aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

P1V-B series

P1V-A series

Air Motors

P1V-A Power Type: 1.6, 2.6 & 3.6 kW
P1V-B Power Type: 5.1, 9 & 18 kW

Catalogue PDE2670TCUK November 2014

Parker

ENGINEERING YOUR SUCCESS.

Features	Air motor	Hydraulic motor	Electric motor
Overload safe	***	***	*
Increased torque at higher loads	***	**	*
Easy to limit torque	***	***	*
Easy to vary speed	***	***	*
Easy to limit power	***	***	*
Reliability	***	***	***
Robustness	***	***	*
Installation cost	***	*	**
Ease of service	***	**	*
Safety in damp environments	***	***	*
Safety in explosive atmospheres	***	***	*
Safety risk with electrical installations	***	***	*
Risk of oil leak	***	*	***
Hydraulic system required	***	*	***
Weight	**	***	*
Power density	**	***	*
High torque for size	**	***	*
Noise level during operation	*	***	**
Total energy consumption	*	**	***
Service interval	*	**	***
Compressor capacity required	*	***	***
Purchase price	*	*	***

* = good, **=average, ***=excellent

Important
Before carrying out service activities, make sure the air motor is vented. Before disassembling the motor, disconnect the primary air hose to ensure that the air supply is interrupted.

Note
All technical data in the catalogue are typical values.
The air quality is a major factor in the service life of the motor, see ISO 8573-1.

Contents

Choosing the correct air motor for your application

1 Which drive principle of the air motor is suitable for your application?

- Air vane motor are suitable for regular operating cycles, speed is very small e.g. 16 rpm
- Tooth gear air motor or turbines are more suitable for continuous operation, 24 hours non-stop, speed is in a upper range, up to 140,000 rpm
- Oil free operation is often an option for these three principles of air motors.

2 Which motor materials are suitable for your application?

- Will the air motor work in a normal production area
- Or in a paper industry
- Or in the food processing industry, in contact or not with food
- Or in underwater usage
- Or in the medical, pharmaceutical industries
- Or in potentially explosive areas
- Others, please describe your environment

3 How do you calculate the motor power taking the application conditions into consideration?

1. Which rotational direction? Clockwise, anti-clockwise, reversible?
2. Air pressure working range? Which air class quality is available?
3. Which torque and which speed under load do you expect to obtain?
4. Calculate the basic power with the formula

   P = M x n / 9550 with P power output in kW, M nominal torque in Nm, n nominal speed in rpm

5. Check performance data of air motors in our catalogues. Note that all data is at 6 bar in the inlet of the air motor, max 3 meters for tubes and oil lubricated operations.
6. To adapt the difference of air pressure with your operation conditions, please check graphs in our catalogues and how to do it.
7. or you can adapt the need of air to fit your operation conditions by throttling the outlet flow in the air motor you will reduce speed without loss of torque.
8. Check if you need an oil free or not working operation. 1 to 2 drops of oil per cube meter are needed to optimize performance and life time of air motors. Oil free operation will decrease by 10 to 15% the performance of air motors.

4 How do you integrate your air motor in your system?

- In which position is the air motor used?
- Do you need to use a brake?
- Do you want to use your own gear box and put it somewhere else in the machine?
- Do you need extra components like fittings, tubes, valves and FRLs?

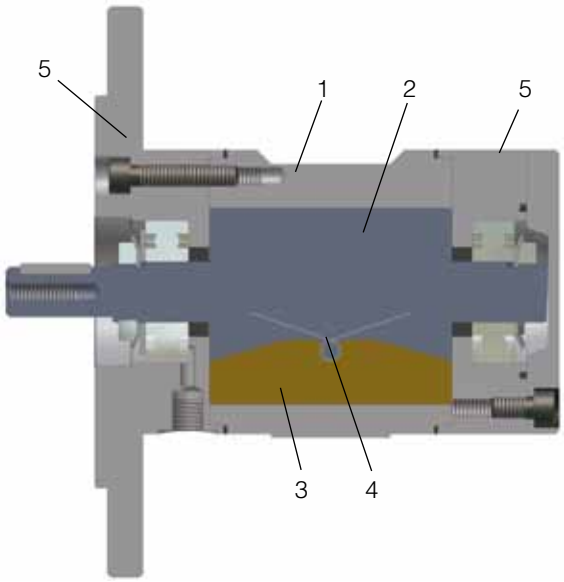
5 How do you ensure a long life and high performance of the air motor?

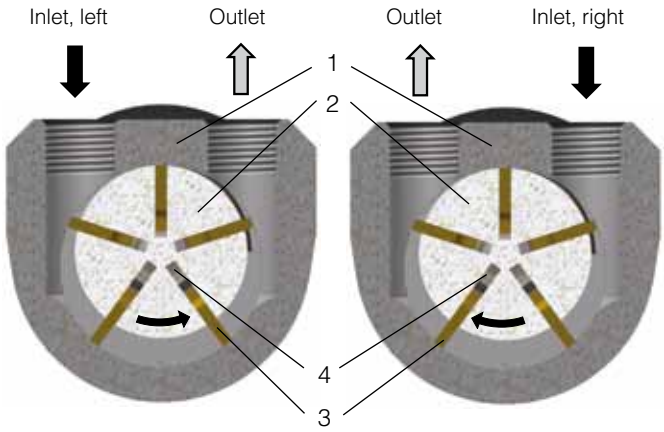
- Ensure you air quality is in accordance with our specifications, oil or oil free lubrication operations.
- Keep the recommended maintenance intervals

6 How do you determine the purchasing and running costs after the air motor installation?

- Keep same level of your air quality.

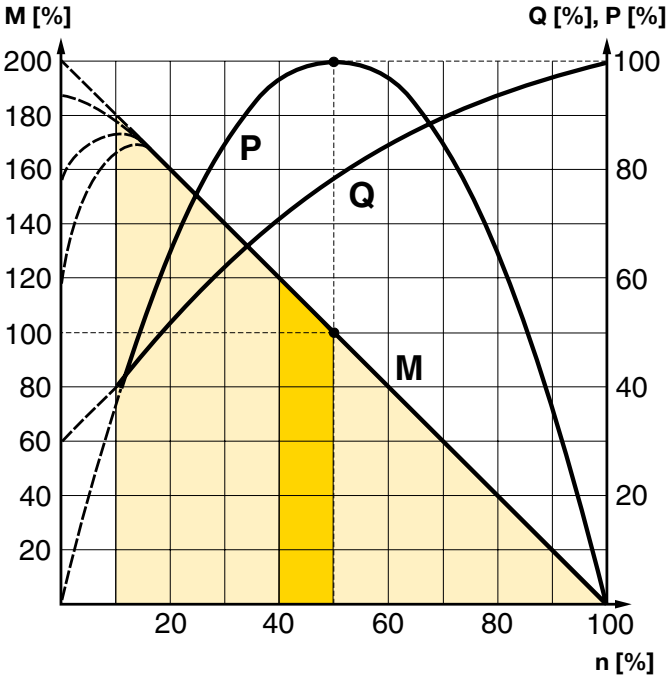
Principles of air motor functioning





1	Rotor cylinder
2	Rotor
3	Vanes
4	Spring
5	End piece with bearing

Torque, power and air consumption graphs



P = power
M = torque
Q = air consumption
n = speed

Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

There are a number of designs of air motors. Parker has chosen to use the vane rotor design, because of its simple design and reliable operation. The small external dimensions of vane motors make them suitable for all applications.

The principle of the vane motor is that a rotor with a number of vanes is enclosed in a rotor cylinder. The motor is supplied with compressed air through one connection and air escapes from the other connection. To give reliable starting, the springs press the vanes against the rotor cylinder. The air pressure always bears at right angles against a surface. This means that the torque of the motor is a result of the vane surfaces and the air pressure.

The performance characteristics of each motor are shown in a family of curves as above, from which torque, power and air consumption can be read off as a function of speed. Power is zero when the motor is stationary and also when running at free speed (100%) with no load. Maximum power (100%) is normally developed when the motor is driving a load at approximately half the free speed (50%).

Torque at free speed is zero, but increases as soon as a load is applied, rising linearly until the motor stalls. As the motor can then stop with the vanes in various positions, it is not possible to specify an exact torque. However, a minimum starting torque is shown in all tables.

Air consumption is greatest at free speed, and decreases with decreasing speed, as shown in the above diagram.

Introduction

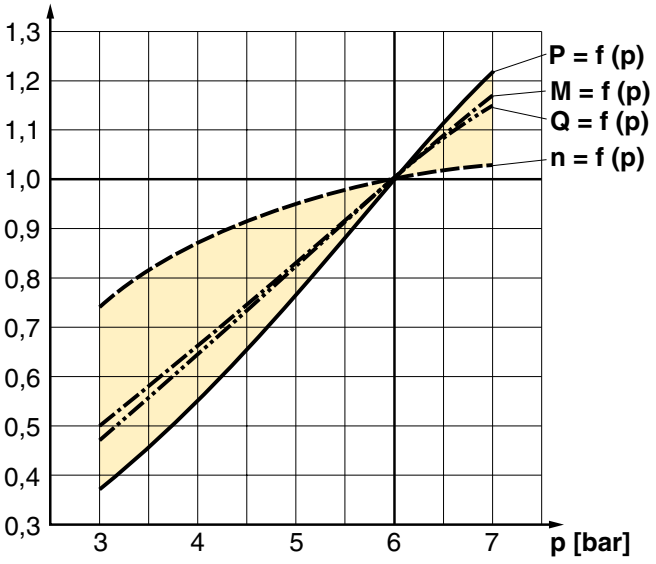
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an air motor can easily be modified. The most economical operation of an air motor (least wear, least air consumption, etc.) is reached by running close to nominal speed. By torque of M = 0, the maximum speed (idle speed) is reached. Shortly before standstill (n - 0), the air motor reaches its maximum torque (Mmax = 2 x Mo). At nominal speed (nn), for example in the middle of the speed range, air motor reaches its maximum power output (Pmax).

Energy Efficiency

A pneumatic motor achieves its maximum power when it is operating as close as possible to its rated speed (50% of the rated idle speed). The energy balance is best in this area, because the compressed air is used efficiently.

Air pressure correction factors

To adapt the difference of air pressure with your operation conditions

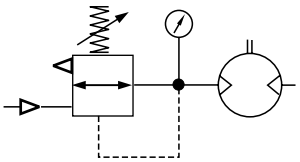


P = Power, M = Torque, Q = Air consumption, N = Speed

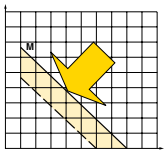
Pressure (p) bar / PSI	Power (P) %	Speed (n) %	Torque (M) %	Air Consumpt. (Q) %
7 / 99	121	103	117	117
6 / 85	100	100	100	100
5 / 71	77	95	83	83
4 / 57	55	87	67	67
3 / 42	37	74	50	50

All catalogue data and curves are specified at a supply pressure of 6 bar to the motor. This diagram shows the effect of pressure on speed, specified torque, power and air consumption.
Start off on the curve at the pressure used and then look up to the lines for power, torque and air consumption. Read off the correction factor on the Y axis for each curve and multiply this by the specified catalogue data in the table, or data read from the torque and power graphs.
Example: at 4 bar supply pressure, the power is only 0.55 x power at 6 bar supply pressure. This example shows how strongly power falls if supply pressure is reduced. You must therefore ensure that the motor is supplied through pipes of sufficient diameter to avoid pressure drop.

The speed and torque can also be regulated by installing a pressure regulator in the inlet pipe. This means that the motor is constantly supplied with air at lower pressure, which means that when the motor is braked, it develops a lower torque on the output shaft.



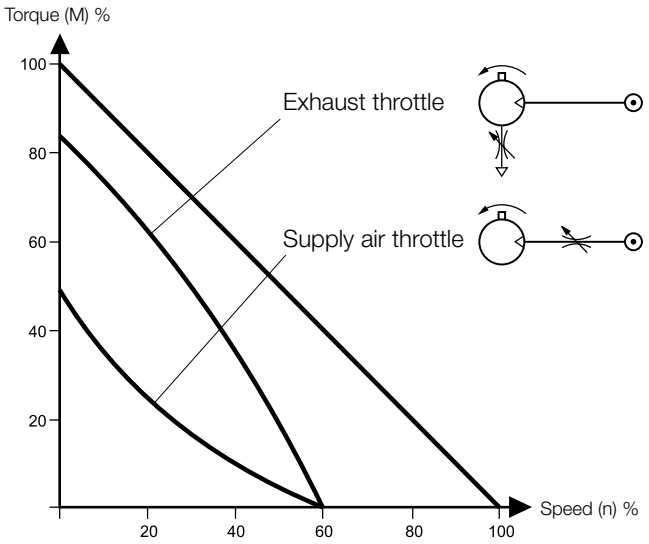
Pressure regulation at motor inlet.



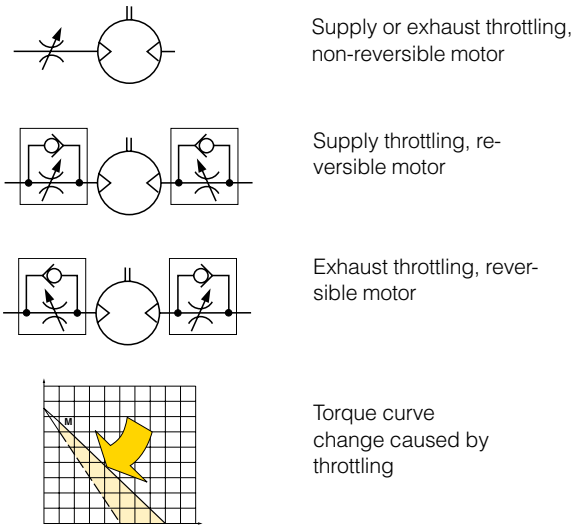
Theoretically torque curve change caused by pressure change

Speed regulation, air flow reduction

Every size reduction or restriction on the air line, whether of the supply hose itself or fittings, before the air motor affects the amount of the supplied air. By throttling you reduce the speed of your motor and simultaneously, the required torque. That means that you reduce the motor performance. The most common way to reduce the speed of a motor is to install a flow control valve in the air outlet, you can set the speed without loss of the torque. When the motor is used in applications where it must reverse and it is necessary to restrict the speed in both directions, flow control valves with by-pass should be used in both directions. If the inlet air is restricted, the air supply is restricted and the free speed of the motor falls, but there is full pressure on the vanes at low speeds. This means that we get full torque from the motor at low speeds despite the low air flow. Since the torque curve becomes "steeper". this also means that we get a lower torque at any given speed than would be developed at full air flow. The benefit of throttling the inlet is that air consumption is reduced, whereas throttling the exhaust air maintains a slightly higher starting torque.



Throttling



Supply or exhaust throttling, non-reversible motor

Supply throttling, reversible motor

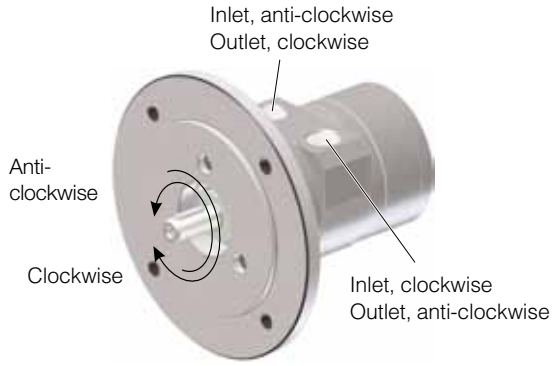
Exhaust throttling, reversible motor

Torque curve change caused by throttling

Component choice for air supply

Direction of motor rotation

The direction of rotation of reversible motors is obtained by supplying inlet L or inlet R with compressed air. The motor can be stopped and started continually without damage occuring.



Reversible means in both directions.

Compressed air quality

Oil and oil mist are avoided whenever possible to ensure a clean work environment. In addition, purchasing, installation and maintenance of oil equipment can be expensive. All users in all industries now try to avoid using components which have to be lubricated. The P1V air motors series are equipped with vanes for intermittent lubrication free operation as standard, which is the most common application of air motors.

Oil mist

If oil mist is used (approx. 1 drop of oil per m^3 of compressed air), the oil not only acts as a lubricant but also protects against corrosion. This means that compressed air with a certain water content may be used without causing corrosion problems inside the motor. ISO8573-1 purity class 3.-.5 may be used without difficulty. The following oils are recommended for use in the food stuffs industry: Klüberoil 4 UH 1-32

ISO 8573-1 purity classes

Quality class	Contaminants particle size (µm)	Contaminants max. concentration (mg/m^3)	Water max. pressure dew point (°C)	Oil max. concentration ($mg.m^3$)
1	0.1	0.1	-70	0.01
2	1	1	-40	0.1
3	5	5	-20	1.0
4	15	8	+3	5.0
5	40	10	+7	25
6	-	-	+10	-

For example: compressed air to purity class 3.4.3. This means a 5 µm filter (standard filter), dew point +3°C (refrigerant cooled) and an oil concentration of 1,0 mg oil/m^3 (as supplied by a standard compressor with a standard filter).

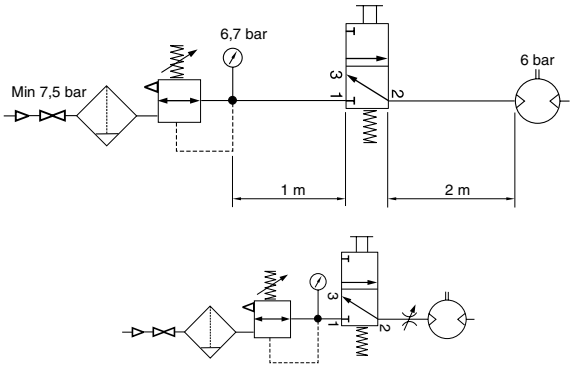
Air supply

Since the supply pressure at the air motor inlet port is of considerable importance for obtaining the power, speed and torque quoted in the catalogue, the recommendations below should be observed.

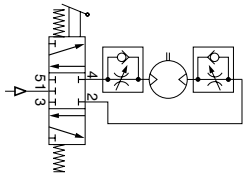
The following data must be complied with:

- Supply pressure: 7 bar
- Regulator pressure setting: 6.7 bar
- Pipe length between air treatment unit and valve: max. 1 m
- Pipe length valve and air motor: max 2 m

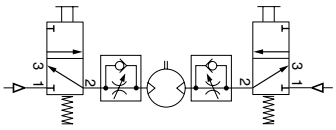
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve

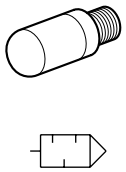


Reversible motor with two 3/2 control valves

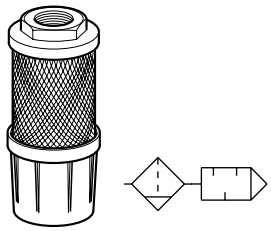
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is used in a non-reversible application, it is sufficient to use a 2/2 or 3/2 valve function for supply. Either one 5/3 or two 3/2 valves functions are needed for a reversible motor, to ensure that the motor receives compressed air and the residual air outlet is vented. A flow control valve can be installed in the supply pipe to regulate the motor speed if the motor is not used as a reversible motor.
One flow control valve with by-pass is needed to regulate each direction of rotation if the motor is used as a reversible motor. The built-in check valve will then allow air from the residual air outlet to escape through the outlet port in the control valve. The compressed air supply must have sufficiently large pipes and valves to give the motor the maximum power. The motor needs 6 bar at the supply port all the time. For example, a reduction of pressure to 5 bar reduces the power developed to 77% and to 55% at 4 bar!

Silencing

Exhaust silencer



Central silencer



The noise from an air motor consists of both mechanical noise and a pulsating noise from the air flowing out of the outlet. The installation of the motor has a considerable effect on mechanical noise. It should be installed so that no mechanical resonance effects can occur. The outlet air creates a noise level which can amount to 115 dB(A) if the air is allowed to exhaust freely into the atmosphere. Various types of exhaust silencers are used to reduce this level. The most common type screws directly onto the exhaust port of the motor. Since the motor function causes the exhaust air to pulsate, it is a good idea to allow the air to exhaust into some kind of chamber first, which reduces the pulsations before they reach the silencer. The best silencing method is to connect a soft plastic hose to a large central silencer with the largest possible area, to reduce the speed of the out-flowing air as far as possible.

NOTE! Remember that if a silencer which is too small or is blocked, generates back pressure on the outlet side of the motor, which reduces the motor power.

