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?

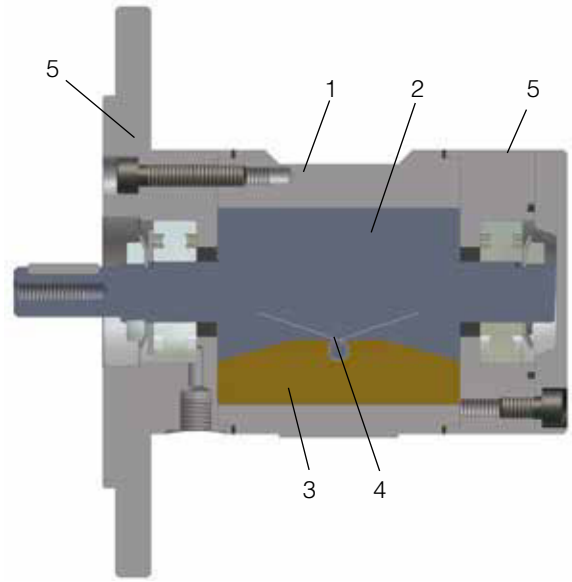
5 How do you ensure a long life and high performance of the air motor?

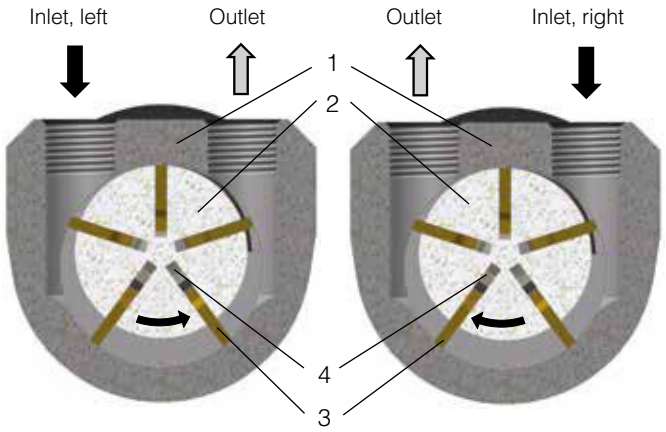
- Ensure you air quality is in accordance with our specifications, oil or oil free lubrication operations.
- Keep the recommended maintenance intervals

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

- Keep same level of your air quality.

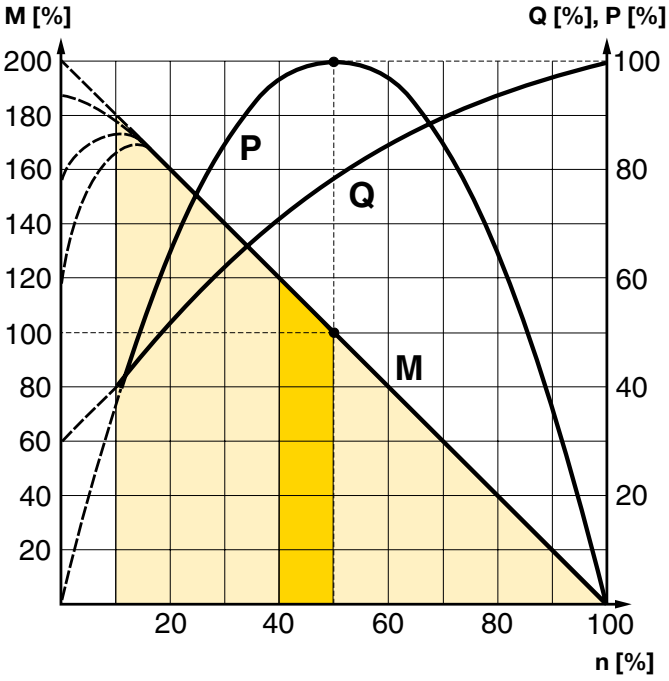
Principles of air motor functioning





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

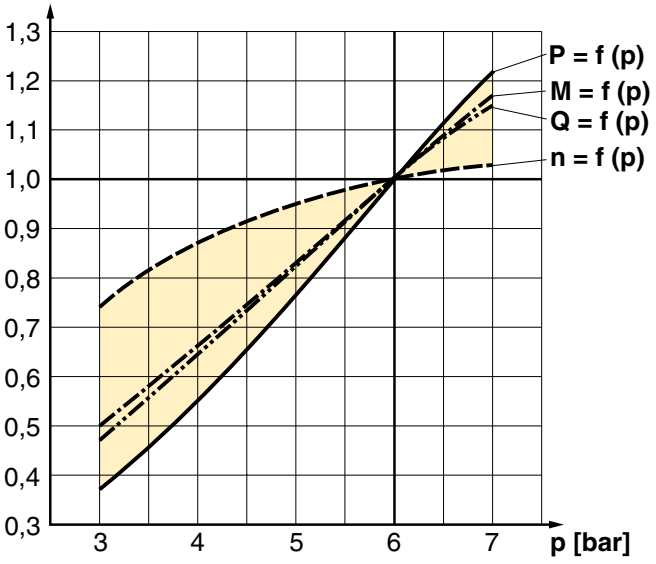
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an 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

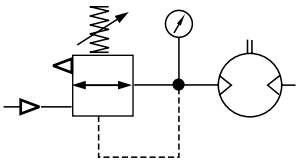


P = Power, M = Torque, Q = Air consumption, N = Speed

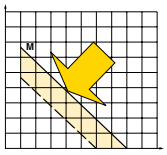
Pressure (p) bar / PSI	Power (P) %	Speed (n) %	Torque (M) %	Air Consumpt. (Q) %
7 / 99	121	103	117	117
6 / 85	100	100	100	100
5 / 71	77	95	83	83
4 / 57	55	87	67	67
3 / 42	37	74	50	50

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.



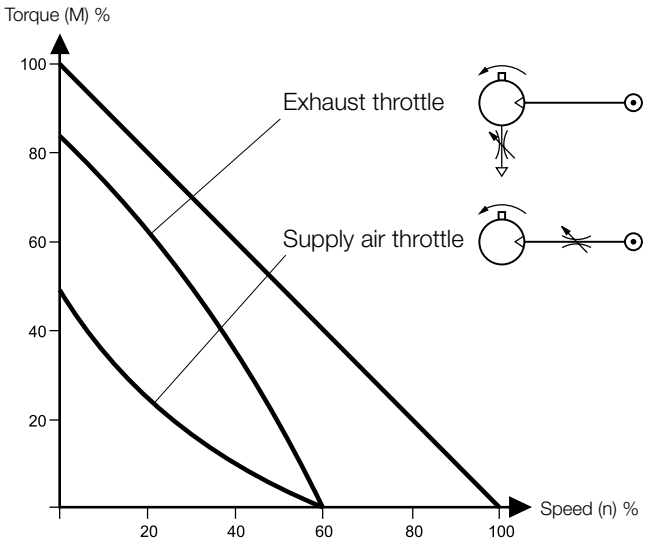
Pressure regulation at motor inlet.



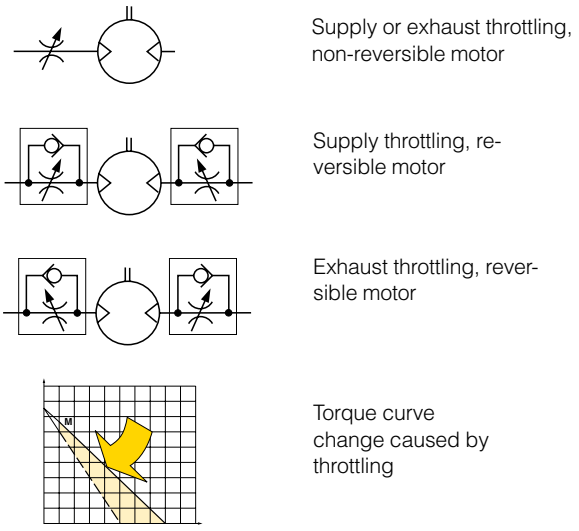
Theoretically torque curve change caused by pressure change

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

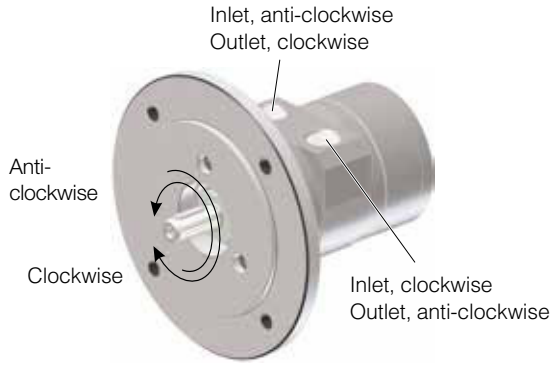
Exhaust throttling, reversible motor

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).

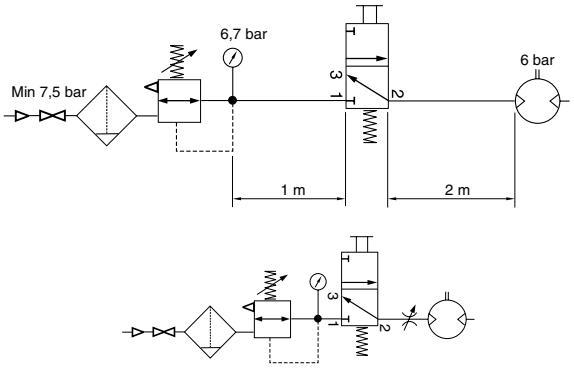
Air supply

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.

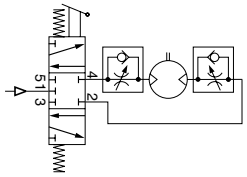
The following data must be complied with:

- 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

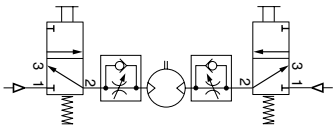
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve

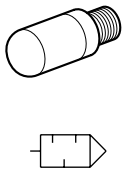


Reversible motor with two 3/2 control valves

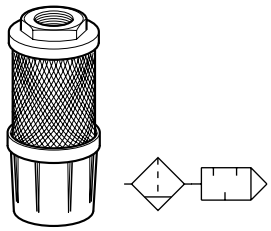
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is 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

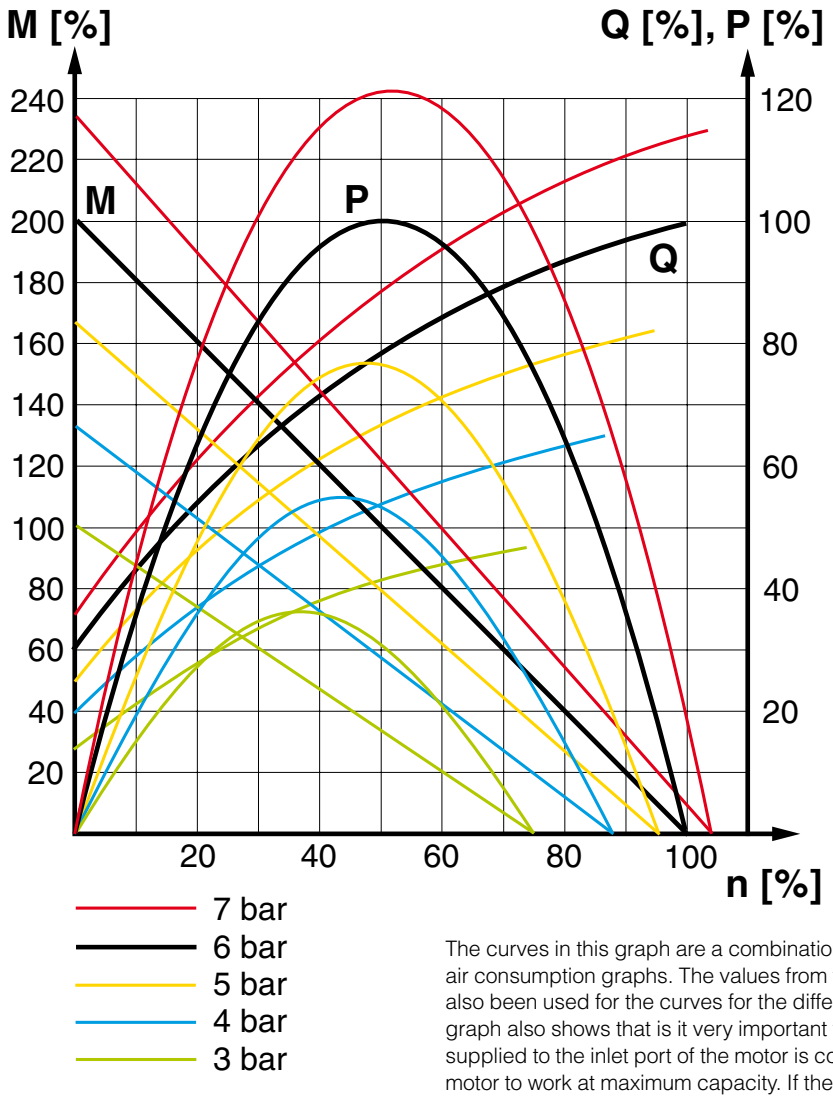
The air motors are supplied as “Components for installation” – the installer is responsible for ensuring that the motors are installed safely in the overall system. Parker Pneumatic guarantees that its products are safe, and as a supplier of pneumatic equipment we ensure that the equipment is designed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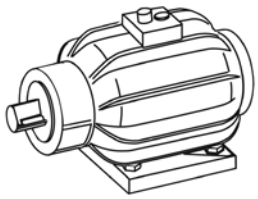
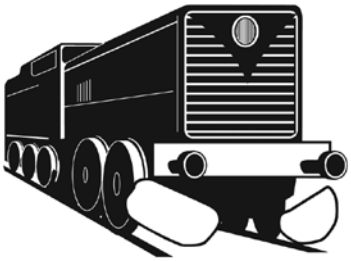


Air motors have much smaller installation dimensions than corresponding electric motors.

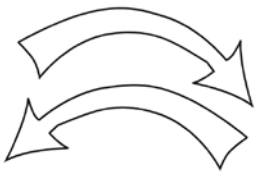
Air motors can be stopped and started continually without damage.



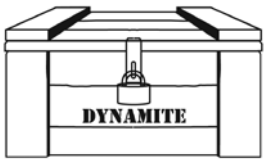
Air motors can be loaded until they stall, without damage. They are designed to be able to withstand the toughest heat, vibration, impact etc.

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

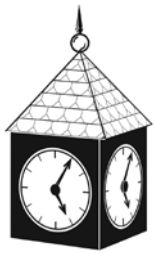
The weight of an air motor is several times less than corresponding electric motors.



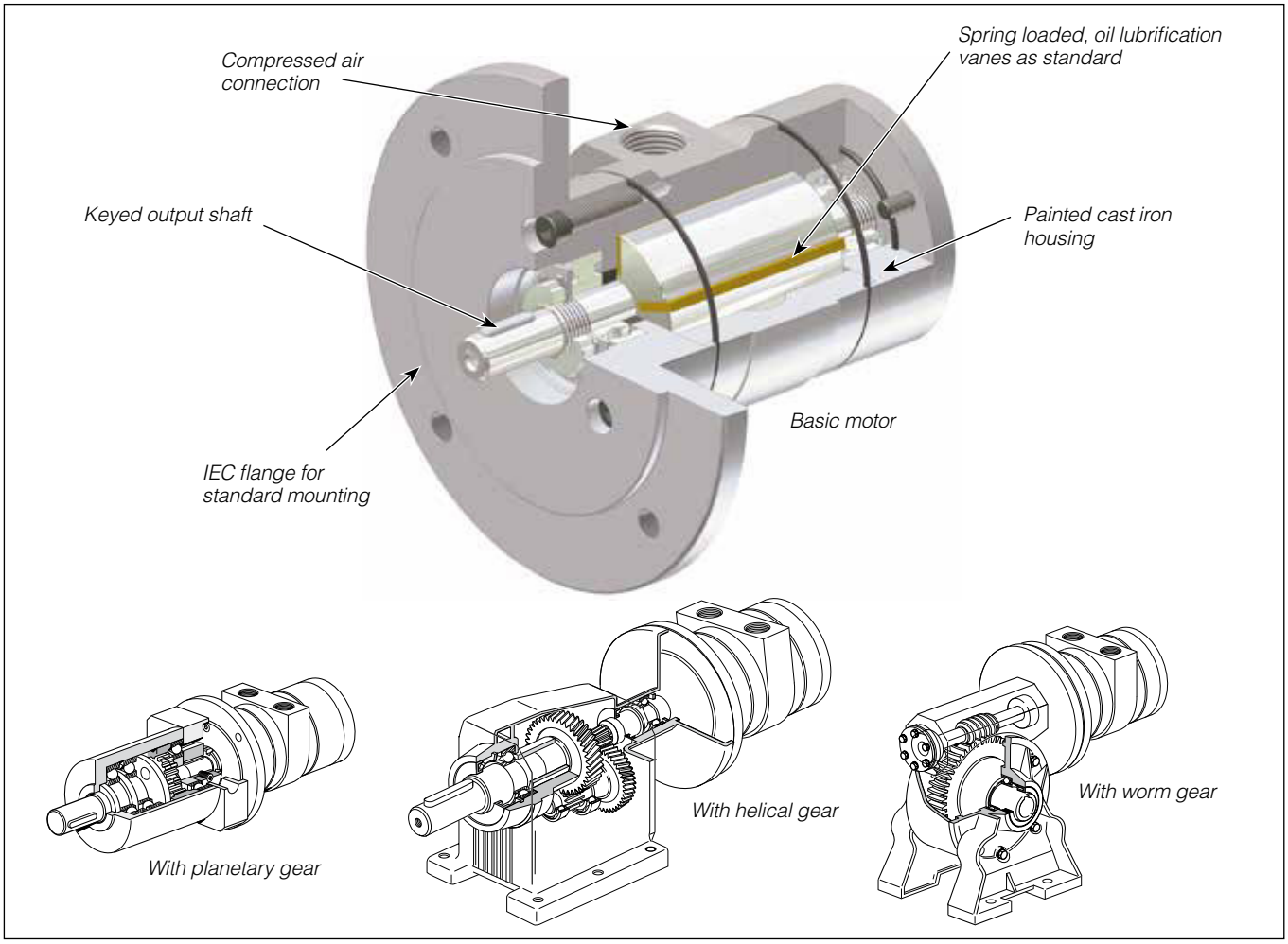
The motors are reversible as standard.



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.

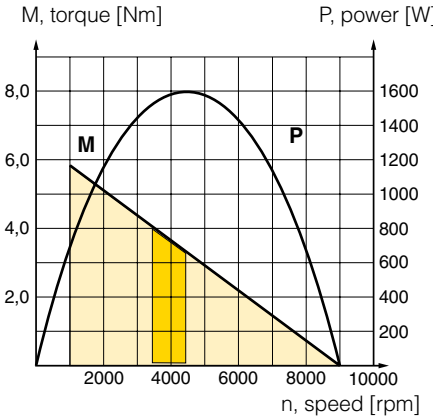
NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.

A: Basic reversible motor without gear box, IEC Flange

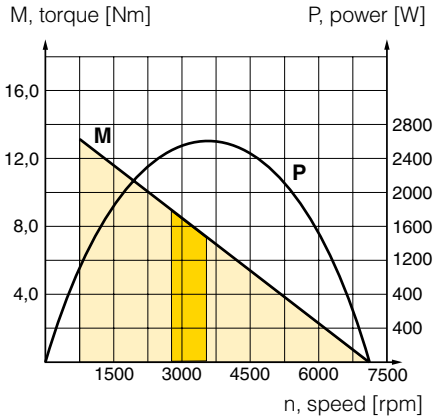
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
1,600	9000	4500	3,3	5,0	32	G1/2	15	4,2	**P1V-A160A0900**
2,600	7000	3500	7,1	11,0	60	G3/4	19	7,9	**P1V-A260A0700**
3,600	6000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

* maximum admissible speed (idling)

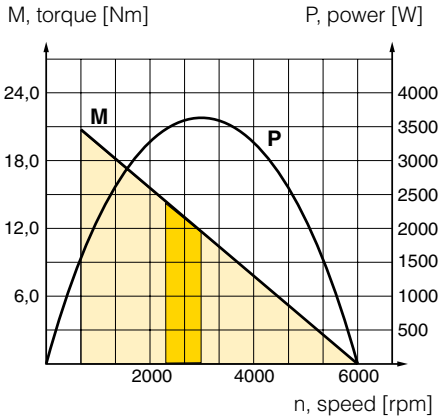
P1V-A160A0900



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)

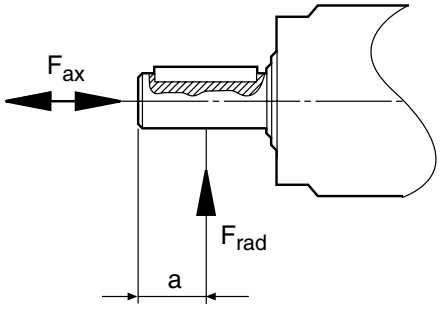
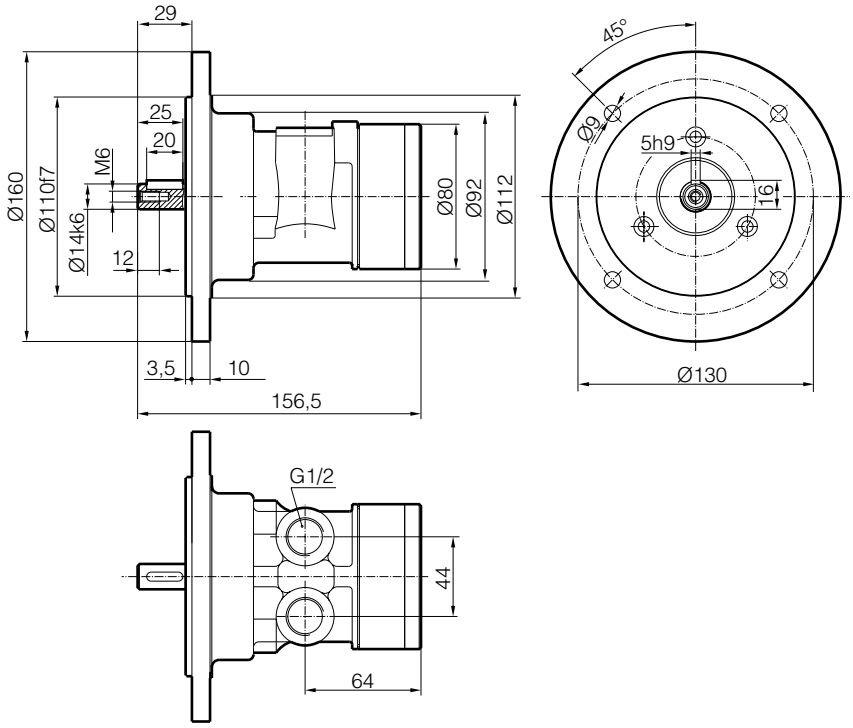


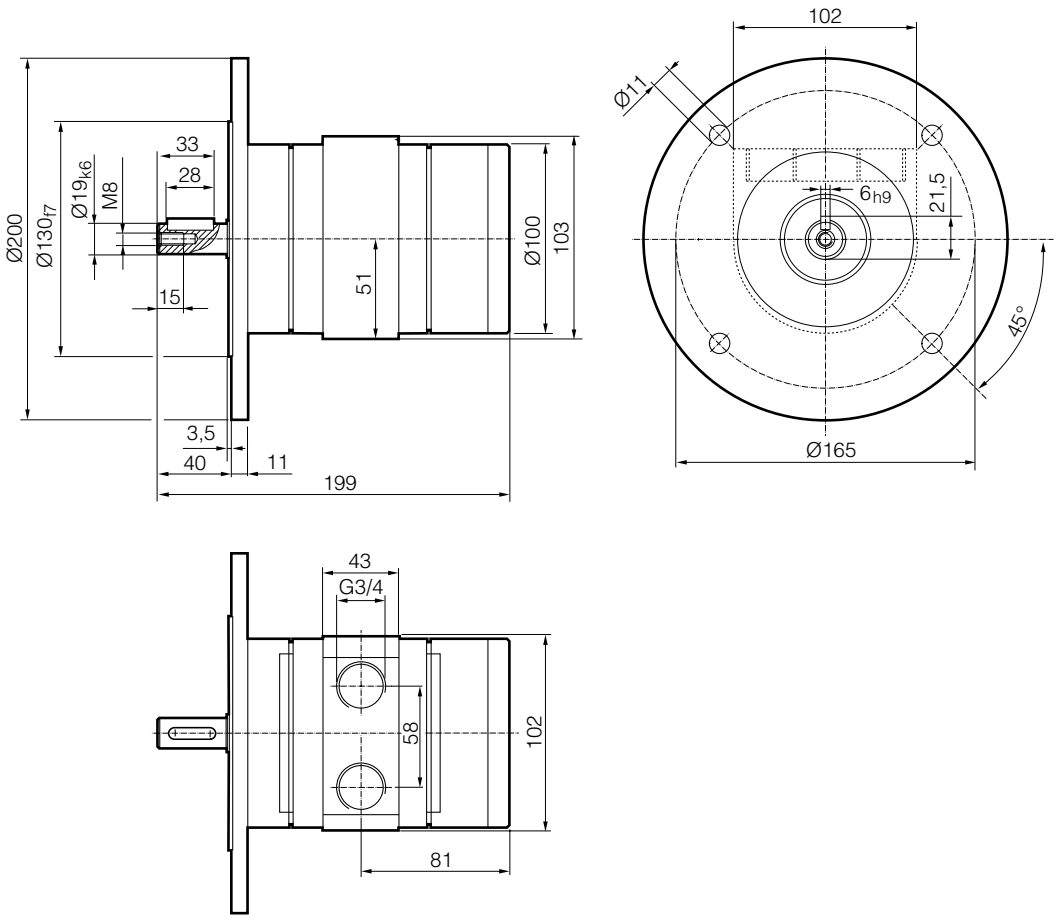
Fig. 1: Loading on output shaft.

