. Industry leading technology.

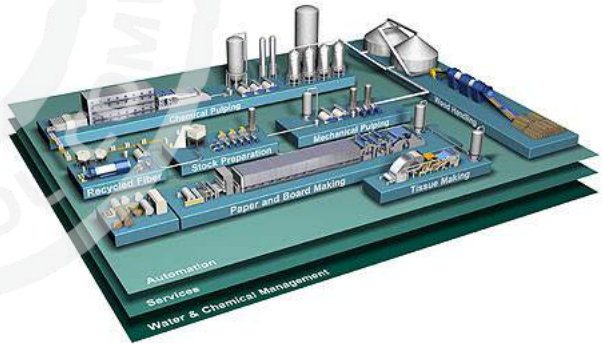
- Foundries
- Paper Mills
- Machine Manufacturers
- Power Plants
- Back-Up Units (for electric motors)
- OEM

Applications

Durability. Dependability. Industry leading technology.

OEM Pipeline Installation





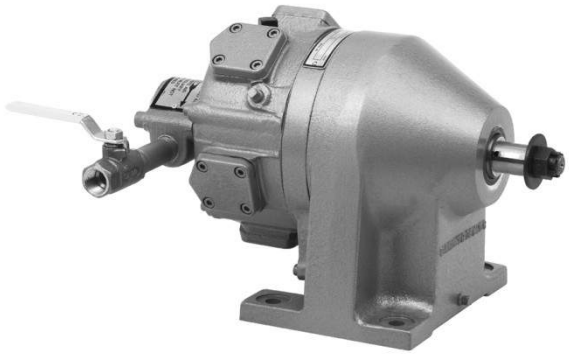
Paper Mills

HERMES
No1
THE TOOL COMPANY

3 Types of Power Motors offered

Durability. Dependability. Industry leading technology.