CE marking

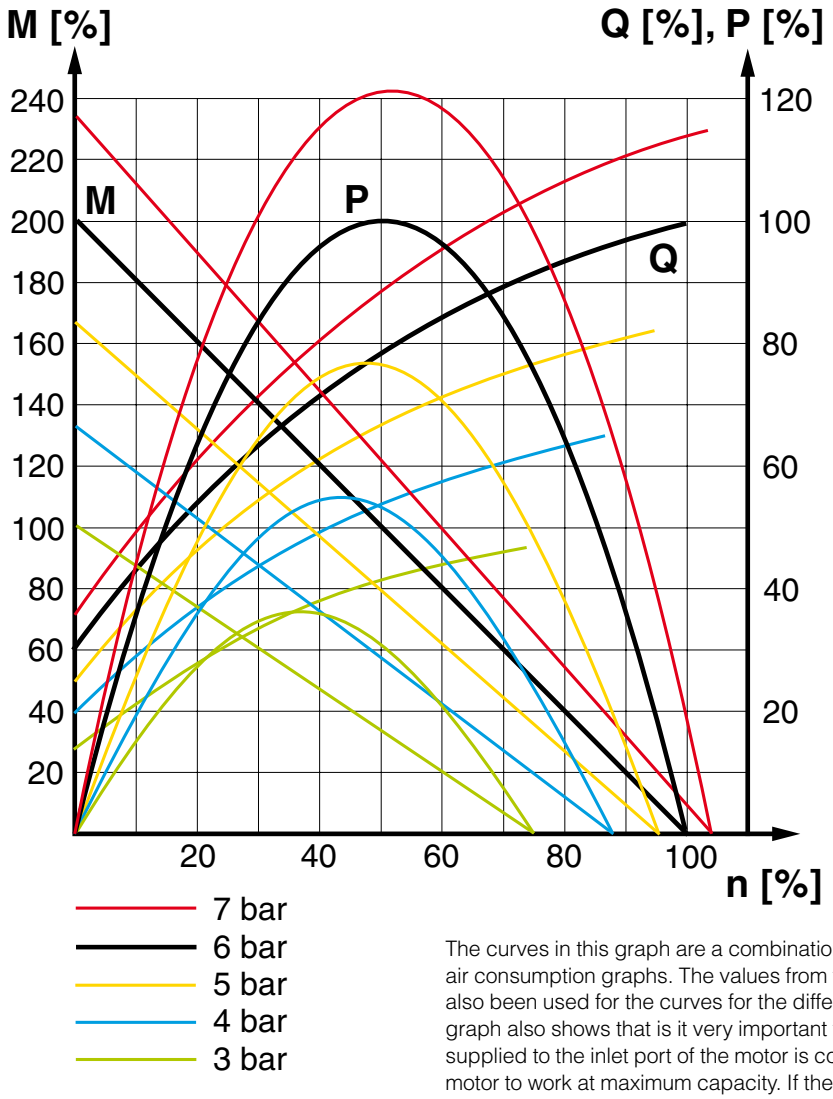
The air motors are supplied as “Components for installation” – the installer is responsible for ensuring that the motors are installed safely in the overall system. Parker Pneumatic guarantees that its products are safe, and as a supplier of pneumatic equipment we ensure that the equipment is designed and manufactured in accordance with the applicable EU directive.

Most of our products are classed as components as defined by various directives, and although we guarantee that the components satisfy the fundamental safety requirements of the directives to the extent that they are our responsibility, they do not usually carry the CE mark.

The following are the currently applicable directives:

- Machinery Directive(essential health and safety requirements relating to the design and structure of machines and safety components)
- EMC Directive
- Simple Pressure Vessels Directive
- Low Voltage Directive

Torque, power and air consumption graphs



P = power	**Q = air consumption**
M = torque	**n = speed**

The curves in this graph are a combination of the torque, power and air consumption graphs. The values from the correction diagram have also been used for the curves for the different pressure values. The graph also shows that is it very important to ensure that the pressure supplied to the inlet port of the motor is correct, in order to allow the motor to work at maximum capacity. If the valve supplying a large motor is too small or if the supply line is underspecified, the pressure at the inlet port may be so low that the motor is unable to do its work. One solution would be to upgrade the valve and supply system, or alternatively you could replace the motor with a smaller motor with lower air consumption. The result would be increased pressure at the inlet port, which means that the smaller motor could carry out the necessary work. However, you may need to select a smaller motor with a lower free speed in order to obtain sufficient torque at the outgoing shaft.

Choice of an air motor, general

The motor to be used should be selected by starting with the torque needed at a specific spindle speed. In other words, to choose the right motor, you have to know the required speed and torque. Since maximum power is reached at half the motor's free speed, the motor should be chosen so that the point aimed at is as close as possible to the maximum power of the motor.
The design principle of the motor means that higher torque is generated when it is braked, which tends to increase the speed. This means that the motor has a kind of speed selfregulation function built in. Use the following graph to choose the correct motor size and the correct type of gear as appropriate. The graph contains the points for the maximum torque of each motor at maximum power. Put in your point on the graph and select a marked point above and to the right of the point you need.

Then check the characteristic graph of each motor to find more accurate technical data. Always select a motor where the data required is in the orange field. Also use the correction diagram to see what it would mean to use different air supply pressures or different air flow in the motor.

Tip: Select a motor which is slightly too fast and powerful, regulate its speed and torque with a pressure regulator and/or restriction to achieve the optimum working point.

Do you need any support to select the right air motor, please feel free to consult your local sales office.

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic metre of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

ISO8573-1:2010 CLASS	Solid Particulate				Water		Oil
	Maximum number of particles per m^3			Mass Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Total Oil (aerosol liquid and vapour)
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				mg/m^3
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20 000	≤ 400	≤ 10	-	≤ -70 °C	-	0,01
2	≤ 400 000	≤ 6 000	≤ 100	-	≤ -40 °C	-	0,1
3	-	≤ 90 000	≤ 1 000	-	≤ -20 °C	-	1
4	-	-	≤ 10 000	-	≤ +3 °C	-	5
5	-	-	≤ 100 000	-	≤ +7 °C	-	-
6	-	-	-	≤ 5	≤ +10 °C	-	-
7	-	-	-	5 - 10	-	≤ 0,5	-
8	-	-	-	-	-	0,5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 - Particulate

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

Class 1 - Oil

In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

ISO8573-1:2010 Class zero

- **Class 0 does not mean zero contamination.**
- **Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.**
- **The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.**
- **The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.**
- **Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.**
- **A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.**
- **If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.**
- **A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.**
- **Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.**
- **Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.**

New Technology

The P3X Lite air preparation system is constructed from ultra light weight technopolymers instead of the traditional aluminium or zinc die cast, this means that is up to 45% lighter than conventional units.
This non-metal construction also means that the P3X Lite is corrosion free enabling it to be used in harsh industrial environments where anti freeze or aggressive synthetic oils are present.

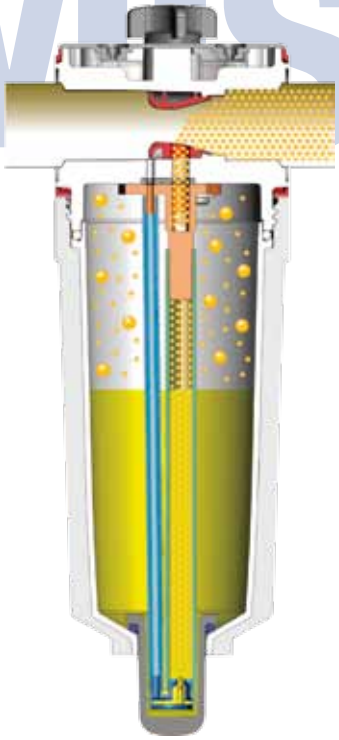
The use of technopolymers in the design of P3X Lite has facilitated a universal body design, this has resulted in reducing the number of variants required to cover the full spectrum of applications. This can dramatically lower logistic costs and simplify stock holding for customers making the P3X Lite a very cost effective solution.

Nano Mist

New Nano Mist Technology, New Lubricator Concept. Self-Adjusting.

With conventional lubricators, only the oil volume per time unit can be adjusted. If the demand changes, the quantity dispensed still remains constant.

The P3X Lite lubricator concept sets new benchmarks here. For the first time, the oil volume is automatically adjusted to the flow rate. This ensures that there is neither too little nor too much oil in the system, which leads to clear economic and ecological advantages. In addition, with conventional systems, the distance between the lubricator and the equipment has to be less than 8 meters. With larger distances, the dispensed oil is deposited as a wall flow. The new lubricator principle of the P3X Lite allows for distances of up to 40 meters. This opens up new scope for the design of even more efficient production systems.



Large Air Motors

P1V-A: 1.6, 2.6 & 3.6 kW

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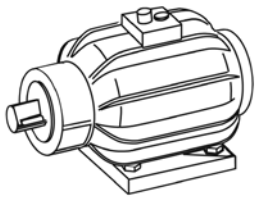
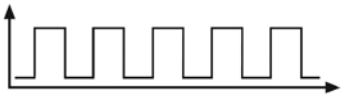
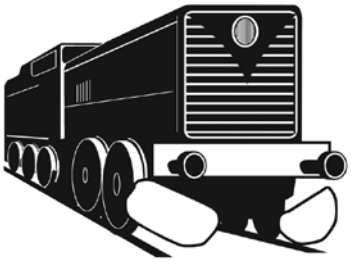


Air motors have much smaller installation dimensions than corresponding electric motors.



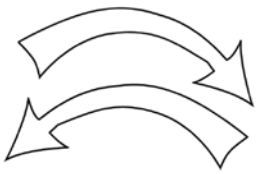
Air motors can be stopped and started continually without damage.



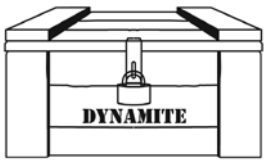
Air motors can be loaded until they stall, without damage. They are designed to be able to withstand the toughest heat, vibration, impact etc.

The simple design principle of air motors make them very easy to service.

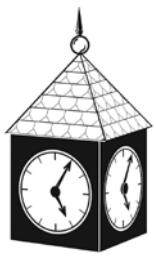
The weight of an air motor is several times less than corresponding electric motors.



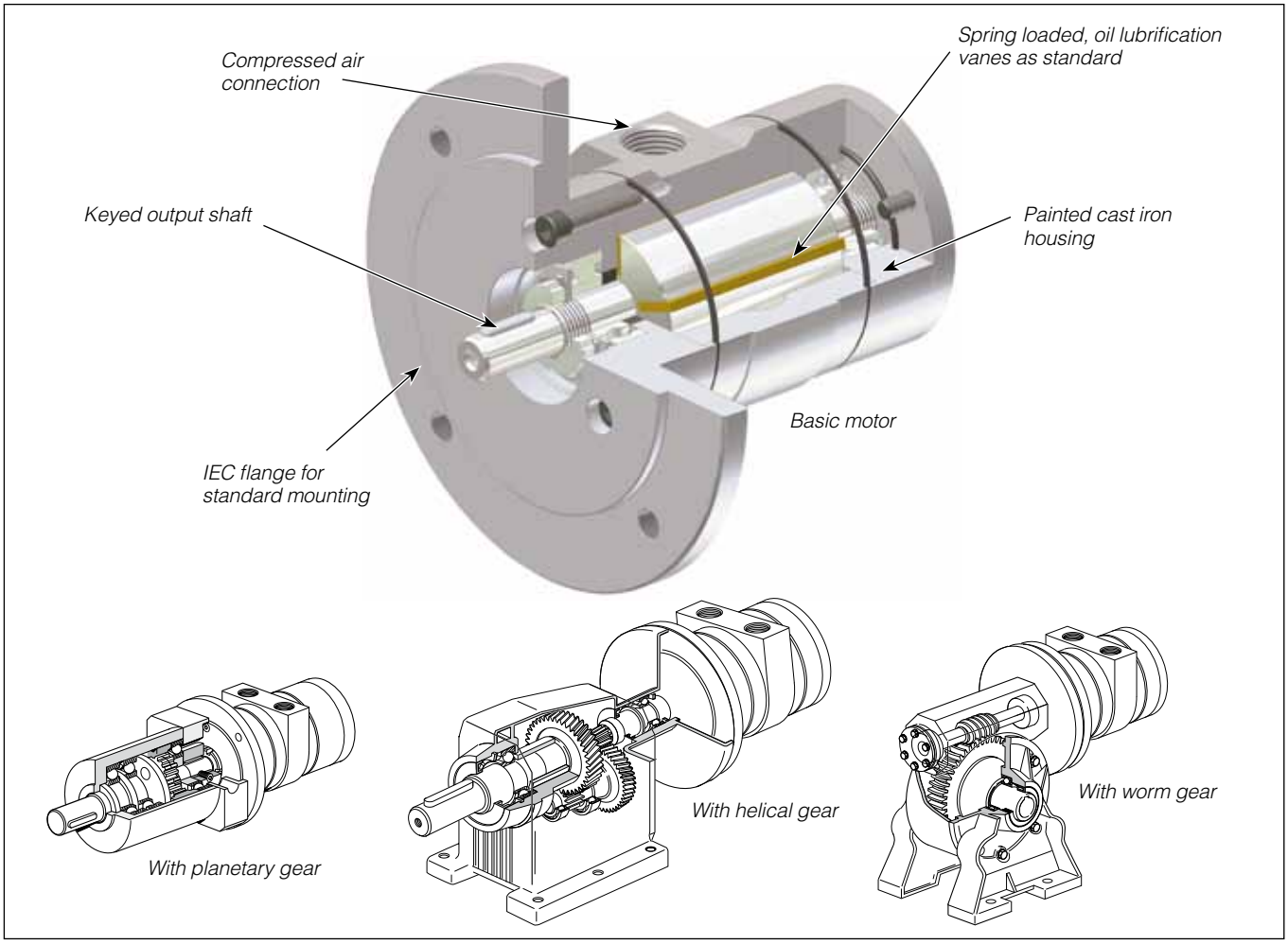
The motors are reversible as standard.



Air motors can be used in the harshest environments.



The reliability of air motors is very high, thanks to the design and the low number of moving parts.



Large Air Motors

P1V-A is a range of reversible air motors intended for heavy and demanding applications. The motor housings are made from painted cast iron, and the components sealed to permit operation in damp and dirty environments.

The range contains three different sizes, P1V-A160, P1V-A260 and P1V-A360, with power ratings of 1600, 2600 or 3600 Watts. The basic motors can be supplied with built-in gearboxes, either planetary, helical or worm drives, to provide the correct speed of rotation and torque, and the correct installation mountings.

Basic motors

All pneumatic motors are equipped with spring loaded vanes as standard, which gives the motors very good starting and low speed running characteristics. They are also equipped with vanes for intermittent or permanent oil lubrification as standard. The simple construction of the motors makes them very reliable, with long service life and they are easy to service.

Motors with planetary gears

A P1V-A combined with a planetary gear has small installation dimensions, low weight in relation to performance, free installation position, flange mounting as standard, in line output shaft and high efficiency. They are available with shaft speeds ranging from 95 rpm to 1200 rpm, with torques ranging from 16 Nm to 160 Nm.

Motors with helical gears

A P1V-A combined with a helical gear has high efficiency, simple installation with flange or foot, and competitive pricing. They are available with shaft speeds ranging from 25 rpm to 1050 rpm, with torques ranging from 23 Nm to 1800 Nm. Oil-bath gears mean that the installation position must be decided beforehand. The installation position governs the amount of oil in the gear and the location of filling and drain plugs.

Motors with worm gears

A P1V-A combined with a worm drive gear has the following characteristics: gearboxes with high gear ratios are self-locking, which means that they can be used to maintain the output shaft in position, simple installation with the flange on the left or right sides or with a foot, small installation dimensions and competitive pricing. They are available with shaft speeds ranging from 62 rpm to 500 rpm, with torques ranging from 38 Nm to 670 Nm. Oil-bath gears mean that the installation position must be decided beforehand. The installation position governs the amount of oil in the gear and the location of filling and drain plugs.

Products specially designed for mobile applications

Technical data

Note: All technical data are based on a working pressure of 6 bar and with oil. Speed tolerance accuracy in between clock and anti-clockwise directions is ±10%.

Air motor size & type	P1V-A160	P1V-A260	P1V-A360
Nominal power (watts)	1600	2600	3600
Working pressure (bar)	3 to 7, 6 in explosive atmosphere		
Working temperature (°C)	-20 to +110		
Ambient temperature (°C)	-20 to +110		
Air flow required (Nl/min)	1900	3600	5800
Min pipe ID, inlet (mm)	15	19	25
Min pipe ID, outlet (mm)	15	19	25
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop			
	2100	3900	6200
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop			
	2300	4200	6600
Medium	40µm filtered, oil mist lubricated compressed air		
Oil operation	1-2 drop per cube meter, ISO8573-1 purity class 3.-.5		
Recommended oil	Foodstuffs industry Klüber oil 4 UH1- 32 N		
Sound level free outlet (dB(A))	120	131	131
With outlet silencer (dB(A))	97.5	99	101

Note: sound levels are measured at free speed with the measuring instrument positioned 1 meter away from the air motor at an height of 1 meter.

Material specification

Air motor size & type	P1V-A160	P1V-A260	P1V-A360
	Without gear box		
Motor housing	Cast iron, synthetic paint, silver grey color		
Shaft	High grade steel		
Key	Hardened steel		
External seal	Nitrile rubber, NBR		
Internal steel parts	High grade steel		
Vanes	Patented, no data		
Screws	Zinc coated steel		
	With gear boxes, common data		
Housing	Alloy steel, synthetic paint, silver grey color		
Shaft	Hardened steel		
Key	Hardened steel		
Shaft seal	Nitrile rubber, NBR		
Screws	Zinc coated steel		
	With planetary gear box		
Housing	Cast iron, synthetic paint, silver grey color		
	With helical gear box		
Housing	Aluminium or cast iron, synthetic paint, silver grey color		
	With worm gear box		
Housing	Aluminium or cast iron, synthetic paint, silver grey color		
Pinion	Chili cast phosphor bronze		
Worm	Alloyed, hardened steel		

Design data

Motor without gear box	With planetary gear box	With helical gear box	With worm gear box
Robust design with few components: • Spring loaded vanes as standard give good starting and low speed characteristics • Keyed output shaft • Reversible operation	Precision made gears with efficiency over 95% • Sealed, permanently grease lubrication gives free installation position • Compact installation and low weight • Central output shaft	• Two versions available, with flange or foot • High efficiency, 90 to 95% • Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.	• Available in three versions, for installation with left-hand flange, right-hand flange or foot mounting. • Compact size and low weight • Self-locking in higher ratios • Output shaft at 90° angle to motor spindle • Hollow output shaft with key slot. Single-ended or "through" twin shaft as options. • Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

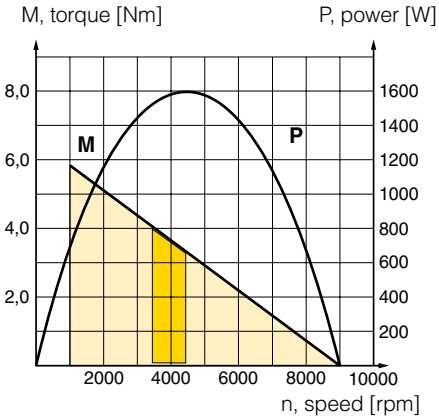
NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.

A: Basic reversible motor without gear box, IEC Flange

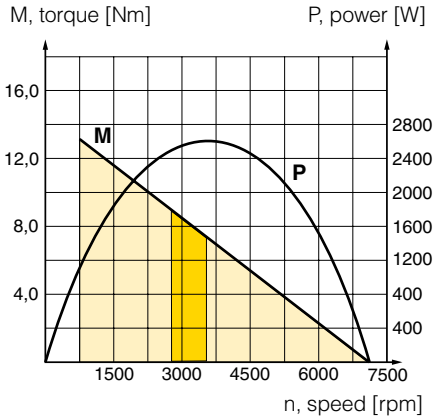
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
1,600	9000	4500	3,3	5,0	32	G1/2	15	4,2	**P1V-A160A0900**
2,600	7000	3500	7,1	11,0	60	G3/4	19	7,9	**P1V-A260A0700**
3,600	6000	3000	11,5	17,0	97	G1	25	16,5	**P1V-A360A0600**

* maximum admissible speed (idling)

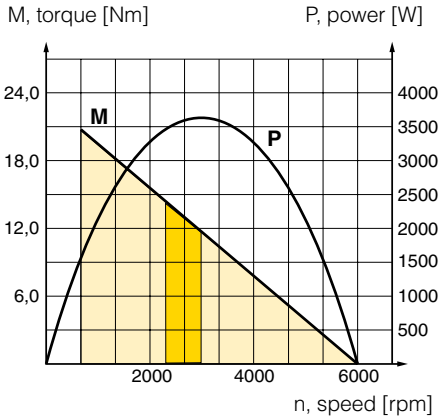
P1V-A160A0900



P1V-A260A0700



P1V-A360A0600



Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Permitted shaft loadings

Max permitted load on output shaft for basic motors (based on 10,000,000 revolutions of the output shaft, with 90% probable service life for ball bearings.