Dimensions (mm)

Flange motor IEC71AB5 (P1V-A160)

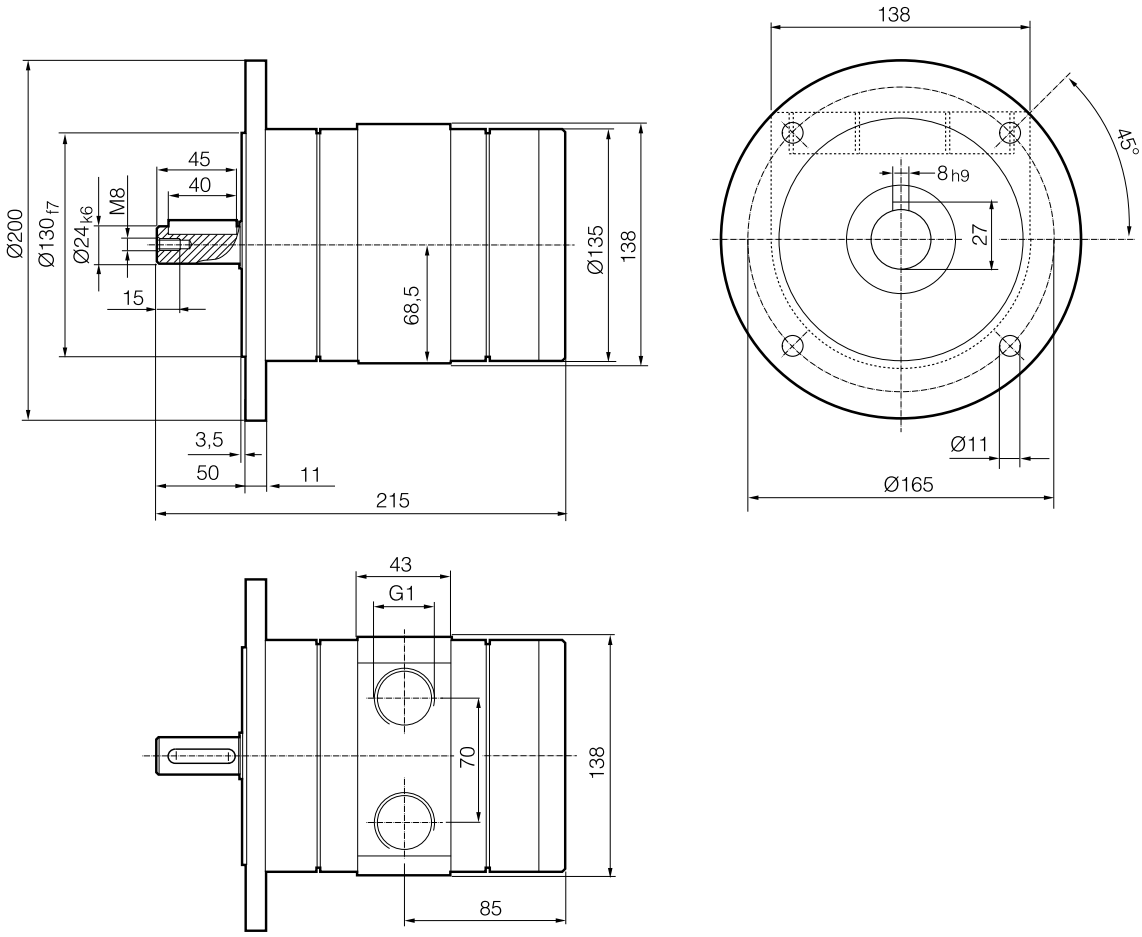


Flange motor IEC80AB5 (P1V-A260)



Dimensions (mm)

Flange motor IEC90AB5 (P1V-A360)



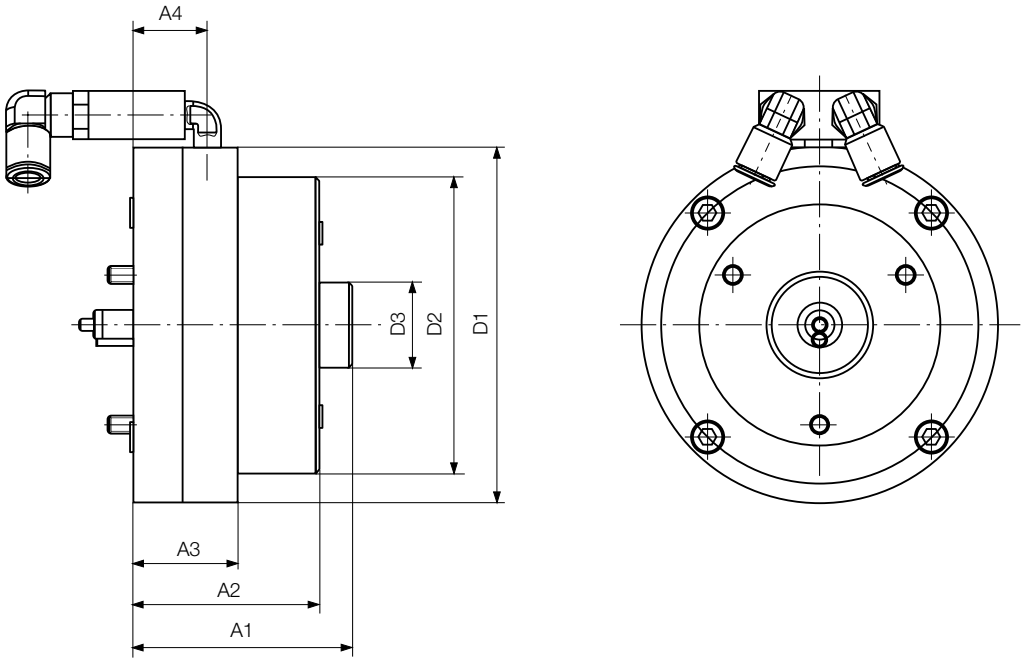
Holding Brakes

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*)

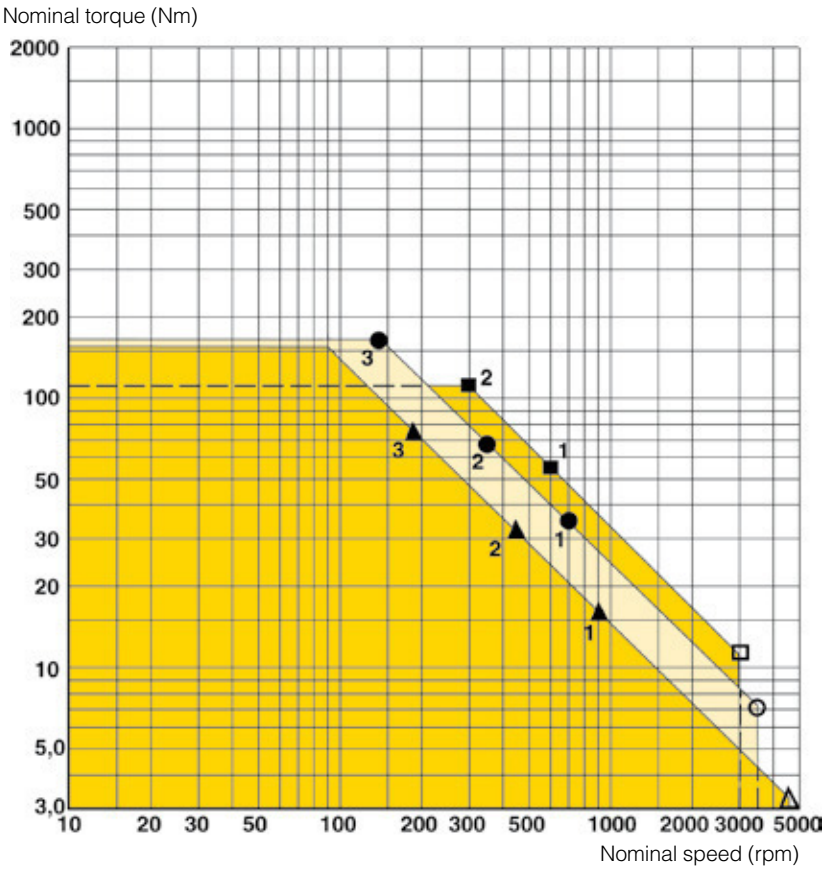
*) The holding brake is not designed for use with a different drive system. Please only use it in combination with the stated motor types.

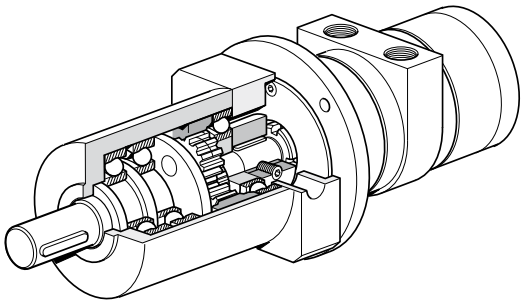
Dimensions (mm)



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.

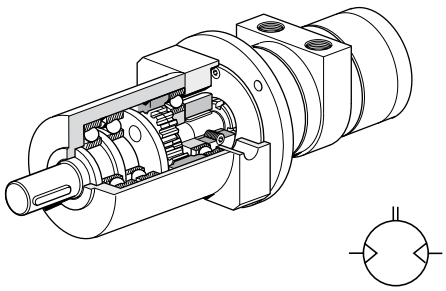
The output shaft is always in the centre of the gearbox. Small installation dimensions relative to the torque provided. The gears are lubricated by grease, which means that it can be installed in all conceivable positions.

- 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)

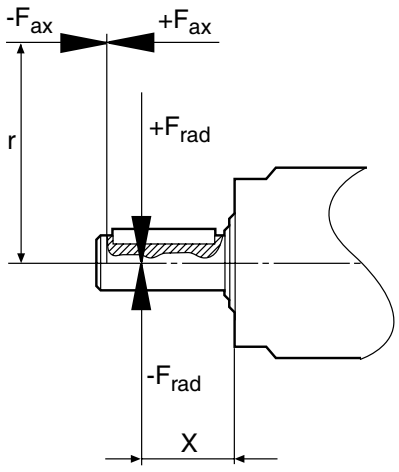
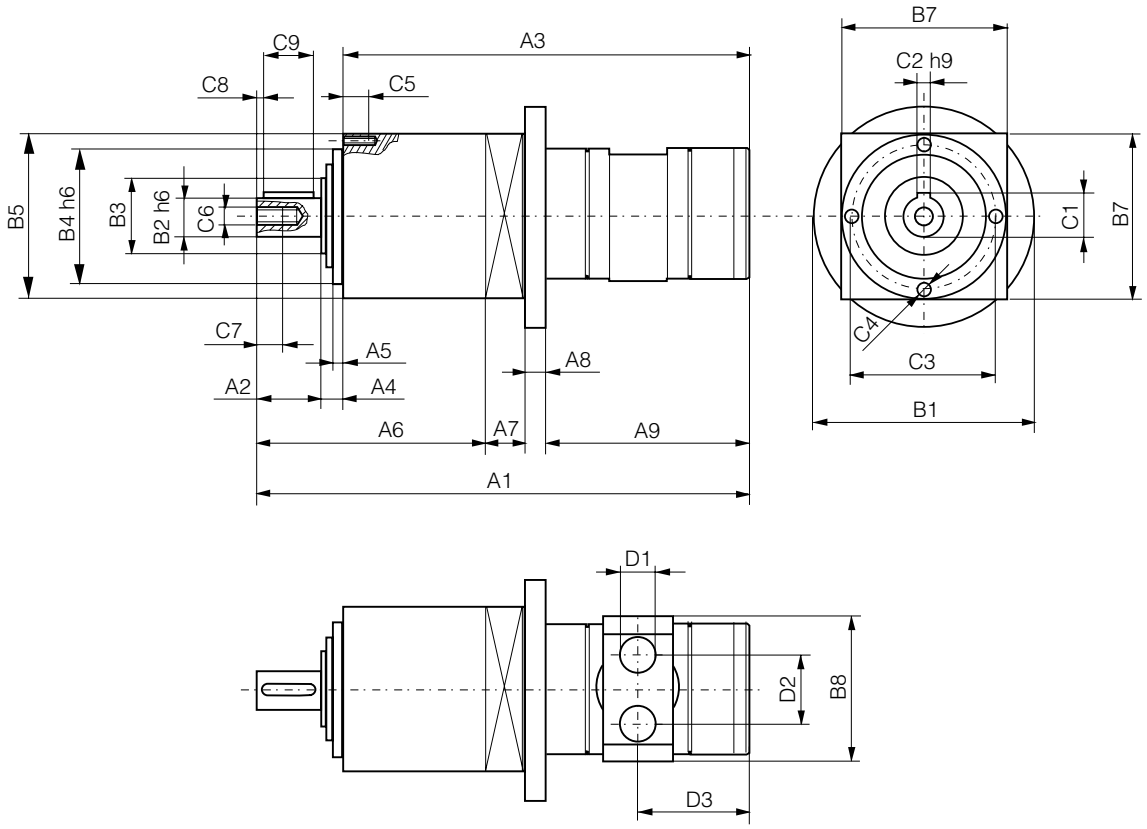


Fig 2: Load and braking torque on output shaft of planetary gear

Dimensions (mm)

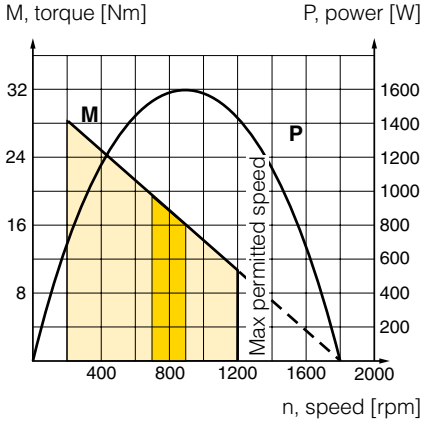
B: Motor with planetary gear, flange mounting



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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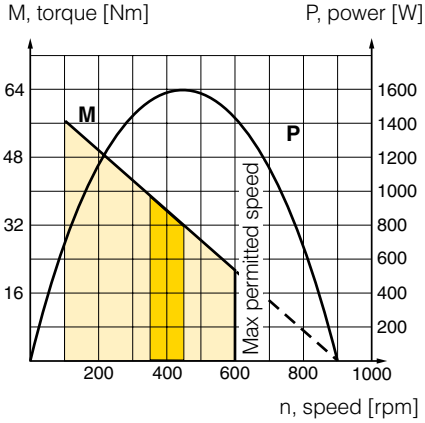

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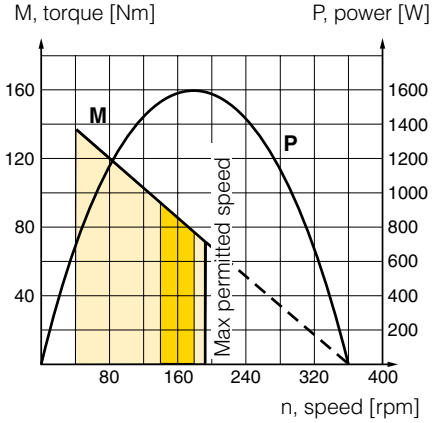

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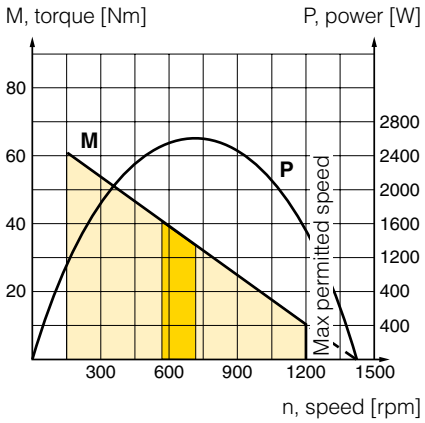
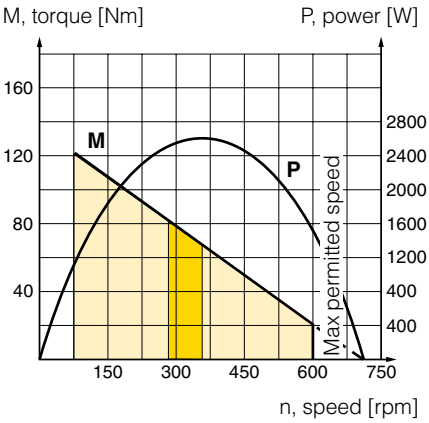
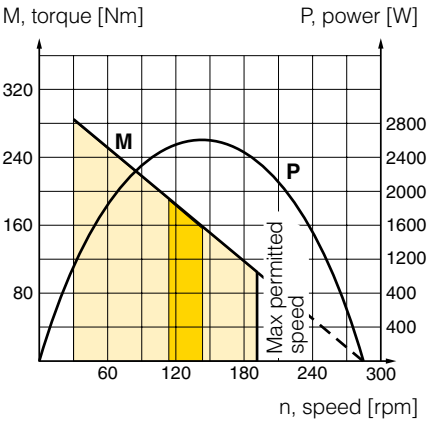


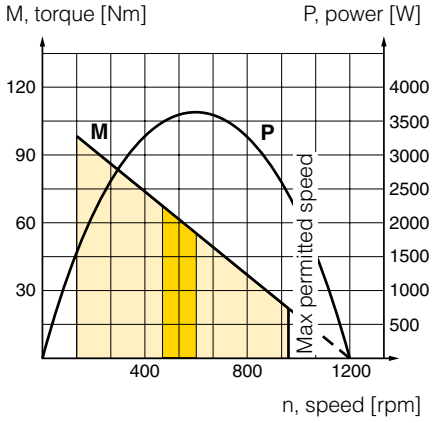
P1V-A260B0060



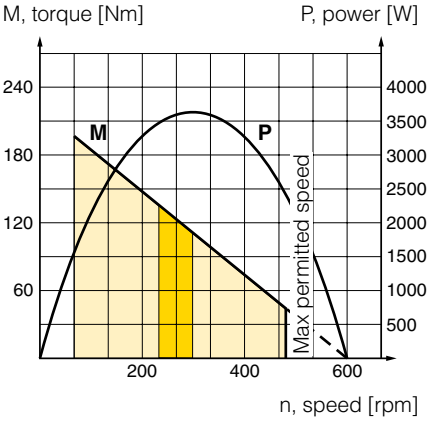
P1V-A260B0019



P1V-A360B0096



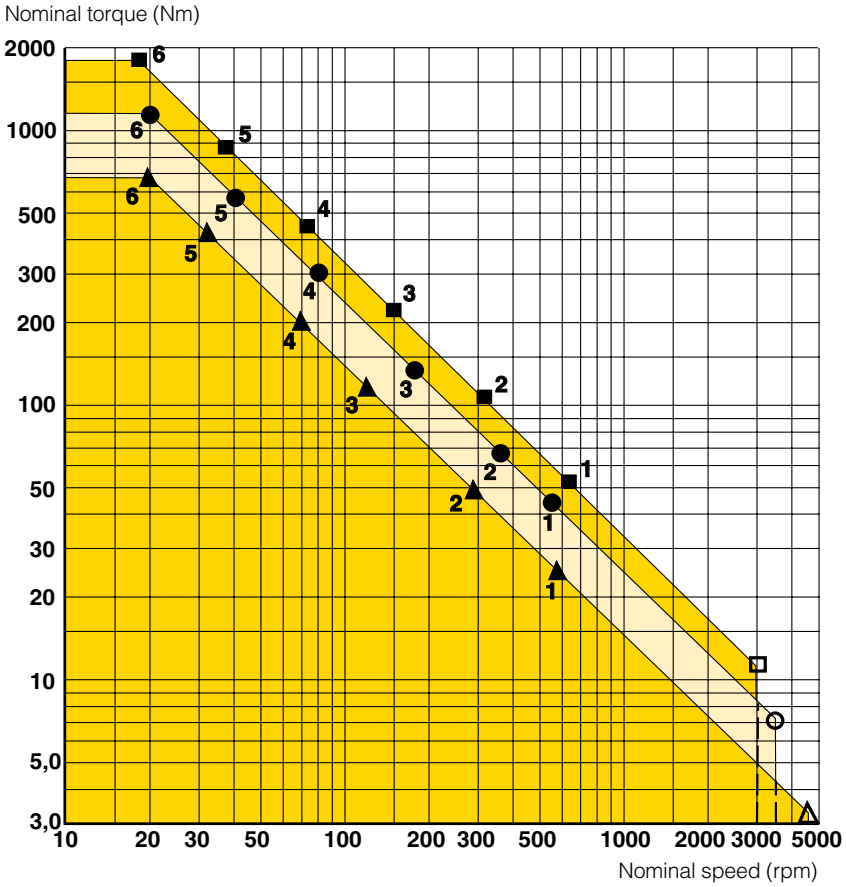
P1V-A360B0048

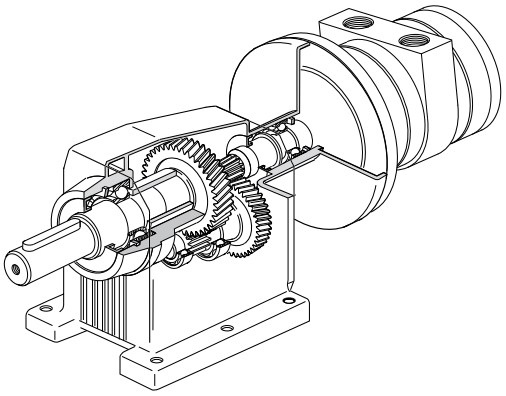


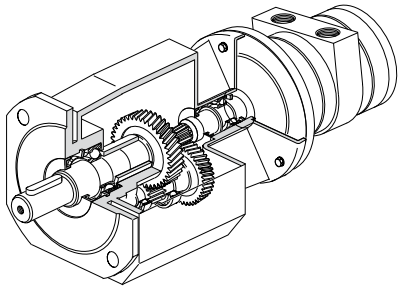
Possible working range of motor.

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.

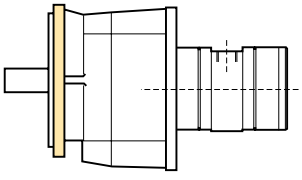
- High efficiency
- Simple flange or foot installation
- Relatively low price

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

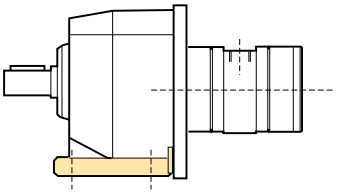
Air motors in diagram above

△	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

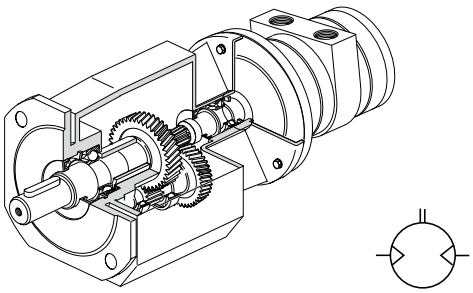
Installation, flange mounting



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)

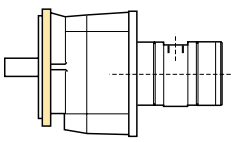
** Max gear box torque for a permanent load

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

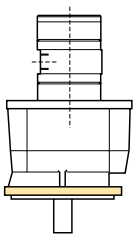
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

D: Installation positions, helical gear, flange mounting

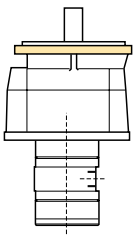
B5



V1

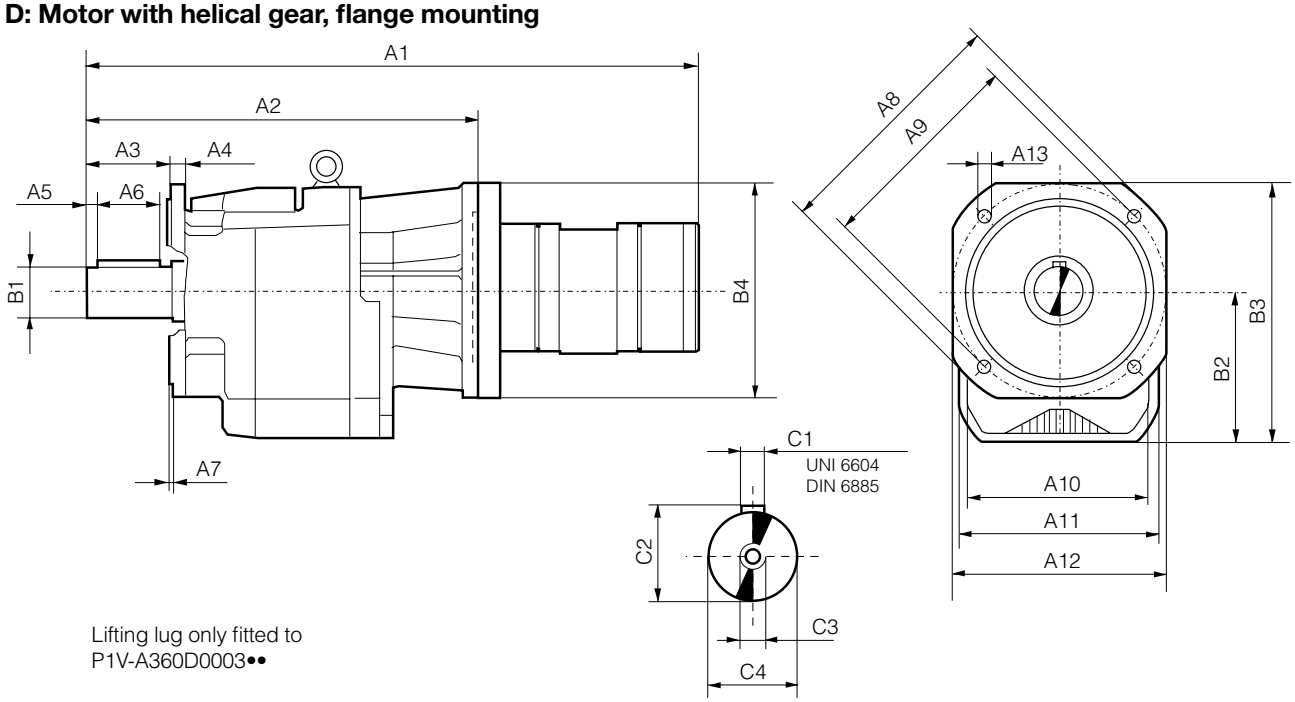


V3



Dimensions (mm)

D: Motor with helical gear, flange mounting



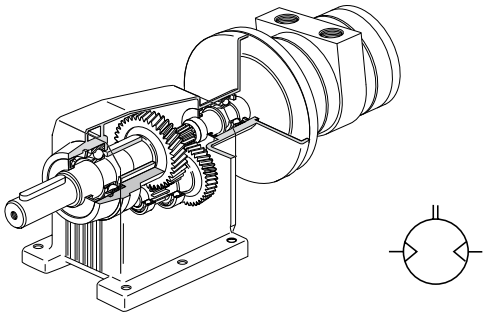
Lifting lug only fitted to
P1V-A360D0003••

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)

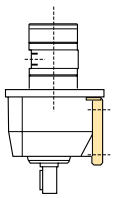
** Max gear box torque for a permanent load

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

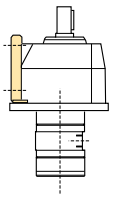
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