- Rotary Vane
- Axial Piston

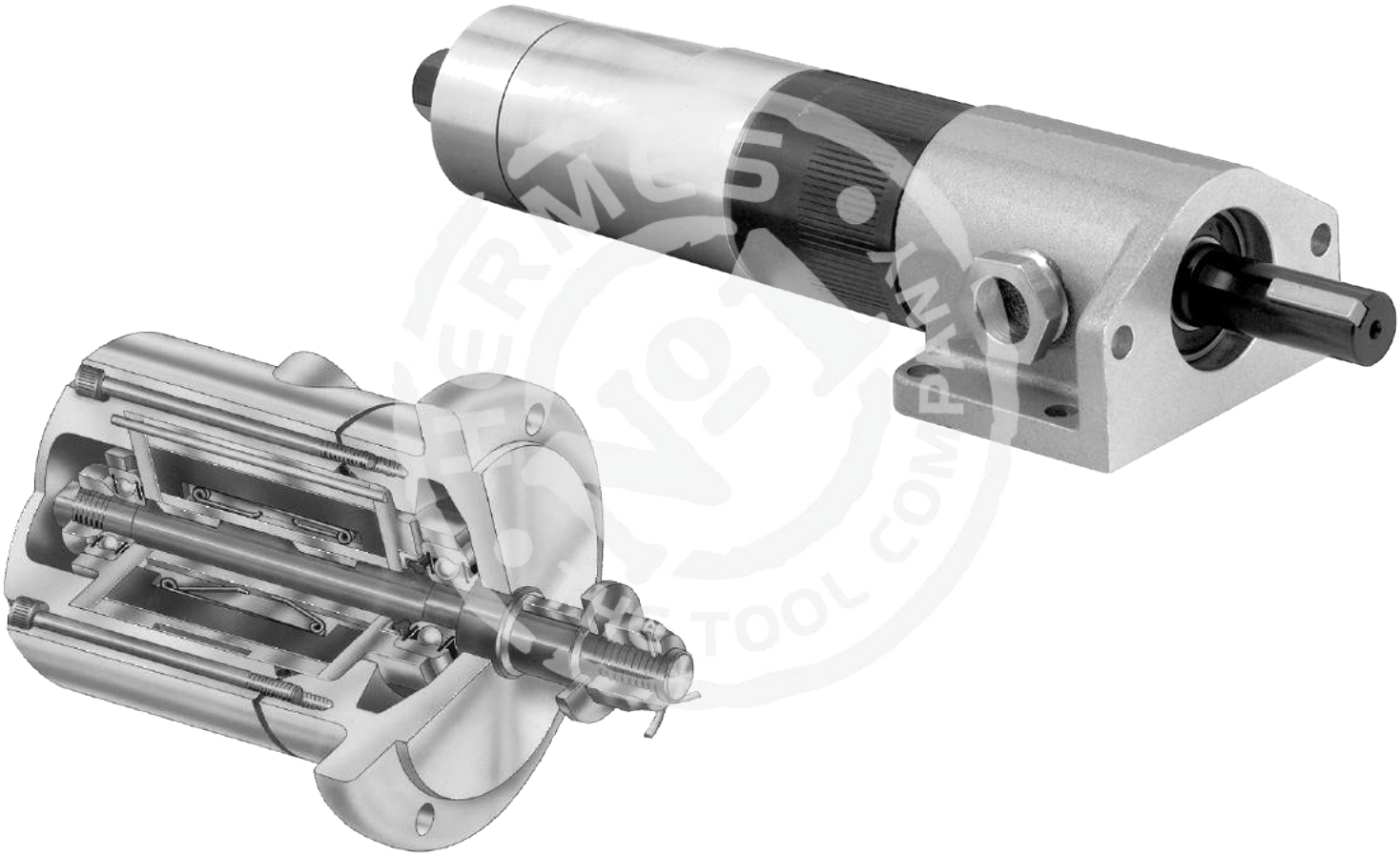


- Radial Piston

Rotary Vane Motors

Cleco®

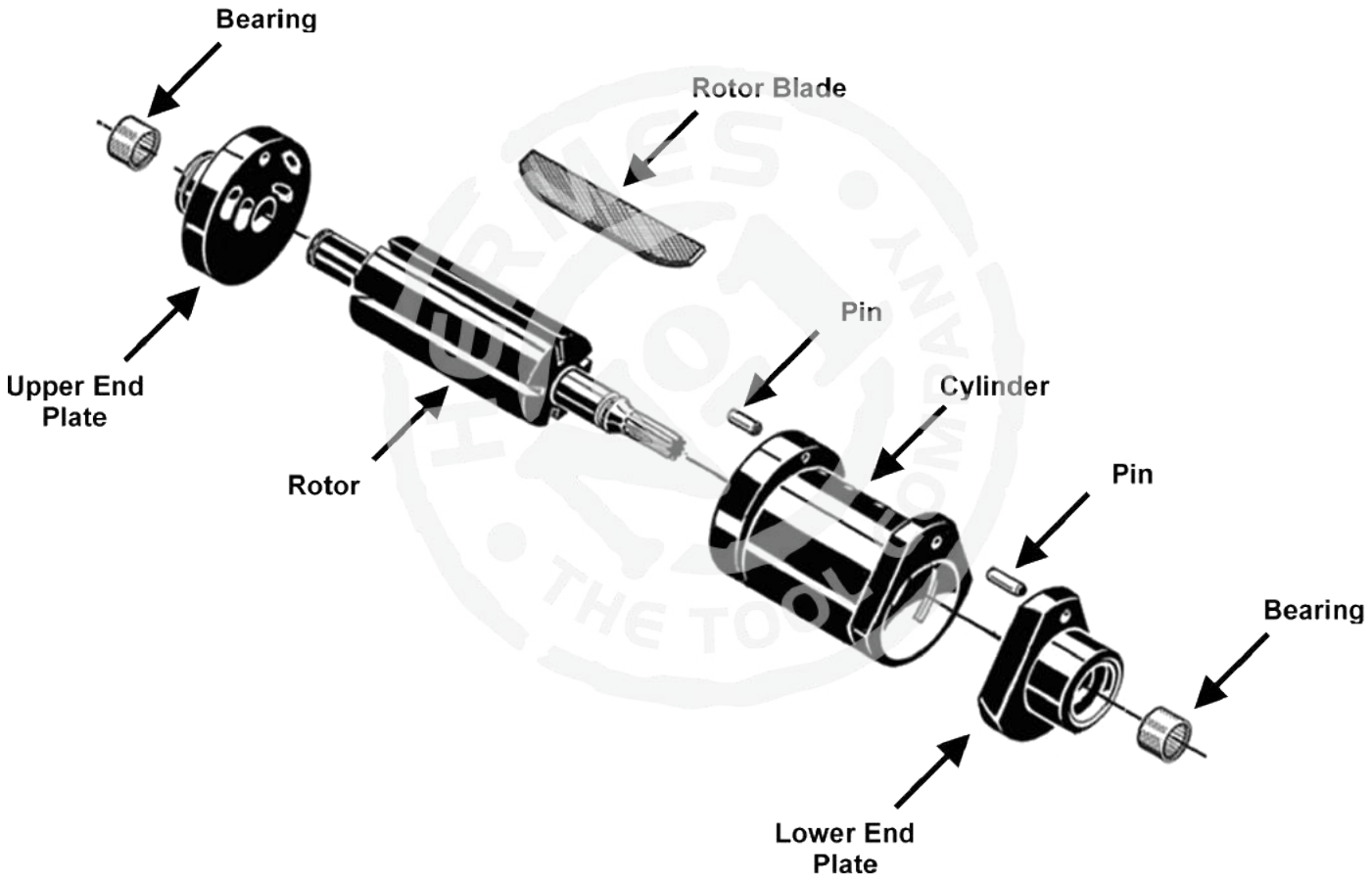
Durability. Dependability. Industry leading technology.