	F_{ax} N	F_{rad} N	a mm
P1V-A160A0900	600	1000	15
P1V-A260A0700	700	1400	20
P1V-A360A0600	900	1900	25

F_{rad} = Radial loading (N)
F_{ax} = Axial loading (N)

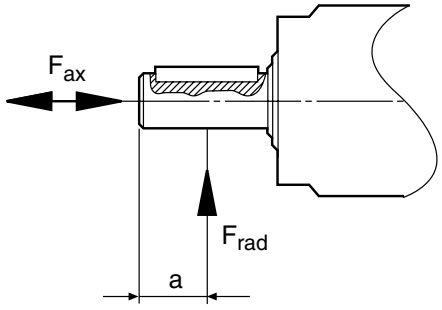
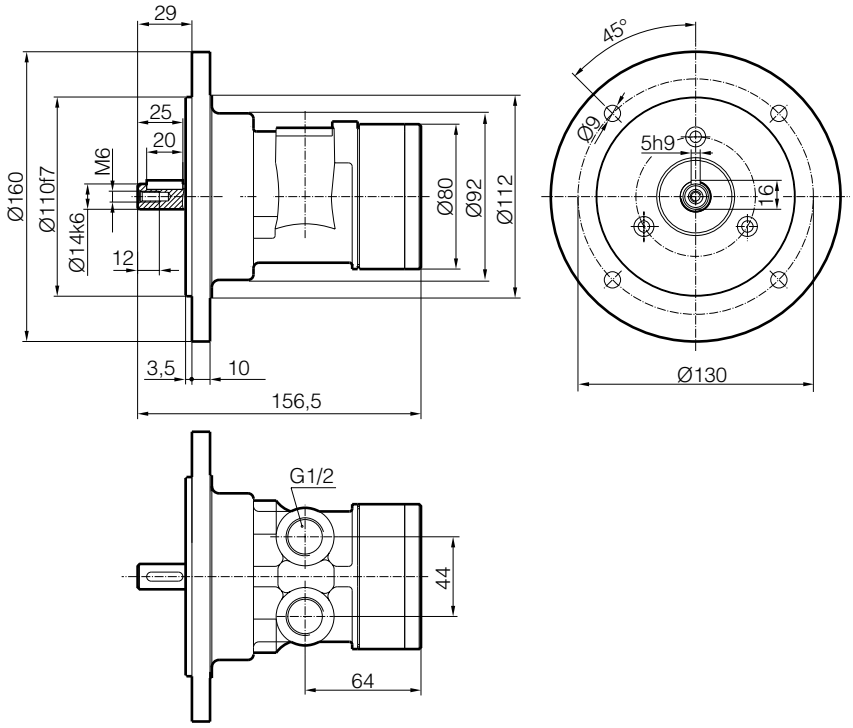


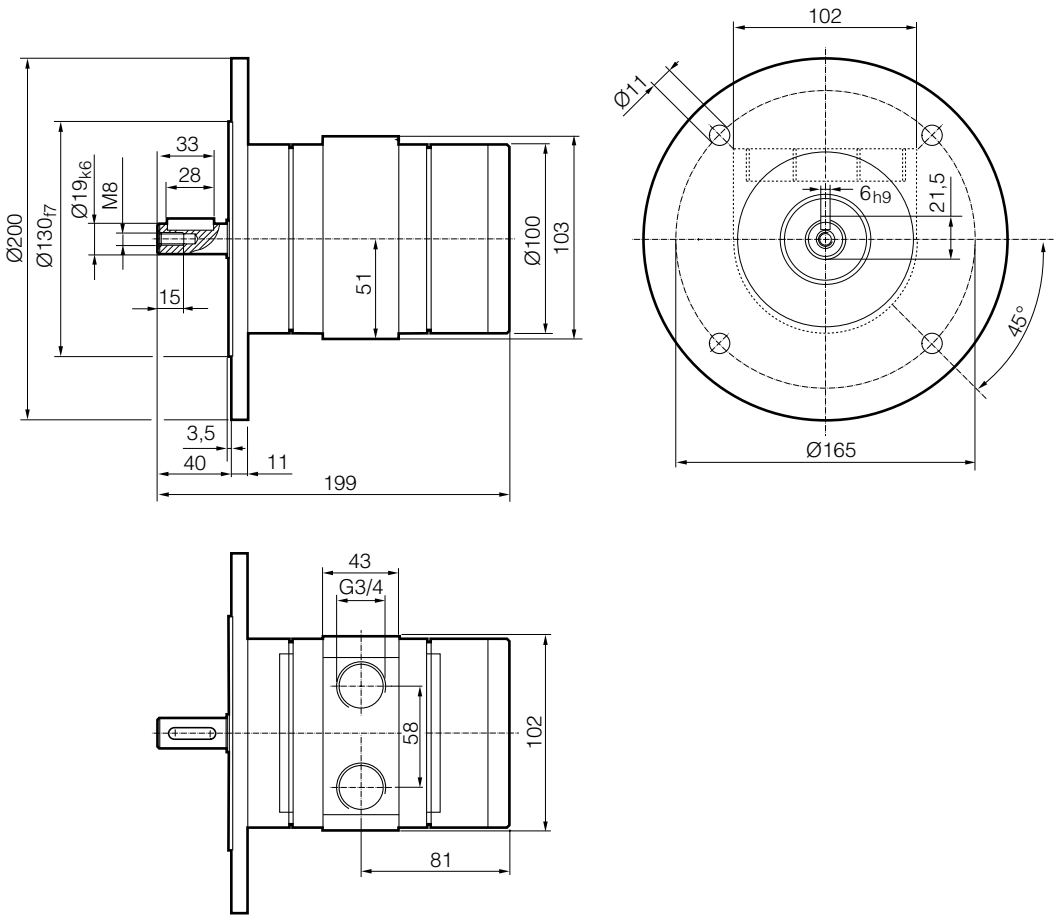
Fig. 1: Loading on output shaft.

Dimensions (mm)

Flange motor IEC71AB5 (P1V-A160)

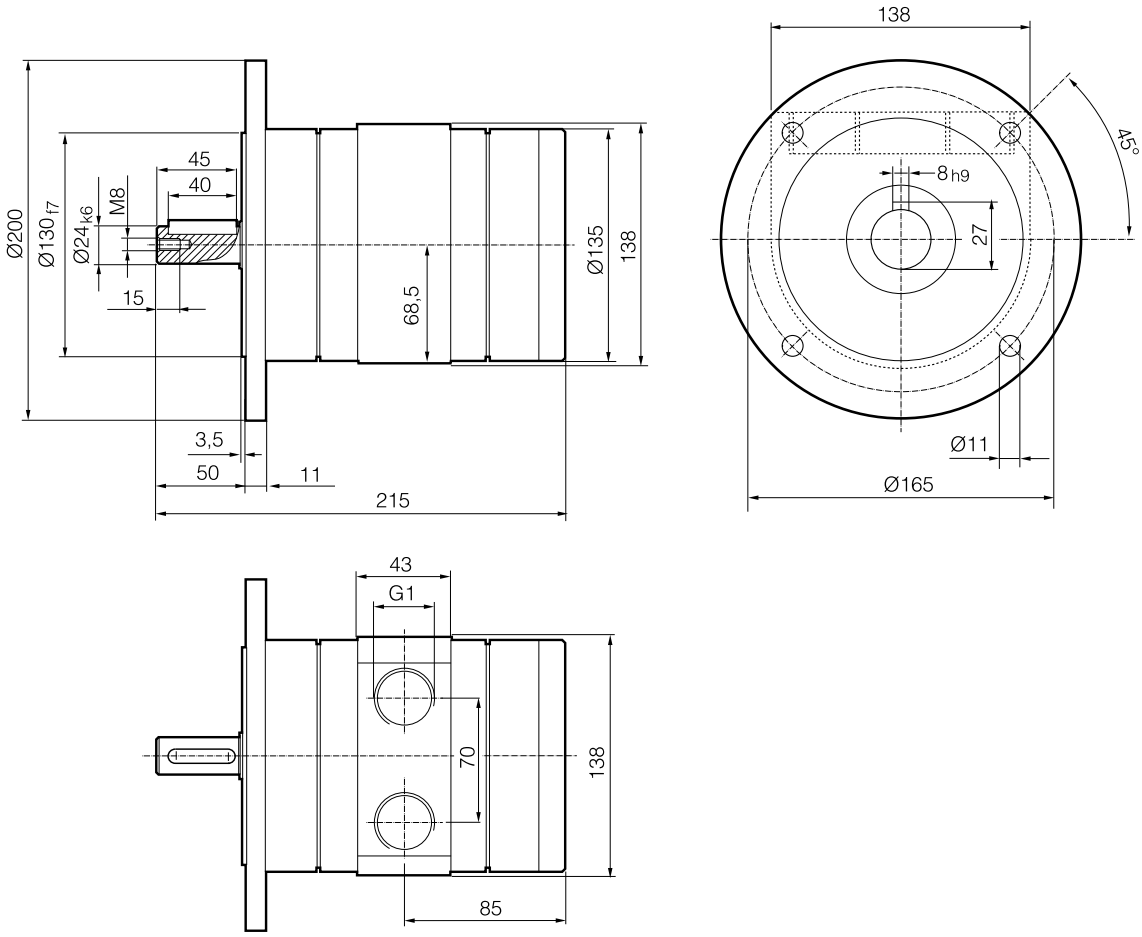


Flange motor IEC80AB5 (P1V-A260)



Dimensions (mm)

Flange motor IEC90AB5 (P1V-A360)



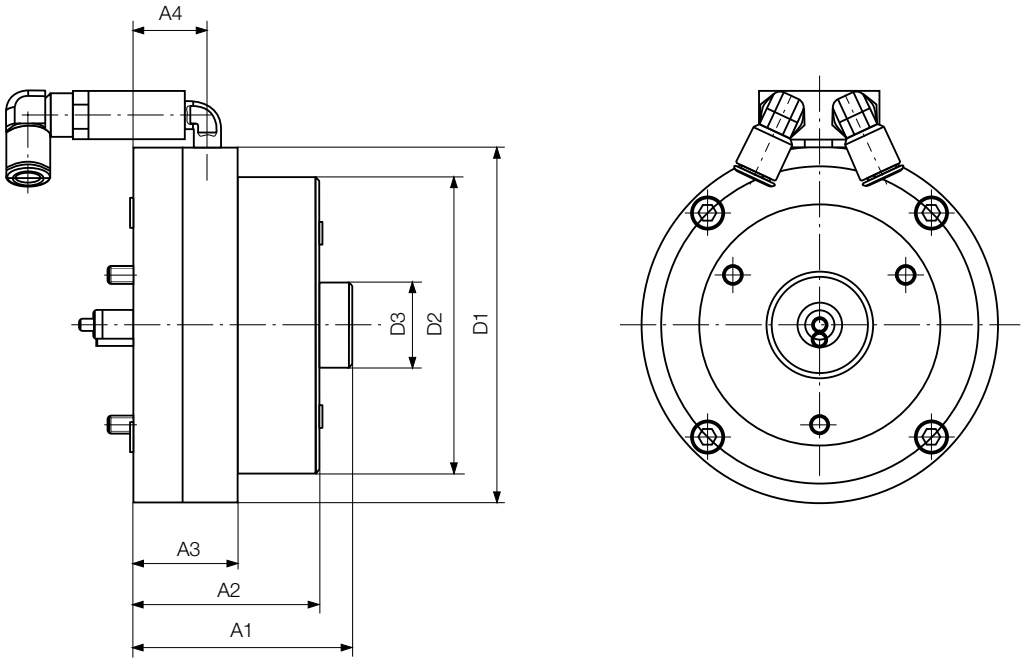
Holding Brakes

Our holding brakes are designed for the motors without gear boxes only.

For motor without gear box	Type	P1V-A160A0900	P1V-A260A0700	P1V-A360A0600
Holding brake	Order code	**P1V-A/445709B**	**P1V-A/445711B**	**P1V-A/445713B**
Brake Torque		12 Nm*)	28 Nm*)	46 Nm*)

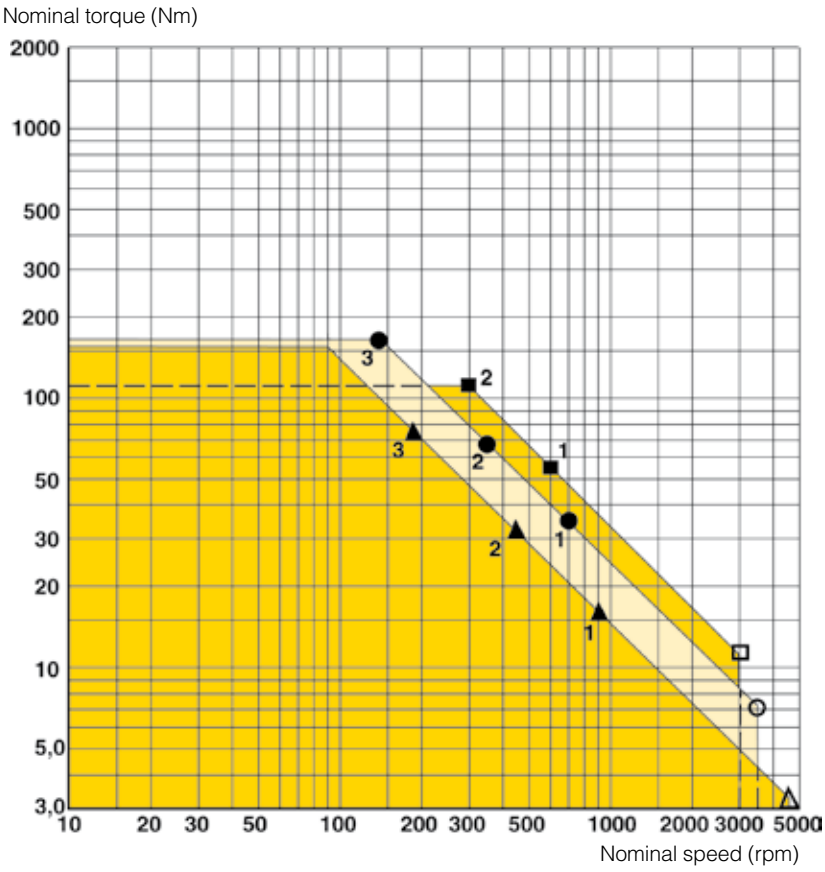
*) The holding brake is not designed for use with a different drive system. Please only use it in combination with the stated motor types.

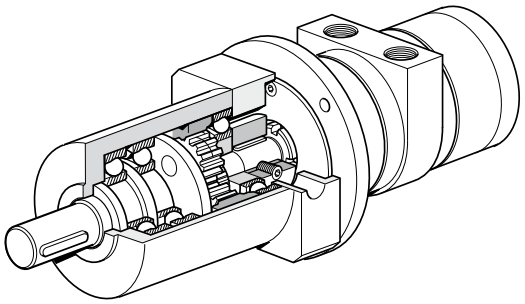
Dimensions (mm)



Dimensions of the braking device (mm)							
Order code	**A1**	**A2**	**A3**	**A4**	**D1**	**D2**	**D3**
P1V-A/445709B	72.5	61.5	34.5	24.5	118	98	28
P1V-A/445711B	107	98	43.5	35.5	190	162	28
P1V-A/445713B	107	98	43.5	35.5	190	162	28

Choice of an air motor with planetary gear





The motor to be used should be selected by starting with the torque needed at a specific spindle speed. In other words, to choose the right motor, you have to know the required speed and torque. Since maximum power is reached at half the motor's free speed, the motor should be chosen so that the point aimed at is as close as possible to the maximum power of the motor.

The design principle of the motor means that higher torque is generated when it is braked, which tends to increase the speed, etc. This means that the motor has a kind of speed self-regulation function built in.

Use the following graph to choose the correct motor size and the correct type of gear as appropriate. The graph contains the points for the maximum torque of each motor at maximum power. Put in your point on the graph and select a marked point above and to the right of the point you need.

Then check the characteristic graph of each motor to find more accurate technical data. Always select a motor where the data required is in the grey field. Also use the correction diagram to see what it would mean to use different air supply pressures with the motor.

Tip: Select a motor which is slightly too fast and powerful, regulate its speed and torque with a pressure regulator and/or restriction to achieve the optimum working point.

Choice of motors with planetary gears

Planetary gears are characterised by high efficiency, low moment of inertia and can offer high gear ratios.

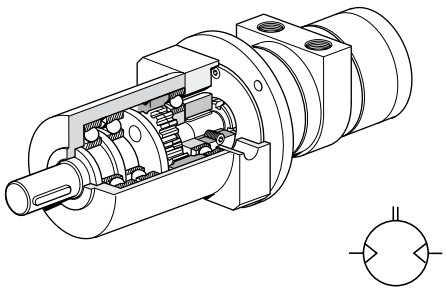
The output shaft is always in the centre of the gearbox. Small installation dimensions relative to the torque provided. The gears are lubricated by grease, which means that it can be installed in all conceivable positions.

- Small installation dimensions
- Free installation position
- Simple flange installation
- Low weight
- Output shaft in centre
- High efficiency

Air motors in diagram above

△	P1V-A160A0900
▲1	P1V-A160B0120
▲2	P1V-A160B0060
▲3	P1V-A160B0019
○	P1V-A260A0700
●1	P1V-A260B0120
●2	P1V-A260B0060
●3	P1V-A260B0019
□	P1V-A360A0600
■1	P1V-A360B0096
■2	P1V-A360B0048

NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



B: Reversible motor with planetary gear, flange mounting, free installation position

Max power kW	Max speed* rpm	Nominal speed rpm	Nominal Torque Nm	Min start torque Nm	Max permanent torque** Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
Series P1V-A160										
1,600	1200	900	16	24	40	32	G1/2	15	8,3	**P1V-A160B0120**
1,600	600	450	32	48	35	32	G1/2	15	8,3	**P1V-A160B0060**
1,600	190	180	77	115	100	32	G1/2	15	15,4	**P1V-A160B0019**
Series P1V-A260										
2,600	1200	700	34	51	40	60	G3/4	19	12,0	**P1V-A260B0120**
2,600	600	350	67	100	40	60	G3/4	19	12,0	**P1V-A260B0060**
2,600	190	140	160	240	40	60	G3/4	19	13,0	**P1V-A260B0019**
Series P1V-A360										
3,600	960	600	55	82	100	97	G1	25	25,5	**P1V-A360B0096**
3,600	480	300	110	165	100	97	G1	25	25,5	**P1V-A360B0048**

* maximum admissible speed (idling)

** Max gear box torque for a permanent load

Permitted shaft loadings

The following calculations should be used to determine the loading on the output shaft bearing, if a service life of 10,000,000 revolutions of the output shaft is to be obtained with 90% probability.

F_{ax} = max 0,24 × F_{rad}

$M = \pm F_{ax} \times r \pm F_{rad} \times (X + K)$

Where M and K are found in the table below

	M Nm	K N
P1V-A160B120	2651	0,031
P1V-A160B060	2651	0,031
P1V-A160B019	7385	0,040
P1V-A160B010	7385	0,040
P1V-A260B120	2651	0,031
P1V-A260B060	2651	0,031
P1V-A260B019	7385	0,040
P1V-A360B096	7385	0,040
P1V-A360B048	7385	0,040

M Max. torque loading on output shaft (Nm)
r Distance from centre of output shaft to axial load (m)
X Distance from collar to radial load (m)
F_{rad} Radial loading (N)
F_{ax} Axial loading (N)

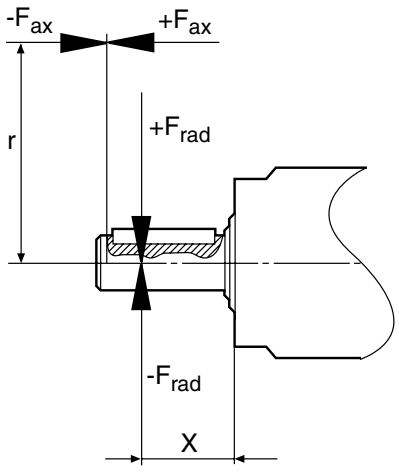
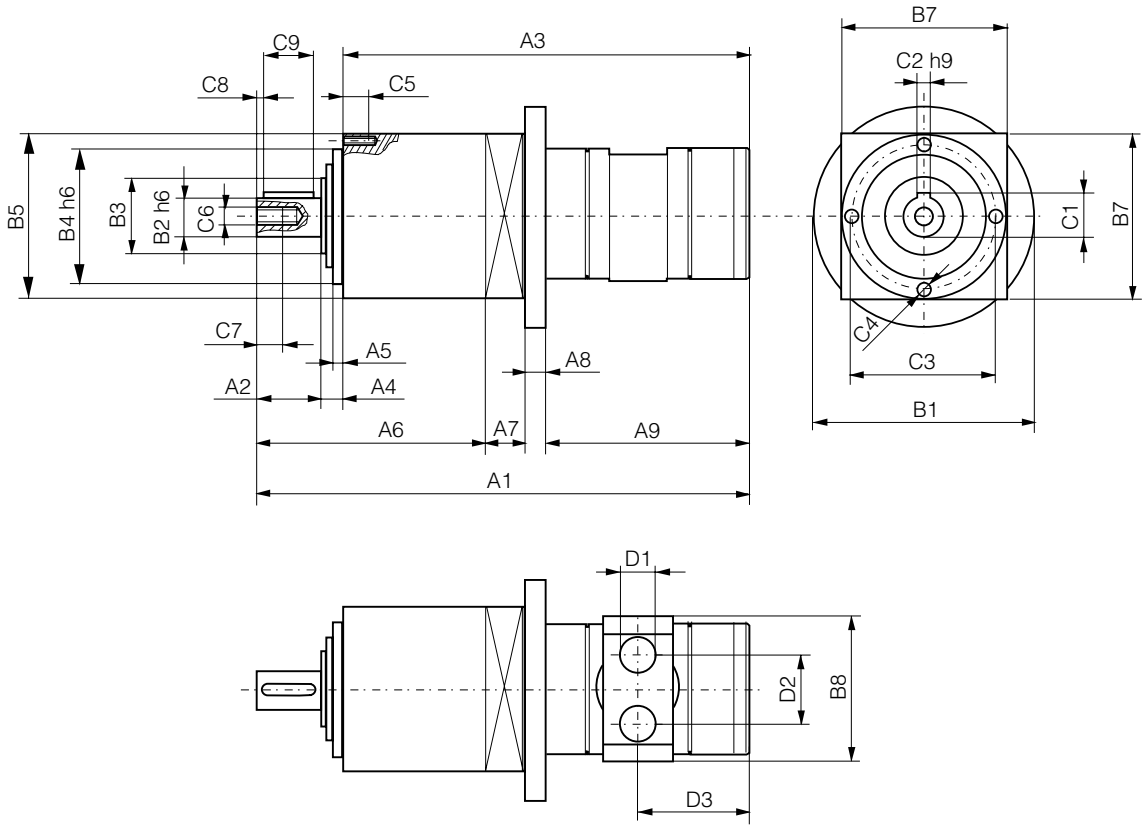