E: Installation positions, helical gear, foot mounting

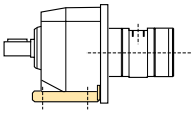
V5



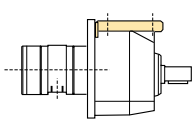
V6



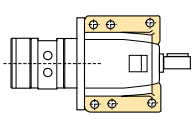
B3



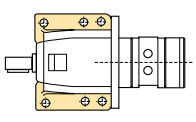
B8



B7

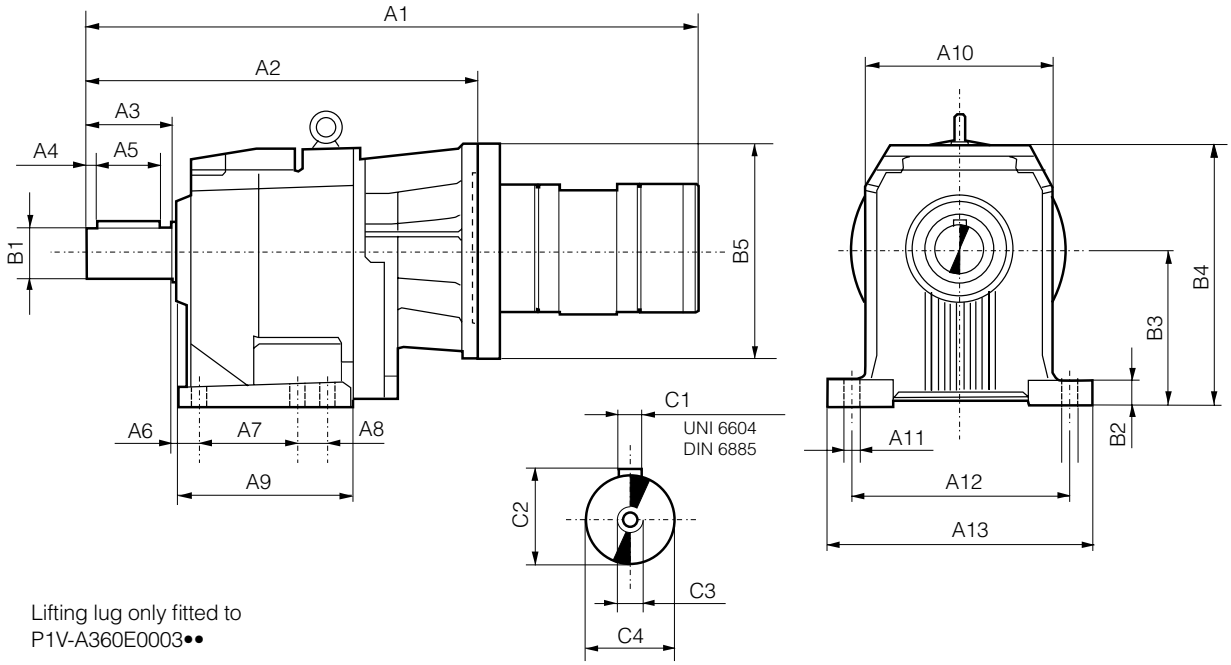


B6



Dimensions (mm)

E: Motor with helical gear, foot mounting



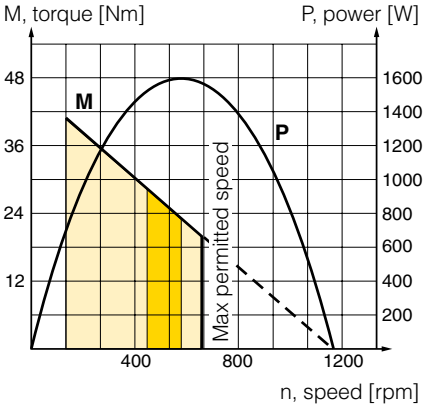
Lifting lug only fitted to P1V-A360E0003••

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

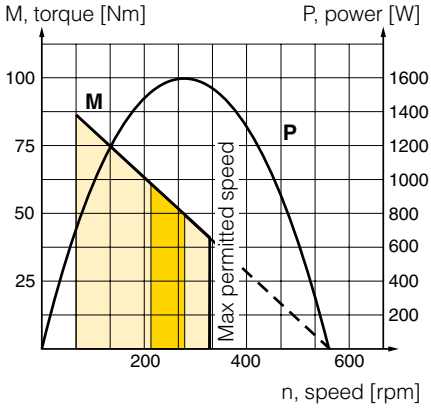
Order code	B4	B5	C1	C2	C3	C4
P1V-A160E0066••	141	160	6x6x30	22,5	M8x19	20 h6
P1V-A160E0032••	166	160	8x7x40	28,0	M8x19	25 h6
P1V-A160E0014••	181	160	8x7x50	33,0	M10x22	30 h6
P1V-A160E0008••	223	160	10x8x60	38,0	M10x22	35 h6
P1V-A160E0004••	278	160	12x8x70	43,0	M12x28	40 h6
P1V-A160E0003••	316	160	14x9x90	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

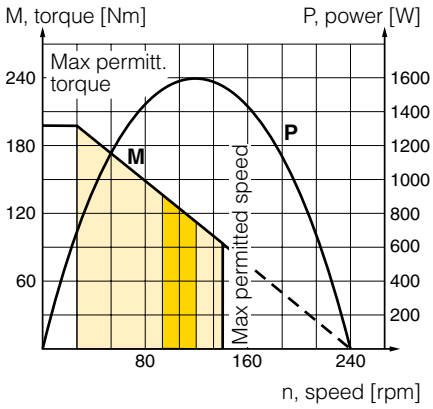
P1V-A160D0066••
P1V-A160E0066••



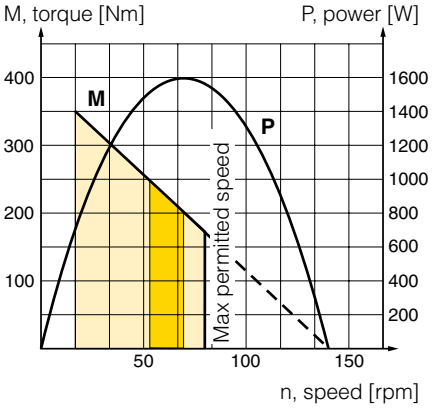
P1V-A160D0032••
P1V-A160E0032••



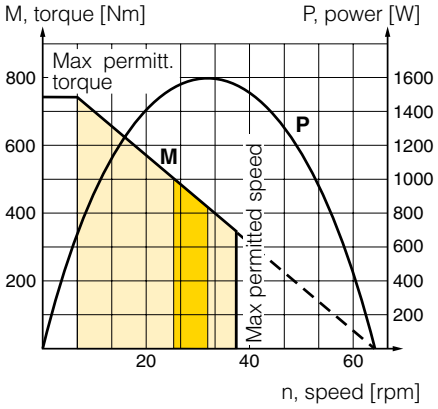
P1V-A160D0014••
P1V-A160E0014••



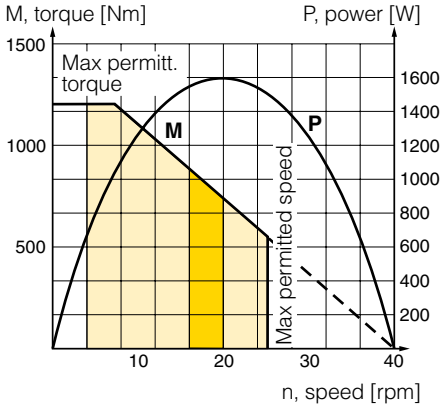
P1V-A160D0008••
P1V-A160E0008••



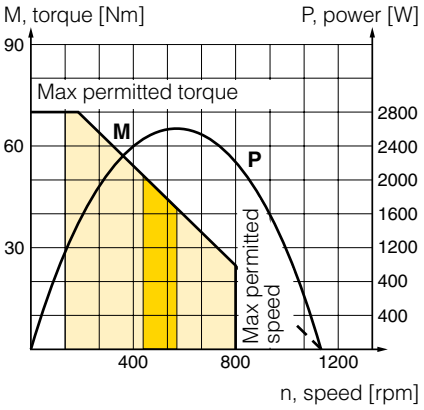
P1V-A160D0004••
P1V-A160E0004••



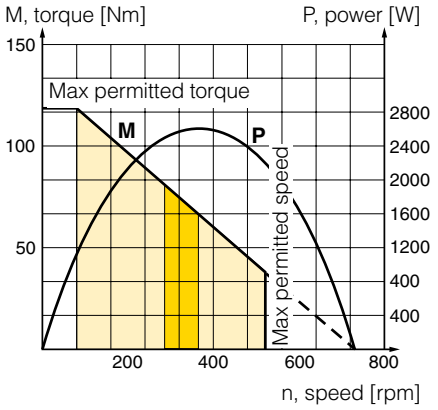
P1V-A160D0003••
P1V-A160E0003••



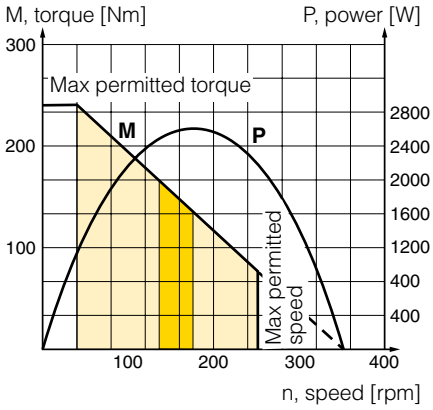
P1V-A260D0080••
P1V-A260E0080••



P1V-A260D0052••
P1V-A260E0052••



P1V-A260D0025••
P1V-A260E0025••

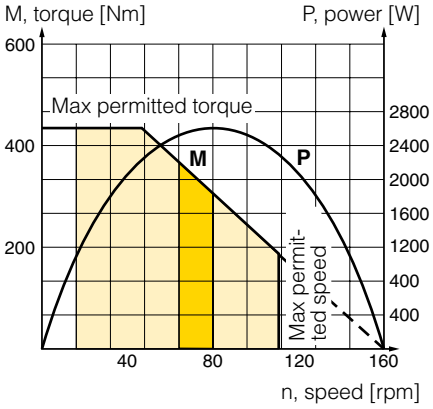


Possible working range of motor.

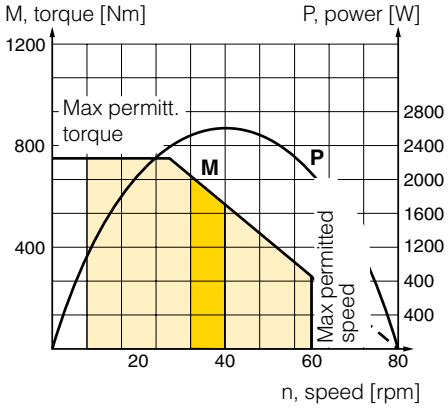
Optimum working range of motor.

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

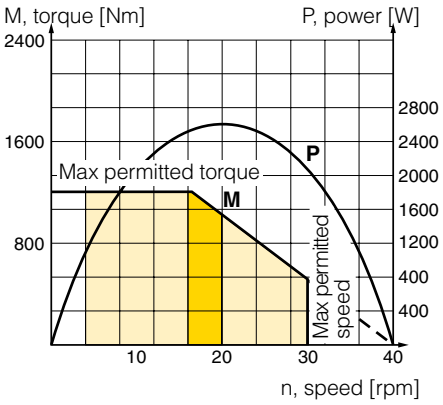
P1V-A260D0011••
P1V-A260E0011••



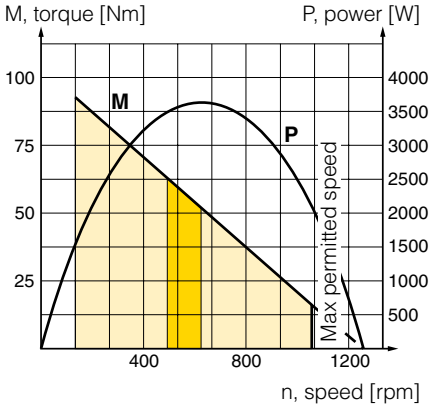
P1V-A260D0006••
P1V-A260E0006••



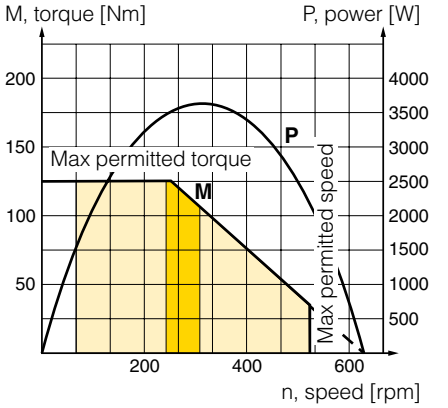
P1V-A260D0003••
P1V-A260E0003••



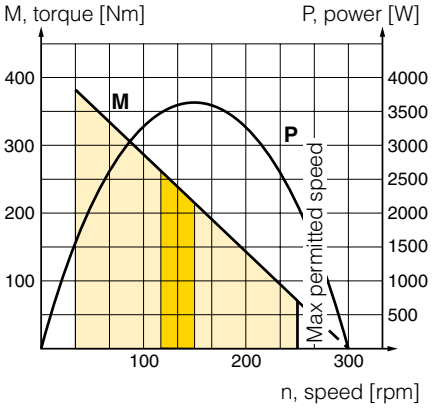
P1V-A360D0105••
P1V-A360E0105••



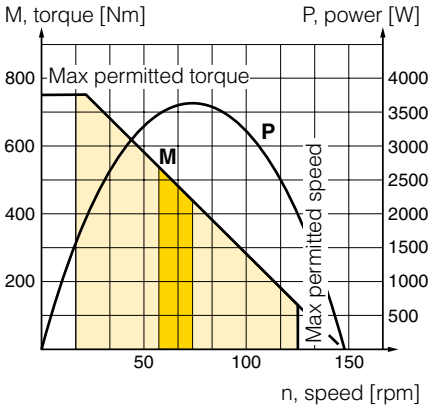
P1V-A360D0052••
P1V-A360E0052••



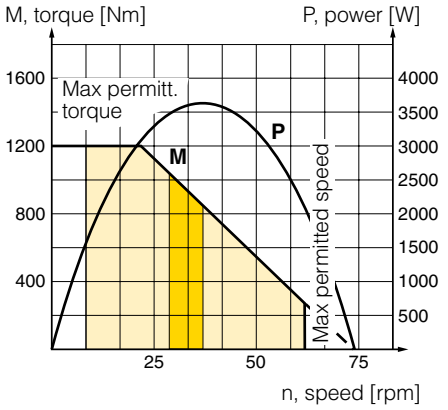
P1V-A360D0025••
P1V-A360E0025••



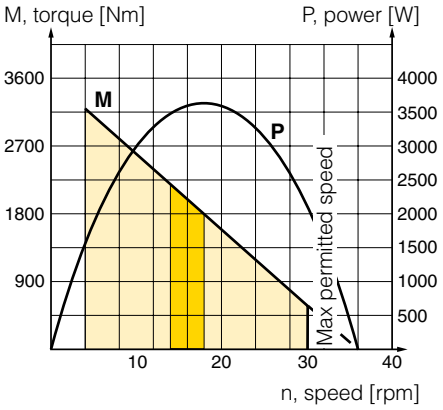
P1V-A360D0013••
P1V-A360E0013••



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:

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

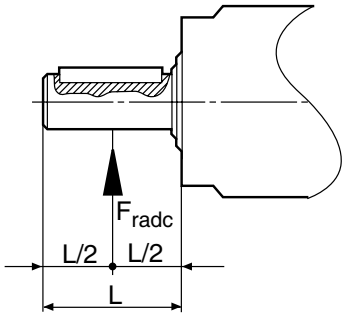


Fig. 3: Force applied at centre of shaft

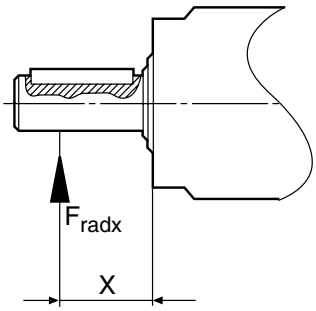


Fig. 4: Force applied at distance X

Axial forces

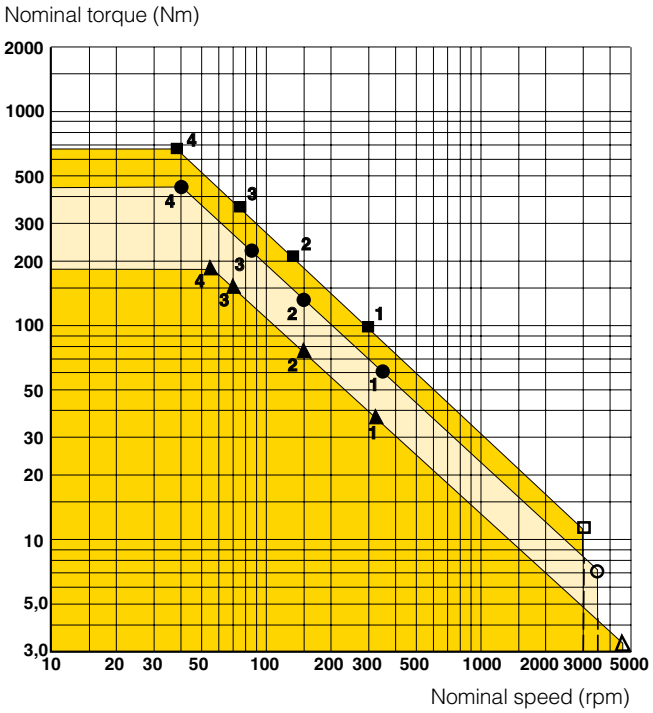
The maximum permissible axial force can be calculated as follows:

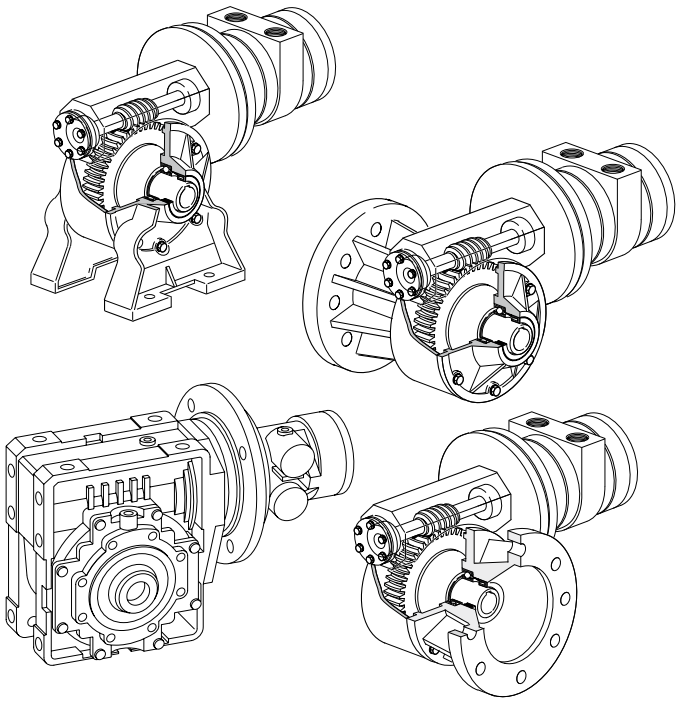
$F_{ax} = F_{rt} \times 0,2$

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.

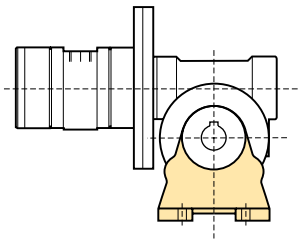
- Low weight in relation to gear ratio
- Non-reversible at high gear ratios
- Relatively low price

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

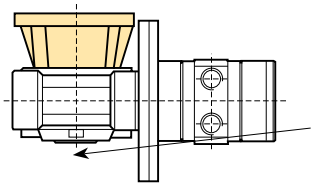
Air motors in diagram above

△	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

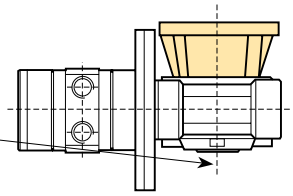


Installation, flange mounting, left-hand

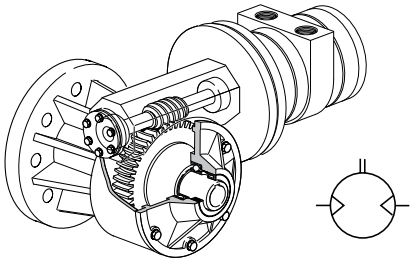


Additional flange option possible on the opposite face

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••**

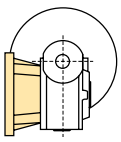
* maximum admissible speed (idling)

** Max gear box torque for a permanent load

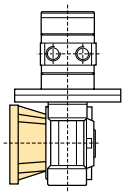
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160F0043B3

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

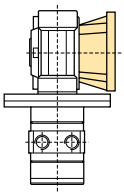
B3



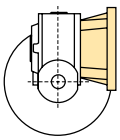
V6



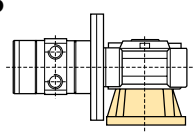
V5



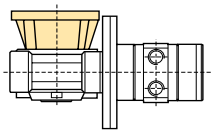
B8



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.

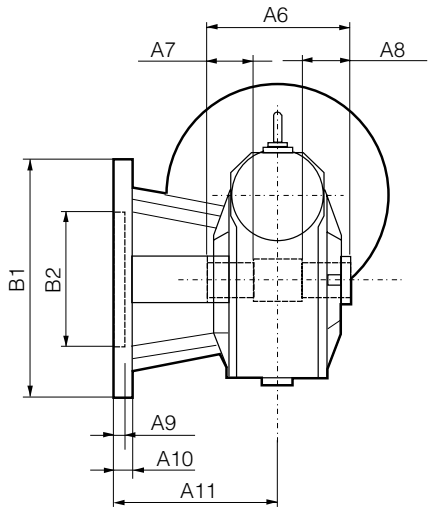
Types of Self-locking

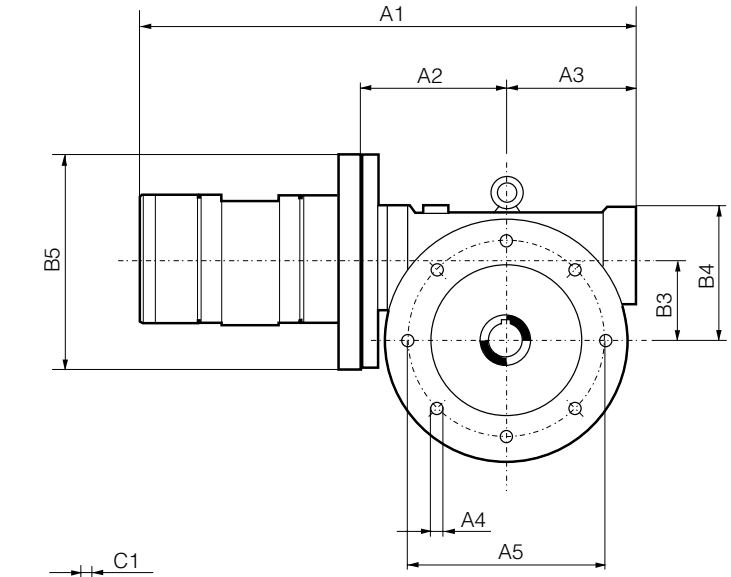
1. Static, not self-locking
2. Static, self-locking - quicker return under vibration - not dynamically self-locking
3. Static, self-locking - return only possible under vibration - good dynamic self-locking

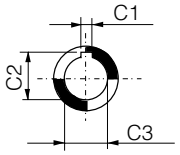
Important!
Since it is practically impossible to guarantee total self-locking, an external brake must be used to guarantee that vibration can not cause an output shaft to move.

Dimensions (mm)

F: Motor with worm gear, flange mounting







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

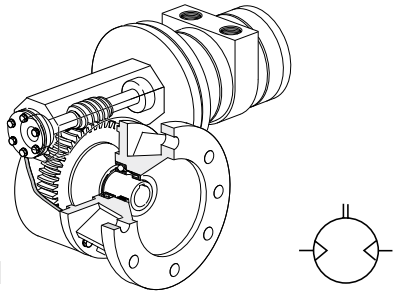
As standard, the motor has a hollow shaft with key slot. Please refer to page 44 for a dimension sketch of the single ended and double ended shafts and for additional flange on the opposite side.

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••**

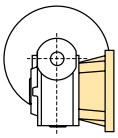
* maximum admissible speed (idling)

** Max gear box torque for a permanent load

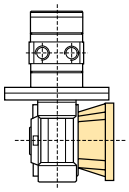
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160G0043B3

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

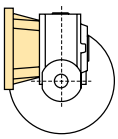
B3



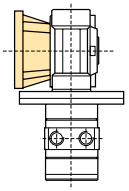
V6



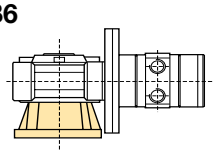
V5



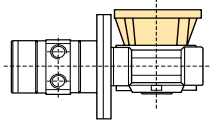
B8



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.

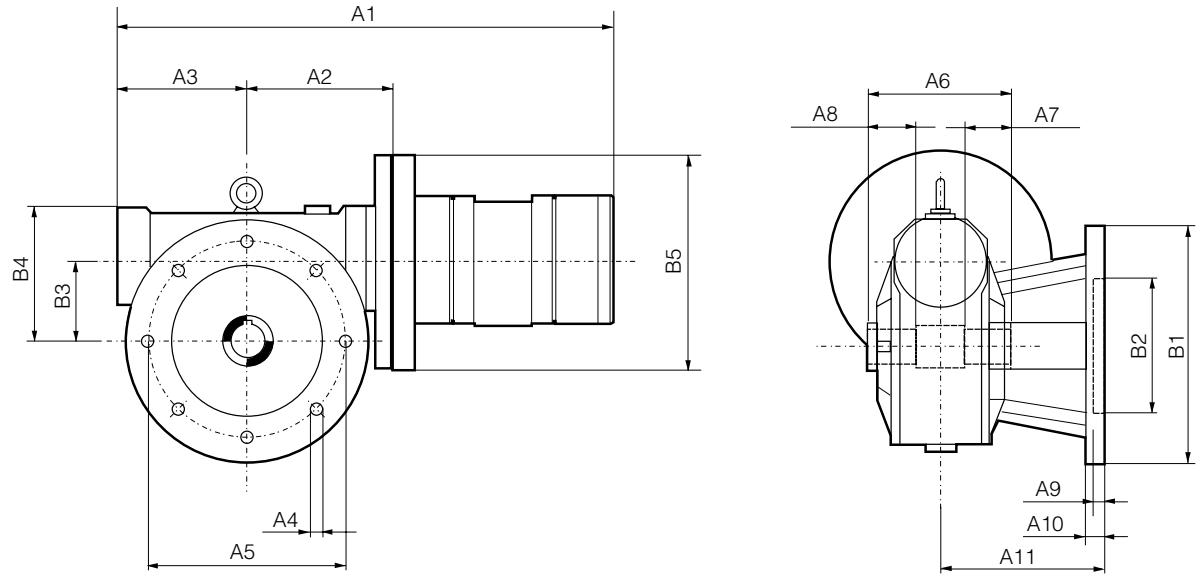
Types of Self-locking

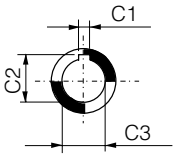
1. Static, not self-locking
2. Static, self-locking - quicker return under vibration - not dynamically self-locking
3. Static, self-locking - return only possible under vibration - good dynamic self-locking

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••

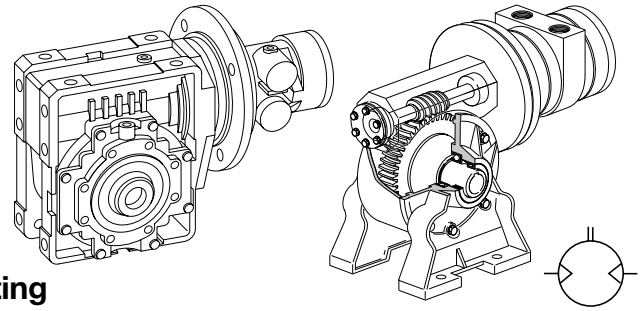
As standard, the motor has a hollow shaft with key slot. Please refer to page 44 for a dimension sketch of the single ended and double ended shafts and for additional flange on the opposite side.