Rotary Vane Motors

Cleco®

Durability. Dependability. Industry leading technology.



Rotary Vane Motors

Cleco®

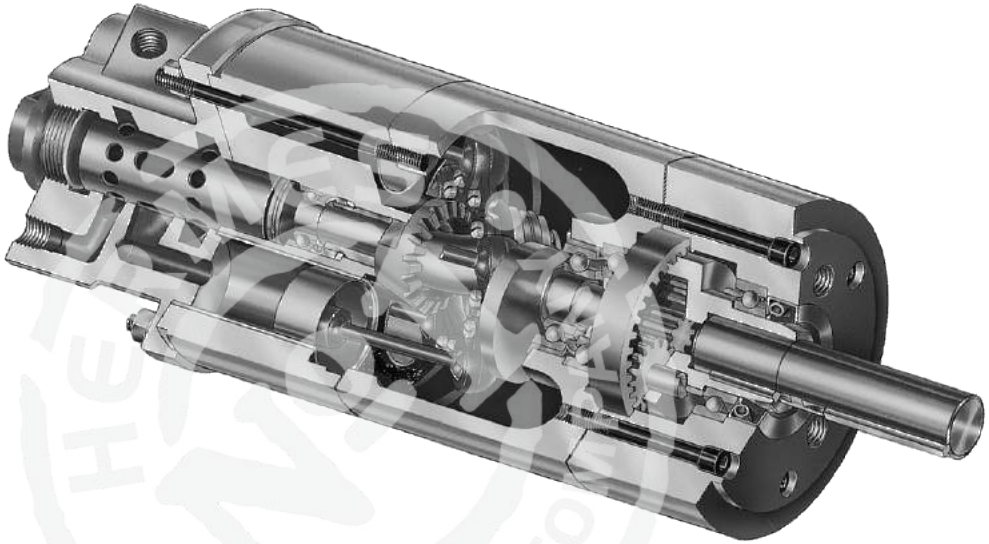
Durability. Dependability. Industry leading technology.

- 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

Cleco®

Durability. Dependability. Industry leading technology.



Axial Piston Motors

Cleco®

Durability. Dependability. Industry leading technology.

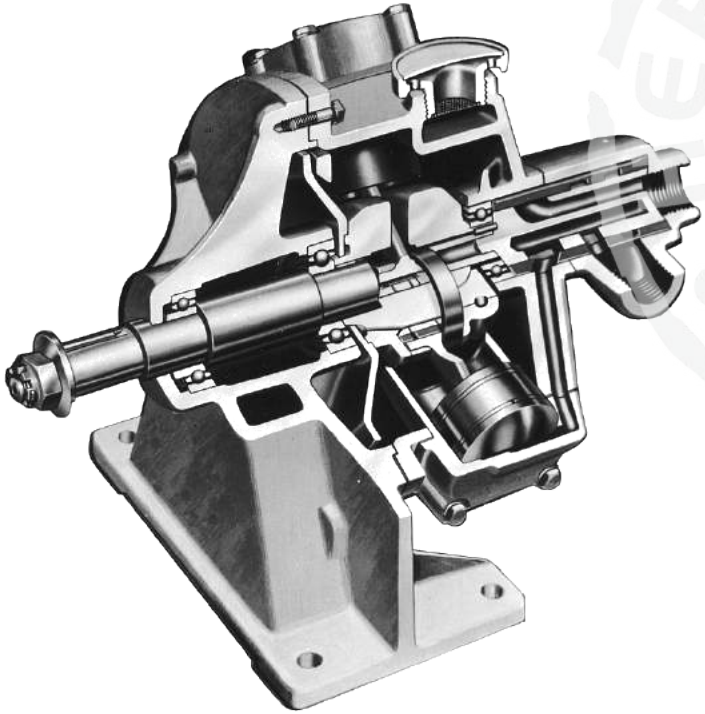
- Cleco is the exclusive brand of Axial Piston Motors