Fig 2: Load and braking torque on output shaft of planetary gear

Dimensions (mm)

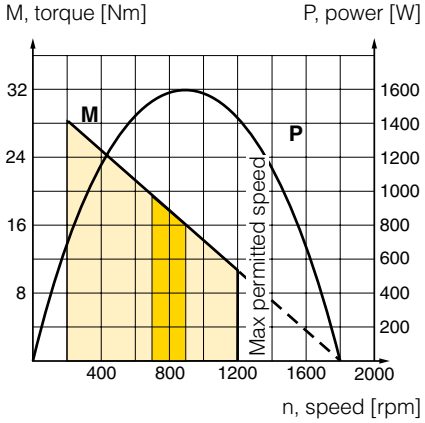
B: Motor with planetary gear, flange mounting



Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	B5	B6
P1V-A160B0120	274,5	36	228,5	10	5	126,0	22	10	116,5	160	22	40	68	90	80
P1V-A160B0060	274,5	36	228,5	10	5	126,0	22	10	116,5	160	22	40	68	90	80
P1V-A160B0019	359,0	58	289,0	12	5	204,5	28	10	116,5	160	32	50	90	120	80
P1V-A260B0120	317,0	36	271,0	10	6	126,0	32	11	148,0	200	22	40	68	90	100
P1V-A260B0060	317,0	36	271,0	10	6	126,0	32	11	148,0	200	22	40	68	90	100
P1V-A260B0019	391,5	58	321,5	12	6	204,5	28	11	148,0	200	32	50	90	120	100
P1V-A360B0096	375,0	58	305,0	12	6	172,0	38	11	154,0	200	32	50	90	120	135
P1V-A360B0048	375,0	58	305,0	12	6	172,0	38	11	154,0	200	32	50	90	120	135

Order code	B7	B8	C1	C2	C3	C4	C5	C6	C7	C8	C9	D1	D2	D3
P1V-A160B0120	120	85	24,5	6	80	M6	12	M8	13	2	32	G1/2	44	64
P1V-A160B0060	120	85	24,5	6	80	M6	12	M8	13	2	32	G1/2	44	64
P1V-A160B0019	120	85	35,0	10	108	M8	16	M12	22	4	50	G1/2	44	64
P1V-A260B0120	140	102	24,5	6	80	M6	12	M8	13	2	32	G3/4	58	81
P1V-A260B0060	140	102	24,5	6	80	M6	12	M8	13	2	32	G3/4	58	81
P1V-A260B0019	140	102	35,0	10	108	M8	16	M12	22	4	50	G3/4	58	81
P1V-A360B0096	140	138	35,0	10	108	M8	16	M12	22	4	50	G1	70	85
P1V-A360B0048	140	138	35,0	10	108	M8	16	M12	22	4	50	G1	70	85

P1V-A160B0120



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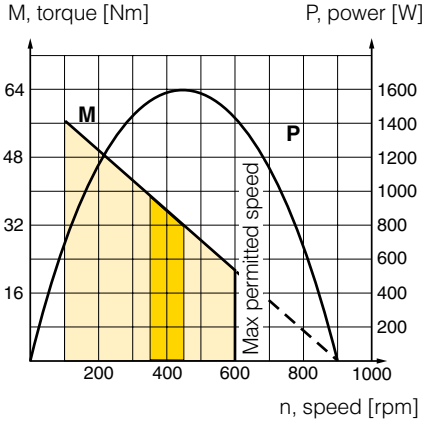

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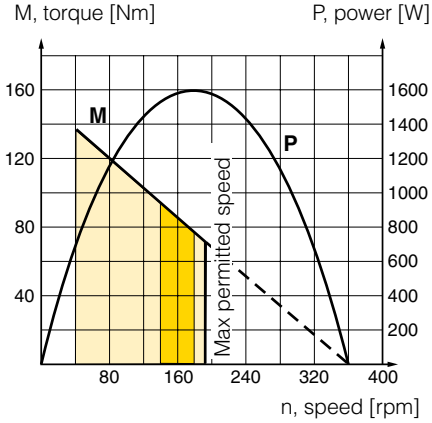

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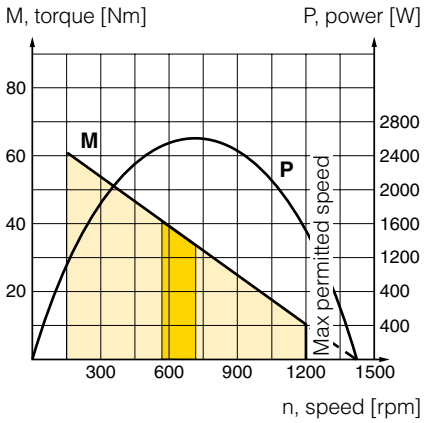

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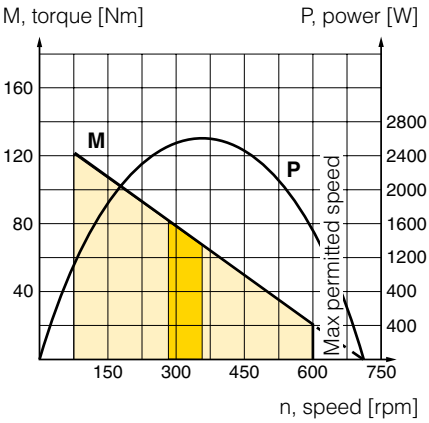
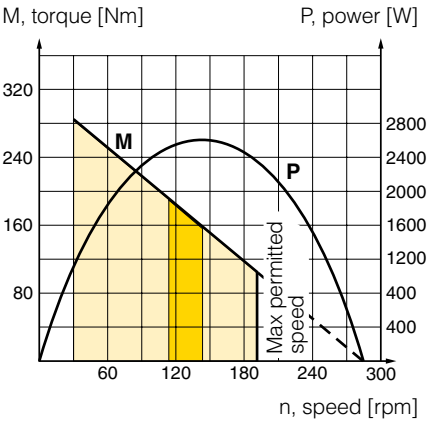
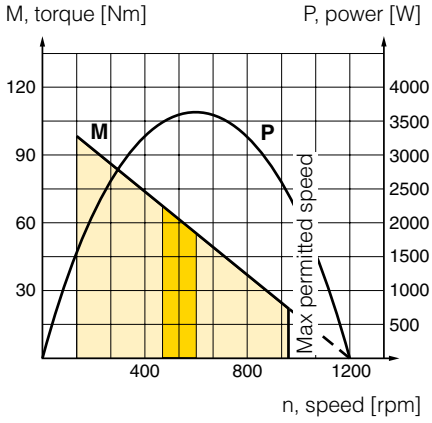


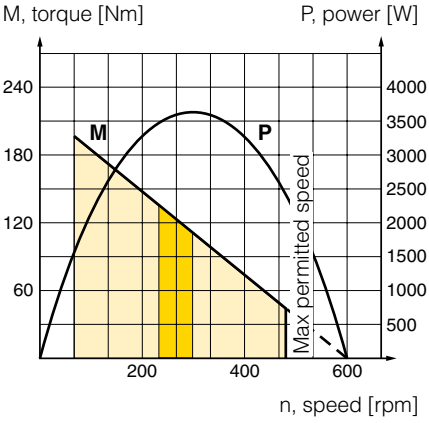
P1V-A260B0019



P1V-A360B0096



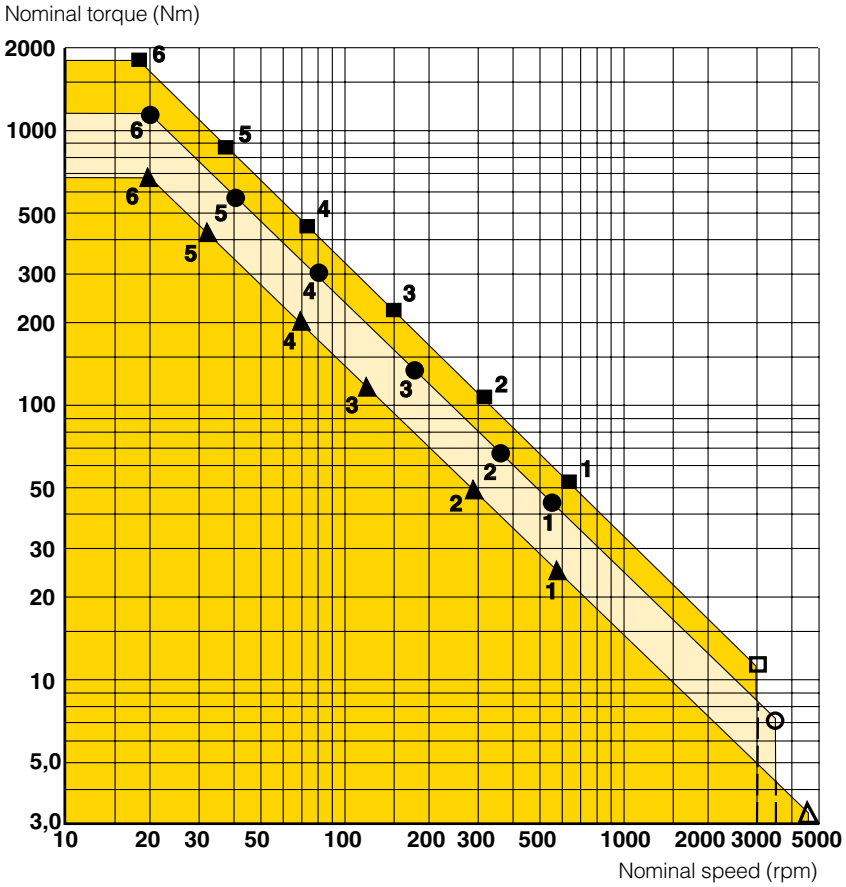
P1V-A360B0048

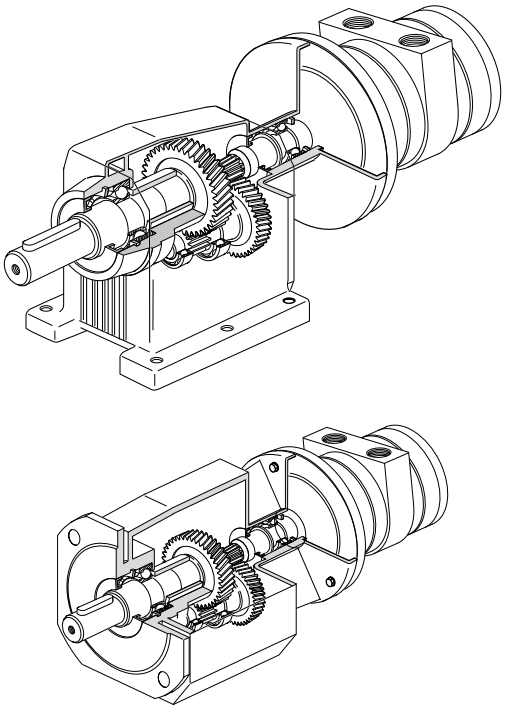


Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Choice of an air motor with helical gear





Helical gears are characterised by high efficiency. Several reduction stages permit relatively high gear ratios. Central output shaft and simple installation with flange or foot.

Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

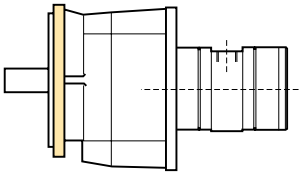
- High efficiency
- Simple flange or foot installation
- Relatively low price

– Installation position must be chosen in advance
– Higher weight than planetary or worm drive gears.

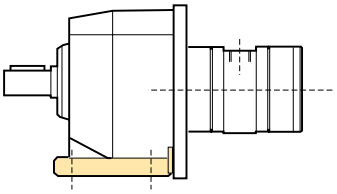
Air motors in diagram above

△	P1V-A160A0900
▲1	P1V-A160•0066••, Choose installation below
▲2	P1V-A160•0032••, Choose installation below
▲3	P1V-A160•0014••, Choose installation below
▲4	P1V-A160•0008••, Choose installation below
▲5	P1V-A160•0004••, Choose installation below
▲6	P1V-A160•0003••, Choose installation below
○	P1V-A260A0700
●1	P1V-A260•0080••, Choose installation below
●2	P1V-A260•0052••, Choose installation below
●3	P1V-A260•0025••, Choose installation below
●4	P1V-A260•0011••, Choose installation below
●5	P1V-A260•0006••, Choose installation below
●6	P1V-A260•0003••, Choose installation below
□	P1V-A360A0600
■1	P1V-A360•0105••, Choose installation below
■2	P1V-A360•0052••, Choose installation below
■3	P1V-A360•0025••, Choose installation below
■4	P1V-A360•0013••, Choose installation below
■5	P1V-A360•0006••, Choose installation below
■6	P1V-A360•0003••, Choose installation below

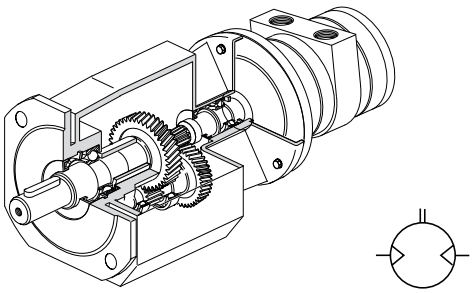
Installation, flange mounting



Installation, foot mounting



NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



D: Reversible motor with helical gear, flange mounting

Max power kW	Max speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Max permanent torque** Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
Series P1V-A160										
1,600	660	590	24	36	45	32	G1/2	15	9,8	**P1V-A160D0066••**
1,600	320	280	50	75	140	32	G1/2	15	11,5	**P1V-A160D0032••**
1,600	140	120	113	171	280	32	G1/2	15	14,4	**P1V-A160D0014••**
1,600	80	70	197	299	560	32	G1/2	15	31,7	**P1V-A160D0008••**
1,600	37	33	413	626	1000	32	G1/2	15	49,2	**P1V-A160D0004••**
1,600	21	18	716	1084	1600	32	G1/2	15	67,2	**P1V-A160D0003••**
Series P1V-A260										
2,600	800	565	42	64	42	60	G3/4	19	14,9	**P1V-A260D0080••**
2,600	520	365	65	100	115	60	G3/4	19	16,1	**P1V-A260D0052••**
2,600	250	175	135	210	235	60	G3/4	19	19,0	**P1V-A260D0025••**
2,600	110	80	302	468	500	60	G3/4	19	36,4	**P1V-A260D0011••**
2,600	55	40	614	951	1000	60	G3/4	19	54,9	**P1V-A260D0006••**
2,600	30	20	990	1530	1600	60	G3/4	19	68,9	**P1V-A260D0003••**
Series P1V-A360										
3,600	1050	625	52	78	80	97	G1	25	24,6	**P1V-A360D0105••**
3,600	520	310	105	155	175	97	G1	25	24,6	**P1V-A360D0052••**
3,600	250	150	216	320	385	97	G1	25	45,0	**P1V-A360D0025••**
3,600	125	74	441	652	795	97	G1	25	63,5	**P1V-A360D0013••**
3,600	60	36	888	1312	1600	97	G1	25	77,5	**P1V-A360D0006••**
3,600	30	18	1800	2670	4000	97	G1	25	151,5	**P1V-A360D0003••**

* maximum admissible speed (idling)

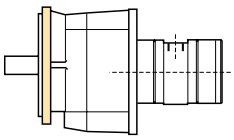
** Max gear box torque for a permanent load

Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160D0066B5

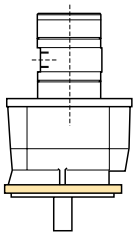
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

D: Installation positions, helical gear, flange mounting

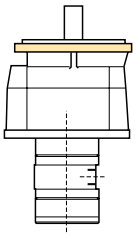
B5



V1

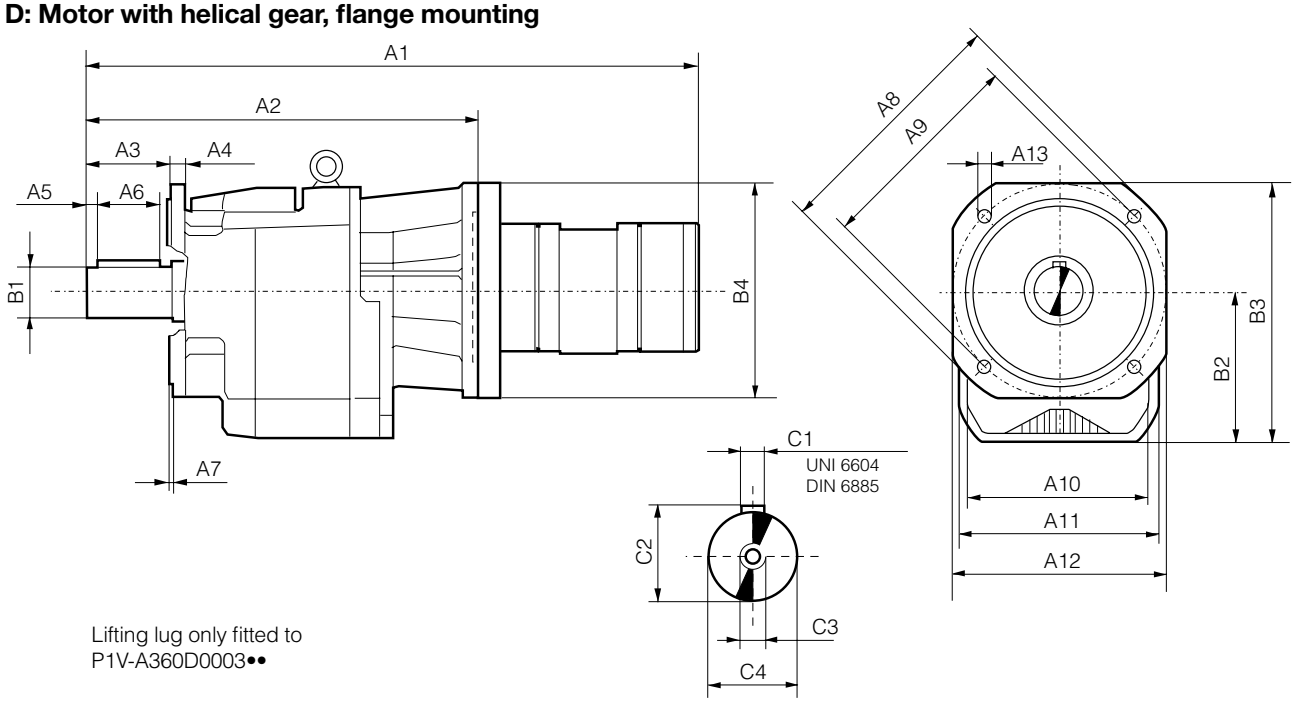


V3



Dimensions (mm)

D: Motor with helical gear, flange mounting



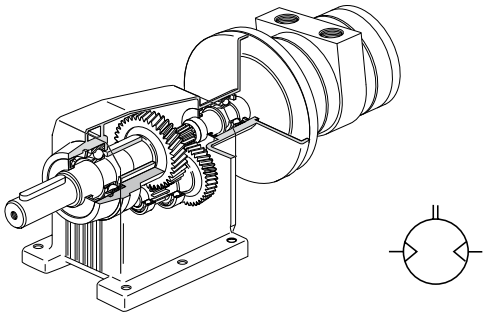
Lifting lug only fitted to
P1V-A360D0003••

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	B1	B2	B3
P1V-A160D0066••	370,5	244	40	8	5	30	3,0	140	115	95f7	95	105	9,5	20	82	138,0
P1V-A160D0032••	399,5	273	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A160D0014••	433,5	307	60	12	5	50	3,5	200	165	130f7	130	150	11,5	30	108	183,0
P1V-A160D0008••	463,5	337	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A160D0004••	559,5	433	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A160D0003••	601,5	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A260D0080••	423,0	264	40	8	5	30	3,0	140	115	95f7	95	105	9,5	20	82	138,0
P1V-A260D0052••	451,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A260D0025••	486,0	327	60	12	5	50	3,5	200	165	130f7	130	150	11,5	30	108	183,0
P1V-A260D0011••	515,0	356	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A260D0006••	612,0	453	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A260D0003••	634,0	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A360D0105••	458,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A360D0052••	458,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A360D0025••	521,0	356	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A360D0013••	547,0	382	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A360D0006••	640,0	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A360D0003••	699,0	534	140	20	15	110	5,0	400	350	300 f7	320	350	18,0	80	247	424,0

Order code	B4	C1	C2	C3	C4
P1V-A160D0066••	160	6x6x30	22,5	M8x19	20 h6
P1V-A160D0032••	160	8x7x40	28,0	M8x19	25 h6
P1V-A160D0014••	160	8x7x50	33,0	M10x22	30 h6
P1V-A160D0008••	160	10x8x60	38,0	M10x22	35 h6
P1V-A160D0004••	160	12x8x70	43,0	M12x28	40 h6
P1V-A160D0003••	160	14x9x90	53,5	M16x36	50 h6
P1V-A260D0080••	200	6x6x30	22,5	M8x19	20 h6
P1V-A260D0052••	200	8x7x40	28,0	M8x19	25 h6
P1V-A260D0025••	200	8x7x50	33,0	M10x22	30 h6
P1V-A260D0011••	200	10x8x60	38,0	M10x22	35 h6
P1V-A260D0006••	200	12x8x70	43,0	M12x28	40 h6
P1V-A260D0003••	200	14x9x90	53,5	M16x36	50 h6
P1V-A360D0105••	200	8x7x40	28,0	M8x19	25 h6
P1V-A360D0052••	200	8x7x40	28,0	M8x19	25 h6
P1V-A360D0025••	200	10x8x60	38,0	M10x22	35 h6
P1V-A360D0013••	200	12x8x70	43,0	M12x28	40 h6
P1V-A360D0006••	200	14x9x90	53,5	M16x36	50 h6
P1V-A360D0003••	200	22x14x110	85,0	M20x42	80 h6