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

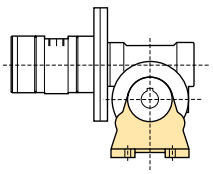
Max power	Max speed*	Nominal speed	Nominal torque	Min start torque	Max permanent torque**	Types of self-locking	Air consumption at max power	Connection	Min pipe ID inlet/ outlet	Weight	Order code
kW	rpm	rpm	Nm	Nm	Nm		l/s		mm	Kg	
Series P1V-A160											
1,600	430	320	38	40	44	1	32	G1/2	15	7,2	**P1V-A160H0043••**
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

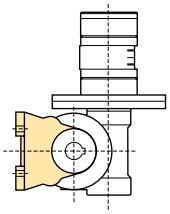
Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160H0043B3

H: Installation positions, worm gear, foot mounting

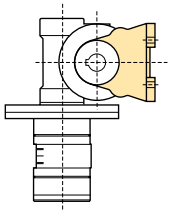
B3



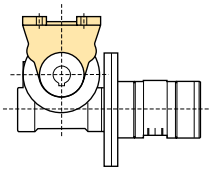
V6



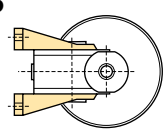
V5



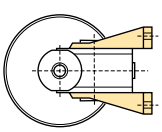
B8



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.

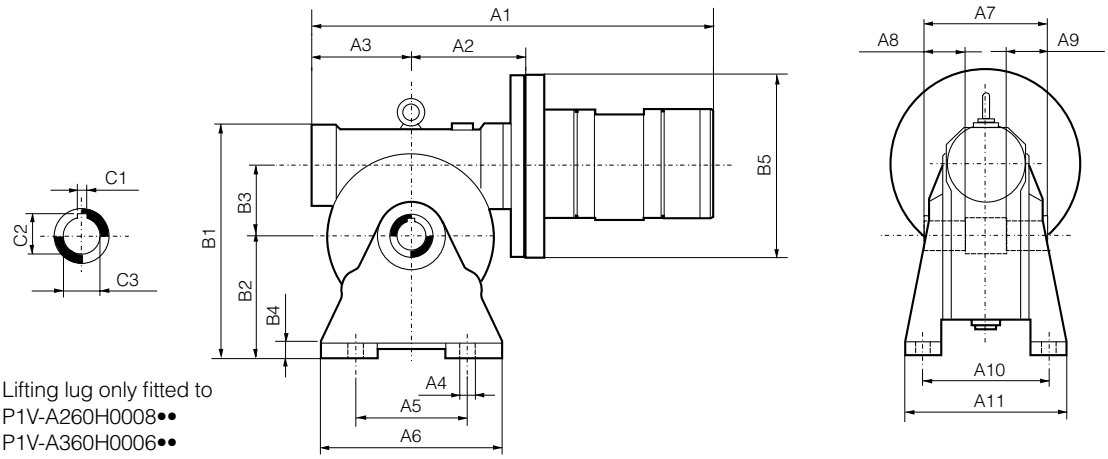
Types of Self-locking

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)

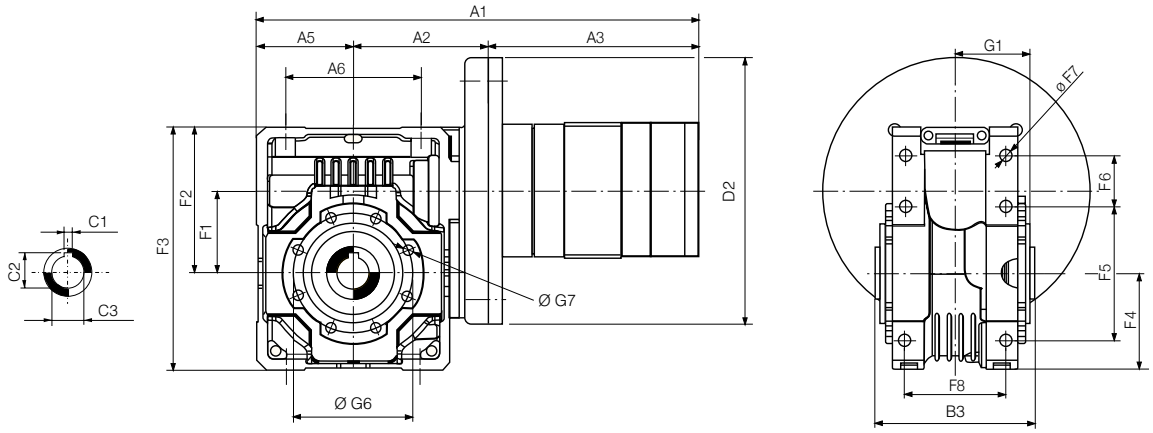
H: Motor with worm gear, foot mounting



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



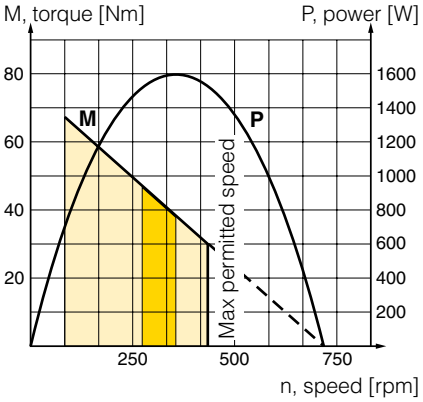
Order code	A1	A2	A3	A5	A6	B3	D2	F1	F2	F3	F4	F5	F6	Ø F7
P1V-A160H0020••	294,5	95	127	72,5	102	120	160	62,2	110,0	182,5	72,5	102	37,5	9,0
P1V-A160H0010••	355,0	128	127	100,0	144	140	160	86,9	145,5	245,5	100,0	144	45,5	11,5
P1V-A160H0008••	355,0	128	127	100,0	144	140	160	86,9	145,5	245,5	100,0	144	45,5	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

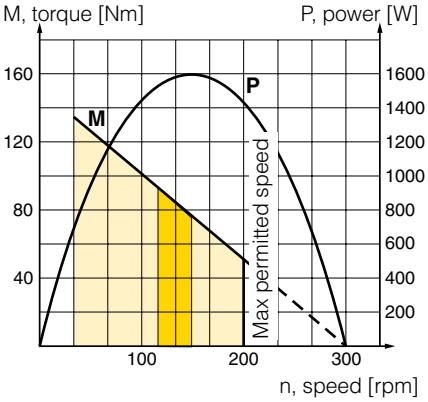
••: see previous page for installation positions

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.

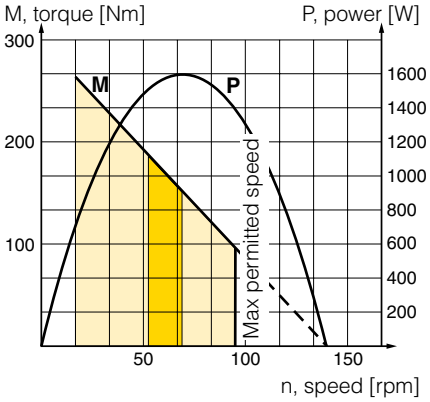
P1V-A160F0043••
P1V-A160G0043••
P1V-A160H0043••



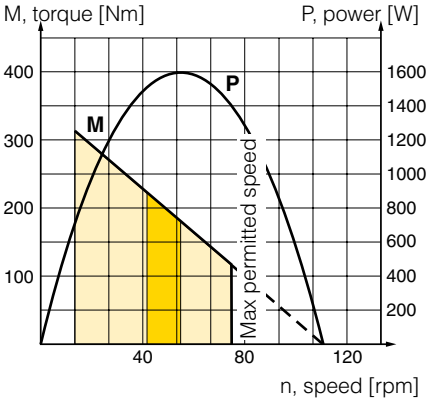
P1V-A160F0020••
P1V-A160G0020••
P1V-A160H0020••



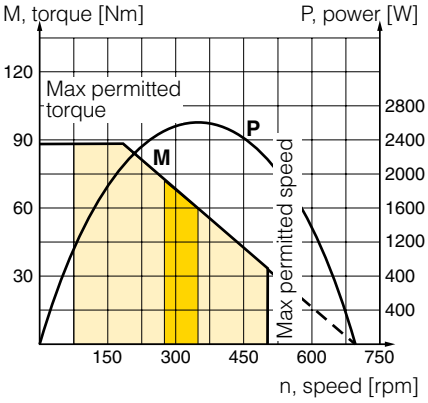
P1V-A160F0010••
P1V-A160G0010••
P1V-A160H0010••



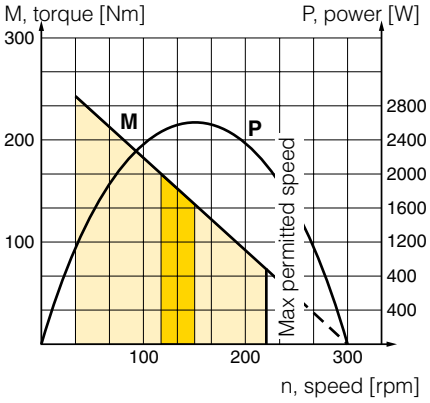
P1V-A160F0008••
P1V-A160G0008••
P1V-A160H0008••



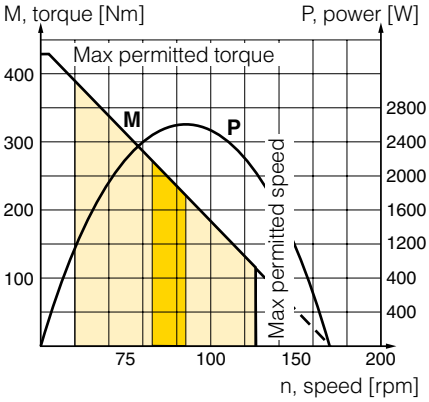
P1V-A260F0050••
P1V-A260G0050••
P1V-A260H0050••



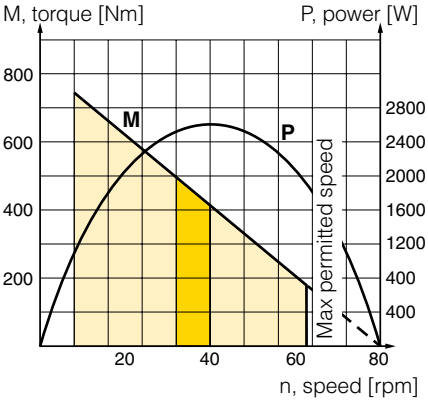
P1V-A260F0022••
P1V-A260G0022••
P1V-A260H0022••



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



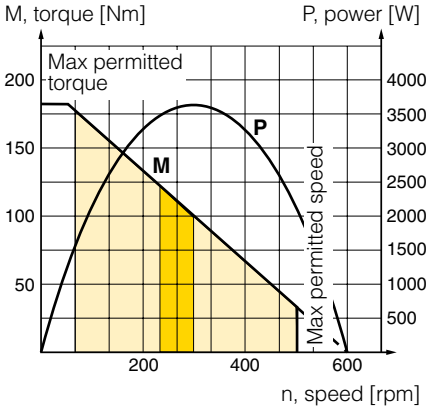
P1V-A260F0008••
P1V-A260G0008••
P1V-A260H0008••



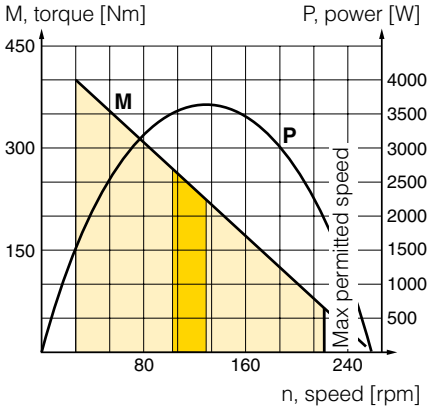
Possible working range of motor.

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

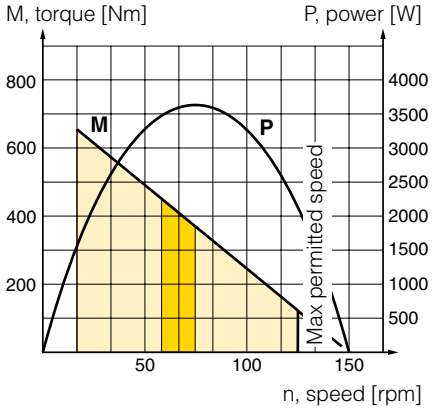
P1V-A360F0050••
P1V-A360G0050••
P1V-A360H0050••



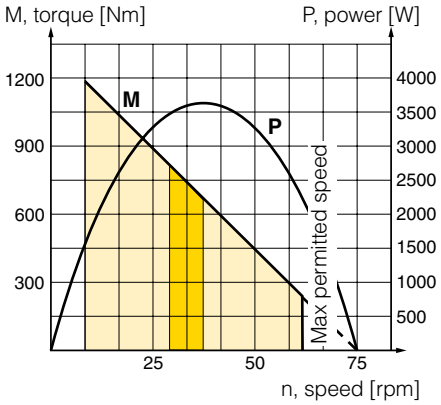
P1V-A360F0022••
P1V-A360G0022••
P1V-A360H0022••



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:

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

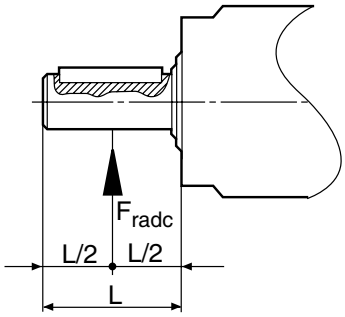


Fig. 4: Force applied at centre of shaft

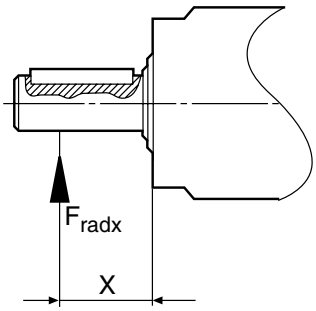


Fig. 5: Force applied at distance X

Axial forces

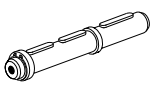
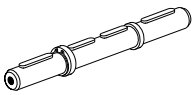
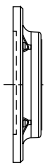
The maximum permissible axial force can be calculated as follows:

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

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

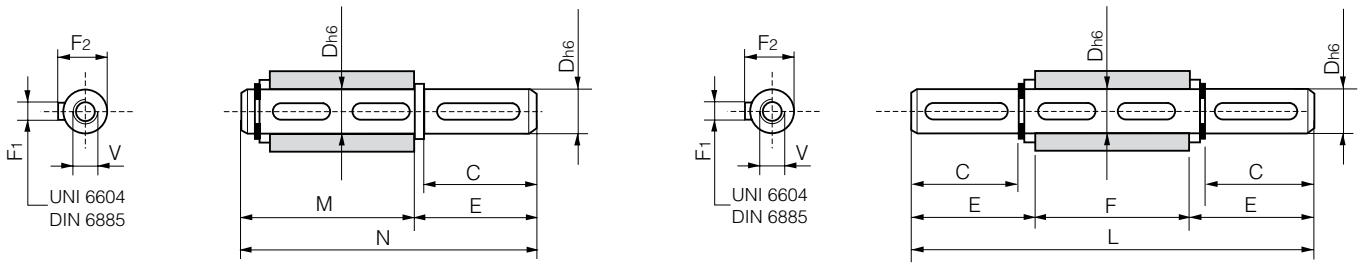
- • Motor with worm gear (functions F, G and H)
- •• Installation position, optional

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

P1V-A 160 E 0 066 B6

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

Free/max speed per min	
000	0000
900	9000

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

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

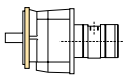
Note: This model code can not be used for creating new part numbers. All possible combinations between motor size, function and free speed are in all previous pages.

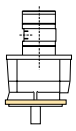
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

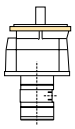
A: Free installation positions, basic motor

B: Free installation positions, planetary gear

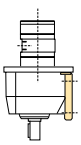
D: Free installation positions, helical gear and flange

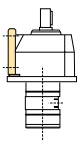
B5 

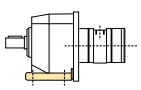
V1 

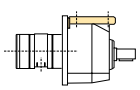
V3 

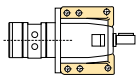
E: Installation positions, helical gear and foot

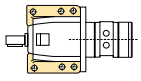
V5 

V6 

B3 

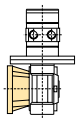
B8 

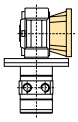
B7 

B6 

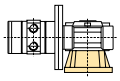
F: Installation pos., worm gear and flange, left-hand

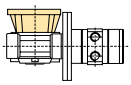
B3 

V6 

V5 

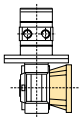
B8 

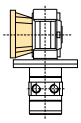
B6 

B7 

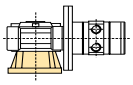
G: Installation pos., worm gear and flange, right-hand

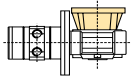
B3 

V6 

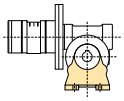
V5 

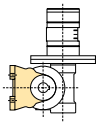
B8 

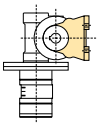
B6 

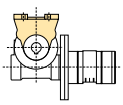
B7 

H: Installation positions, worm gear and foot

B3 

V6 

V5 

B8 

B6 

B7 

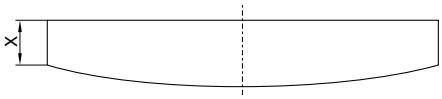
Lubrication and service life

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%.

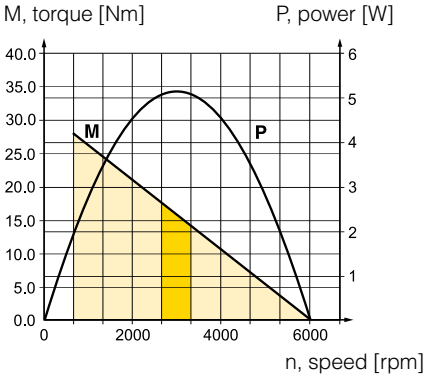
Very Large Air Motors

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

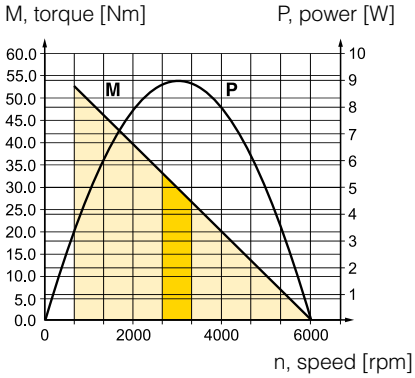
Reversible motor without gear box, IEC Flange

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



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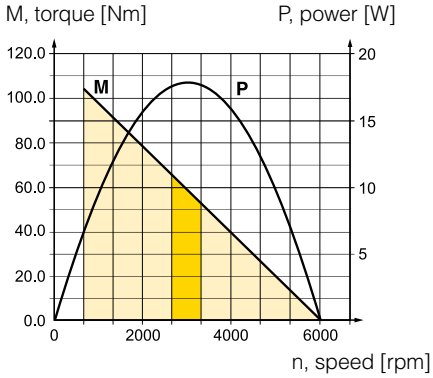


Possible working range of motor.

Optimum working range of motor.

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

Technical data

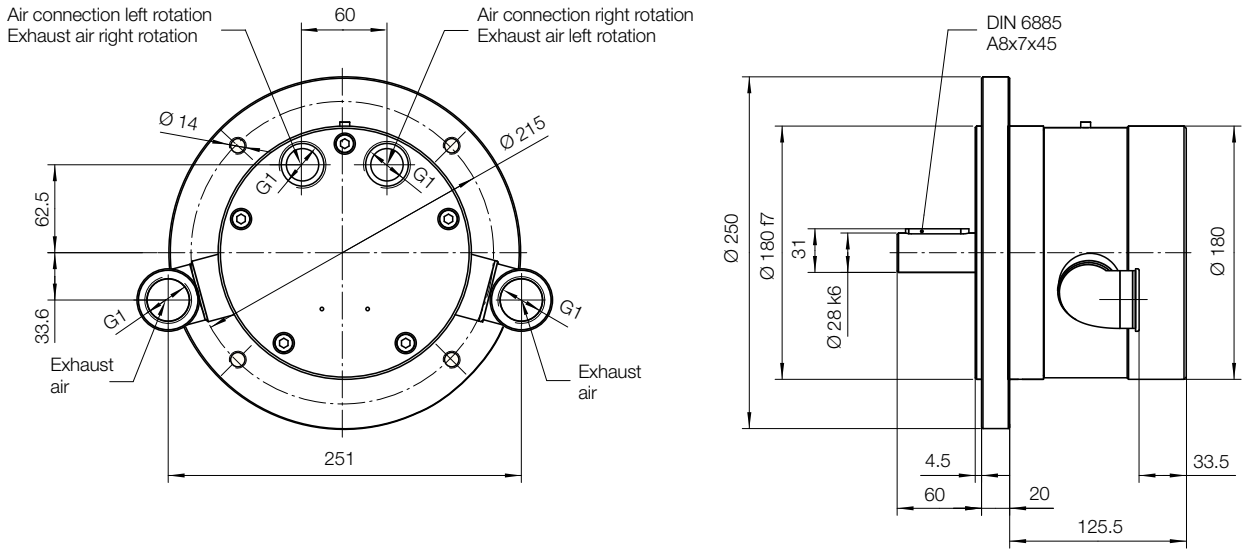
Air motor size & type	P1V-B510	P1V-B900	P1V-BJ00
Nominal power (watts)	5100	9000	18000
Working pressure (bar)	3 to 7		
Working temperature (°C)	-20 to +110		
Ambient temperature (°C)	-20 to +110		
Air flow required (Nl/min)	6200	10000	20000
Min pipe ID, inlet (mm)	25	25	43
Min pipe ID, outlet (mm)	25	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

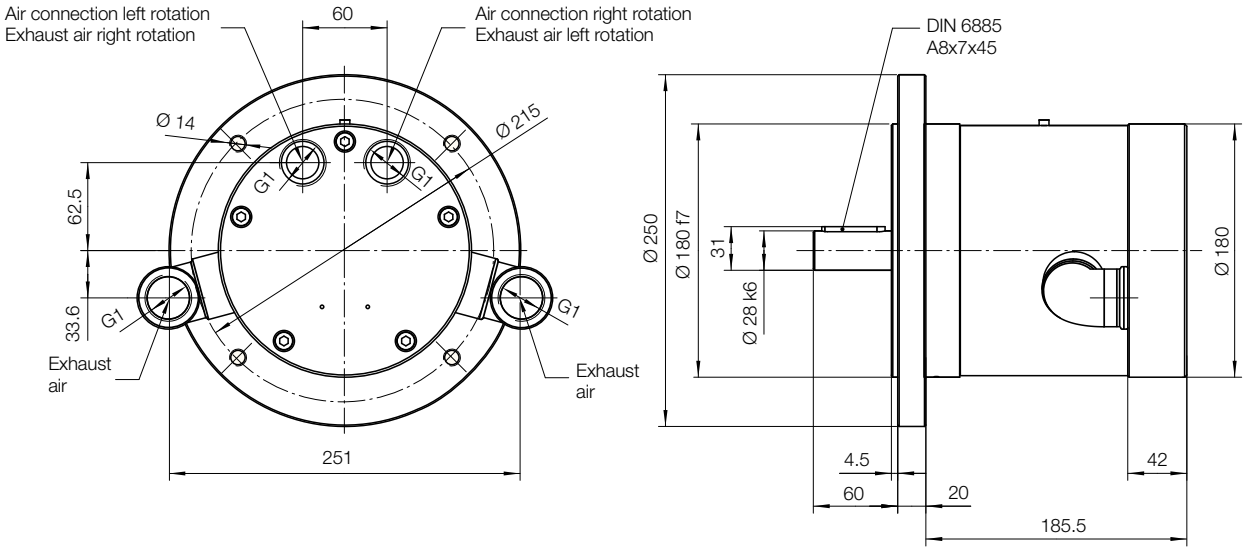
Air motor size & type	P1V-B510	P1V-B900	P1V-BJ00
Motor housing	Cast iron, synthetic paint, silver grey color		
Shaft	High grade steel		
Key	Hardened steel		
External seal	Nitrile rubber, NBR		
Internal steel parts	High grade steel		
Vanes	Patented, no data		

Dimensions (mm)

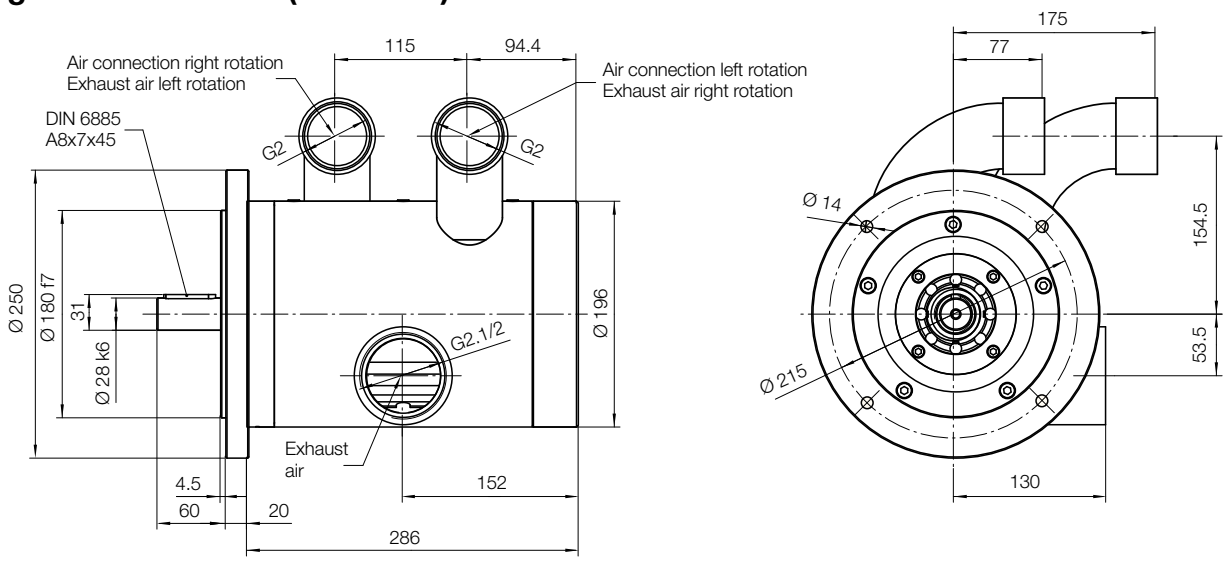
Flange motor IEC112A (P1V-B510)



Flange motor IEC112A (P1V-B900)



Flange motor IEC112A (P1V-BJ00)



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Catalogue PDE2670TCUK - V2 - November 2014

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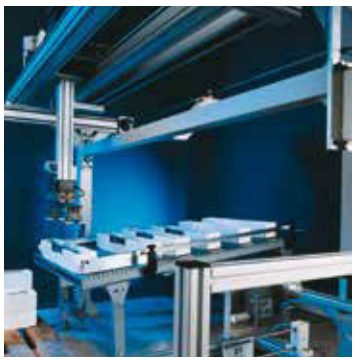

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climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Air Motors

P1V-M Robust Type
0.2, 0.4, 0.6, 0.9 & 1.2 kW

Catalogue PDE2539TCUK November 2014

Parker

ENGINEERING YOUR SUCCESS.