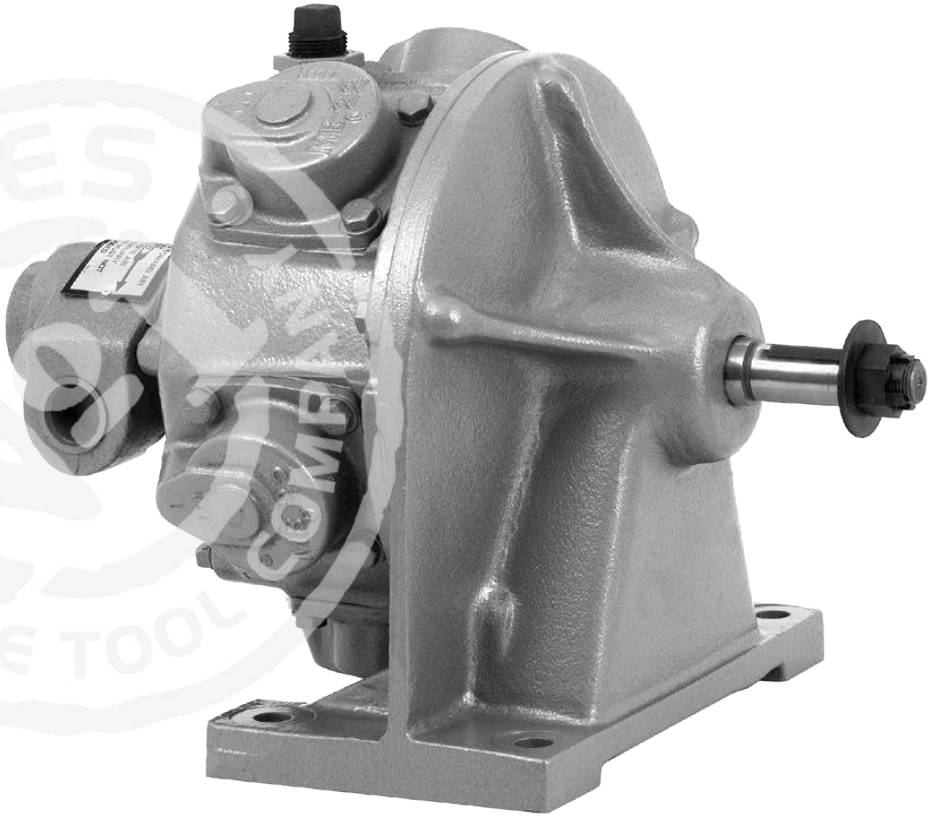
- Despite their relatively small size, Axial Piston motors develop high speed & power

- High torque is an inherent characteristic of the Axial Piston motor making them especially desirable for applications involving heavy starting loads

Radial Piston Motors

Durability. Dependability. Industry leading technology.





Radial Piston Motors

Durability. Dependability. Industry leading technology.

- 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

Cleco®

Durability. Dependability. Industry leading technology.

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
Temperaturue Limits	To121°C; Intermittent use; motor runs below ambient	To 40°C; motor runs hotter than ambient

Sizing the Motor - A

Durability. Dependability. Industry leading technology.