••: see previous page for installation positions

NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



E: Reversible motor with helical gear, foot mounting

Max power kW	Max speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Max permanent torque** Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
Series P1V-A160										
1,600	660	590	24	36	45	32	G1/2	15	9,8	**P1V-A160E0066••**
1,600	320	280	50	75	140	32	G1/2	15	11,5	**P1V-A160E0032••**
1,600	140	120	113	171	280	32	G1/2	15	14,4	**P1V-A160E0014••**
1,600	80	70	197	299	560	32	G1/2	15	31,7	**P1V-A160E0008••**
1,600	37	33	413	626	1000	32	G1/2	15	49,2	**P1V-A160E0004••**
1,600	21	18	716	1084	1600	32	G1/2	15	67,2	**P1V-A160E0003••**
Series P1V-A260										
2,600	800	565	42	64	42	60	G3/4	19	14,9	**P1V-A260E0080••**
2,600	520	365	65	100	115	60	G3/4	19	16,1	**P1V-A260E0052••**
2,600	250	175	135	210	235	60	G3/4	19	19,0	**P1V-A260E0025••**
2,600	110	80	302	468	500	60	G3/4	19	36,4	**P1V-A260E0011••**
2,600	55	40	614	951	1000	60	G3/4	19	54,9	**P1V-A260E0006••**
2,600	30	20	990	1530	1600	60	G3/4	19	68,9	**P1V-A260E0003••**
Series P1V-A360										
3,600	1050	625	52	78	80	97	G1	25	24,6	**P1V-A360E0105••**
3,600	520	310	105	155	175	97	G1	25	24,6	**P1V-A360E0052••**
3,600	250	150	216	320	385	97	G1	25	45,0	**P1V-A360E0025••**
3,600	125	74	441	652	795	97	G1	25	63,5	**P1V-A360E0013••**
3,600	62	36	868	1312	1600	97	G1	25	77,5	**P1V-A360E0006••**
3,600	30	18	1800	2670	4000	97	G1	25	151,5	**P1V-A360E0003••**

* maximum admissible speed (idling)

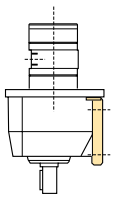
** Max gear box torque for a permanent load

Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160E0066V5

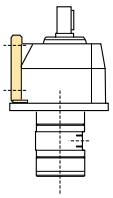
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

E: Installation positions, helical gear, foot mounting

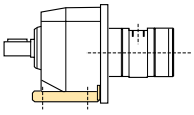
V5



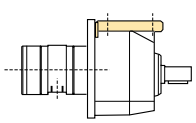
V6



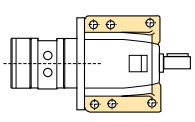
B3



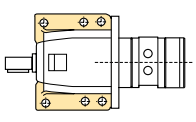
B8



B7

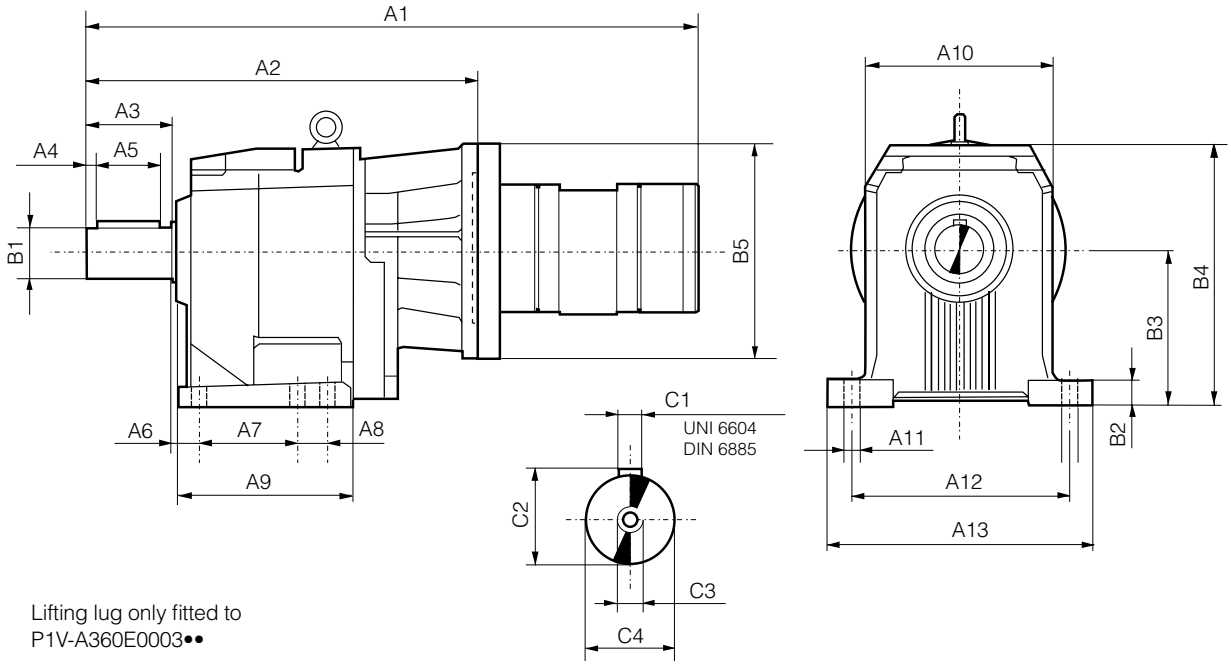


B6



Dimensions (mm)

E: Motor with helical gear, foot mounting



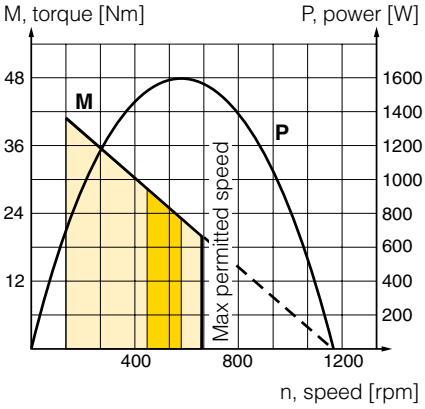
Lifting lug only fitted to P1V-A360E0003••

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	B1	B2	B3
P1V-A160E0066••	370,5	244	40	5	30	18	50	37,0	107,0	95	9	110	130	20	15	85
P1V-A160E0032••	399,5	273	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A160E0014••	433,5	307	60	5	50	18	70	60,0	156,0	130	11	160	190	30	20	110
P1V-A160E0008••	463,5	337	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A160E0004••	559,5	433	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A160E0003••	601,5	475	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A260E0080••	413,0	244	40	5	30	18	50	37,0	107,0	95	9	110	130	20	15	85
P1V-A260E0052••	451,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A260E0025••	486,0	327	60	5	50	18	70	60,0	156,0	130	11	160	190	30	20	110
P1V-A260E0011••	515,0	356	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A260E0006••	612,0	453	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A260E0003••	654,0	495	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A360E0105••	457,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A360E0052••	457,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A360E0025••	521,0	356	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A360E0013••	547,0	382	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A360E0006••	660,0	495	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A360E0003••	699,0	534	140	15	110	33	210	—	277,0	320	26	370	440	80	35	250

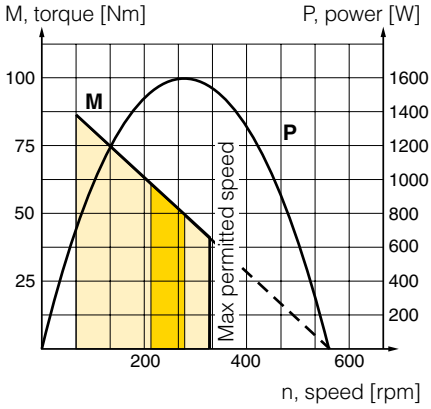
Order code	B4	B5	C1	C2	C3	C4
P1V-A160E0066••	141	160	6x6x30	22,5	M8x19	20 h6
P1V-A160E0032••	166	160	8x7x40	28,0	M8x19	25 h6
P1V-A160E0014••	181	160	8x7x50	33,0	M10x22	30 h6
P1V-A160E0008••	223	160	10x8x60	38,0	M10x22	35 h6
P1V-A160E0004••	278	160	12x8x70	43,0	M12x28	40 h6
P1V-A160E0003••	316	160	14x9x90	53,5	M16x36	50 h6
P1V-A260E0080••	141	200	6x6x30	22,5	M8x19	20 h6
P1V-A260E0052••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A260E0025••	181	200	8x7x50	33,0	M10x22	30 h6
P1V-A260E0011••	223	200	10x8x60	38,0	M10x22	35 h6
P1V-A260E0006••	278	200	12x8x70	43,0	M12x28	40 h6
P1V-A260E0003••	316	200	14x9x90	53,5	M16x36	50 h6
P1V-A360E0105••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A360E0052••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A360E0025••	223	200	10x8x60	38,0	M10x22	35 h6
P1V-A360E0013••	278	200	12x8x70	43,0	M12x28	40 h6
P1V-A360E0006••	316	200	14x9x90	53,5	M16x36	50 h6
P1V-A360E0003••	420	200	22x14x110	85,0	M20x42	80 h6

••: see previous page for installation positions

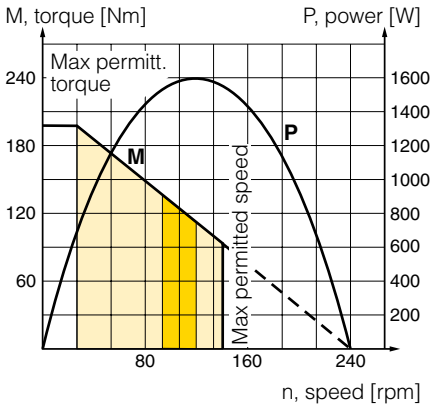
P1V-A160D0066••
P1V-A160E0066••



P1V-A160D0032••
P1V-A160E0032••



P1V-A160D0014••
P1V-A160E0014••



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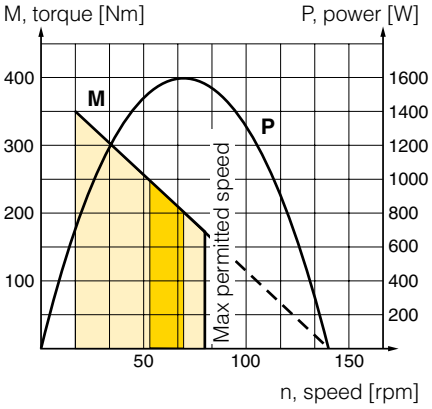
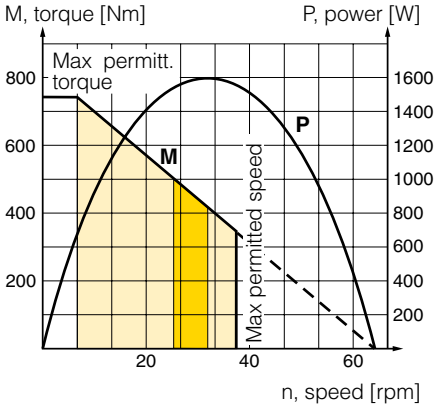
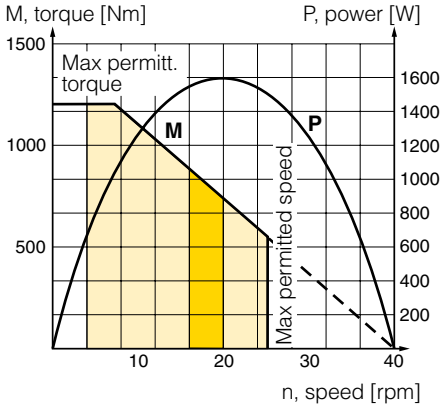
P1V-A160E0008••



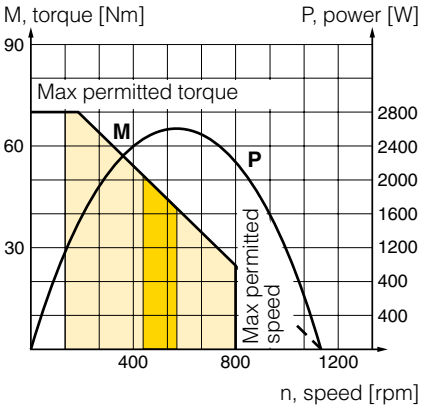
P1V-A160D0004••
P1V-A160E0004••



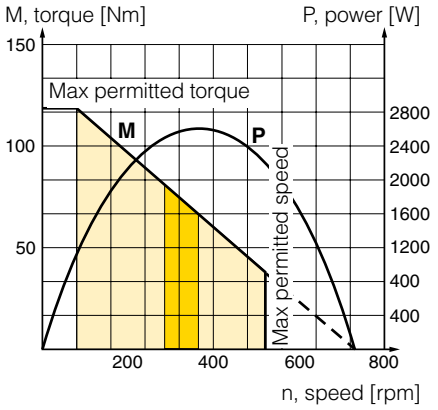
P1V-A160D0003••
P1V-A160E0003••



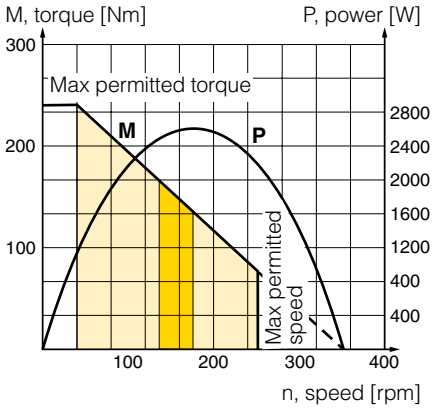
P1V-A260D0080••
P1V-A260E0080••



P1V-A260D0052••
P1V-A260E0052••



P1V-A260D0025••
P1V-A260E0025••

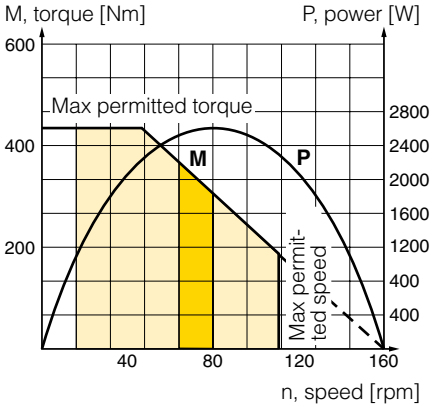


Possible working range of motor.

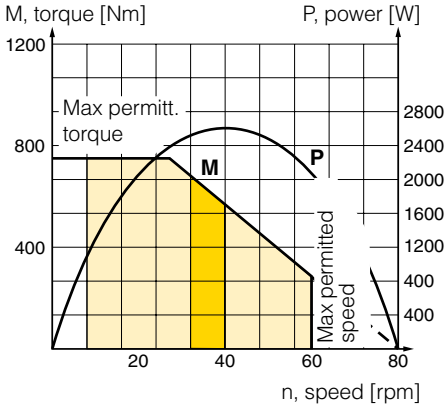
Optimum working range of motor.

Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

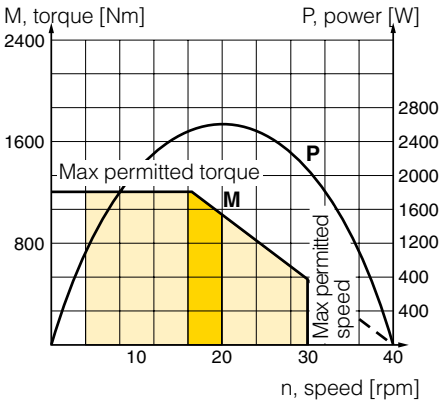
P1V-A260D0011••
P1V-A260E0011••



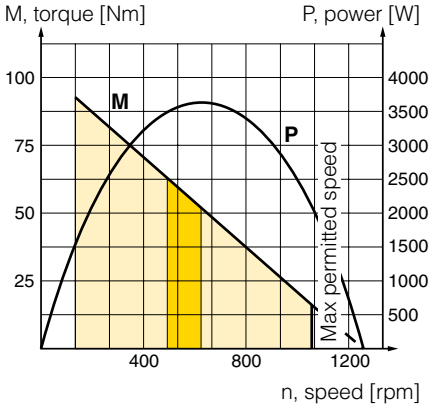
P1V-A260D0006••
P1V-A260E0006••



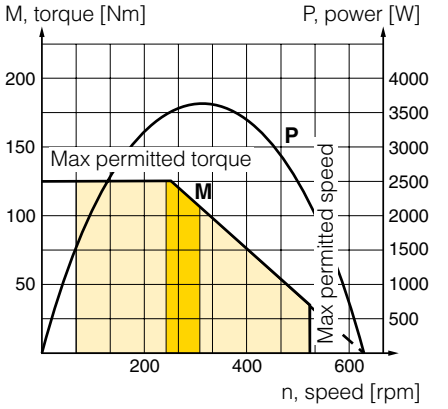
P1V-A260D0003••
P1V-A260E0003••



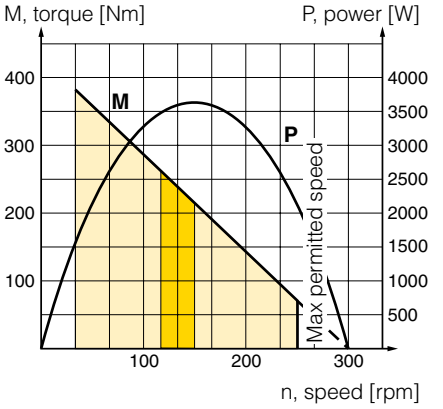
P1V-A360D0105••
P1V-A360E0105••



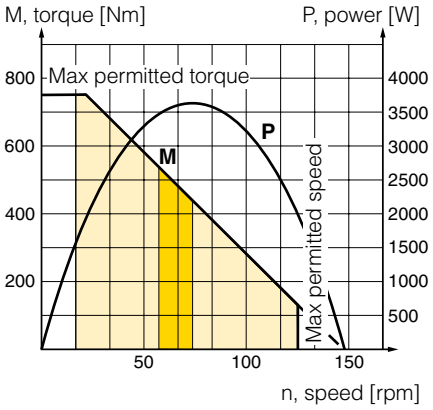
P1V-A360D0052••
P1V-A360E0052••



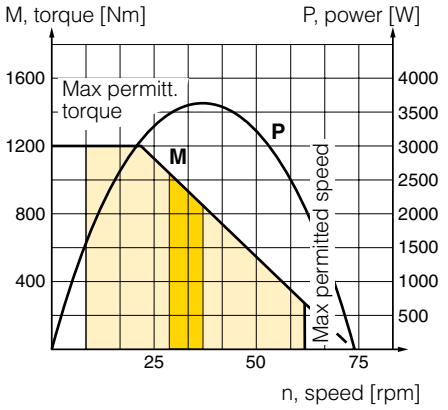
P1V-A360D0025••
P1V-A360E0025••



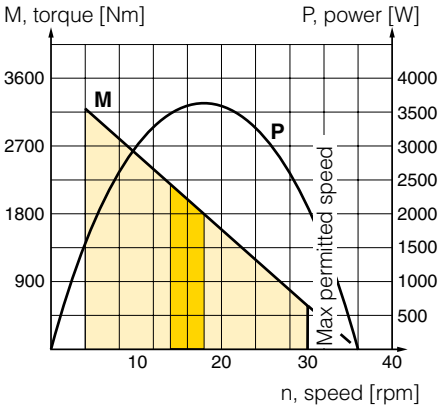
P1V-A360D0013••
P1V-A360E0013••



P1V-A360D0006••
P1V-A360E0006••



P1V-A360D0003••
P1V-A360E0003••



Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Permitted shaft loadings

Radial forces

Depending on the application, the drive shaft of the gearbox can be subjected to various radial forces, which can be calculated as follows:

$F_{rad} = 2000 \times M \times K_r / d$

F_{rad}	Radial force (N)
M	Torque (Nm)
d	Diameter of wheel, pulley, sprocket or gear wheel (mm)
Kr = 1	Sprocket constant
Kr = 1.25	Gear wheel constant
Kr = 1.5 - 2.5	Vee-belt pulley constant

Depending on the point of application of the force (please refer to the adjacent figure), the following two cases are found:

a. The force is applied to the centre of the output shaft, as in figure 3. This value can be read off on the table below, where consideration must be given to the following:

$F_{radc} \leq F_{rt}$

b. The force is applied at a distance x, as in figure 4. This value can be calculated as follows:

$F_{radx} = F_{rt} \times a / (b + X)$ $\quad L/2 < X < c$

F_{rt}	Permissible radial force on centre of output-shaft (N)
a	Gear constant
b	Gear constant
c	Gear constant
X	Distance from shoulder on shaft to point of application of force (mm)

All values are found in the table below.
The following should be considered, however:

$F_{radc} \leq F_{radx}$

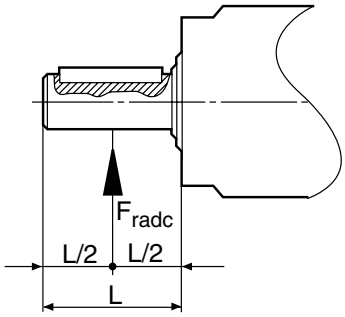


Fig. 3: Force applied at centre of shaft

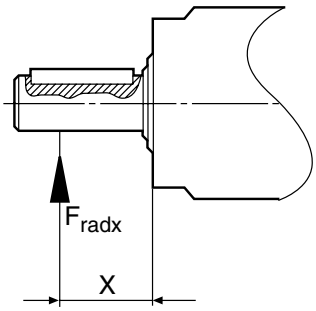


Fig. 4: Force applied at distance X

Axial forces

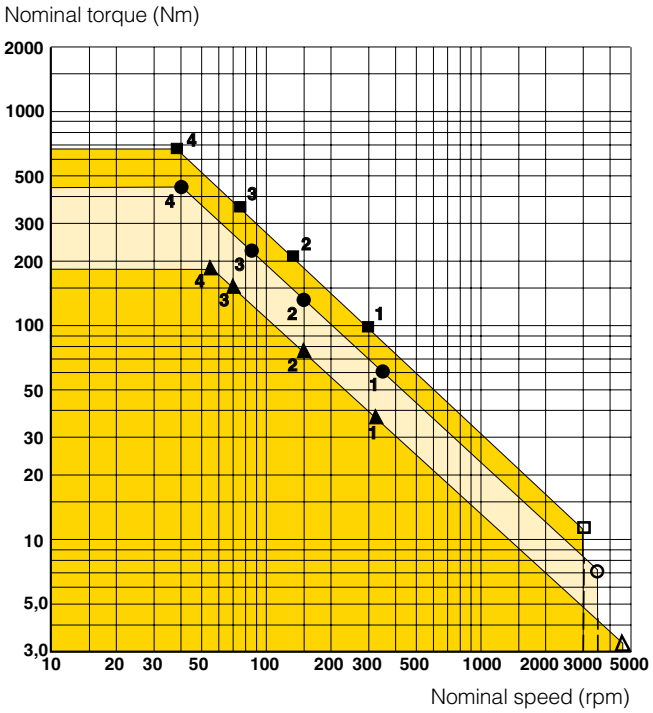
The maximum permissible axial force can be calculated as follows:

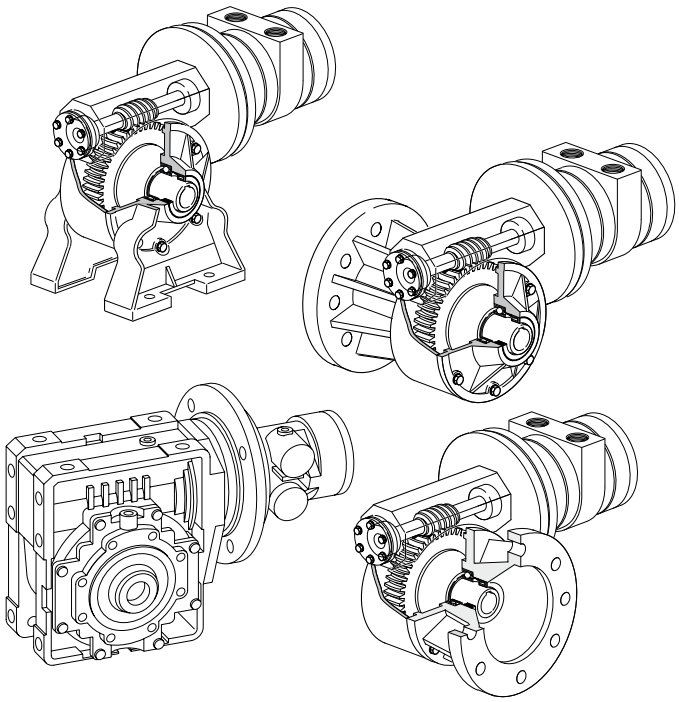
$F_{ax} = F_{rt} \times 0,2$

Motor	a	b	c	F_{rt} N
P1V-A160•0066••	46,0	26,0	450	1130
P1V-A160•0032••	54,5	29,5	550	2480
P1V-A160•0014••	60,5	30,5	750	4710
P1V-A160•0008••	69,0	34,0	850	6620
P1V-A160•0004••	80,5	40,5	900	10000
P1V-A160•0003••	98,5	48,5	1000	16000
P1V-A260•0080••	46,0	26,0	450	660
P1V-A260•0052••	54,5	29,5	550	2110
P1V-A260•0025••	60,5	30,5	750	3850
P1V-A260•0011••	69,0	34,0	850	5660
P1V-A260•0006••	80,5	40,5	900	10000
P1V-A260•0003••	98,5	48,5	1000	16000
P1V-A360•0105••	54,5	29,5	550	1640
P1V-A360•0052••	54,5	29,5	550	2110
P1V-A360•0025••	69,0	34,0	850	4280
P1V-A360•0013••	80,5	40,5	900	6890
P1V-A360•0006••	98,5	48,5	1000	16000
P1V-A360•0003••	131,0	61,0	1500	35000

- • Motor with helical gear (functions D and E)
- •• Installation position, optional

Choice of an air motor with worm gear





Worm gears are characterised by relatively simple technical construction, with a worm and pinion. This can give a large gear ratio and small dimensions. The efficiency of a worm drive gear is considerably lower than for planetary or helical gears. The design principle of worm drive gears makes them self-locking at higher gear ratios (the output shaft is “locked”).

The output shaft comes out at an angle of 90° to the motor spindle. Installation is simple, with a flange on the left or right side, or with a foot. The gearbox is equipped as standard with a hollow output shaft with a key slot. Loose shafts with key can put the output shaft on the right, left, or on both sides.

Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

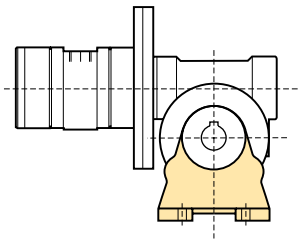
- Low weight in relation to gear ratio
- Non-reversible at high gear ratios
- Relatively low price

– Relatively low efficiency
– Installation position must be decided in advance
– Output shaft at 90° to motor spindle

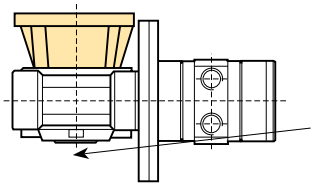
Air motors in diagram above

△	P1V-A160A0900
▲1	P1V-A160•0043••, Choose installation below
▲2	P1V-A160•0020••, Choose installation below
▲3	P1V-A160•0010••, Choose installation below
▲4	P1V-A160•0008••, Choose installation below
○	P1V-A260A0700
●1	P1V-A260•0050••, Choose installation below
●2	P1V-A260•0022••, Choose installation below
●3	P1V-A260•0013••, Choose installation below
●4	P1V-A260•0008••, Choose installation below
□	P1V-A360A0600
■1	P1V-A360•0050••, Choose installation below
■2	P1V-A360•0022••, Choose installation below
■3	P1V-A360•0013••, Choose installation below
■4	P1V-A360•0006••, Choose installation below

Installation, foot mounting

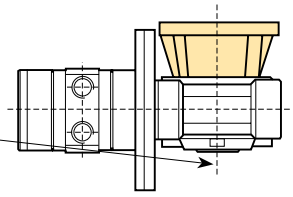


Installation, flange mounting, left-hand

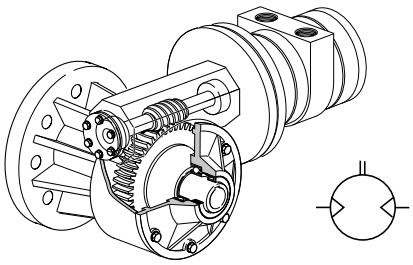


Additional flange option possible on the opposite face

Installation, flange mounting, right-hand



NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



F: Reversible motor with worm gear, flange mounting left-hand

Max power	Max speed*	Nominal speed	Nominal torque	Min start torque	Max permanent torque**	Types of self-locking	Air consumption at max power	Connection	Min pipe ID inlet/ outlet	Weight	Order code
kW	rpm	rpm	Nm	Nm	Nm		l/s		mm	Kg	
Series P1V-A160											
1,600	430	320	38	40	44	1	32	G1/2	15	7,2	**P1V-A160F0043••**
1,600	200	150	77	65	125	2	32	G1/2	15	10,5	**P1V-A160F0020••**
1,600	95	70	154	117	250	3	32	G1/2	15	17,8	**P1V-A160F0010••**
1,600	75	55	180	130	225	3	32	G1/2	15	17,8	**P1V-A160F0008••**
Series P1V-A260											
2,600	500	350	62	71	125	1	60	G3/4	19	14,5	**P1V-A260F0050••**
2,600	220	150	133	133	285	1	60	G3/4	19	21,0	**P1V-A260F0022••**
2,600	125	85	224	191	430	2	60	G3/4	19	21,0	**P1V-A260F0013••**
2,600	62	44	415	308	660	3	60	G3/4	19	57,0	**P1V-A260F0008••**
Series P1V-A360											
3,600	500	300	98	113	125	1	97	G1	25	22,9	**P1V-A360F0050••**
3,600	220	130	224	230	285	1	97	G1	25	31,0	**P1V-A360F0022••**
3,600	125	75	368	317	595	2	97	G1	25	55,0	**P1V-A360F0013••**
3,600	62	37	670	480	660	3	97	G1	25	65,5	**P1V-A360F0006••**

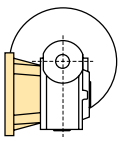
* maximum admissible speed (idling)

** Max gear box torque for a permanent load

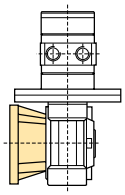
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160F0043B3

F: Installation positions, worm gear, flange mounting left-hand

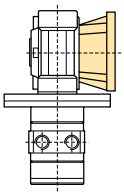
B3



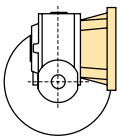
V6



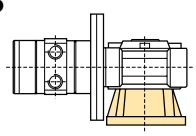
V5



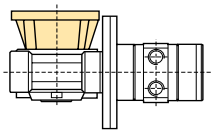
B8



B6



B7



Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

Self-locking

Dynamic self-locking means that the force acting on the output shaft of the gear can not turn the gear further when the air motor is stopped. Dynamic self-locking is only possible when the gear ratio is high, and at low speeds. None of our worm drive gears are completely self-locking in dynamic conditions.

Static self-locking means that the force acting on the output shaft of the gear can not begin to turn the shaft.

When loads with considerable momentum are driven, it is necessary to have a braking time sufficient to stop the gearbox from being over-loaded. It is extremely important that the maximum permitted torque is not exceeded.

Tip: Braking of the air motor can be arranged by either slowly restricting the air supply to the motor until it is completely shut off, or by slowly reducing the supply pressure to zero.

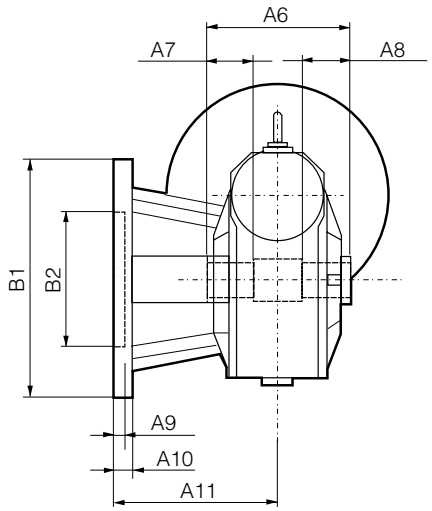
Types of Self-locking

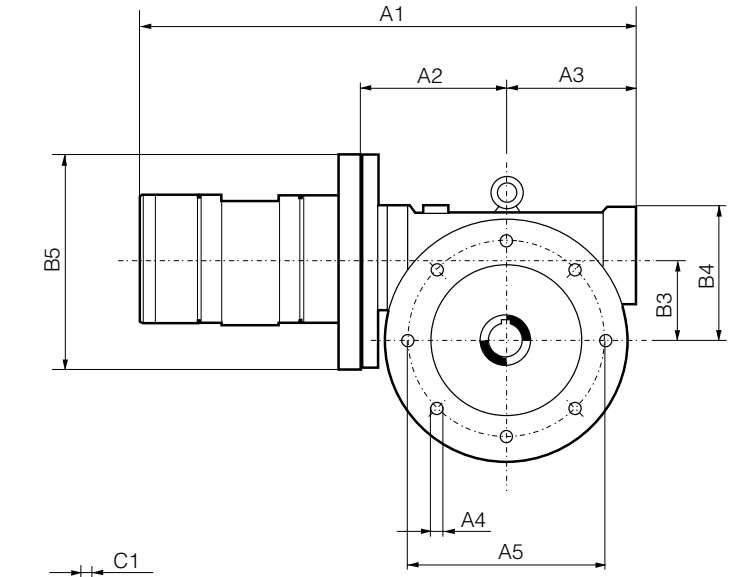
1. Static, not self-locking
2. Static, self-locking - quicker return under vibration - not dynamically self-locking
3. Static, self-locking - return only possible under vibration - good dynamic self-locking

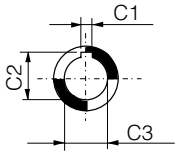
Important!
Since it is practically impossible to guarantee total self-locking, an external brake must be used to guarantee that vibration can not cause an output shaft to move.

Dimensions (mm)

F: Motor with worm gear, flange mounting







Lifting lug only fitted to
P1V-A260F0008••
P1V-A360F0006••

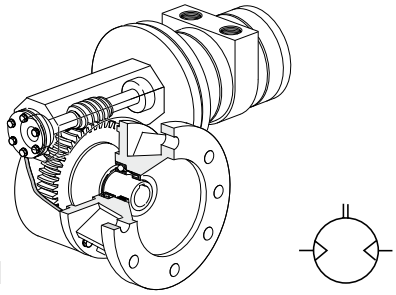
As standard, the motor has a hollow shaft with key slot. Please refer to page 44 for a dimension sketch of the single ended and double ended shafts and for additional flange on the opposite side.

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3
P1V-A160F0043••	259,5	70	63	10,5	90	82	22,5	22,5	10	12	85,0	125	70 H8	49,50
P1V-A160F0020••	301,5	95	80	10,5	130	120	40,0	40,0	8	11	116,0	180	115 H8	62,17
P1V-A160F0010••	362,5	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A160F0008••	362,5	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260F0050••	292,0	70	63	10,5	90	82	22,5	22,5	10	12	85,0	125	70 H8	49,50
P1V-A260F0022••	395,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260F0013••	395,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260F0008••	498,0	185	154	16,0	255	165	52,5	52,5	18	20	197,5	320	180 H8	130,00
P1V-A360F0050••	340,0	95	80	10,5	130	120	40,0	40,0	8	11	116,0	180	115 H8	62,17
P1V-A360F0022••	401,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A360F0013••	456,0	153	138	13,5	230	155	45,0	45,0	18	20	179,5	280	170 H8	110,10
P1V-A360F0006••	504,0	185	154	16,0	255	165	52,5	52,5	18	20	197,5	320	180 H8	130,00

Order code	B4	B5	C1	C2	C3
P1V-A160F0043••	80,0	160	8 H8	28,3	25 H7
P1V-A160F0020••	98,5	160	8 H8	28,3	25 H7
P1V-A160F0010••	138,0	160	10 H8	38,3	35 H7
P1V-A160F0008••	138,0	160	10 H8	38,3	35 H7
P1V-A260F0050••	80,0	200	8 H8	28,3	25 H7
P1V-A260F0022••	138,0	200	10 H8	38,3	35 H7
P1V-A260F0013••	138,0	200	10 H8	38,3	35 H7
P1V-A260F0008••	195,0	200	14 H8	48,8	45 H7
P1V-A360F0050••	98,5	200	8 H8	28,3	25 H7
P1V-A360F0022••	138,0	200	10 H8	38,3	35 H7
P1V-A360F0013••	169,0	200	12 H8	45,3	42 H7
P1V-A360F0006••	195,0	200	14 H8	48,8	45 H7

••: see previous page for installation positions

NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



G: Reversible motor with worm gear, flange mounting right-hand

Max power	Max speed*	Nominal speed	Nominal torque	Min start torque	Max permanent torque**	Types of self-locking	Air consumption at max power	Connection	Min pipe ID inlet/ outlet	Weight	Order code
kW	rpm	rpm	Nm	Nm	Nm		l/s		mm	Kg	
Series P1V-A160											
1,600	430	320	38	40	44	1	32	G1/2	15	7,2	**P1V-A160G0043••**
1,600	200	150	77	65	125	2	32	G1/2	15	10,5	**P1V-A160G0020••**
1,600	95	70	154	117	250	3	32	G1/2	15	17,8	**P1V-A160G0010••**
1,600	75	55	180	130	225	3	32	G1/2	15	17,8	**P1V-A160G0008••**
Series P1V-A260											
2,600	500	350	62	71	125	1	60	G3/4	19	14,5	**P1V-A260G0050••**
2,600	220	150	133	133	285	1	60	G3/4	19	21,0	**P1V-A260G0022••**
2,600	125	85	224	191	430	2	60	G3/4	19	21,0	**P1V-A260G0013••**
2,600	62	44	415	308	660	3	60	G3/4	19	57,0	**P1V-A260G0008••**
Series P1V-A360											
3,600	500	300	98	113	125	1	97	G1	25	22,9	**P1V-A360G0050••**
3,600	220	130	224	230	285	1	97	G1	25	31,0	**P1V-A360G0022••**
3,600	125	75	368	317	595	2	97	G1	25	55,0	**P1V-A360G0013••**
3,600	62	37	670	480	660	3	97	G1	25	65,5	**P1V-A360G0006••**

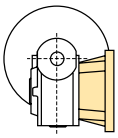
* maximum admissible speed (idling)

** Max gear box torque for a permanent load

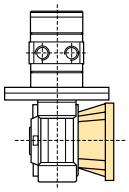
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160G0043B3

G: Installation positions, worm gear gear, flange mounting right-hand

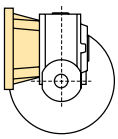
B3



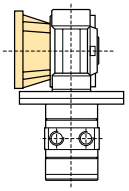
V6



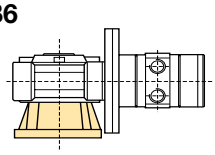
V5



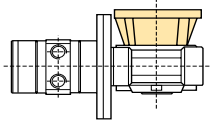
B8



B6



B7



Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

Self-locking shafts and for additional flange on the opposite side.

Dynamic self-locking means that the force acting on the output shaft of the gear can not turn the gear further when the air motor is stopped. Dynamic self-locking is only possible when the gear ratio is high, and at low speeds. None of our worm drive gears are completely self-locking in dynamic conditions.

Static self-locking means that the force acting on the output shaft of the gear can not begin to turn the shaft.

When loads with considerable momentum are driven, it is necessary to have a braking time sufficient to stop the gearbox from being over-loaded. It is extremely important that the maximum permitted torque is not exceeded.

Tip: Braking of the air motor can be arranged by either slowly restricting the air supply to the motor until it is completely shut off, or by slowly reducing the supply pressure to zero.

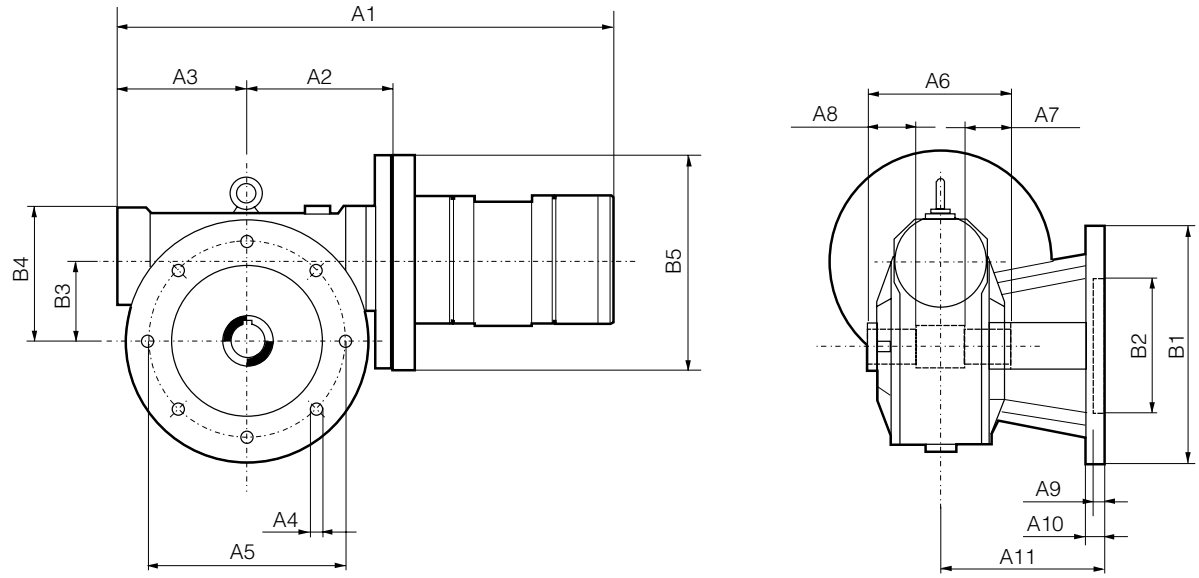
Types of Self-locking

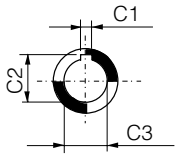
1. Static, not self-locking
2. Static, self-locking - quicker return under vibration - not dynamically self-locking
3. Static, self-locking - return only possible under vibration - good dynamic self-locking

Important!
Since it is practically impossible to guarantee total self-locking, an external brake must be used to guarantee that vibration can not cause an output shaft to move.