P1V-M - Robust Air Motors

Features	Air motor	Hydraulic motor	Electric motor	Electric motor regulated	Electric motor regulated with feed back
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	*	*	***	***	**
Accuracy, speed	*	**	*	**	***
Regulating dynamic	*	*	*	*	***
Communication	*	*	*	***	***

* = 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.

WARNING

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Contents Page

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?

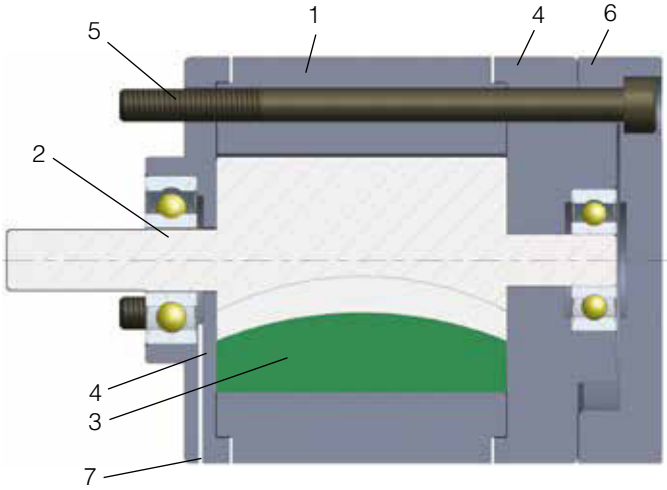
5 How do you ensure a long life and high performance of the air motor?

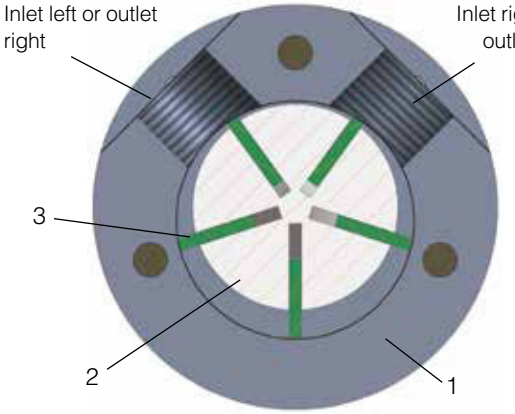
- Ensure you air quality is in accordance with our specifications, oil or oil free lubrication operations.
- Keep the recommended maintenance intervals

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

- Keep same level of your air quality.

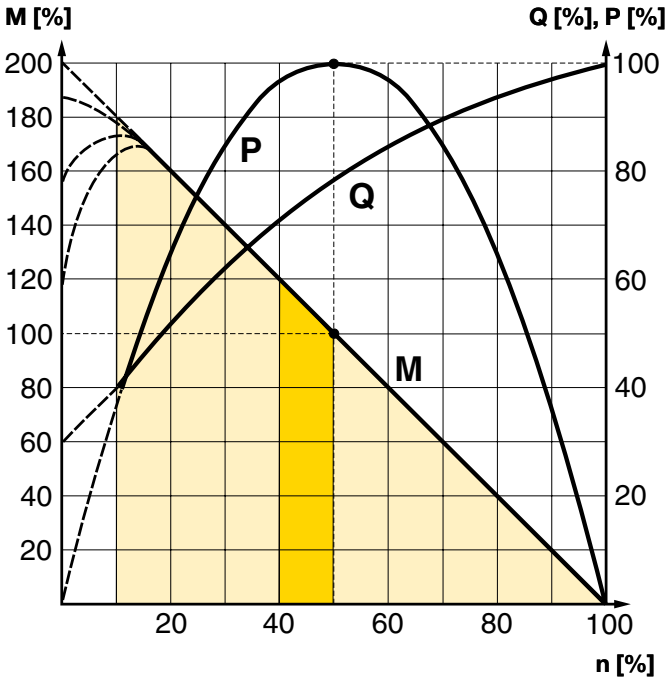
Principles of air motor functioning





1	Rotor cylinder
2	Rotor
3	Vanes
4	End piece with bearing
5	Mounting screw for motor
6	Removable rear piece
7	Pressure unloading

Torque, power and air consumption graphs



The curve is for 6 bar
P = power **Q = air consumption**
M = torque **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. 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. 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 braked to 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 stop with the vanes in various positions, it is not possible to specify an exact starting 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

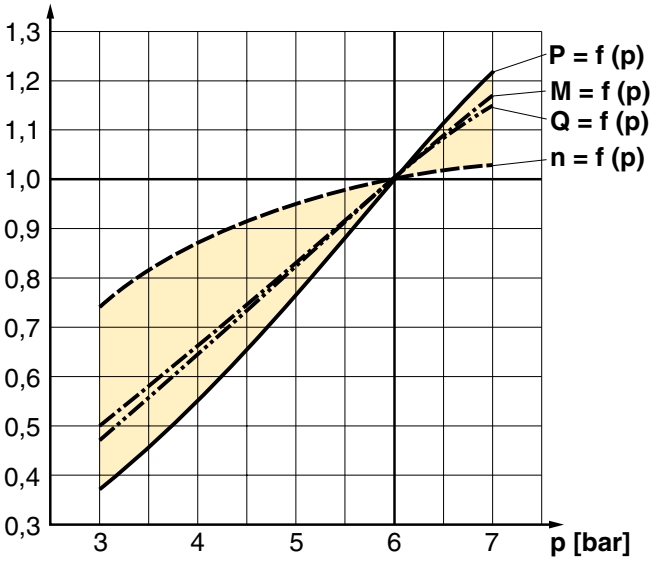
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an 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

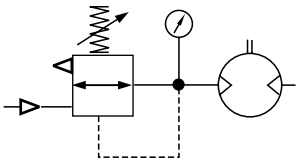


P = Power, M = Torque, Q = Air consumption, N = Speed

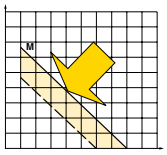
Pressure (p) bar / PSI	Power (P) %	Speed (n) %	Torque (M) %	Air Consumpt. (Q) %
7 / 99	121	103	117	117
6 / 85	100	100	100	100
5 / 71	77	95	83	83
4 / 57	55	87	67	67
3 / 42	37	74	50	50

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.



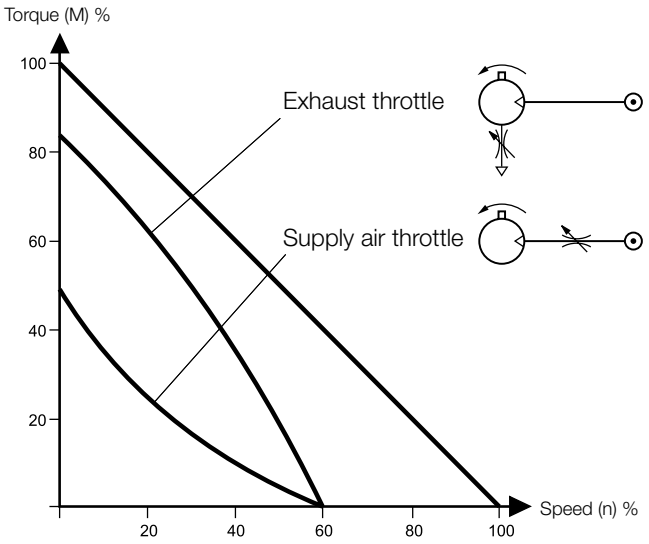
Pressure regulation at motor inlet.



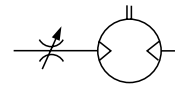
Theoretically torque curve change caused by pressure change

Speed regulation, air flow reduction

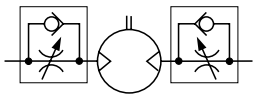
Every size reduction or restriction on the air line, whether of the supply hose itself or fittings, before the air motor affects the amount of the supplied air. By throttling you reduce the speed of your motor and simultaneously, the required torque. That means that you reduce the motor performance. 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.



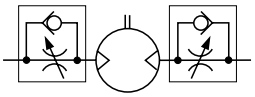
Throttling



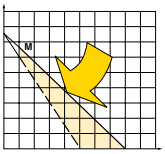
Supply or exhaust throttling, non-reversible motor



Supply throttling, reversible motor



Exhaust throttling, reversible motor



Theoretically 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.

Dry unlubricated compressed air

If unlubricated compressed air is used, the compressed air should comply with the purity standards below in order to guarantee the longest possible overall service life. If the unlubricated compressed air has a high water content, condensation forms inside the motor, causing corrosion in all internal components. A ball bearing can be destroyed in a remarkably short time if it comes into contact with a single water droplet. For indoor use, we recommend ISO8573-1 purity class 3.4.1. To achieve this, compressors must befitted with after coolers, oil filters, refrigerant air dryers and air filters. For indoor/ outdoor use, we recommend ISO8573-1 purity class 1.2.1. To achieve this, compressors must be fitted with after coolers, oil filters, adsorption dryers and dust filters.

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: Shell Cassida Fluid HF 32 or 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).

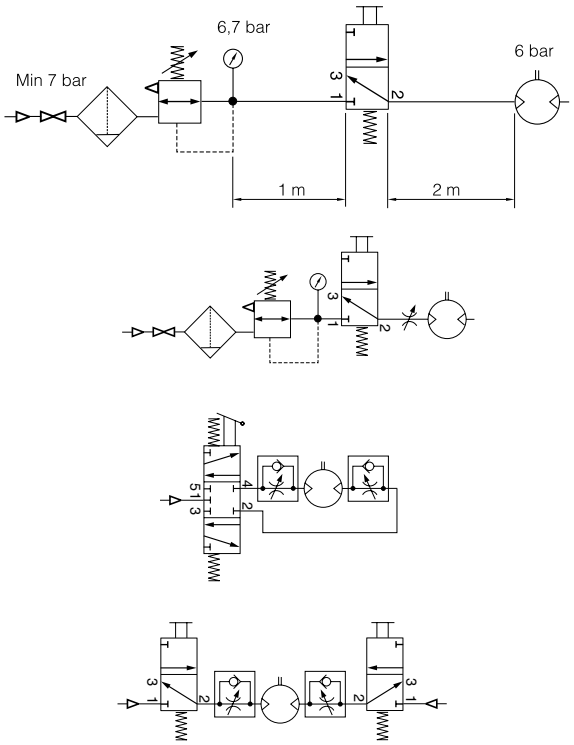
Air supply

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

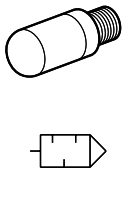
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



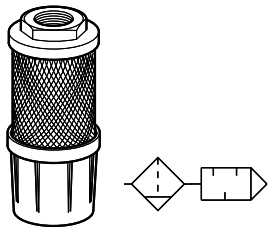
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is 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

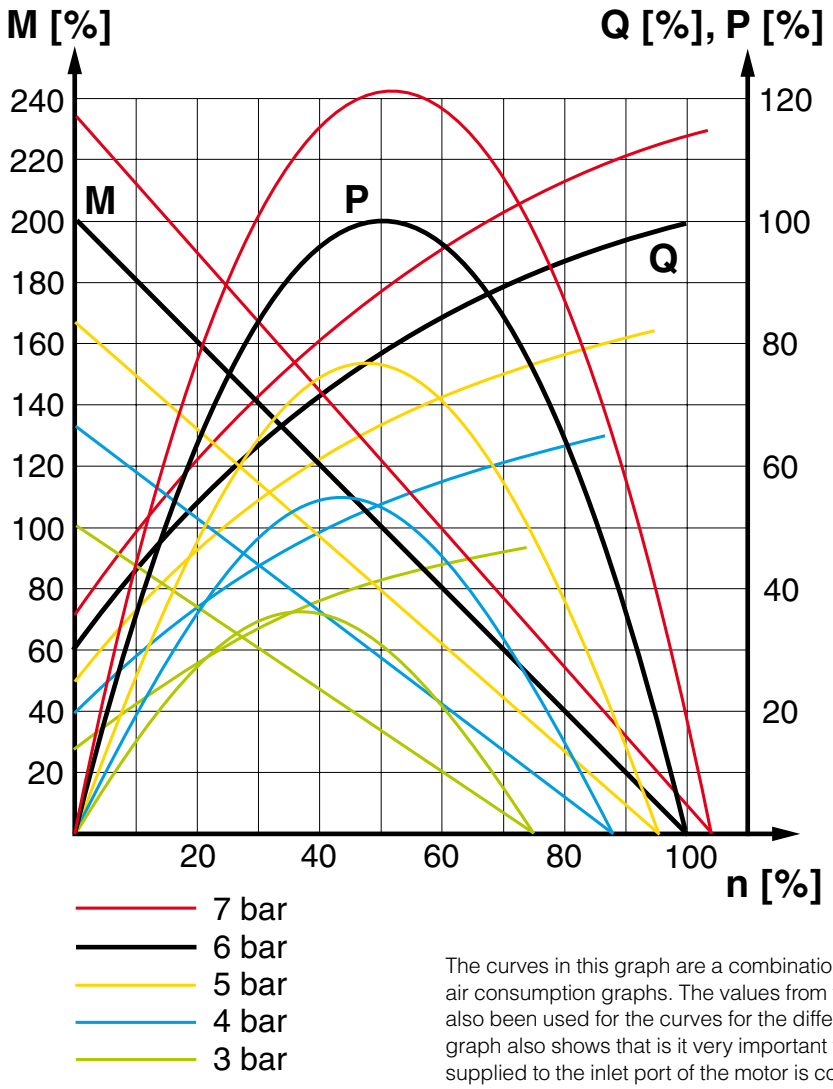
The air motors are supplied as “Components for installation” – the installer is responsible for ensuring that the motors are installed safely in the overall system. Parker Pneumatic guarantees that its products are safe, and as a supplier of pneumatic equipment we ensure that the equipment is designed 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
- ATEX Directive (ATEX = ATmosphere EXplosive)

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) mg/m^3
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				
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.

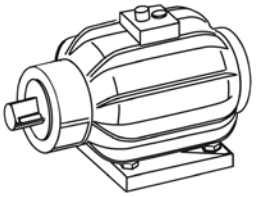
Nano Mist

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.

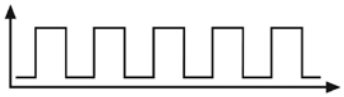
The P3X Lite lubricator concept sets new benchmarks here. For the first time, the oil volume is automatically adjusted to the flow rate. This ensures that there is neither too little nor too much oil in the system, which leads to clear economic and ecological advantages. In addition, with conventional 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.

P1V-M - Robust Air Motors

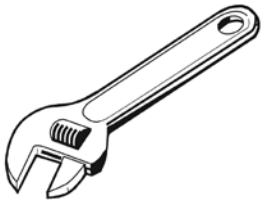


Air motors have much smaller installation dimensions than corresponding electric motors.

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

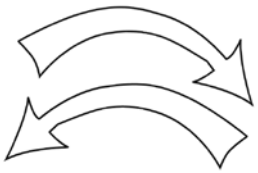


Air motors can be stopped and started continually without damage.

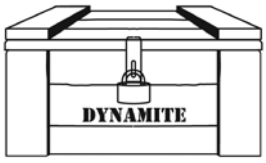


The simple design principle of air motors makes them very easy to service.

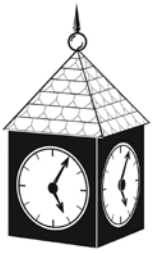
The weight of an air motor is several times less than corresponding electric motors.



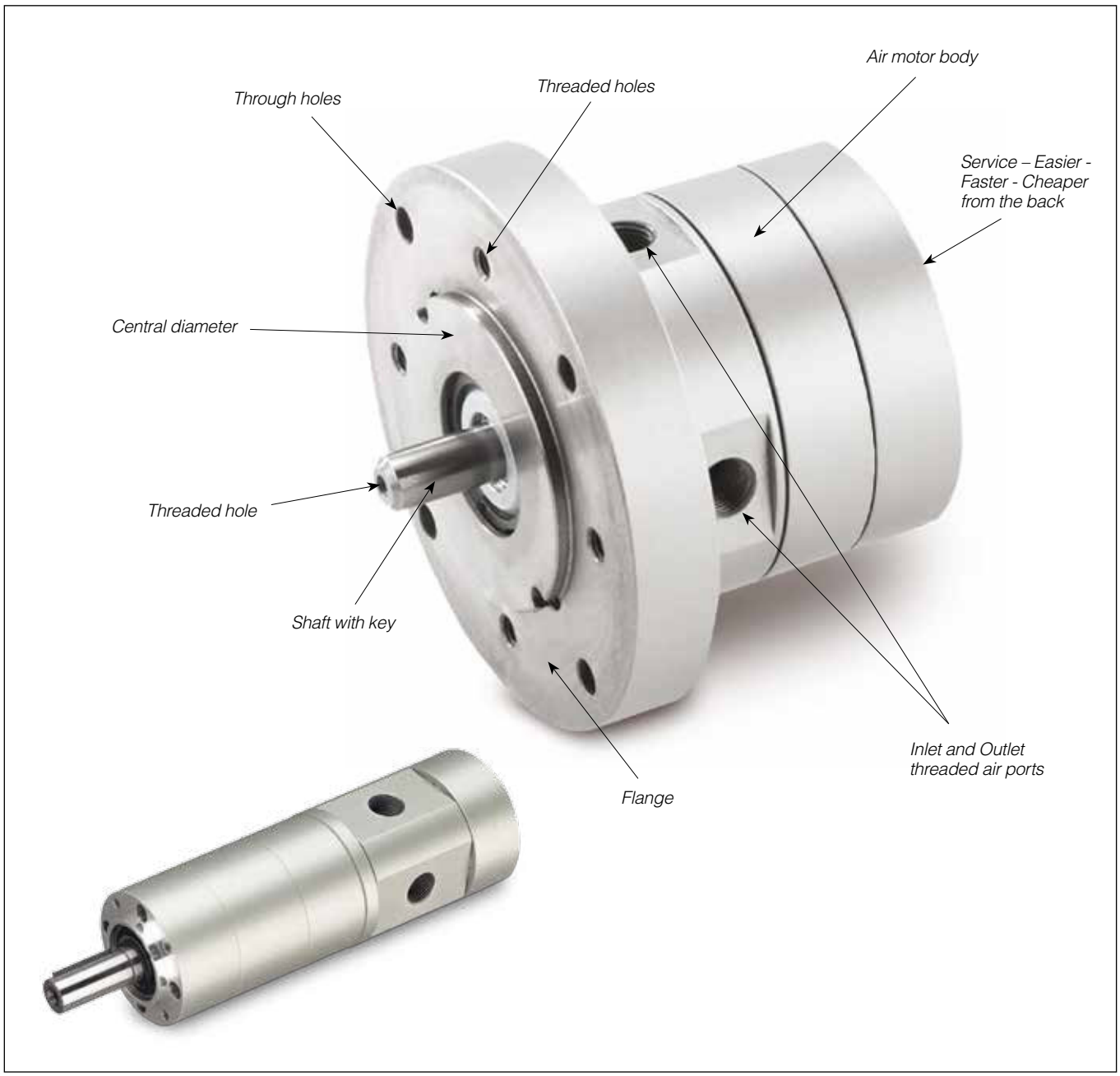
The motors are reversible as standard.



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.



Robust Air Motors

P1V-M is a series of air motors, with planetary gearbox and motor made of grey casted iron. Its robustness makes it suitable for all normal air motor applications.

The range contains three different sizes with power ratings of 200, 400, 600, 900 and 1200 Watts,

The motor and gearbox are built to be extremely strong, making the motors suitable for applications requiring considerable robustness. The gearbox is of the planetary type, permanently lubricated with grease. The flange mounting is cast as an integral part of the case, and give, together with the foot bracket, plenty of opportunity for simple and robust installation.

A new design principle has made service activities quicker and easier than for any comparable motor. Servicing involves loosening the screws holding the rear piece to the motor, removing the worn vanes from the back and inserting the new vanes.

Unlike traditional air motors, there is no need to fully open the P1V-M for servicing, making the process much easier.

Technical data

Note: All technical data are based on a working pressure of 6 bar and with oil.
For oil-free performances are -10 to 15% lower than data in charts.
Speed tolerance accuracy in between clock and anti-clockwise directions is ±10%.

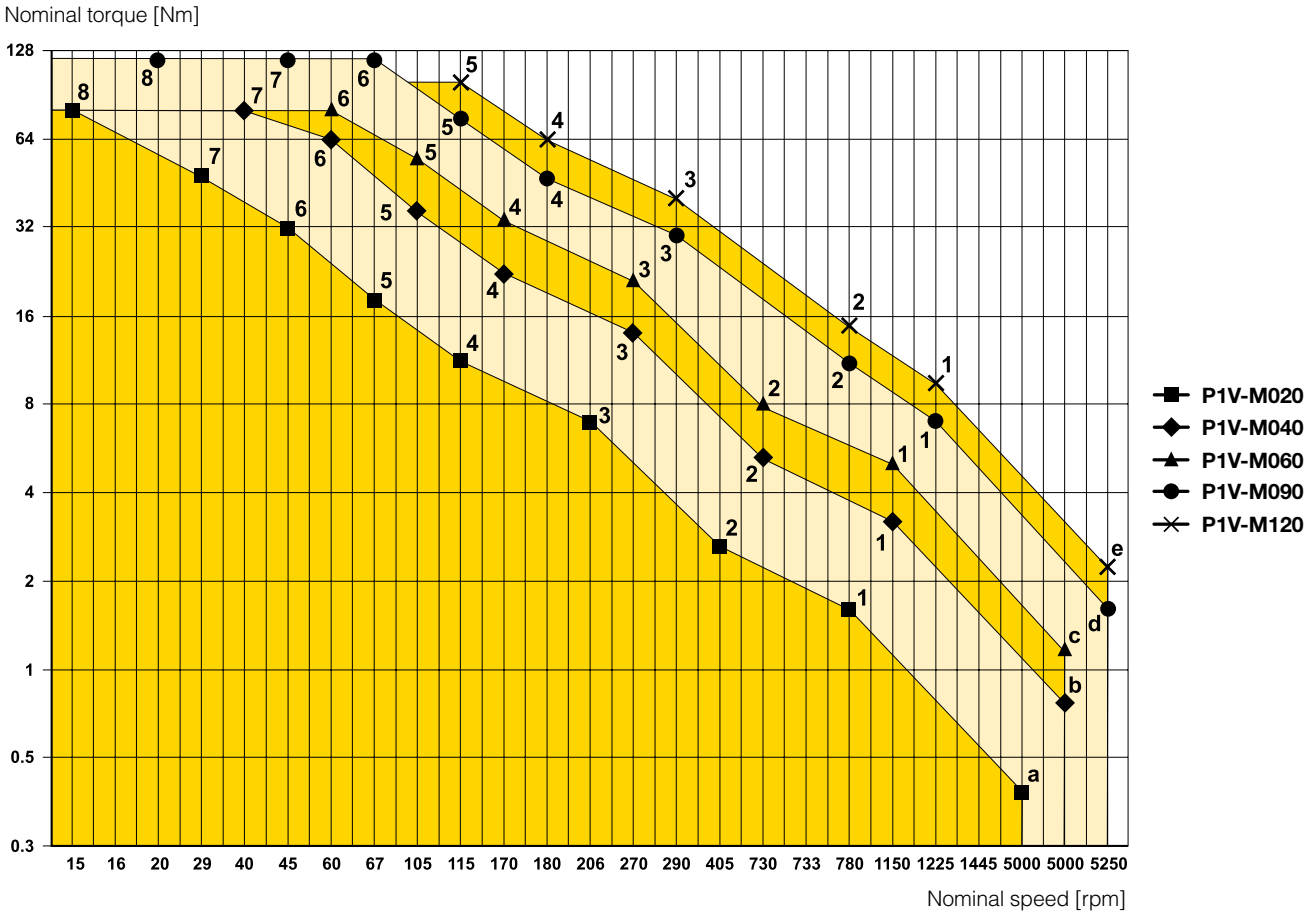
Air motor size & type	P1V-M020	P1V-M040	P1V-M060	P1V-M090	P1V-M120
Nominal power (watts)	200	400	600	900	1200
Working pressure (bar)	3 to 7, 6 in explosive atmosphere				
Working temperature (°C)	-20 to +110				
Ambient temperature (°C)	-20 to +40 in explosive atmosphere				
Air flow required (Nl/min)	300	600	900	2200	2600
Min pipe ID, inlet (mm)	10	12	13	13	13
Min pipe ID, outlet (mm)	10	12	13	13	13
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop					
	330	660	990	2500	2900
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop					
	360	720	1080	2800	3200
Medium	40µm filtered, oil mist or dry unlubricated compressed air				
Oil free operation, indoor	ISO8573-1 purity class 3.4.1				
Oil free operation, outdoor	ISO8573-1 purity class 1.2.1				
Oil operation	1-2 drop(s) 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))	107	107	107	120	120
With outlet silencer (dB(A))	97	98	99	81	81

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-M020	P1V-M040	P1V-M060	P1V-M090	P1V-M120
	Without gear box				
Motor housing	Cast iron, synthetic paint, grey color				
Shaft	Hardened steel				
Key	Hardened steel				
External seal	NBR				
Internal steel parts	High grade steel				
Motor lubrication	Bearings: grease				
Vanes	Patented, no data				
	With gear box				
Planetary gearbox	Steel / cast iron, synthetic paint, grey color				
Shaft	Hardened steel				
Key	Hardened steel				
External seal	NBR				
Internal steel parts	High grade steel				
Gearbox lubrication	Grease, Shell Cassida RLS2				

Choice of an air motor



The motor to be used should be selected by starting with the torque needed at a specific shaft 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 operating point 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 above graph to choose the correct motor size. The graph contains the points for the maximum torque of each motor at maximum output. Add your operating point to the graph, then select a marked point above and to the right of your point.

Then use the correct working diagram of the chosen motor to get more detailed technical data. Always select a motor whose requisite technical data are in the shaded area. Also use the correction diagram to find out what operation with different supply pressures would mean for the motor.