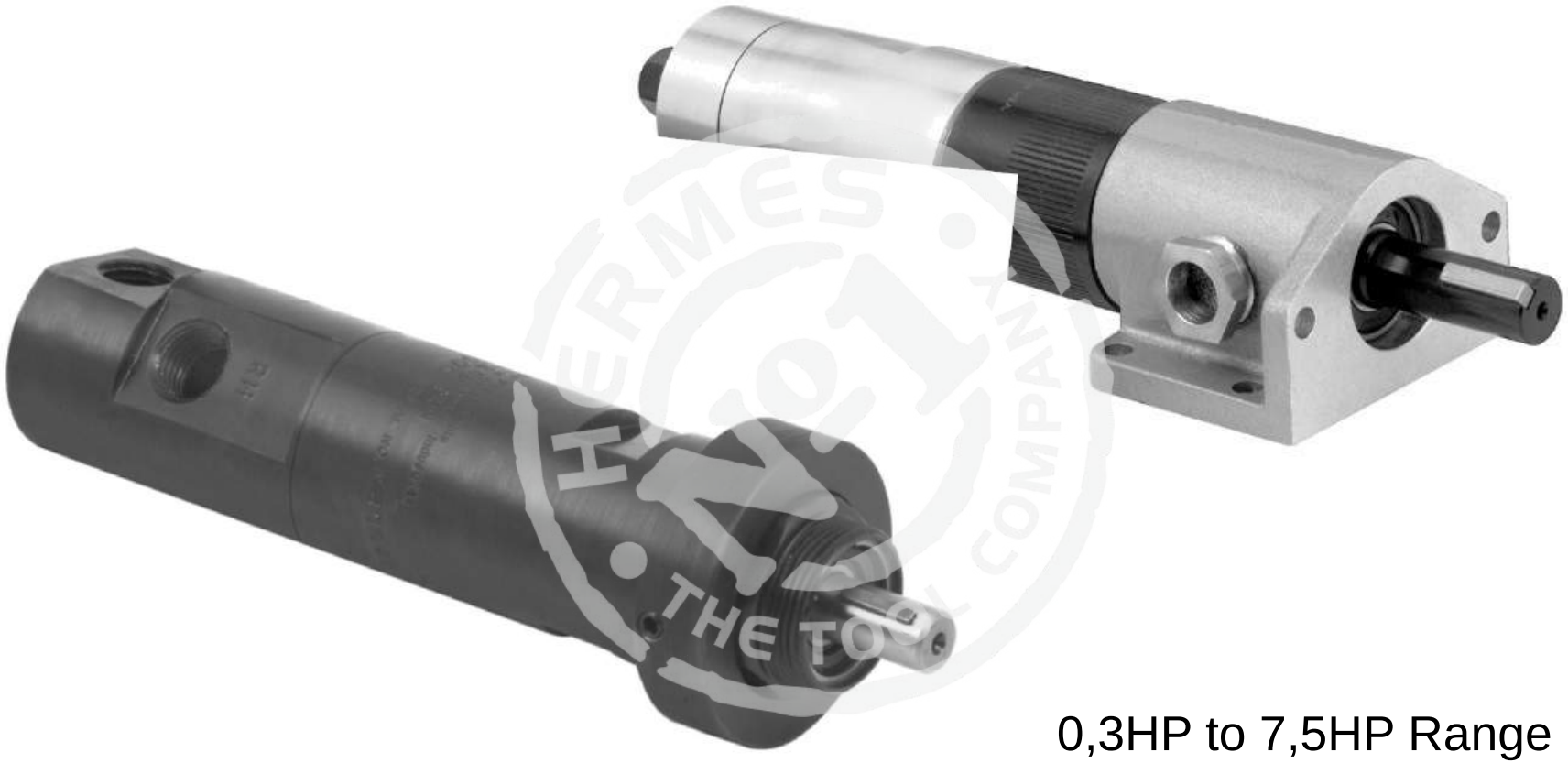
√ e of Thumb!

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

Rotary Vane Motors

Cleco®

Durability. Dependability. Industry leading technology.



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

Rotary Vane Motors

Cleco®
Durability. Dependability. Industry leading technology.

Two types:

- Large (MR Series – 1,0 to 7,5 hp)
- Small to Medium (Various series – 0,3 to 2,3 hp)

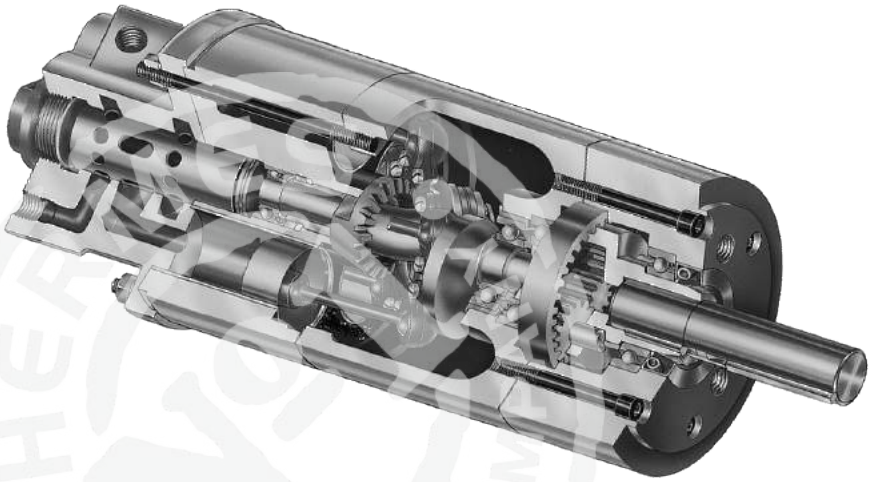
- All motors feature durable construction with precision heavy duty bearings throughout & multiple blade rotors for smooth power