Dimensions (mm)

G: Motor with worm gear, flange mounting





Lifting lug only fitted to
P1V-A260G0008••
P1V-A360G0006••

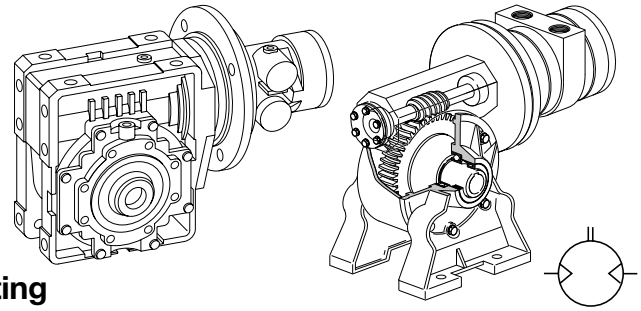
As standard, the motor has a hollow shaft with key slot. Please refer to page 44 for a dimension sketch of the single ended and double ended shafts and for additional flange on the opposite side.

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3
P1V-A160G0043••	259,5	70	63	10,5	90	82	22,5	22,5	10	12	85,0	125	70 H8	49,50
P1V-A160G0020••	301,5	95	80	10,5	130	120	40,0	40,0	8	11	116,0	180	115 H8	62,17
P1V-A160G0010••	362,5	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A160G0008••	362,5	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260G0050••	292,0	70	63	10,5	90	82	22,5	22,5	10	12	85,0	125	70 H8	49,50
P1V-A260G0022••	395,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260G0013••	395,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A260G0008••	498,0	185	154	16,0	255	165	52,5	52,5	18	20	197,5	320	180 H8	130,00
P1V-A360G0050••	340,0	95	80	10,5	130	120	40,0	40,0	8	11	116,0	180	115 H8	62,17
P1V-A360G0022••	401,0	126	110	12,5	176	140	45,0	45,0	15	15	151,0	210	152 H8	86,90
P1V-A360G0013••	456,0	153	138	13,5	230	155	45,0	45,0	18	20	179,5	280	170 H8	110,10
P1V-A360G0006••	504,0	185	154	16,0	255	165	52,5	52,5	18	20	197,5	320	180 H8	130,00

Order code	B4	B5	C1	C2	C3
P1V-A160G0043••	80,0	160	8 H8	28,3	25 H7
P1V-A160G0020••	98,5	160	8 H8	28,3	25 H7
P1V-A160G0010••	138,0	160	10 H8	38,3	35 H7
P1V-A160G0008••	138,0	160	10 H8	38,3	35 H7
P1V-A260G0050••	80,0	200	8 H8	28,3	25 H7
P1V-A260G0022••	138,0	200	10 H8	38,3	35 H7
P1V-A260G0013••	138,0	200	10 H8	38,3	35 H7
P1V-A260G0008••	195,0	200	14 H8	48,8	45 H7
P1V-A360G0050••	98,5	200	8 H8	28,3	25 H7
P1V-A360G0022••	138,0	200	10 H8	38,3	35 H7
P1V-A360G0013••	169,0	200	12 H8	45,3	42 H7
P1V-A360G0006••	195,0	200	14 H8	48,8	45 H7

••: see previous page for installation positions

NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



H: Reversible motor with worm gear, foot mounting

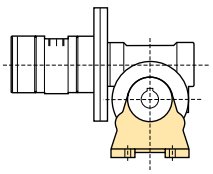
Max power	Max speed*	Nominal speed	Nominal torque	Min start torque	Max permanent torque**	Types of self-locking	Air consumption at max power	Connection	Min pipe ID inlet/ outlet	Weight	Order code
kW	rpm	rpm	Nm	Nm	Nm		l/s		mm	Kg	
Series P1V-A160											
1,600	430	320	38	40	44	1	32	G1/2	15	7,2	**P1V-A160H0043••**
1,600	200	150	77	65	125	2	32	G1/2	15	10,2	**P1V-A160H0020••**
1,600	95	70	154	177	250	3	32	G1/2	15	20,5	**P1V-A160H0010••**
1,600	75	55	180	130	225	3	32	G1/2	15	20,5	**P1V-A160H0008••**
Series P1V-A260											
2,600	500	350	62	90	125	1	60	G3/4	19	11,0	**P1V-A260H0050••**
2,600	220	150	133	206	285	1	60	G3/4	19	21,0	**P1V-A260H0022••**
2,600	125	85	224	330	430	2	60	G3/4	19	21,0	**P1V-A260H0013••**
2,600	62	44	415	308	660	3	60	G3/4	19	57,0	**P1V-A260H0008••**
Series P1V-A360											
3,600	500	300	98	113	125	1	97	G1	25	22,5	**P1V-A360H0050••**
3,600	220	130	224	230	285	1	97	G1	25	33,0	**P1V-A360H0022••**
3,600	125	75	368	317	595	2	97	G1	25	49,0	**P1V-A360H0013••**
3,600	62	37	670	480	660	3	97	G1	25	65,5	**P1V-A360H0006••**

* maximum admissible speed (idling)
** Max gear box torque for a permanent load

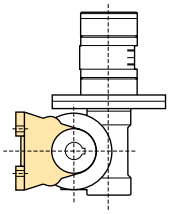
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160H0043B3

H: Installation positions, worm gear, foot mounting

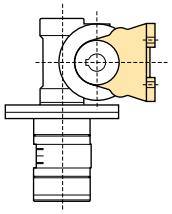
B3



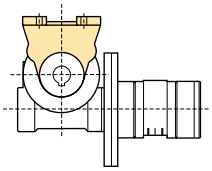
V6



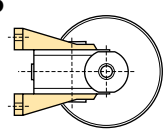
V5



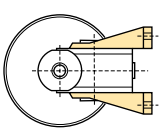
B8



B6



B7



Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

Self-locking

Dynamic self-locking means that the force acting on the output shaft of the gear can not turn the gear further when the air motor is stopped. Dynamic self-locking is only possible when the gear ratio is high, and at low speeds. None of our worm drive gears are completely self-locking in dynamic conditions.

Static self-locking means that the force acting on the output shaft of the gear can not begin to turn the shaft.

When loads with considerable momentum are driven, it is necessary to have a braking time sufficient to stop the gearbox from being overloaded. It is extremely important that the maximum permitted torque is not exceeded.

Tip: Braking of the air motor can be arranged by either slowly restricting the air supply to the motor until it is completely shut off, or by slowly reducing the supply pressure to zero.

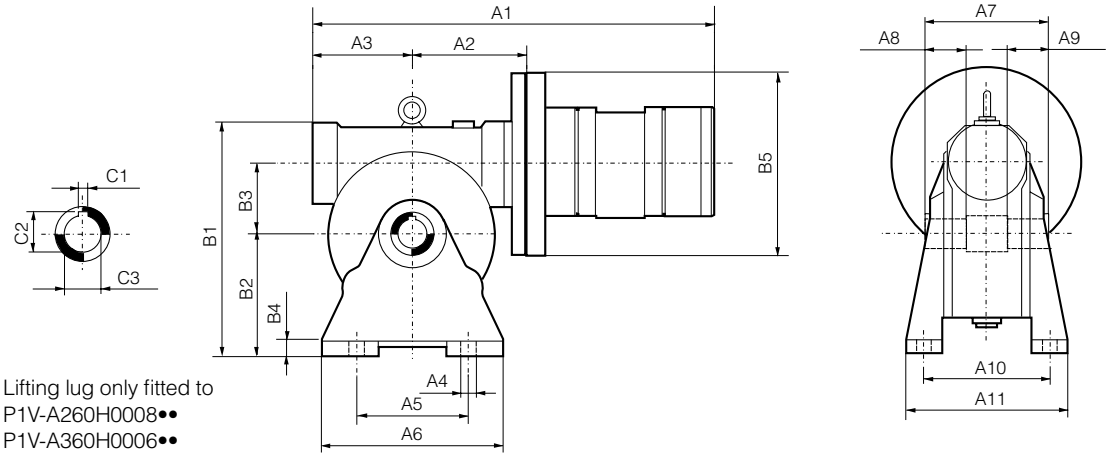
Types of Self-locking

1. Static, not self-locking
2. Static, self-locking - quicker return under vibration - not dynamically self-locking
3. Static, self-locking - return only possible under vibration - good dynamic self-locking

Important!
Since it is practically impossible to guarantee total self-locking, an external brake must be used to guarantee that vibration can not cause an output shaft to move.

Dimensions (mm)

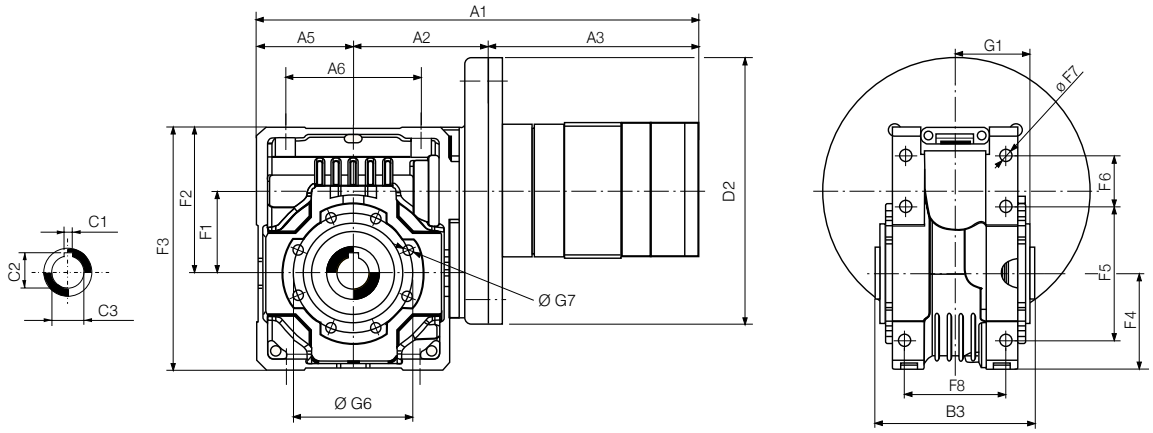
H: Motor with worm gear, foot mounting



Lifting lug only fitted to
P1V-A260H0008••
P1V-A360H0006••

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	B1	B2	B3
P1V-A160H0043••	259,5	70	63	8,5	63	110	82	22,5	22,5	98,5	124	162	82	49,50
P1V-A260H0008••	498,0	185	154	16,0	220	310	165	52,5	52,5	191,0	245	398	195	130,00
P1V-A360H0006••	504,0	185	154	16,0	220	310	165	52,5	52,5	191,0	245	398	195	130,00

	B4	B5	C1	C2	C3
P1V-A160H0043••	12	160	8 H8	28,3	25 H7
P1V-A260H0008••	18	200	14 H8	48,8	45 H7
P1V-A360H0006••	18	200	14 H8	48,8	45 H7



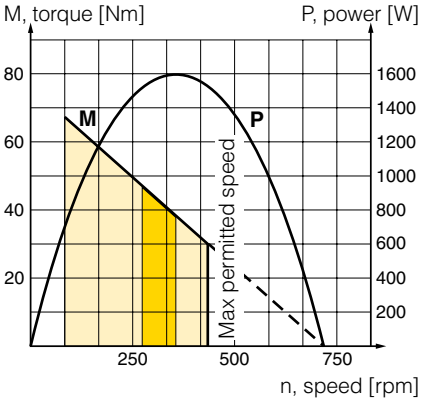
Order code	A1	A2	A3	A5	A6	B3	D2	F1	F2	F3	F4	F5	F6	Ø F7
P1V-A160H0020••	294,5	95	127	72,5	102	120	160	62,2	110,0	182,5	72,5	102	37,5	9,0
P1V-A160H0010••	355,0	128	127	100,0	144	140	160	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A160H0008••	355,0	128	127	100,0	144	140	160	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A260H0050••	333,5	102	159	72,5	102	120	200	62,2	110,0	182,5	72,5	102	37,5	9,0
P1V-A260H0022••	387,0	128	159	100,0	144	140	200	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A260H0013••	387,0	128	159	100,0	144	140	200	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A360H0050••	334,5	102	165	72,5	102	120	200	62,2	110,0	182,5	72,5	102	37,5	9,0
P1V-A360H0022••	393,0	128	165	100,0	144	140	200	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A360H0013••	433,0	143	165	125,0	174	155	200	110,1	183,0	308,0	125,0	184	58,0	14,0

Order code	F8	G1	Ø G6	Ø G7	C1 (H8)	C2	C3 (H7)
P1V-A160H0020••	76	56,0	90	M8 depth 14	8	28,3	25
P1V-A160H0010••	101	68,0	130	M10 depth 18	10	38,3	35
P1V-A160H0008••	101	68,0	130	M10 depth 18	10	38,3	35
P1V-A260H0050••	76	53,0	90	M8 depth 14	8	28,3	25
P1V-A260H0022••	101	68,0	130	M10 depth 18	10	38,3	35
P1V-A260H0013••	101	68,0	130	M10 depth 18	10	38,3	35
P1V-A360H0050••	76	56,0	90	M8 depth 14	8	28,3	25
P1V-A360H0022••	101	68,0	130	M10 depth 18	10	38,3	35
P1V-A360H0013••	115	76,5	135	M12 depth 19	12	45,3	42

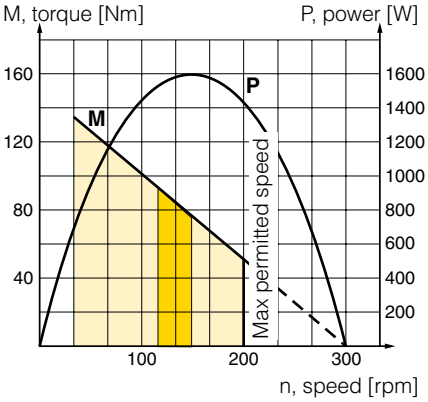
••: see previous page for installation positions

As standard, the motor has a hollow shaft with key slot. Please refer to page 44 for a dimension sketch of the single ended and double ended shafts and for additional flange on the opposite side.

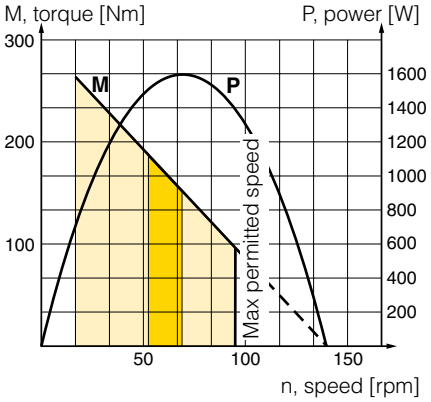
P1V-A160F0043••
P1V-A160G0043••
P1V-A160H0043••



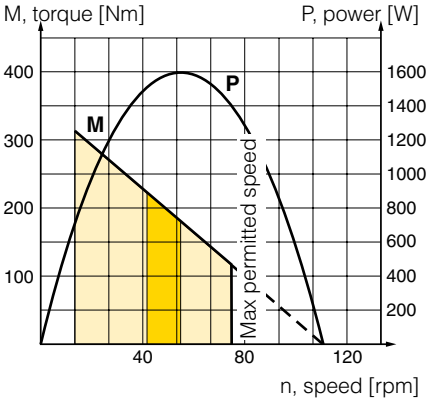
P1V-A160F0020••
P1V-A160G0020••
P1V-A160H0020••



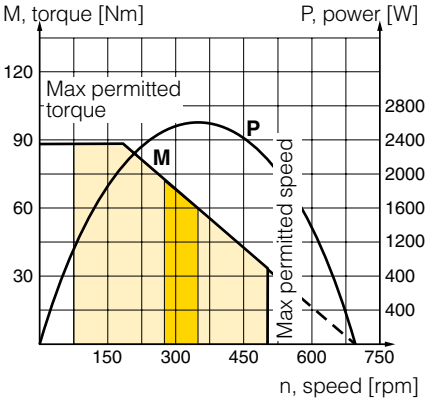
P1V-A160F0010••
P1V-A160G0010••
P1V-A160H0010••



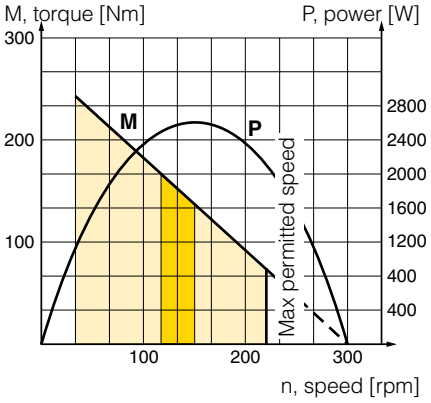
P1V-A160F0008••
P1V-A160G0008••
P1V-A160H0008••



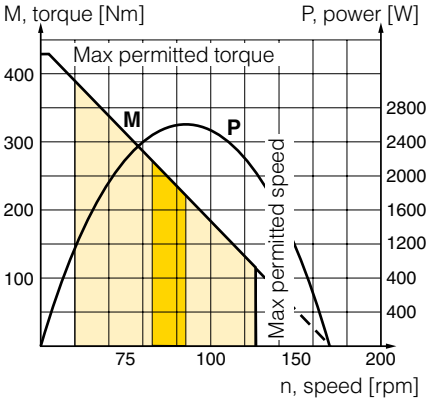
P1V-A260F0050••
P1V-A260G0050••
P1V-A260H0050••



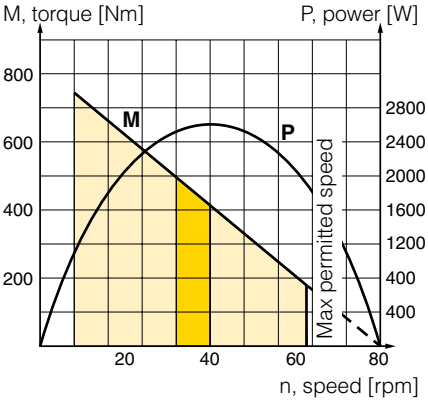
P1V-A260F0022••
P1V-A260G0022••
P1V-A260H0022••



P1V-A260F0013••
P1V-A260G0013••
P1V-A260H0013••



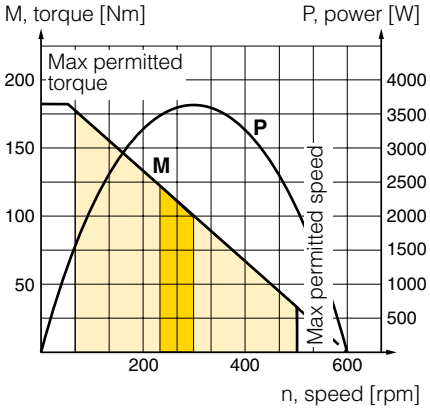
P1V-A260F0008••
P1V-A260G0008••
P1V-A260H0008••



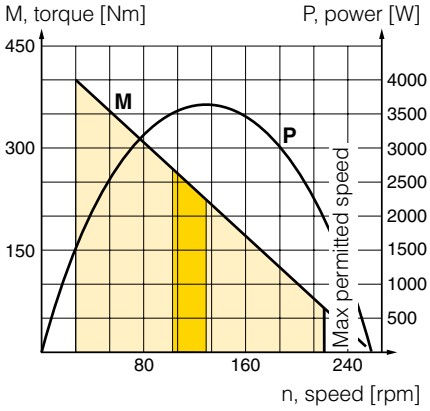
Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

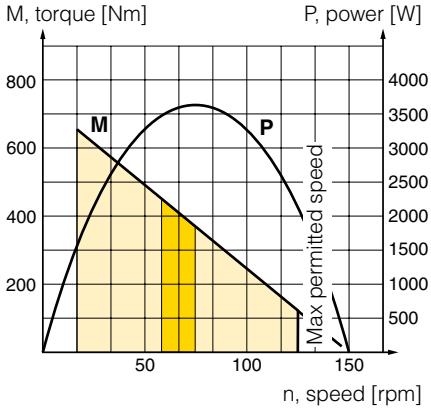
P1V-A360F0050••
P1V-A360G0050••
P1V-A360H0050••



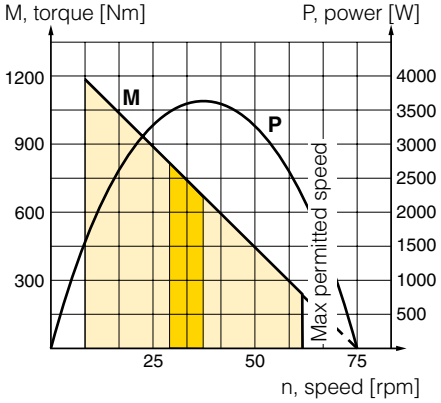
P1V-A360F0022••
P1V-A360G0022••
P1V-A360H0022••



P1V-A360F0013••
P1V-A360G0013••
P1V-A360H0013••



P1V-A360F0006••
P1V-A360G0006••
P1V-A360H0006••



Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Permitted shaft loadings

Radial forces

Depending on the application, the drive shaft of the gearbox can be subjected to various radial forces, which can be calculated as follows:

$F_{rad} = 2000 \times M \times K_r / d$

F_{rad}	Radial force (N)
M	Torque (Nm)
d	Diameter of wheel, pulley, sprocket or gear wheel (mm)
Kr = 1	Sprocket constant
Kr = 1.25	Gear wheel constant
Kr = 1.5 - 2.5	Vee-belt pulley constant