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

Air motors in diagram above

■ a	P1V-M020B0A00
◆ b	P1V-M040B0A00
▲ c	P1V-M060B0A00
● d	P1V-M090B0A00
X e	P1V-M120B0A00
■ 1	P1V-M020C0230
■ 2	P1V-M020C0146
■ 3	P1V-M020C0054
■ 4	P1V-M020C0034
■ 5	P1V-M020C0021
■ 6	P1V-M020C0012
■ 7	P1V-M020C0008
■ 8	P1V-M020C0003
◆ 1	P1V-M040C0230
◆ 2	P1V-M040C0146
◆ 3	P1V-M040C0054
◆ 4	P1V-M040C0034
◆ 5	P1V-M040C0021
◆ 6	P1V-M040C0012
◆ 7	P1V-M040C0008
▲ 1	P1V-M060C0230
▲ 2	P1V-M060C0146
▲ 3	P1V-M060C0054
▲ 4	P1V-M060C0034
▲ 5	P1V-M060C0021
▲ 6	P1V-M060C0012
● 1	P1V-M090C0245
● 2	P1V-M090C0156
● 3	P1V-M090C0058
● 4	P1V-M090C0036
● 5	P1V-M090C0023
● 6	P1V-M090C0013
● 7	P1V-M090C0009
● 8	P1V-M090C0004
X 1	P1V-M120C0245
X 2	P1V-M120C0156
X 3	P1V-M120C0058
X 4	P1V-M120C0036
X 5	P1V-M120C0023

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%

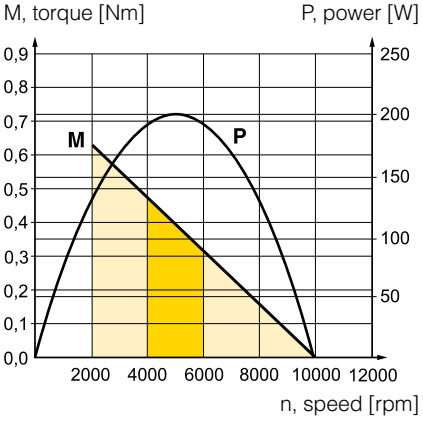
II 2 GD c IIC T4 (130°C)

Robust motor reversible with keyed shaft, flange

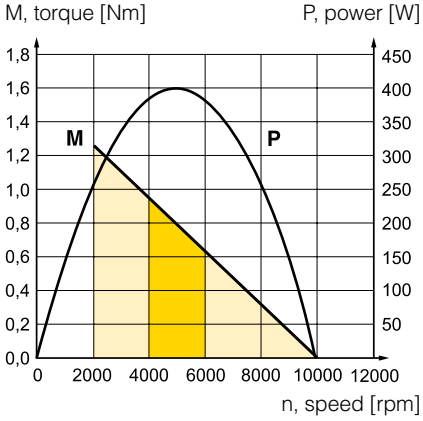
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,200	10 000	5 000	0,38	0,57	5	G1/8	10	1,00	**P1V-M020B0A00**
0,400	10 000	5 000	0,76	1,10	10	G3/8	12	1,40	**P1V-M040B0A00**
0,600	10 000	5 000	1,10	1,70	15	G3/8	13	1,60	**P1V-M060B0A00**
0,900	10 500	5 250	1,60	2,40	36,7	G1/2	13	3,10	**P1V-M090B0A00**
1,200	10 500	5 250	2,20	3,30	43,3	G1/2	13	3,80	**P1V-M120B0A00**

* maximum admissible speed (idling)

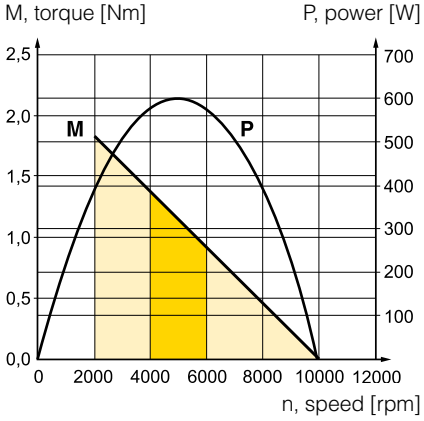
P1V-M020B0A00



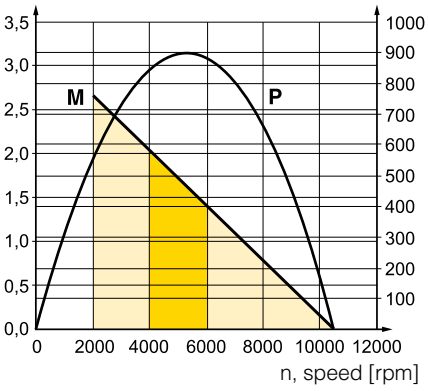
P1V-M040B0A00



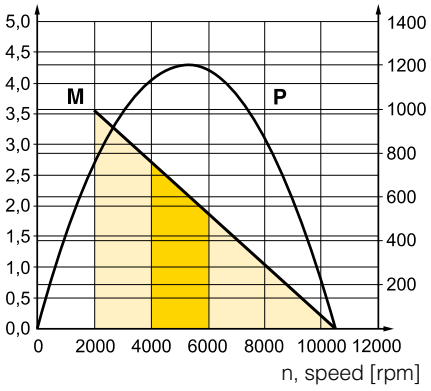
P1V-M060B0A00



P1V-M090B0A00



P1V-M120B0A00

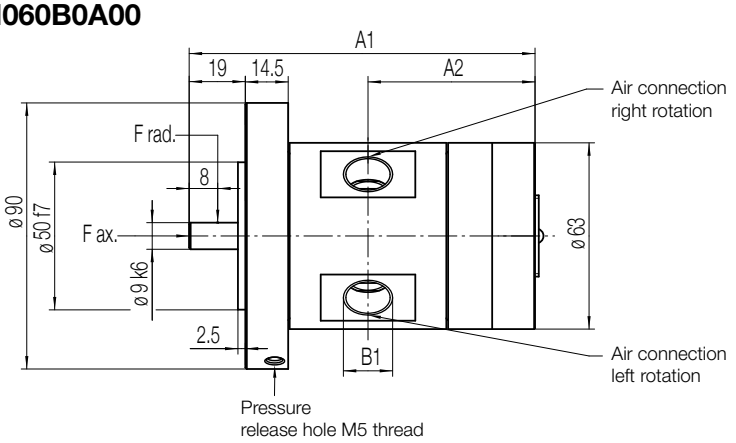


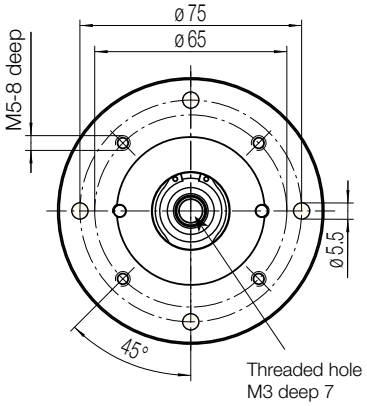
Possible working range of motor.

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

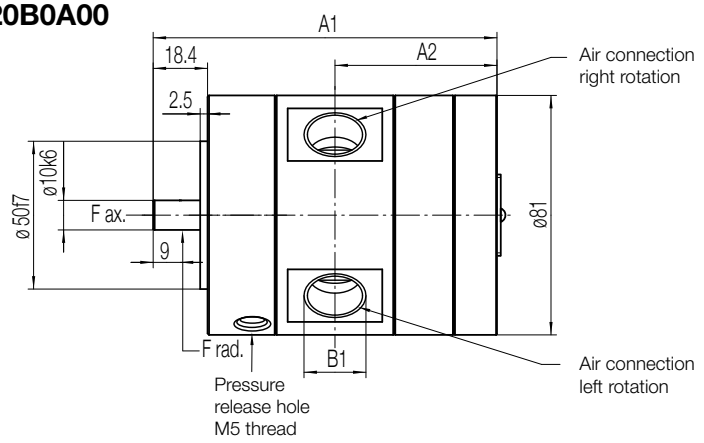
Dimensions (mm)

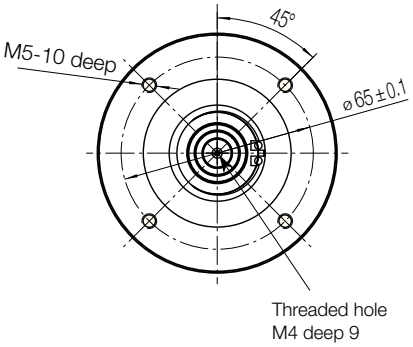
Motor P1V-M020B0A00
Motor P1V-M040B0A00
Motor P1V-M060B0A00



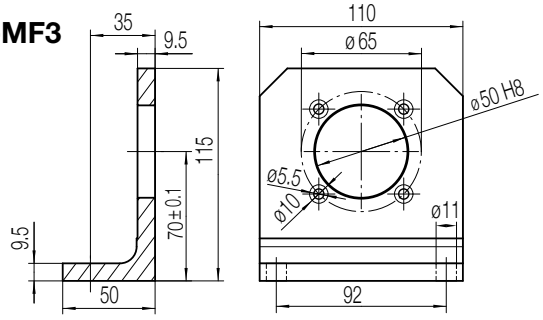


Motor P1V-M090B0A00
Motor P1V-M120B0A00





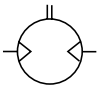
Foot bracket P1V-MF3



Motor type	Dimensions (mm)			
	A1	A2	B1	Key on shaft
P1V-M020B0A00	82	39	G1/8	DIN6885 A3x3x10
P1V-M040B0A00	102	49	G3/8	DIN6885 A3x3x10
P1V-M060B0A00	117	56.5	G3/8	DIN6885 A3x3x10
P1V-M090B0A00	116.3	54.8	G1/2	DIN6885 A3x3x18
P1V-M120B0A00	136.3	64.3	G1/2	DIN6885 A3x3x18

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%

II 2 GD c IIC T4 (130°C)



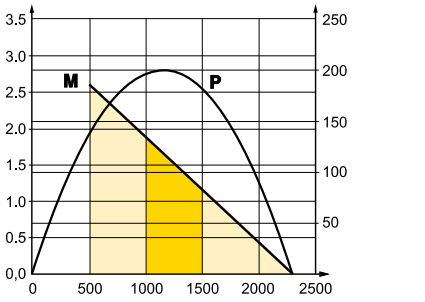
Robust reversible motor with keyed shaft, flange

Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,200	2 300	1 150	1,60	2,40	5	G1/8	10	2,40	**P1V-M020C0230**
0,200	1 460	730	2,60	3,90	5	G1/8	10	2,40	**P1V-M020C0146**
0,200	540	270	7,00	10,50	5	G1/8	10	2,80	**P1V-M020C0054**
0,200	340	170	11,20	16,80	5	G1/8	10	2,80	**P1V-M020C0034**
0,200	210	105	18,20	27,30	5	G1/8	10	2,80	**P1V-M020C0021**
0,200	120	60	31,80	47,70	5	G1/8	10	3,20	**P1V-M020C0012**
0,200	80	40	47,80	71,70	5	G1/8	10	3,20	**P1V-M020C0008**
0,200	32	16	80**	80**	5	G1/8	10	3,20	**P1V-M020C0003**

* maximum admissible speed (idling) / ** gear box restriction

P1V-M020C0230

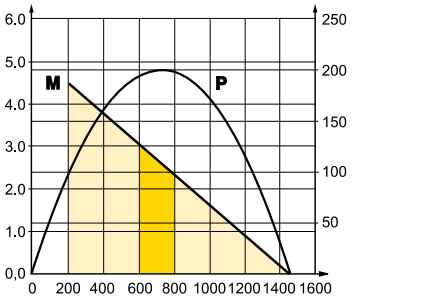
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0146

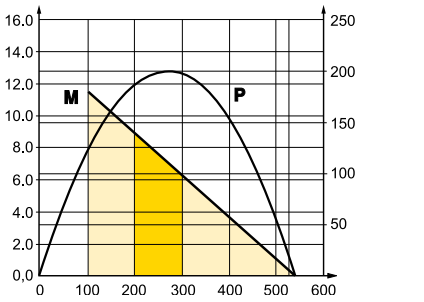
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0054

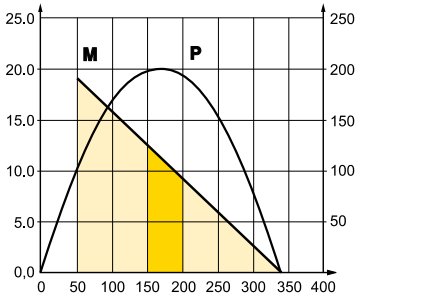
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0034

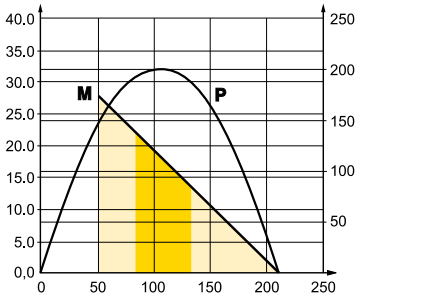
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0021

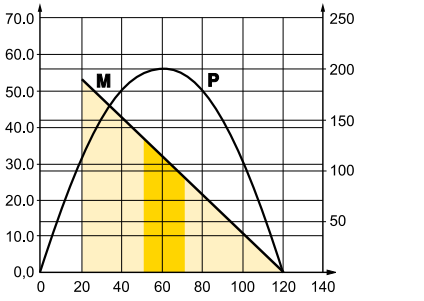
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0012

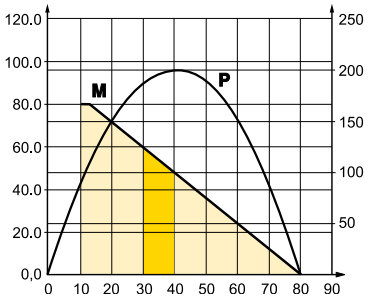
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0008

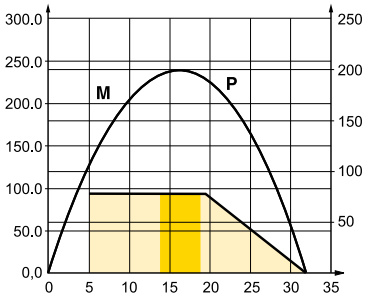
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M020C0003

M, torque [Nm] P, power [W]



n, speed [rpm]

Possible working range of motor.

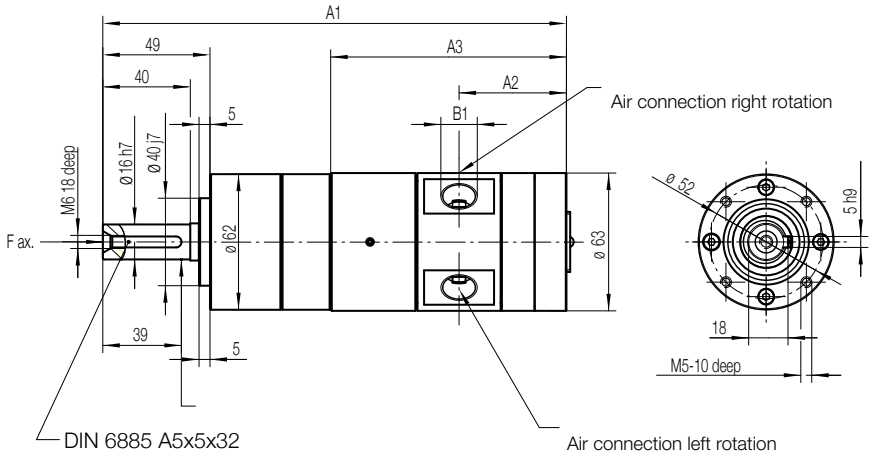
Optimum working range of motor.

Higher speeds = more vane wear

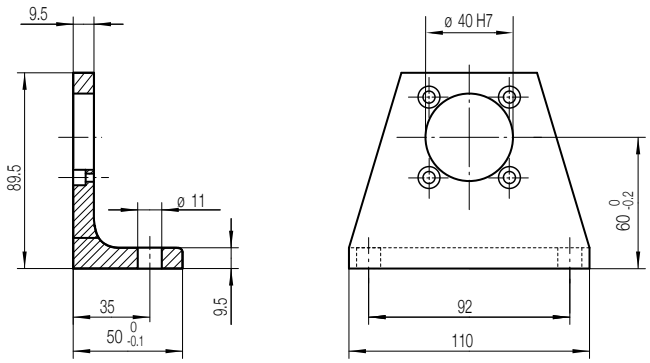
Lower speeds with high torque = more gearbox wear

Dimensions (mm)

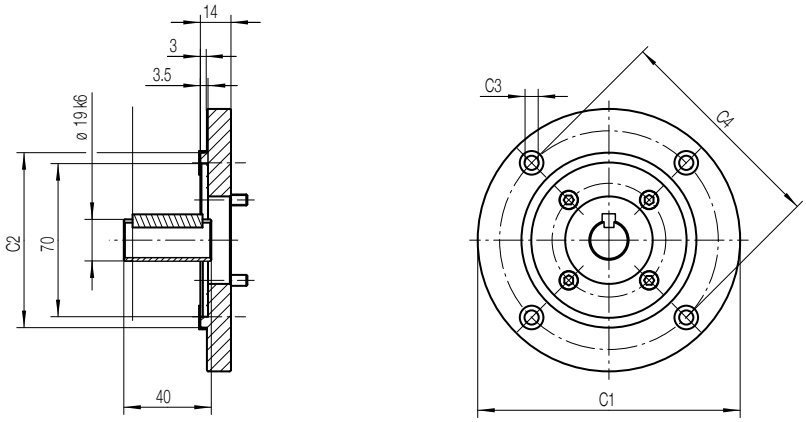
Motor P1V-M020C



Foot bracket P1V-MF4



Flanges P1V-MF8, P1V-MF9

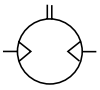


Motor size				Dimensions (mm)			
				A1	A2	A3	B1
200 watts	**P1V-M020C0230**	**P1V-M020C0034**		192.5	39	88	G1/8
	P1V-M020C0146	**P1V-M020C0021**	**P1V-M020C0008**	208.5	39	88	G1/8
	P1V-M020C0054	**P1V-M020C0012**	**P1V-M020C0003**	224	39	88	G1/8

Motor type		Dimensions (mm)			
		C1	C2	C3	C4
P1V-M020C	**(IEC80 B5) P1V-MF9**	200	130f7	11	165
	(IEC80 B14) P1V-MF8	120	80f7	M6	100

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%

II 2 GD c IIC T4 (130°C)



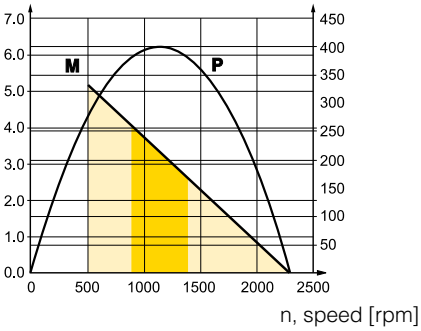
Robust reversible motor with keyed shaft, flange

Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,400	2 300	1 150	3,20	4,80	10	G3/8	12	2,80	**P1V-M040C0230**
0,400	1 460	730	5,20	7,80	10	G3/8	12	2,80	**P1V-M040C0146**
0,400	540	270	14,00	21,00	10	G3/8	12	3,20	**P1V-M040C0054**
0,400	340	170	22,40	33,60	10	G3/8	12	3,20	**P1V-M040C0034**
0,400	210	105	36,40	54,60	10	G3/8	12	3,20	**P1V-M040C0021**
0,400	120	60	63,60	80**	10	G3/8	12	3,60	**P1V-M040C0012**
0,400	80	40	80**	80**	10	G3/8	12	3,60	**P1V-M040C0008**

* maximum admissible speed (idling) / ** gear box restriction

P1V-M040C0230

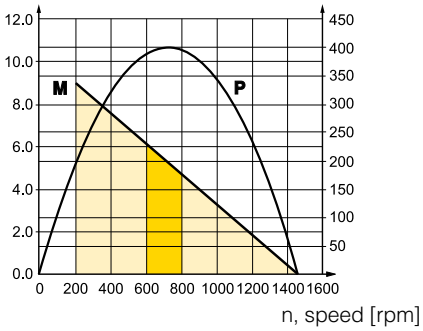
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0146

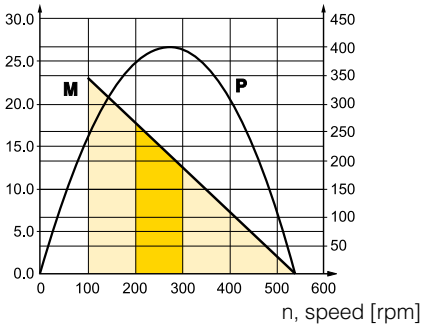
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0054

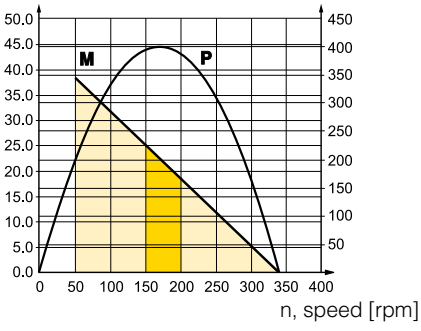
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0034

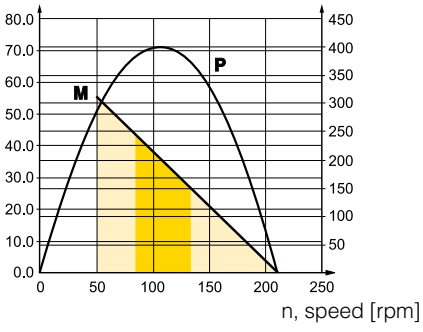
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0021

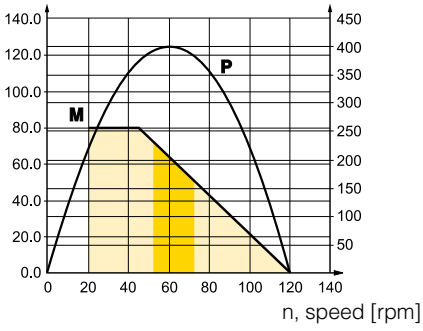
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0012

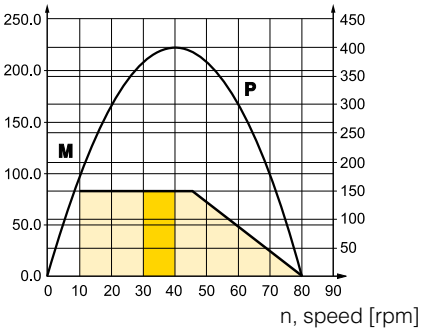
M, torque [Nm] P, power [W]



n, speed [rpm]

P1V-M040C0008

M, torque [Nm] P, power [W]



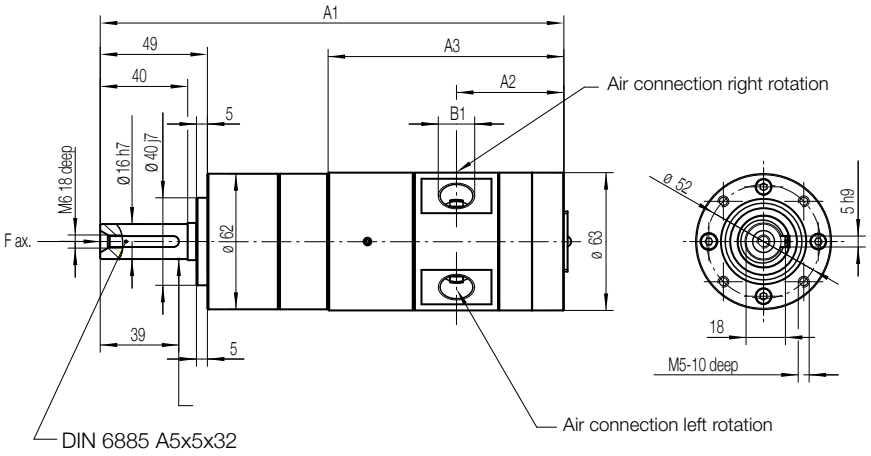
n, speed [rpm]

Possible working range of motor.