- Wide range of speeds and torque as well as a choice of foot, face or flange mounting

Axial Piston Motors

Cleco®

Durability. Dependability. Industry leading technology.



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

Axial Piston Motors

Cleco®

Durability. Dependability. Industry leading technology.

- 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

Durability. Dependability. Industry leading technology.

- 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

Cleco®

Durability. Dependability. Industry leading technology.

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

Radial Piston Motors

Durability. Dependability. Industry leading technology.

- 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

Cleco®

Durability. Dependability. Industry leading technology.

- Radial Piston motors should be operated under load & in a horizontal position

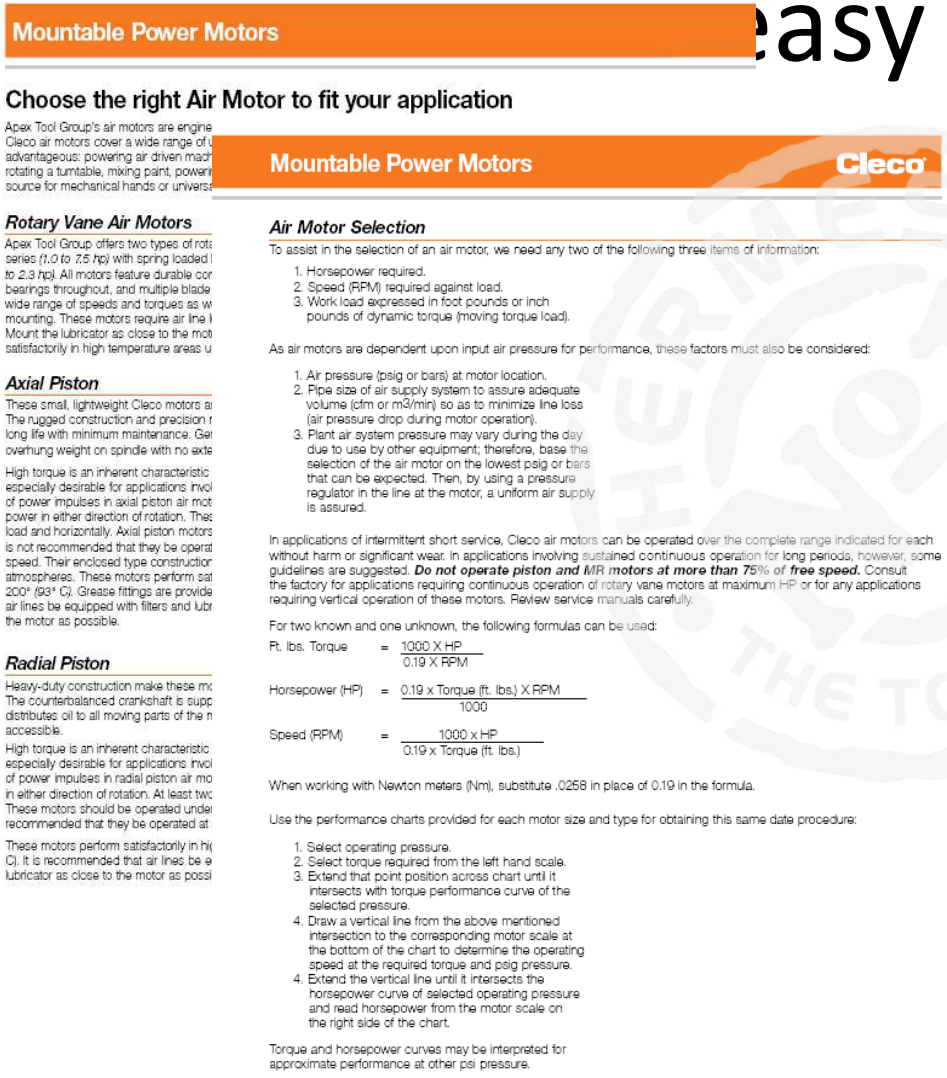
- It is not recommended that these motors be operated at speeds greater than 75% of free speed

- These motors perform in high temperature areas up to 93 °C

Selecting the right

easy

Durability. Dependability. Industry leading technology.