Depending on the point of application of the force (please refer to the adjacent figure), the following two cases are found:

a. The force is applied to the centre of the output shaft, as in figure 3. This value can be read off on the table below, where consideration must be given to the following:

$F_{radc} \leq F_{rt}$

b. The force is applied at a distance x, as in figure 4. This value can be calculated as follows:

$F_{radx} = F_{rt} \times a / (b + X)$ $\quad L/2 < X < c$

F_{rt}	Permissible radial force on centre of output-shaft (N)
a	Gear constant
b	Gear constant
c	Gear constant
X	Distance from shoulder on shaft to point of application of force (mm)

All values are found in the table below.
The following should be considered, however:

$F_{radc} \leq F_{radx}$

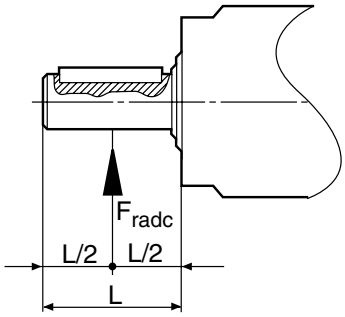


Fig. 4: Force applied at centre of shaft

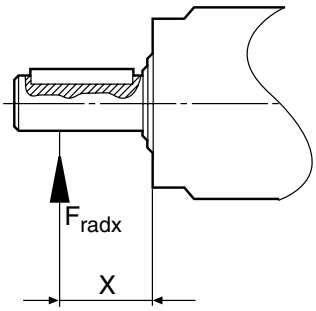


Fig. 5: Force applied at distance X

Axial forces

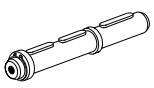
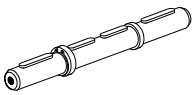
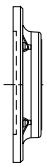
The maximum permissible axial force can be calculated as follows:

$F_{ax} = F_{rt} \times 0,2$

Motor	a	b	F_{rt} N
P1V-A160•0043••	99	69	3450
P1V-A160•0020••	132	102	4700
P1V-A160•0010••	147	117	7000
P1V-A160•0008••	147	117	7000
P1V-A260•0050••	99	69	3450
P1V-A260•0022••	147	117	7000
P1V-A260•0013••	147	117	7000
P1V-A260•0008••	182	142	13800
P1V-A360•0050••	132	102	4700
P1V-A360•0022••	147	117	7000
P1V-A360•0013••	171	134	8000
P1V-A360•0006••	182	142	13800

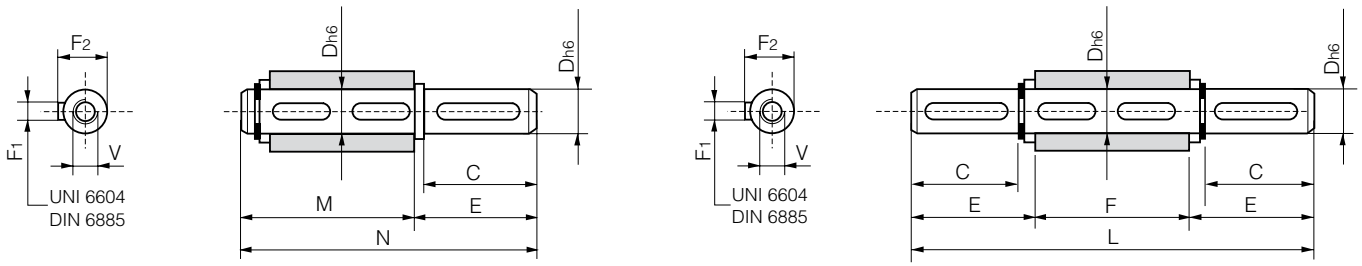
- • Motor with worm gear (functions F, G and H)
- •• Installation position, optional

Shaft and additional flange with keys for motor with worm gear

Motor type	Single-ended shaft Order code	Weight kg	Double-ended shaft Order code	Weight kg	Close flange	Wide flange
						
Serie P1V-A160						
P1V-A160•0043••	**9121510242**	0,60	**9121510247**	0,77	-	-
P1V-A160•0020••	**9121510243**	0,75	**9121510248**	0,95	**P1V-A/830930**	**P1V-A/830929**
P1V-A160•0010••	**9121510244**	1,60	**9121510249**	2,00	**P1V-A/830932**	**P1V-A/830931**
P1V-A160•0008••	**9121510244**	1,60	**9121510249**	2,00	**P1V-A/830932**	**P1V-A/830931**
Serie P1V-A260						
P1V-A260•0050••	**9121510242**	0,60	**9121510247**	0,77	**P1V-A/830930**	**P1V-A/830929**
P1V-A260•0022••	**9121510244**	1,60	**9121510249**	2,00	**P1V-A/830932**	**P1V-A/830931**
P1V-A260•0013••	**9121510244**	1,60	**9121510249**	2,00	**P1V-A/830932**	**P1V-A/830931**
P1V-A260•0008••	**9121510246**	3,20	**9121510251**	4,10	-	-
Serie P1V-A360						
P1V-A360•0050••	**9121510243**	0,75	**9121510248**	0,95	**P1V-A/830930**	**P1V-A/830929**
P1V-A360•0022••	**9121510244**	1,60	**9121510249**	2,00	**P1V-A/830932**	**P1V-A/830931**
P1V-A360•0013••	**9121510245**	2,80	**9121510250**	3,60	**P1V-A/830935**	**P1V-A/830934**
P1V-A360•0006••	**9121510246**	3,20	**9121510251**	4,10	-	-

- Motor with worm gear (functions F, G and H)
•• Installation position, optional

Dimensions (mm)



Single-ended shaft

Order code	C	D	E	F1	F2	M	N	V
9121510242	60	25	65	8	28,0	89	154	M8x20
9121510243	60	25	65	8	28,0	127	192	M8x20
9121510244	60	35	65	10	38,0	149	214	M10x25
9121510245	75	42	80	12	45,0	164	244	M12x32
9121510246	80	45	85	14	48,5	176	261	M12x32

Double-ended shaft

Order code	C	D	E	F	F1	F2	L	V
9121510247	60	25	63,20	82	8	28,0	208,4	M8x20
9121510248	60	25	63,20	120	8	28,0	246,4	M8x20
9121510249	60	35	64,00	140	10	38,0	268,0	M10x25
9121510250	75	42	79,25	155	12	45,0	313,5	M12x32
9121510251	80	45	84,75	165	14	48,5	334,5	M12x32

Material specification

Shaft:	High grade steel
Key:	Hardened steel

Order key

P 1 V - A | 1 6 0 | E | 0 | 0 6 6 | B 6

Air motor family	
P1V-A	Large Air Motor

Motor size	
160	1600 W
260	2600 W
360	3600 W

Function	
A	Basic motor without gear-box, keyed shaft
B	With planetary gear, keyed shaft
D	With helical gear, flange, keyed shaft
E	With helical gear, foot, keyed shaft
F	With worm gear, flange left, hollow shaft with key slot
G	With worm gear, flange right, hollow shaft with key slot
H	With worm gear, foot, hollow shaft with key slot

Optional function	
0	Intermittent standard vanes springs loaded
C	Continuous black vanes springs loaded

Free/max speed per min	
000	0000
900	9000

Installation position	
-	Free installation
	Horizontal installation
B3	Installation position B3
B5	Installation position B5
B6	Installation position B6
B7	Installation position B7
B8	Installation position B8
	Vertical installation
V1	Installation position V1
V3	Installation position V3
V5	Installation position V5
V6	Installation position V6

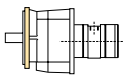
Note: This model code can not be used for creating new part numbers. All possible combinations between motor size, function and free speed are in all previous pages.

Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

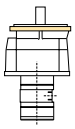
A: Free installation positions, basic motor

B: Free installation positions, planetary gear

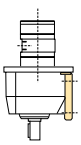
D: Free installation positions, helical gear and flange

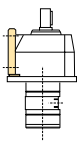
B5 

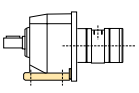
V1 

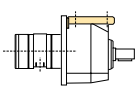
V3 

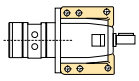
E: Installation positions, helical gear and foot

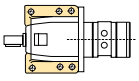
V5 

V6 

B3 

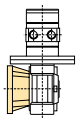
B8 

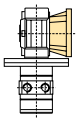
B7 

B6 

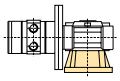
F: Installation pos., worm gear and flange, left-hand

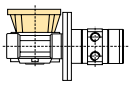
B3 

V6 

V5 

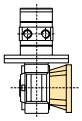
B8 

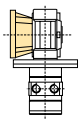
B6 

B7 

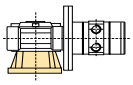
G: Installation pos., worm gear and flange, right-hand

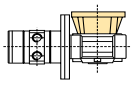
B3 

V6 

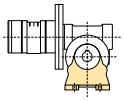
V5 

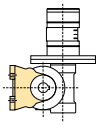
B8 

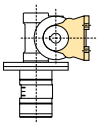
B6 

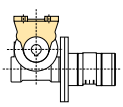
B7 

H: Installation positions, worm gear and foot

B3 

V6 

V5 

B8 

B6 

B7 

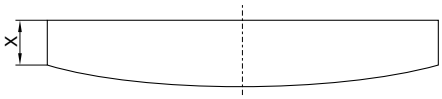
Lubrication and service life

Oil and oil mist are things which one tries to avoid to get the best possible working environment. In addition, purchasing, installation and maintenance of oil mist equipment costs money and, above all, time to achieve optimum lubrication effect.

The P1V-A motor is equipped with vanes for intermittent operation as standard for most common applications.

Service interval

The first service is due after approximately 500 hours of operation. After the first service, the service interval is determined by the degree of vane wear. The table below shows new dimensions.



Air motor	Dimensions on new vanes X [mm]
P1V-A160	16
P1V-A260	20
P1V-A360	30

The following normal service intervals should be applied to in order to guarantee problem-free operation in air motors working continuously at load speeds.

Intermittent lubrication operation of P1V-A basic motors

Duty cycle	70%
Max. duration of intermittent use	15 minutes
Oil volume	1 drop oil/Nm³
Filtering 40 µm	app. 750 hours operation
Filtering 5 µm	app. 1,000 hours operation

Continuous lubrication operation of P1V-A basic motors

Oil volume	1 drop oil/Nm³
Filtering 40 µm	app. 1,000 hours operation
Filtering 5 µm	app. 2,000 hours operation

Continuous lubrication operation of P1V-A basic motors

Filtering 40 µm	app. 750 hours operation
Filtering 5 µm	app. 1,000 hours operation

Service kits

The following kits are available for the basic motors, consisting of vanes, O-rings and springs:

Service kits, vanes for intermittent lubrication operation, option "0"

For motor	Order code
P1V-A160A0900	**9121720630**
P1V-A260A0700	**9121720631**
P1V-A360A0600	**9121720632**

Service kits, vanes for continuous lubrication operation, option "C"

For motor	Order code
P1V-A160AC900	**9121720633**
P1V-A260AC700	**9121720634**
P1V-A360AC600	**9121720635**

For more information about our maintenance services, please contact your local parker sales office.

Very Large Air Motors

P1V-B: 5.1, 9 & 18 kW

Contents Page

P1V-B Very Large Air Motors

Note: All technical data are based on a working pressure of 6 bar and with oil. Speed tolerance accuracy is -+10%.

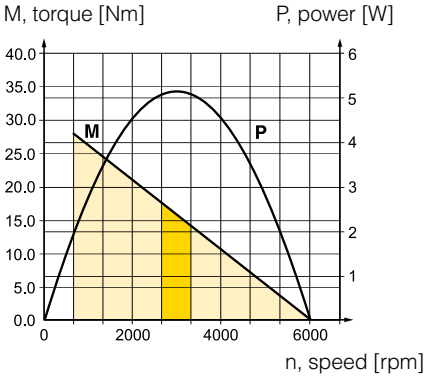
Very Large Air Motors

These large motors are designed for use in the most arduous applications, requiring considerable power, torque, robustness and reliability.

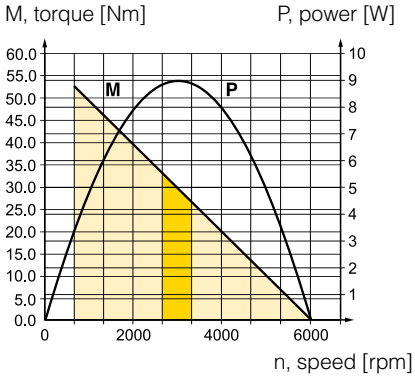
Reversible motor without gear box, IEC Flange

Max power	Free speed	Speed at max power	Torque at at max power	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	m^3/min		mm	Kg	
5,1	6000	3000	16.2	24.4	6.2	G1	25	27	**P1V-B510A0600**
9	6000	3000	28.6	43	10	G1	25	25	**P1V-B900A0600**
18	6000	3000	57	85	20	G2	43	54	**P1V-BJ00A0600**

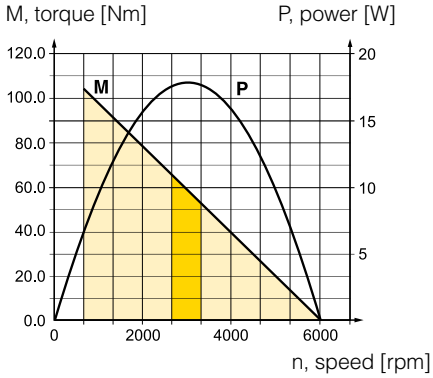
P1V-B510A0600



P1V-B900A0600



P1V-BJ00A0600



Possible working range of motor.

Optimum working range of motor.

Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Technical data

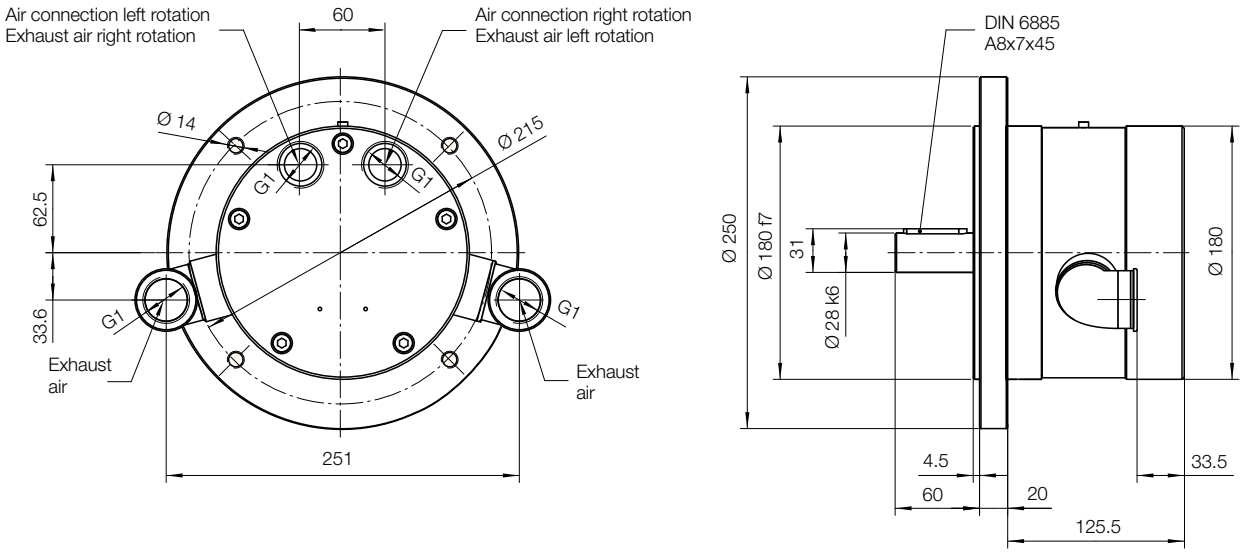
Air motor size & type	P1V-B510	P1V-B900	P1V-BJ00
Nominal power (watts)	5100	9000	18000
Working pressure (bar)	3 to 7		
Working temperature (°C)	-20 to +110		
Ambient temperature (°C)	-20 to +110		
Air flow required (Nl/min)	6200	10000	20000
Min pipe ID, inlet (mm)	25	25	43
Min pipe ID, outlet (mm)	25	25	43
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop			
	6400	10300	20400
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop			
	6600	10600	20800
Medium	40µm filtered, oil mist lubricated compressed air		
Oil operation	1-2 drop per cube meter, ISO8573-1 purity class 3.-.5		
Recommended oil	Foodstuffs industry Klüber oil 4 UH 1-32 N		
Shaft radial force (N)	7500	7500	7500
Shaft axial force (N)	11000	11000	11000

Material specification

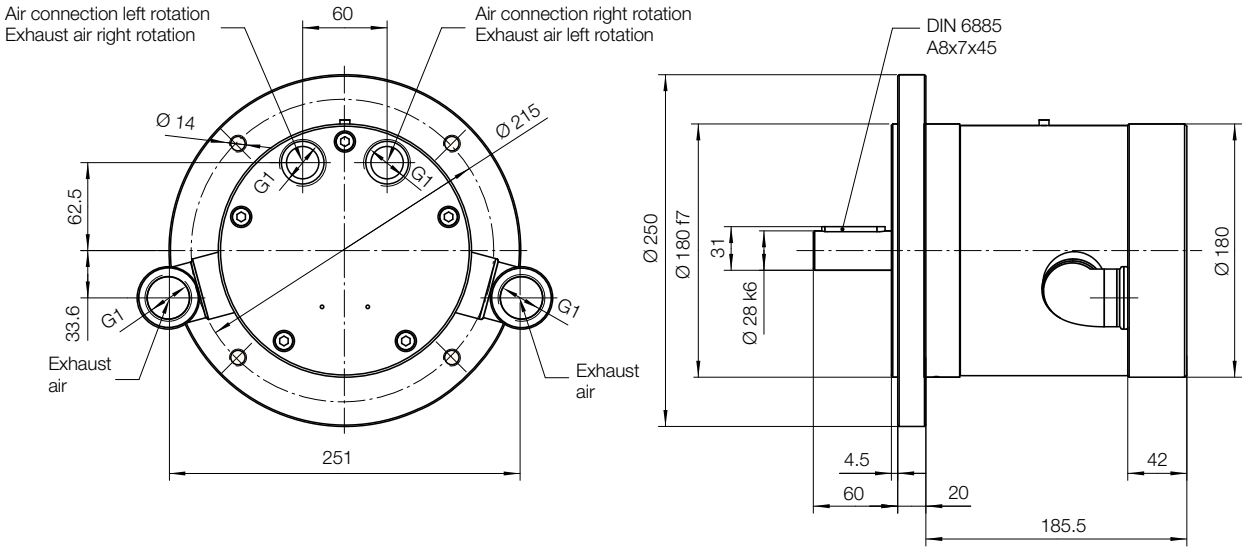
Air motor size & type	P1V-B510	P1V-B900	P1V-BJ00
Motor housing	Cast iron, synthetic paint, silver grey color		
Shaft	High grade steel		
Key	Hardened steel		
External seal	Nitrile rubber, NBR		
Internal steel parts	High grade steel		
Vanes	Patented, no data		

Dimensions (mm)

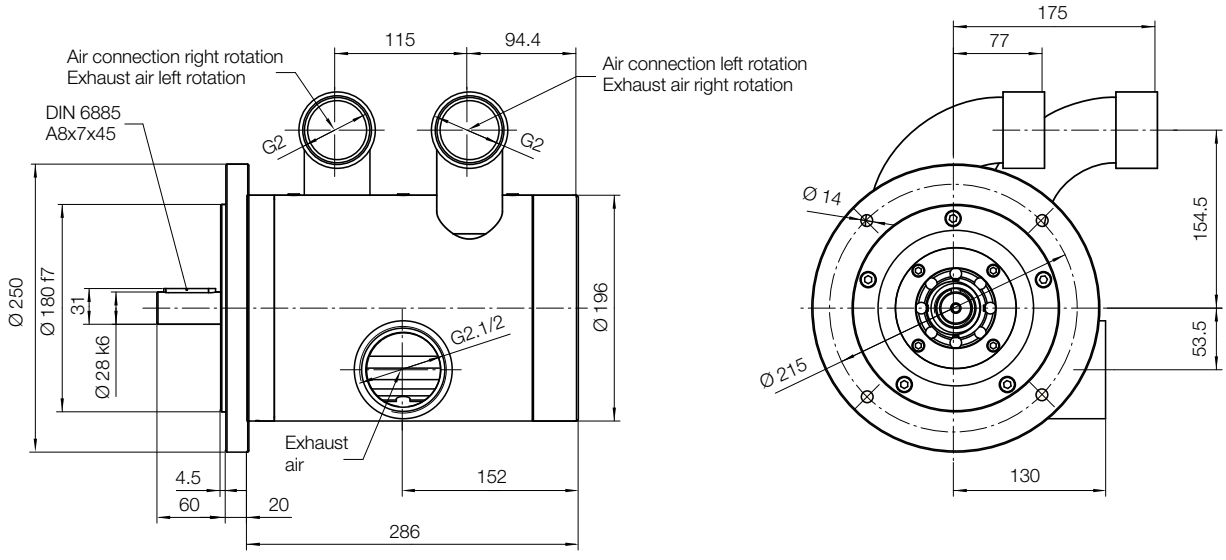
Flange motor IEC112A (P1V-B510)



Flange motor IEC112A (P1V-B900)



Flange motor IEC112A (P1V-BJ00)



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