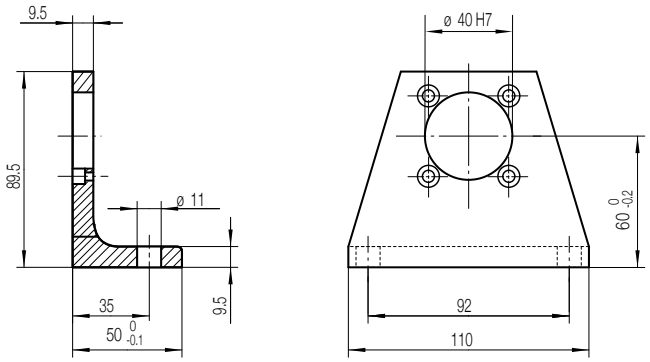
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Dimensions (mm)

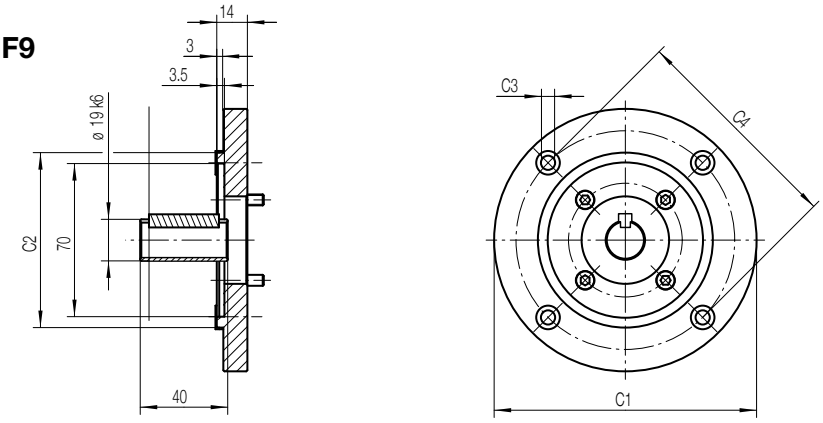
Motor P1V-M040C



Foot bracket
P1V-MF4



Flanges
P1V-MF8, P1V-MF9



Motor size				Dimensions (mm)			
				A1	A2	A3	B1
400 watts	**P1V-M040C0230**	**P1V-M040C0034**		212.5	49	108	G3/8
	P1V-M040C0146	**P1V-M040C0021**	**P1V-M040C0008**	228.5	49	108	G3/8
	P1V-M040C0054	**P1V-M040C0012**		244	49	108	G3/8

Motor type		Dimensions (mm)			
		C1	C2	C3	C4
P1V-M040C	**(IEC80 B5) P1V-MF9**	200	130f7	11	165
	(IEC80 B14) P1V-MF8	120	80f7	M6	100

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%

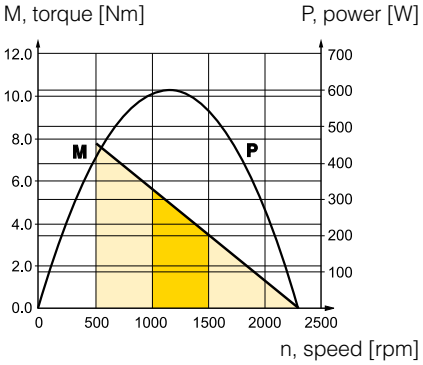
II 2 GD c IIC T4 (130°C)

Robust reversible motor with keyed shaft, flange

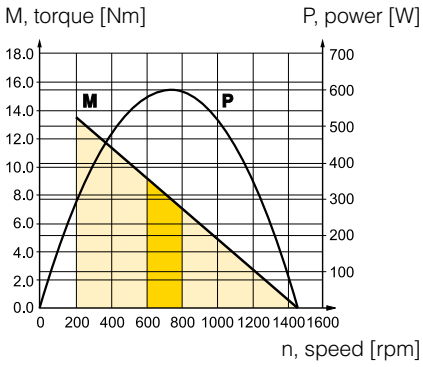
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,600	2 300	1 150	5,00	7,50	15	G3/8	13	3,00	**P1V-M060C0230**
0,600	1 460	730	7,80	11,70	15	G3/8	13	3,00	**P1V-M060C0146**
0,600	540	270	21,00	31,50	15	G3/8	13	3,40	**P1V-M060C0054**
0,600	340	170	33,60	50,40	15	G3/8	13	3,40	**P1V-M060C0034**
0,600	210	105	54,50	80**	15	G3/8	13	3,40	**P1V-M060C0021**
0,600	120	60	80**	80**	15	G3/8	13	3,80	**P1V-M060C0012**

* maximum admissible speed (idling) / ** gear box restriction

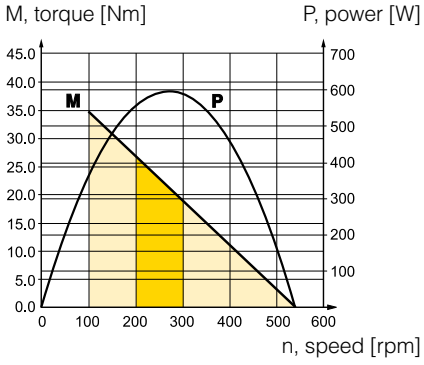
P1V-M060C0230



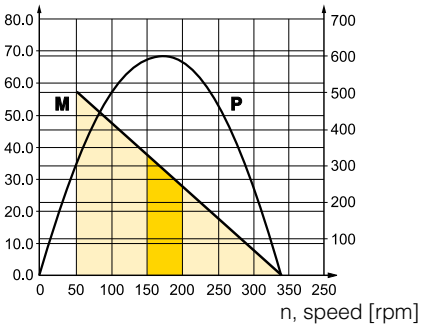
P1V-M060C0146



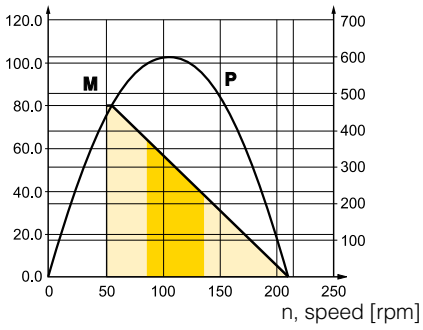
P1V-M060C0054



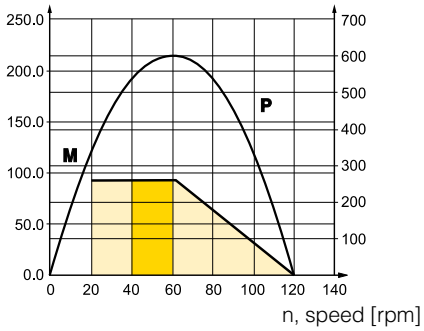
P1V-M060C0034



P1V-M060C0021



P1V-M060C0012

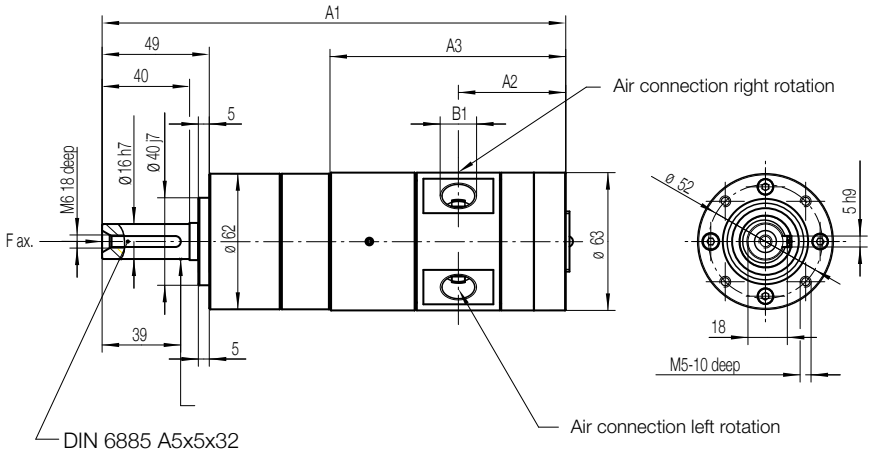


Possible working range of motor.

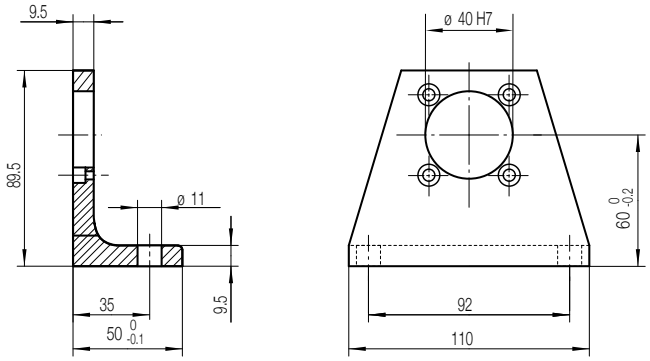
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Dimensions (mm)

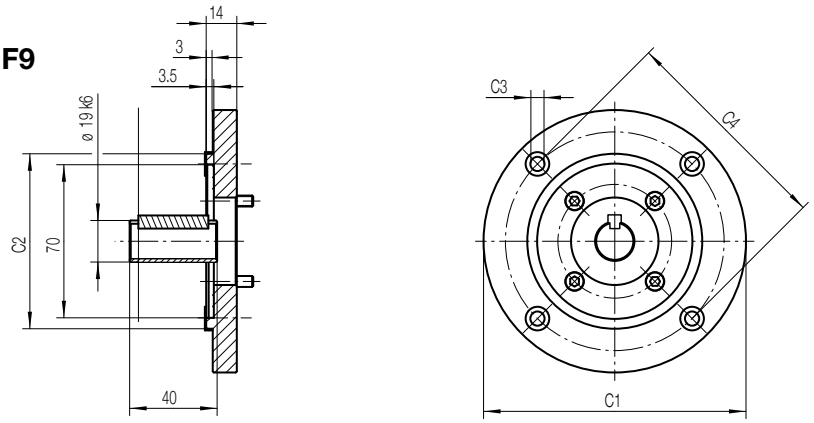
Motor P1V-M060C



Foot bracket
P1V-MF4



Flanges
P1V-MF8, P1V-MF9

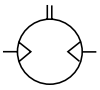


Motor size				Dimensions (mm)			
				A1	A2	A3	B1
600 watts	**P1V-M060C0230**	**P1V-M060C0034**		227.5	56.5	123	G3/8
	P1V-M060C0146	**P1V-M060C0021**	**P1V-M060C0012**	243.5	56.5	123	G3/8
	P1V-M060C0054			259	56.5	123	G3/8

Motor type		Dimensions (mm)			
		C1	C2	C3	C4
P1V-M060C	**(IEC80 B5) P1V-MF9**	200	130f7	11	165
	(IEC80 B14) P1V-MF8	120	80f7	M6	100

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%

II 2 GD c IIC T4 (130°C)



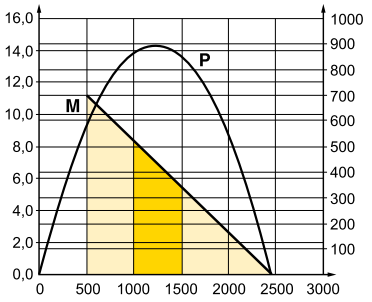
Robust motor reversible with keyed shaft, flange

Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,900	2 450	1 225	7,00	10,50	36,7	G1/2	13	4,90	**P1V-M090C0245**
0,900	1 560	780	11,00	16,50	36,7	G1/2	13	4,90	**P1V-M090C0156**
0,900	580	290	30,00	45,00	36,7	G1/2	13	5,60	**P1V-M090C0058**
0,900	360	180	47,00	71,00	36,7	G1/2	13	5,60	**P1V-M090C0036**
0,900	230	115	75,00	112,00	36,7	G1/2	13	5,60	**P1V-M090C0023**
0,900	134	67	120**	120**	36,7	G1/2	13	6,30	**P1V-M090C0013**
0,900	90	45	120**	120**	36,7	G1/2	13	6,30	**P1V-M090C0009**
0,900	40	20	120**	120**	36,7	G1/2	13	6,30	**P1V-M090C0004**

* maximum admissible speed (idling) / ** gear box restriction

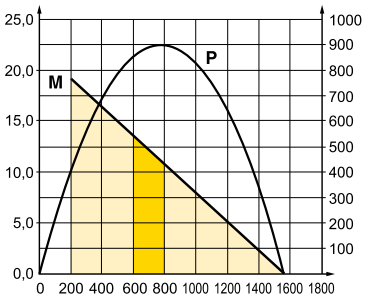
P1V-M090C0245

M, torque [Nm] P, power [W]



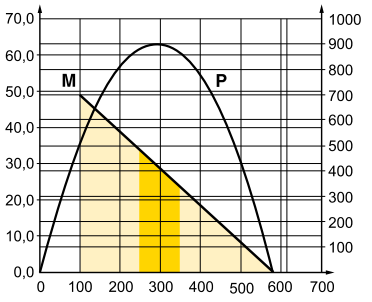
P1V-M090C0156

M, torque [Nm] P, power [W]



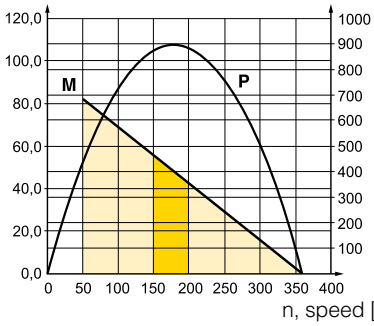
P1V-M090C0058

M, torque [Nm] P, power [W]



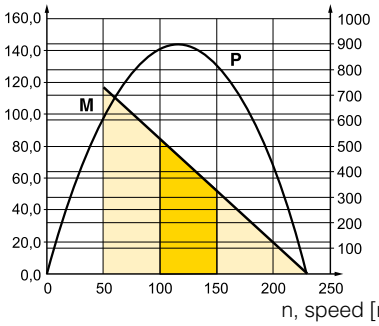
P1V-M090C0036

M, torque [Nm] P, power [W]



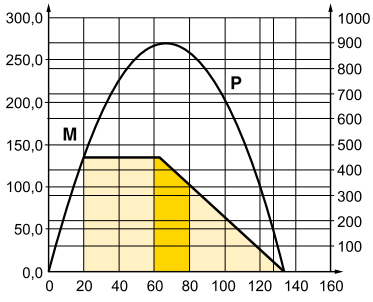
P1V-M090C0023

M, torque [Nm] P, power [W]



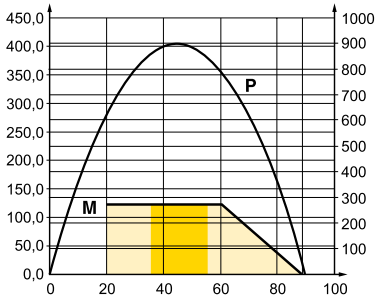
P1V-M090C0013

M, torque [Nm] P, power [W]



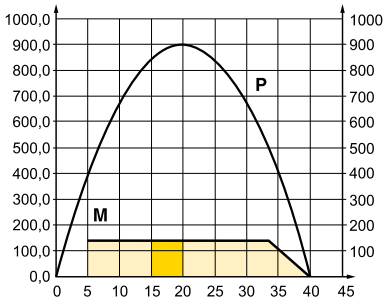
P1V-M090C0009

M, torque [Nm] P, power [W]



P1V-M090C0004

M, torque [Nm] P, power [W]



Possible working range of motor.

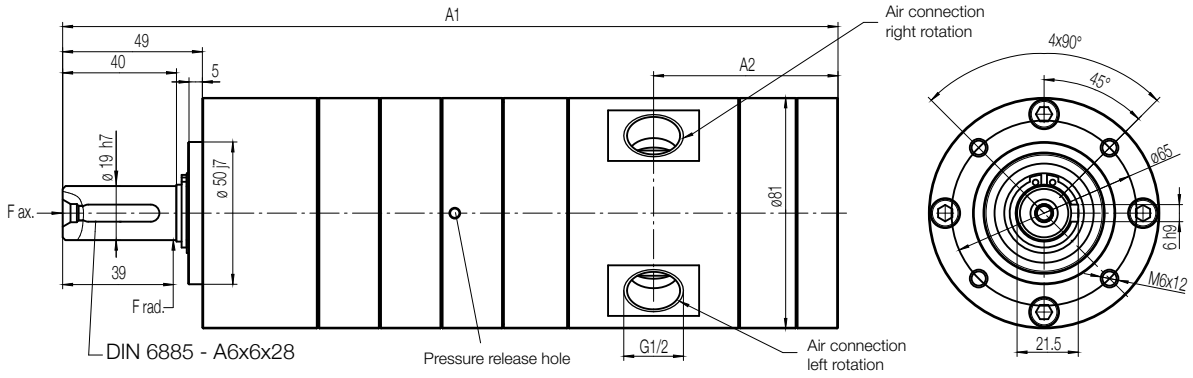
Optimum working range of motor.

Higher speeds = more vane wear

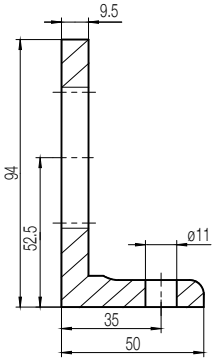
Lower speeds with high torque = more gearbox wear

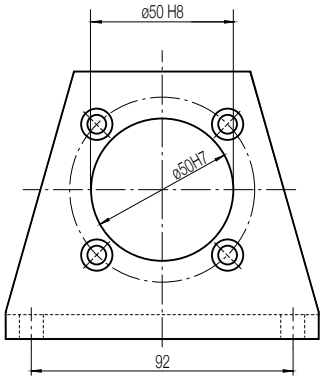
Dimensions (mm)

Motor P1V-M090C

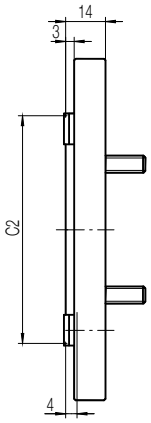


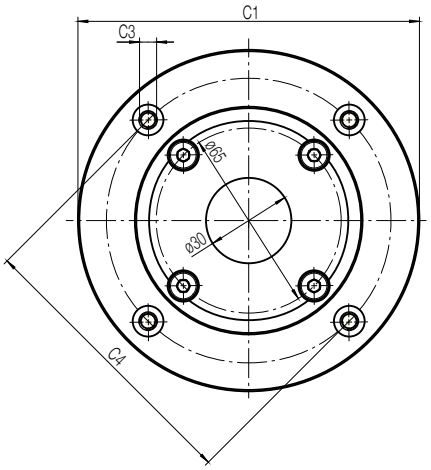
Foot bracket P1V-MF5





Flanges P1V-MF6, P1V-MF7





Motor size				Dimensions (mm)	
				A1	A2
900 watts	**P1V-M090C0245**	**P1V-M090C0156**		209	55
	P1V-M090C0058	**P1V-M090C0036**	**P1V-M090C0023**	231	55
	P1V-M090C0013	**P1V-M090C0009**	**P1V-M090C0004**	252.5	55

Motor type		Dimensions (mm)			
		C1	C2	C3	C4
P1V-M090C	**(IEC80 B5) P1V-MF7**	200	130f7	11	165
	(IEC80 B14) P1V-MF6	120	80f7	M6	100

NOTE! **All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Speed tolerance accuracy -+10%**

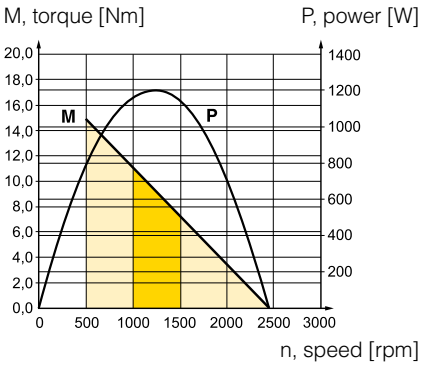
II 2 GD c IIC T4 (130°C)

Robust motor reversible with keyed shaft, flange

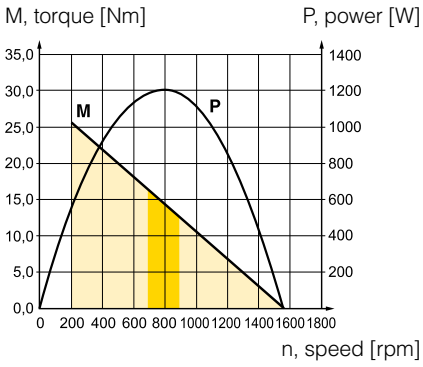
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
1,20	2 450	1 225	9,40	14,00	43,3	G1/2	13	5,60	**P1V-M120C0245**
1,20	1 560	780	14,70	22,00	43,3	G1/2	13	5,60	**P1V-M120C0156**
1,20	580	290	40,00	60,00	43,3	G1/2	13	6,30	**P1V-M120C0058**
1,20	360	180	63,00	94,00	43,3	G1/2	13	6,30	**P1V-M120C0036**
1,20	230	115	100,00	120**	43,3	G1/2	13	6,30	**P1V-M120C0023**

* maximum admissible speed (idling) / ** gear box restriction

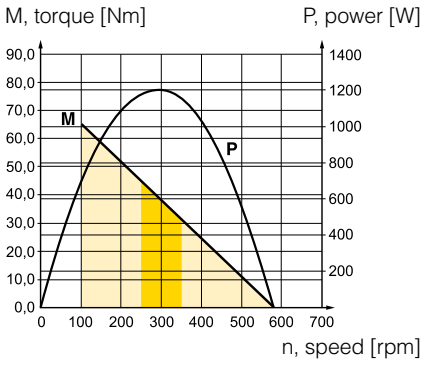
P1V-M120C0245



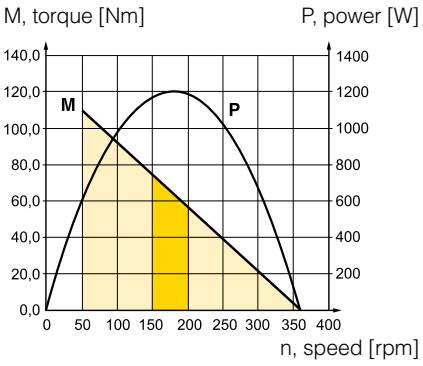
P1V-M120C0156



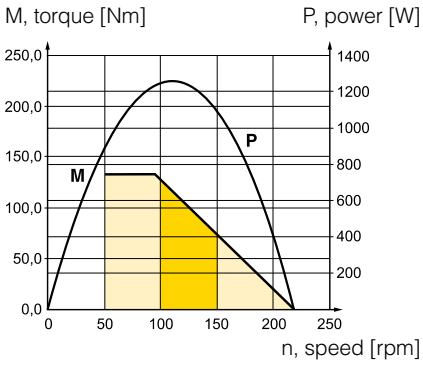
P1V-M120C0058



P1V-M120C0036



P1V-M120C0023

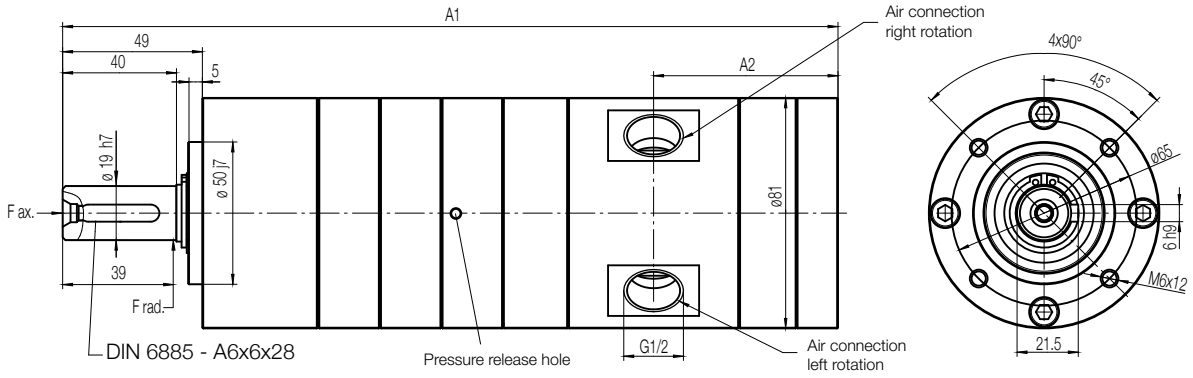


Possible working range of motor.

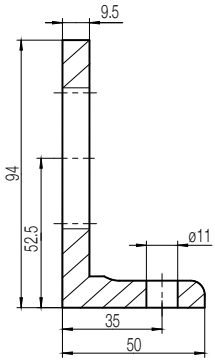
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

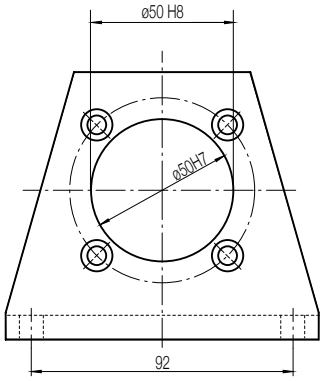
Dimensions (mm)

Motor P1V-M120C

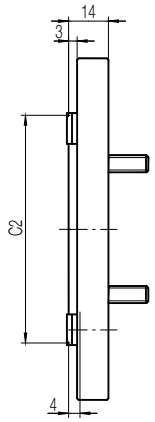


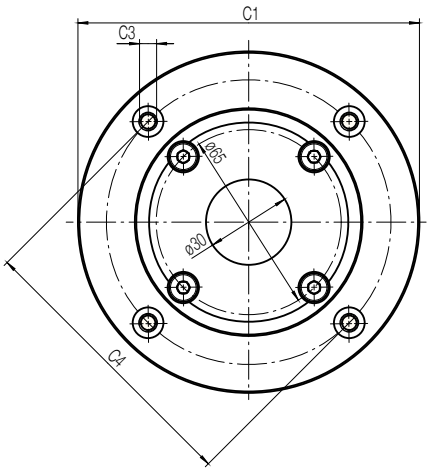
Foot bracket P1V-MF5





Flanges P1V-MF6, P1V-MF7





Motor size				Dimensions (mm)	
				A1	A2
1200 watts	**P1V-M120C0245**	**P1V-M120C0156**		229	65
	P1V-M120C0058	**P1V-M120C0036**	**P1V-M120C0023**	251	65

Motor type		Dimensions (mm)			
		C1	C2	C3	C4
P1V-M120C	**(IEC80 B5) P1V-MF7**	200	130f7	11	165
	(IEC80 B14) P1V-MF6	120	80f7	M6	100

Permissible forces air motors with gear boxes

Max. permitted load on output shaft for basic motors (based on 10,000 rpm at input shaft with 90 % probable service life for ball bearings).

a (mm)	Radial force (N)	Axial force (N)
Motors P1V-M020C0230, P1V-M020C0146		
39	240	50
Motors P1V-M020C0054, P1V-M020C0034, P1V-M020C0021		
39	360	70
Motors P1V-M020C0012, P1V-M020C0008,P1V-M020C0003		
39	520	120

Motors P1V-M040C0230, P1V-M040C0146		
39	240	50
Motors P1V-M040C0054, P1V-M040C0034, P1V-M040C0021		
39	360	70
Motors P1V-M040C0012, P1V-M040C0008		
39	520	120

Motors P1V-M060C0230, P1V-M060C0146		
39	240	50
Motors P1V-M060C0054, P1V-M060C0034, P1V-M060C0021		
39	360	70
Motors P1V-M060C0012		
39	520	120

Motors P1V-M090C0245, P1V-M090C0156		
39	400	80
Motors P1V-M090C0058, P1V-M090C0036, P1V-M090C0023		
39	600	120
Motors P1V-M090C0013, P1V-M090C0009, P1V-M090C0004		
39	1000	200

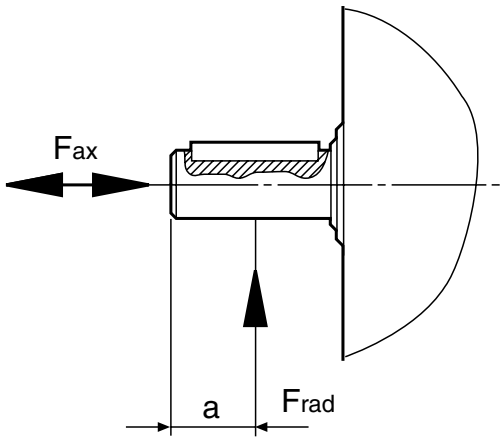
Motors P1V-M120C0245, P1V-M120C0156		
39	400	80
Motors P1V-M120C0058, P1V-M120C0036, P1V-M120C0023		
39	600	120

Permissible forces air motors without gear boxes

	a (mm)	Radial force (N)	Axial force (N)
P1V-M020B	8	145	0
P1V-M040B	8	145	0
P1V-M060B	8	145	0
P1V-M090B	9	145	0
P1V-M120B	9	145	0

Frad = Radial loading (N)

Fax = Axial loading (N)



Loads on output shaft for basic motor with shaft with key slot.

Order key

P1V-M **020** **B** **0** **A00**

	Motor size
020	200 W
040	400 W
060	600 W
090	900 W
120	1200 W

	Function
B	Basic motor without gearbox, keyed shaft
C	With planetary gear, keyed shaft

	Optional function
0	Standard vanes
Z	Spring loaded vanes

	Air motor range
P1V-M	Robust Air Motor

Free speed	10500	10000	2450	2300	1560	1460	730	580	540	360	340	230	210	134	120	90	80	40	32
per min	**A00**	**A00**	**245**	**230**	**156**	**146**	**073**	**041**	**054**	**036**	**034**	**023**	**021**	**013**	**012**	**009**	**008**	**004**	**003**
M020		X		X		X	X		X		X		X		X		X		X
M040		X		X		X	X		X		X		X		X		X		
M060		X		X		X	X		X		X		X		X				
M090	X		X		X			X		X		X		X		X		X	
M120	X		X		X			X		X		X							

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 except for optional function.

Service – Easier - Faster - Cheaper

Replacing vanes - step by step.

Step 1.
Remove the rear piece.

Step 2.
Remove the inspection plug.

Step 3.
Use a screwdriver to rotate the motor until you can see a vane in the centre of the inspection hole.

Step 4.
Remove the old vane and replace it with a new one.

Repeat steps 3 and 4 until all the vanes have been replaced.

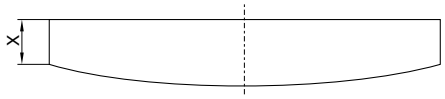
Step 5.
Replace the inspection plug.