Mountable Power Motors

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 mach
rotating a turntable, mixing paint, powerin
source for mechanical hands or universa

Rotary Vane Air Motors

Apex Tool Group offers two types of rot
series (1.0 to 7.5 hp) with spring loaded
to 2.3 hp). All motors feature durable cor
bearings throughout, and multiple blade
wide range of speeds and torques as w
mounting. These motors require air line
Mount the lubricator as close to the mot
satisfactorily in high temperature areas u

Axial Piston

These small, lightweight Cleco motors a
The rugged construction and precision
long life with minimum maintenance. Ge
overhung weight on spindle with no exte

High torque is an inherent characteristic
especially desirable for applications invol
of power impulses in axial piston air mot
power in either direction of rotation. Thes
load and horizontally. Axial piston motors
is not recommended that they be operat
speed. Their enclosed type constructior
atmospheres. These motors perform sat
200° (93° C). Grease fittings are provide
air lines be equipped with filters and lubr
the motor as possible.

Radial Piston

Heavy-duty construction make these mo
The counterbalanced crankshaft is supp
distributes oil to all moving parts of the
accessible.

High torque is an inherent characteristic
especially desirable for applications invol
of power impulses in radial piston air mo
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 hi
C). It is recommended that air lines be e
lubricator as close to the motor as possi

Mountable Power Motors — Cleco

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 m^3/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:

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

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

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

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 date 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.

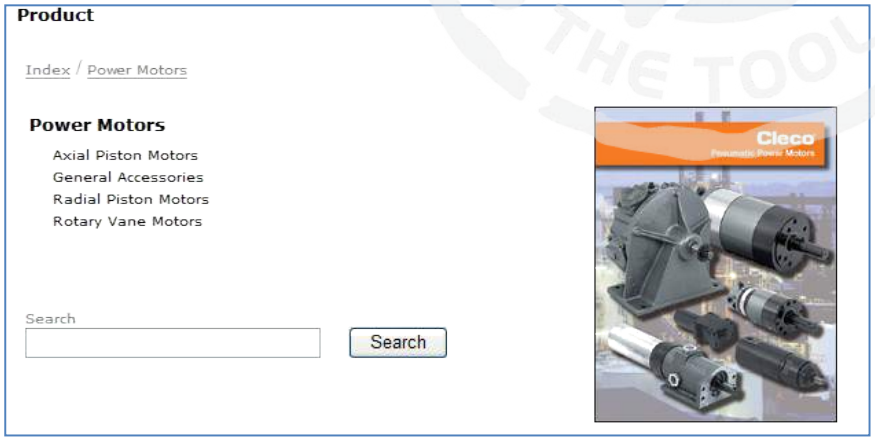
Torque and horsepower curves may be interpreted for approximate performance at other psi pressure.

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

ApexToolGroup.com

Durability. Dependability. Industry leading technology.

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



Appendix

Vision & Values

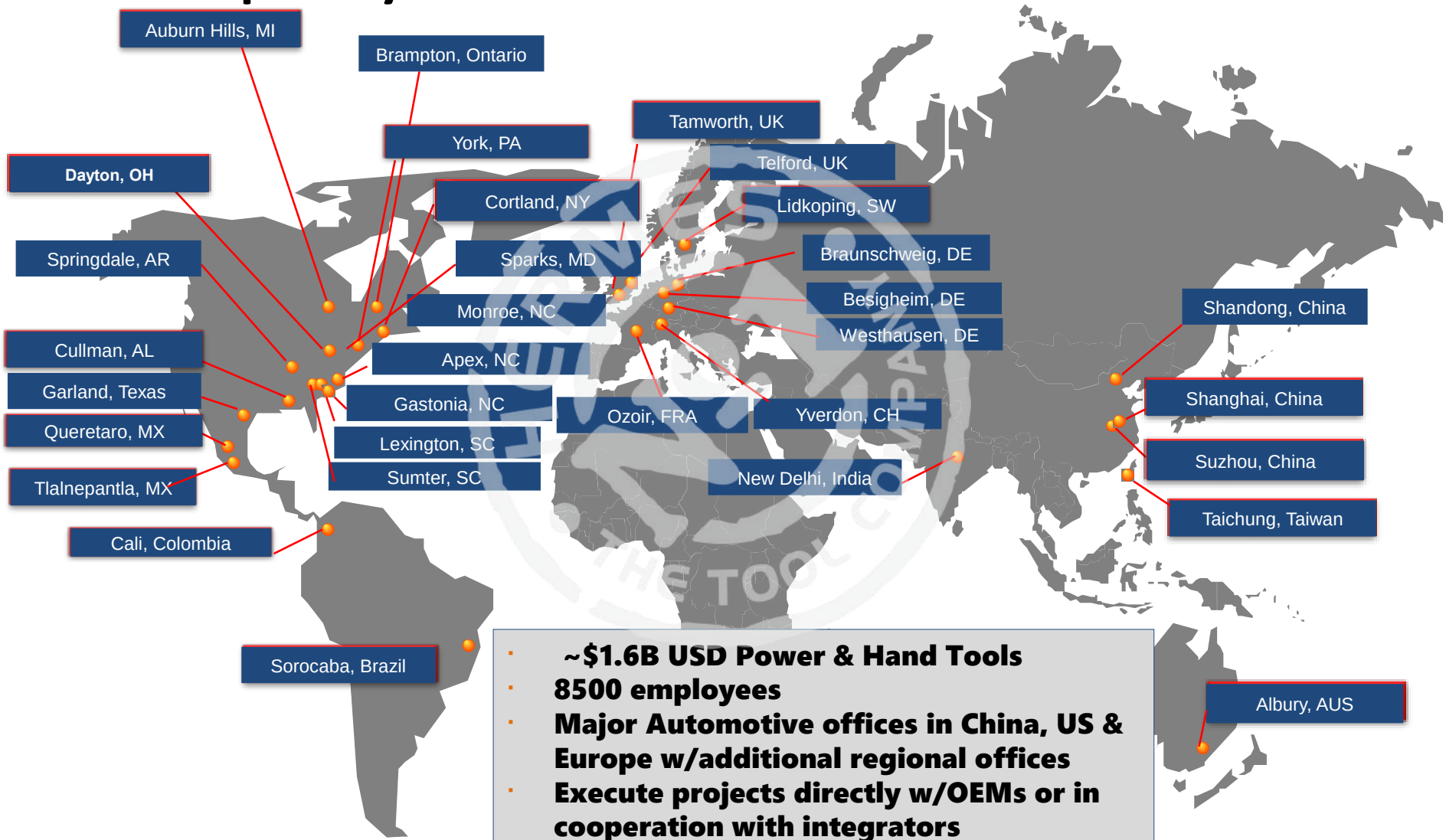
Durability. Dependability. Industry leading technology.

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

Company Overview

Cleco®

Durability. Dependability. Industry leading technology.



- **~$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 leading technology.

- 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®

Durability. Dependability. Industry leading technology.

DGD

Cleco®

DOTCO®

APEX®

Airetool®

Recoules®

Quackenbush®

MP Master Power

GETA

UTICA®

Standard Business Tools

DBS/ABS Evolution

Lean Manufacturing only

Lean Manufacturing + Transactional

Lean + Growth

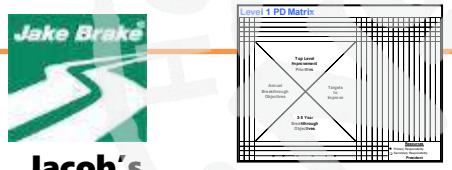
Growth + Lean + Leadership

DBS Milestones

1950s
TOYOTA Production System

1984
Danaher Formed

1988
Jacob's Production System
Shingijutsu
DPS launched



1991
First use of Policy Deployment
TPI launched
DPS→DBS

2001
DANAHER Revised Danaher Logo
Value Selling First Growth Tool

2005
GBT Launch Growth Breakthroughs
DIR DANAHER INNOVATION RECOGNITION AWARD First Innovation Awards

2011+
ABS
DANAHER LEADERSHIP PROGRAM

Durability. Dependability. Industry leading technology.

The European Power Tools headquarter in Westhausen 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 as well as standard- and customer-specific

History of Apex

Cleco®

Durability. Dependability. Industry leading technology.

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 electrictools, measurement, metal cutting, drilling applicatio systems as well as professional electronic tools

Dieth new innovative power Westhausen offers