Step 6.
Replace the rear piece.

Replacing vanes with motor still fitted to the machine
The P1V-M motor has been developed to allow the vanes to be replaced without the need to remove the motor from the machine. This makes vane replacement easier, quicker and cheaper, while minimising stoppages.

Lubrication and service life

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 and the minimum dimensions of worn vanes.



Air motors	Dimensions on new vanes X [mm]	Minimum dimensions on vane X [mm]
P1V-M020	8,5	6,5
P1V-M040	7,0	5,0
P1V-M060	8,0	6,0
P1V-M090	X	X
P1V-M120	X	X

Spare parts

For motor with Z optional function, please consult factory

	Spare parts Order Code	
Motor	**Air Motor (1)**	**Gear Box (2)**
P1V-M020C0230	**P1V-M/202193A**	**P1V-M/202202B**
P1V-M020C0146	**P1V-M/202193A**	**P1V-M/202202D**
P1V-M020C0054	**P1V-M/202193A**	**P1V-M/202202G**
P1V-M020C0034	**P1V-M/202193B**	**P1V-M/202202C**
P1V-M020C0021	**P1V-M/202193B**	**P1V-M/202202E**
P1V-M020C0012	**P1V-M/202193B**	**P1V-M/202202F**
P1V-M020C0008	**P1V-M/202193B**	**P1V-M/202202H**
P1V-M020C0003	**P1V-M/202193B**	**P1V-M/202202I**
Motor	**Air Motor (1)**	**Gear Box (2)**
P1V-M040C0230	**P1V-M/202194A**	**P1V-M/202202B**
P1V-M040C0146	**P1V-M/202194A**	**P1V-M/202202D**
P1V-M040C0054	**P1V-M/202194A**	**P1V-M/202202G**
P1V-M040C0034	**P1V-M/202194B**	**P1V-M/202202C**
P1V-M040C0021	**P1V-M/202194B**	**P1V-M/202202E**
P1V-M040C0012	**P1V-M/202194B**	**P1V-M/202202F**
P1V-M040C0008	**P1V-M/202194B**	**P1V-M/202202H**
Motor	**Air Motor (1)**	**Gear Box (2)**
P1V-M060C0230	**P1V-M/202179A**	**P1V-M/202202B**
P1V-M060C0146	**P1V-M/202179A**	**P1V-M/202202D**
P1V-M060C0054	**P1V-M/202179A**	**P1V-M/202202G**
P1V-M060C0034	**P1V-M/202179B**	**P1V-M/202202C**
P1V-M060C0021	**P1V-M/202179B**	**P1V-M/202202E**
P1V-M060C0012	**P1V-M/202179B**	**P1V-M/202202F**
Motor	**Air Motor (1)**	**Gear Box (2)**
P1V-M090C0245	**P1V-M/202409A**	**P1V-M/807015B**
P1V-M090C0156	**P1V-M/202409B**	**P1V-M/807015C**
P1V-M090C0058	**P1V-M/202409A**	**P1V-M/807015D**
P1V-M090C0036	**P1V-M/202409B**	**P1V-M/807015E**
P1V-M090C0023	**P1V-M/202409B**	**P1V-M/807015F**
P1V-M090C0013	**P1V-M/202409A**	**P1V-M/807015G**
P1V-M090C0009	**P1V-M/202409B**	**P1V-M/807015H**
P1V-M090C0004	**P1V-M/202409B**	**P1V-M/807015I**
Motor	**Air Motor (1)**	**Gear Box (2)**
P1V-M120C0245	**P1V-M/202457A**	**P1V-M/807015B**
P1V-M120C0156	**P1V-M/202457B**	**P1V-M/807015C**
P1V-M120C0058	**P1V-M/202457A**	**P1V-M/807015D**
P1V-M120C0036	**P1V-M/202457B**	**P1V-M/807015E**
P1V-M120C0023	**P1V-M/202457B**	**P1V-M/807015F**

Service kits

The following kits are available for the basic motors, consisting of vanes.

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

For motors	Order code
P1V-M020	**P1V-6/831297A**
P1V-M040	**P1V-6/831298A**
P1V-M060	**P1V-6/831299A**
P1V-M090	**P1V-6/831300A**
P1V-M120	**P1V-6/831301A**

The following kits are available for the basic motors, consisting of vanes and springs.

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

For motors	Order code
P1V-M020	**Consult Factory**
P1V-M040	**Consult Factory**
P1V-M060	**Consult Factory**
P1V-M090	**Consult Factory**
P1V-M120	**Consult Factory**

* The following normal service intervals should be applied to in order to guarantee problem-free operation in air motors working at load speeds. The specified hours of operation apply when the motor is running at the speed corresponding to maximum power (load speed). This is approximately half free speed. If the motor operates at higher speeds, the service interval is shorter. If the motor operates at lower speeds, the service interval is longer.

Introduction to the ATEX directive

Explosive atmospheres

Directive 94/9/EC defines an explosive atmosphere as a mixture of:

a) **flammable substances** – gases, vapours, mists or dusts
b) with **air**
c) under specific **atmospheric conditions**
d) in which, after ignition has occurred, combustion spreads to the entire flammable mixture

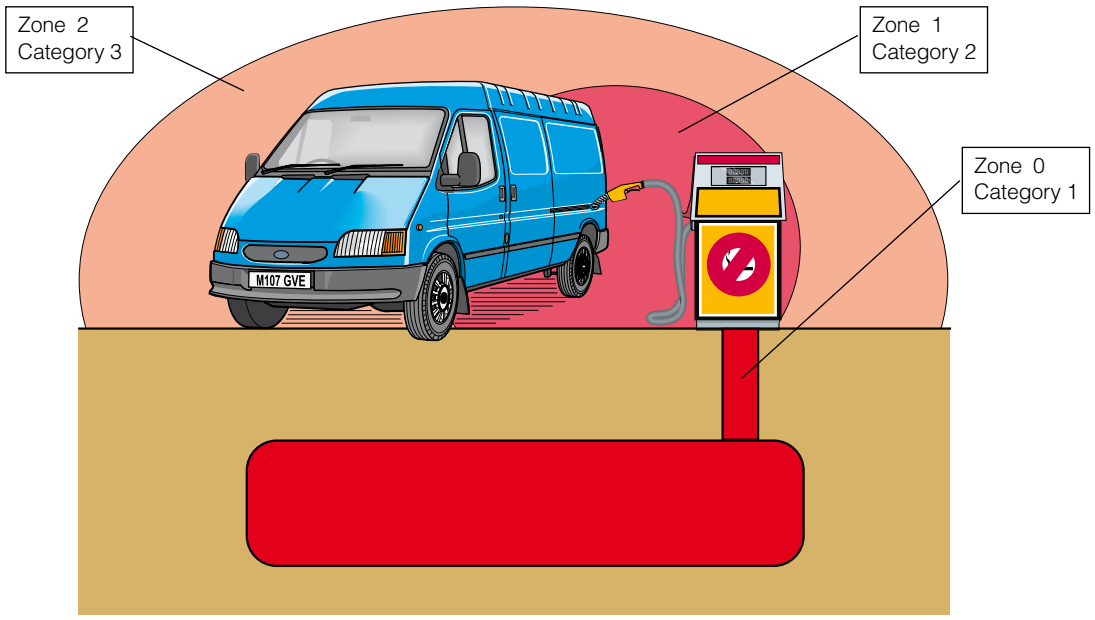
(NB: with regard to dust, it may be that not all dust is combusted after ignition has occurred)

An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a **potentially explosive atmosphere**. Products covered by directive 94/9/EC are defined as intended for use in potentially explosive atmospheres.

Harmonised European ATEX standard

The European Union has adopted two harmonised directives in the field of health and safety. The directives are known as ATEX 100a and ATEX 137.

Directive ATEX 100a (94/9/EC) lays down minimum safety requirements for products intended for use in potentially explosive atmospheres in European Union member states. Directive ATEX 137 (99/92/EC) defines minimum requirements for health and safety at the workplace, for working conditions and for the handling of products and materials in potentially explosive atmospheres. This directive also divides the workplace into **zones** and defines criteria by which products are **categorised** within these zones.
The table below describes the **zones** in an installation where there is a potential for explosive atmospheres. The **owner** of the installation must analyse and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into **zones**. This process of zoning then allows the correct plant and equipment to be selected for use in the area.
The ATEX directive has been in force throughout the European Union



Zones Gas G	Zones Dust D	Presence of potentially explosive atmosphere	Type of risk
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but, if it does occur, will persist for a short period only	Minimal

since 1 July 2003, replacing the existing divergent national and European legislation relating to explosive atmospheres.
Please note that for the first time, the directive covers mechanical, hydraulic and pneumatic equipment and not just electrical equipment as before.

With regard to the **Machinery directive** 98/37/EC, note that a number of external requirements in 94/9/EC refer to hazards arising from potentially explosive atmospheres, where the Machinery directive only contains general requirements relating to explosion safety (Annex I 1.5.7).
As a result, directive 94/9/EC (ATEX 100a) takes precedence over the Machinery directive with regard to explosion protection in potentially explosive atmospheres. The requirements in the Machinery directive are applicable to all other risks relating to machinery.

Levels of protection for the various equipment categories

The various equipment categories must be capable of operating in accordance with the manufacturer's operating specifications at defined levels of protection.

Level of protection	Category Group I	Category Group II	Type of protection	Operating specifications
Very high	M1		Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and and functional even with an explosive atmosphere present
Very high		1	Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and functional in zones 0, 1, 2 (G) and/or zones 20, 21, 22 (D)
High	M2		Protection suitable for normal operation and severe operating conditions	The equipment is de-energised in the event of an explosive atmosphere
High		2	Protection suitable for normal operation and frequent faults, or equipment in which faults normally have to be taken into account	The equipment remains energised and functional in zones 1, 2 (G) and/or zones 21, 22 (D)
Normal		3	Protection suitable for normal operation	The equipment remains energised and functional in zones 2 (G) and/or zones 22 (D)

Definition of groups (EN 1127-1)

Group I Equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by flammable vapours and/or flammable dusts.

Group II Equipment intended for use in other places exposed to explosive atmospheres.

Group	I mines, combustible vapours		II other potentially explosive atmospheres (gases, dust)					
Category	**M1**	**M2**	**1**		**2**		**3**	
Atmosphere*			G	D	G	D	G	D
Zone			0	20	1	21	2	22

G = gas and D = dust

Temperature classes

Classification of flammable gases and vapours on the basis of ignition temperature

Temperature class	Ignition temperature °C
T1	Over 450
T2	(300) – 450
T3	(200) – 300
T4	(135) – 200
T5	(100) – 135
T6	(85) - 100

Declaration of conformity

The product catalogues contain copies of the declaration of conformity demonstrating that the product meets the requirements of directive 94/9/EC.
The declaration is only valid in conjunction with the instructions contained in the installation manual relating to the safe use of the product throughout its service life.
The instructions relating to the conditions in the surrounding area are particularly important, as the certificate is invalidated if the instructions are found not to have been adhered to during operation of the product.
If there is any doubt as to the validity of the certificate of conformity, contact Parker Hannifin customer service.

Operation, installation and maintenance

The installation manual of the product contains instructions relating to the safe storage, handling, operation and servicing of the product.
The manual is available in different languages, and can be downloaded from **www.parker.com/euro_pneumatic**.
This document must be made accessible in a suitable place near where the product is installed. It is used as a reference for all personnel authorised to work with the product throughout its service life.
We, the manufacturer, reserve the right to modify, extend or improve the installation manual in the interests of the users.

For more information about ATEX see EUs homepage: **http://europa.eu.int/comm/enterprise/atex/**

Additional safety instructions for installation in explosive atmospheres

Serious, even fatal, damage or injury may be caused by the hot moving parts of the air motors in the presence of explosive gas mixtures and concentrations of dust.

All installation, connection, commissioning, servicing and repair work on air motors must be carried out by qualified personnel taking account of the following

- These instructions
- Notices on the motor
- All other planning documents, commissioning instructions and connection diagrams associated with the application.
- Provisions and requirements specific to the application
- Applicable national/international regulations (explosion protection, safety and accident prevention)

Real life applications

Air motors are designed to provide rotary movement in industrial applications, and should only be used in accordance with the instructions in the technical specifications in the catalogue, and within the operating range indicated on the motor housing. The motors meet the applicable standards and requirements of the Machinery Directive
94/9/EC (ATEX)

The motors must not be used as brakes in explosive atmospheres.
Braking involves driving the motor against the direction of rotation for which the motor is supplied with compressed air. The motor is then operating as a compressor, and there is a corresponding increase in temperature.

The motors must **not** be used underground in mines susceptible to firedamp and/or combustible dust. The motors are intended for use in areas in which explosive atmospheres caused by gases, vapours or mists of combustible liquids, or air/dust mixtures may be expected to occur during normal use (infrequently)

Checklist

Before using the motors in a potentially explosive atmosphere, you should check the following:

Do the motor specifications match the classification of the area of use in accordance with Directive 94/9/EG
(previously ATEX 100a)

- Equipment group
- Equipment category
- Zone
- Temperature class
- Max. surface temperature

1. When installing the motor, is it certain that there is no potentially explosive atmosphere, oil, acids, gases, vapours or radiation?
2. Is the ambient temperature as specified in the technical data in the catalogue at all times?
3. Is it certain that the air motor is adequately ventilated and that no additional heat is added (for example in the shaft connection)?
4. Are all the driven mechanical components ATEX certified?

Installation requirements in potentially explosive atmospheres

- The temperature of the supply air must not exceed the ambient temperature.
- The air motor may be installed in any position.
- An air treatment unit must be attached to the air inlet.
- In a potentially explosive atmosphere, none of the motor ports may be blocked because this may cause an increase in temperature. The air from the port must be taken to the silencer or, preferably, outside the potentially explosive area.
- The air motor must be connected to ground at all times, through its support, a metallic tube or separate conductor.
- The outlet of the air motor must not open within a potentially explosive area, but must be passed to the silencer or, preferably, removed and released outside the potentially explosive area.
- The air motor may only drive units that are ATEX certified.
- Ensure that the motor is not exposed to forces greater than those permitted in accordance with the catalogue.

Measuring the temperature on the outside of the air motor (only when used in potentially explosive areas)

During the commissioning process, it is essential to measure temperature increases at the indicated positions on the outside of the air motor.
These measurements can be taken using standard thermometers.

Checking the motor during operation

The motor must be kept clean on the outside, and a layer of dirt thicker than 5 mm must never be allowed to form.
Strong solvents should not be used for cleaning, because they can cause the seal (material NBR/FPM) around the drive shaft to swell, potentially increasing the temperature.

P1V-M Declaration of Conformity
According to ATEX 94/9/EC
P1V-M Declaration of Incorporation
According to EC Machinery Directive 2006/42/EC

We Parker Hannifin Manufacturing
Germany GmbH & Co. KG
Pneumatic Division Europe
Industriestrasse 8
70794 Filderstadt Germany

Declare that the following Air Motors have been assessed in accordance with ATEX 94/9/EC (Products for use in potentially explosive atmospheres). Air Motors here below from the P1V-M series are compatible for the use in explosive atmosphere **Ex II 2 GD c IIC T4 (130ºC) X.**
P/Ns are without gear boxes : P1V-M020B*xxx, P1V-M040B*xxx, P1V-M060B*xxx, P1V-M090B*xxx, P1V-M120B*xxx
And P/Ns with gear boxes are : P1V-M020C*xxx, P1V-M040C*xxx, P1V-M060C*xxx, P1V-M090C*xxx, P1V-M120C*xxx; * for internal vanes option 0 or Z, xxx for speed range
With *: for internal vanes option 0 or Z, xxx: for speed range

P1V-M is designed for utilization in applications falling under the scope of the ATEX 94/9/EC. These products are designed and manufactured in compliance with following elements:

- **EN 1127-1:2007** Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology
- **EN 13463-1:2009** Non electrical equipment for use in potentially explosive atmospheres – Part 1: Basic method and requirements
- **EN 13463-5** Non-electrical equipment intended for use in potentially explosive atmospheres – Part 5: Protection by constructional safety ´c´
- **EN 983+A1:2008** Safety of machinery – Safety requirements for fluid power systems and their components - Pneumatics

As manufacturer of the partly completed machine we declare that:

- The specified Air motors correspond to the listed essential requirements of the **EC Machinery Directive 2006/42/EC**
- The relevant technical documentation is complied in accordance with **part B of Annex VII**
- The relevant technical documentation in accordance with part B of Annex VII will be transmitted in response to a reasonable request by the national authorities

Product: Air motor P1V-M series

Directives	**Date**	**Applied and fulfilled essential requirements**
2006/42/EC	2006-06	1.1.2, 1.1.5, 1.3.4, 1.5.3, 1.7.3, 1.7.4
Standards	**Date**	**Remark**
DIN EN ISO 12100	2011-03	Partly fulfilled

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporates has been declared in conformity with the provisions of the Directive 2006/42/EG, were appropriated.

Sticker

Additional Information
This coverage could only be referred to as long as operations needed for final assembling and starting up of theses products comply with standards relating to the above mentioned directive. Each time this will be required for compliance purpose, the user will have to apply for a complete coverage of the final assembled system according to the above mentioned directive and relating standards

Filderstadt, Germany June 2014

Ing. Franck Roussillon
European Product Manager
Actuators Business Unit, Pneumatic Division Europe

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Catalogue PDE2539TCUK-Deprag - V2 - November 2014

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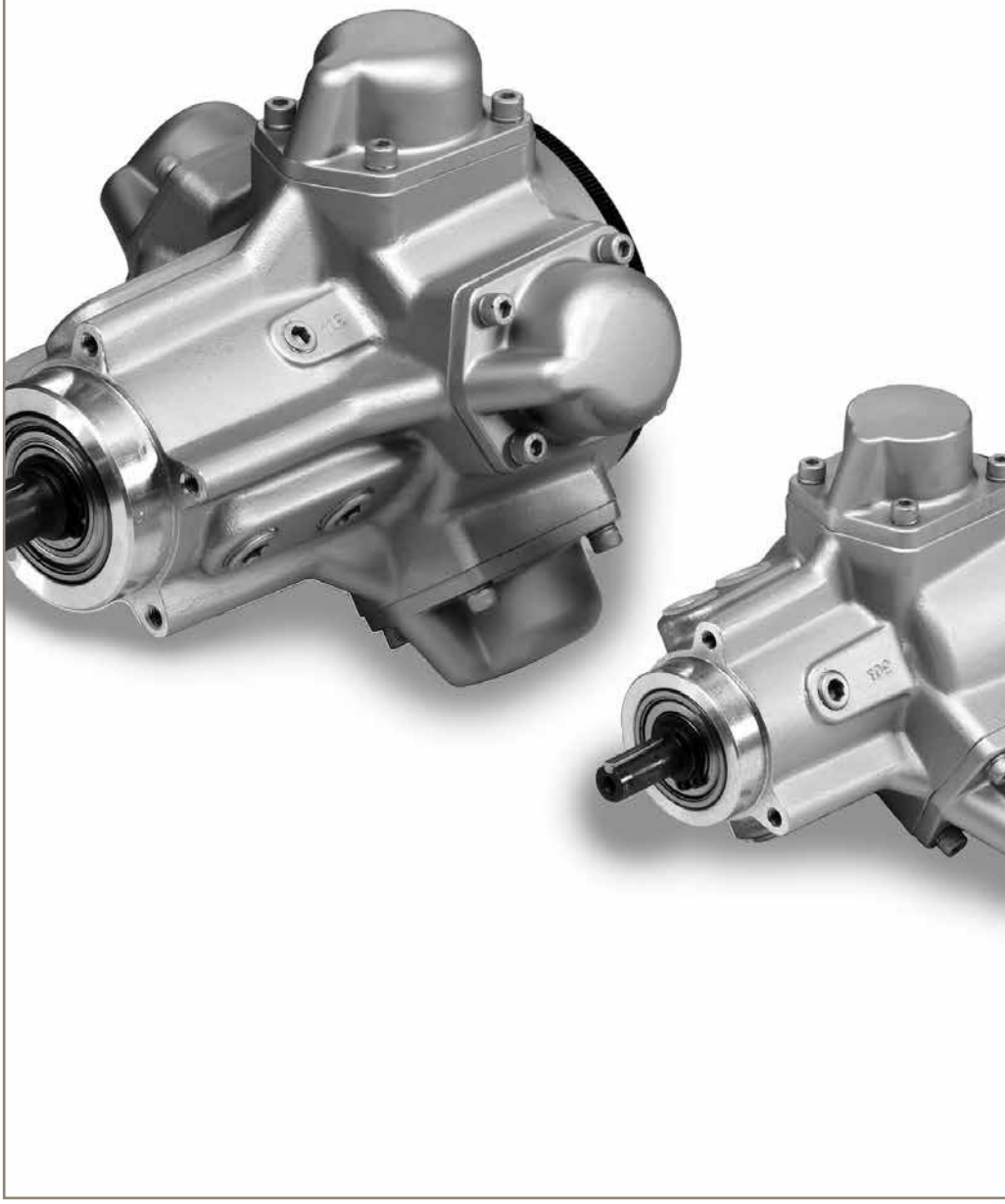

Air Motors

P1V-P Radial Piston Type
0.066 to 0.228 kW

Catalogue PDE2538TCUK November 2014

Parker

ENGINEERING YOUR SUCCESS.

Features	Air motor	Hydraulic motor	Electric motor	Electric motor regulated	Electric motor regulated with feed back
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	*	*	***	***	**
Accuracy, speed	*	**	*	**	***
Regulating dynamic	*	*	*	*	***
Communication	*	*	*	***	***

* = 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.

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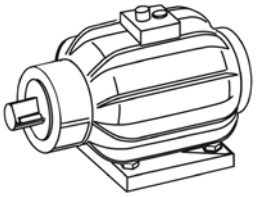


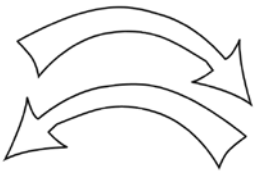
Air motors have much smaller installation dimensions than corresponding electric motors.

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

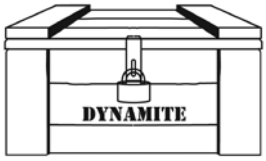
Air motors can be stopped and started continually without damage.

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

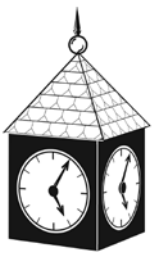
The weight of an air motor is several times less than corresponding electric motors.



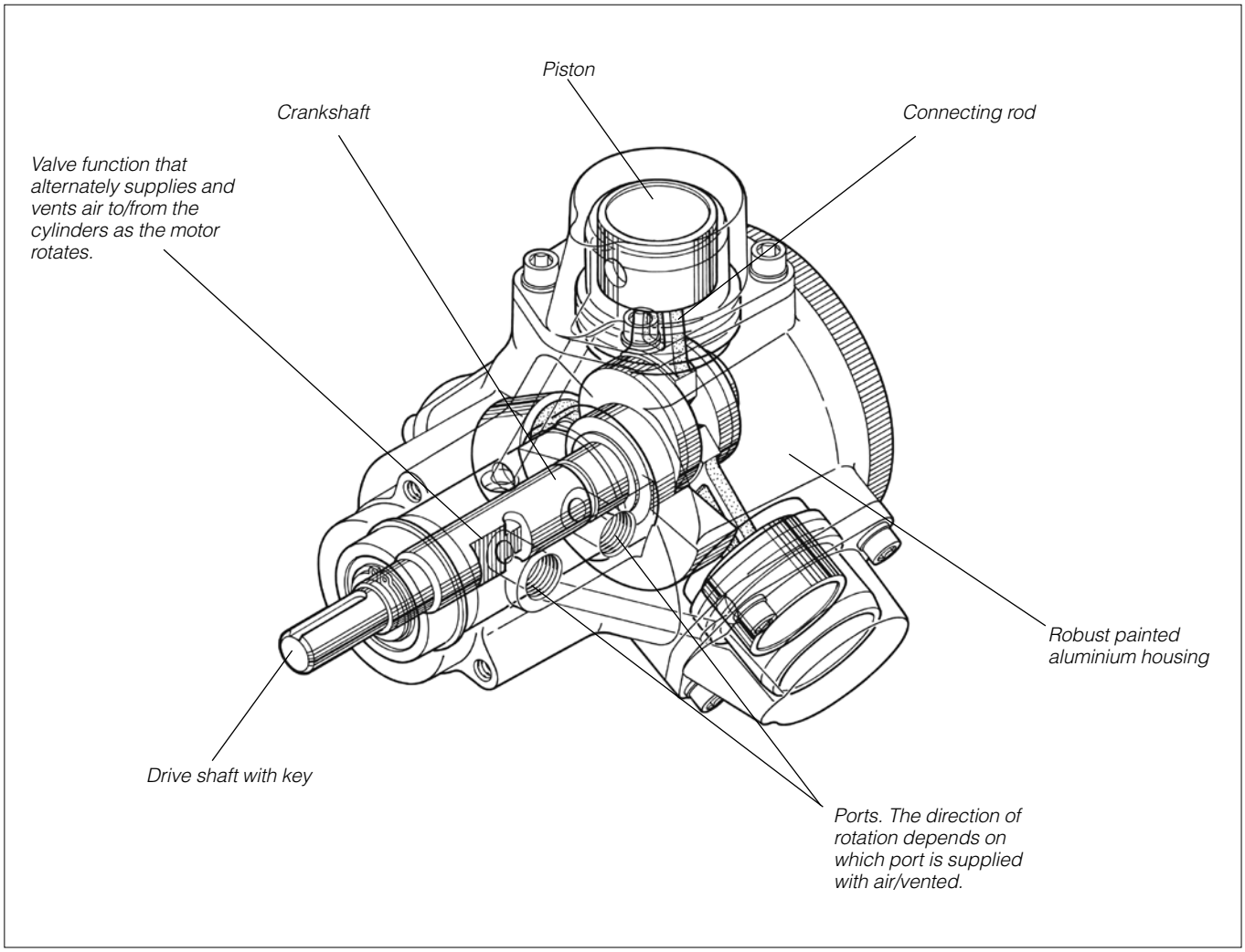
The motors are reversible as standard.



Air motors can be used in the harshest environments. Most P1V-S motors are ATEX certified.



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



Radial piston air motors

P1V-P is a range of air motors using the radial piston principle. Radial piston motors can operate at a low speed while delivering high torque.

The low speed keeps the noise level to a minimum, making this type of motor suitable for all applications that are subject to stringent noise level requirements.

The range includes three basic motors with 73.5, 125 and 228 watt power at 5 bar supply pressure.
They can also be supplied with alternative flanges or foot brackets.

Various gearboxes are also available for these motors, to provide the right speed and torque for every application.

Almost every motor is also available in a model equipped with a spring-loaded braking unit, which releases its braking effect in response to a compressed air signal.

The P1V-P motors have an extremely robust structure, with a housing made of painted cast aluminium, and a strong outgoing keyed shaft made of steel.

The medium used by the P1V-P is oil mist. This makes the motors unique in that they require no servicing at all, apart from ensuring that the correct air quality is supplied.

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?

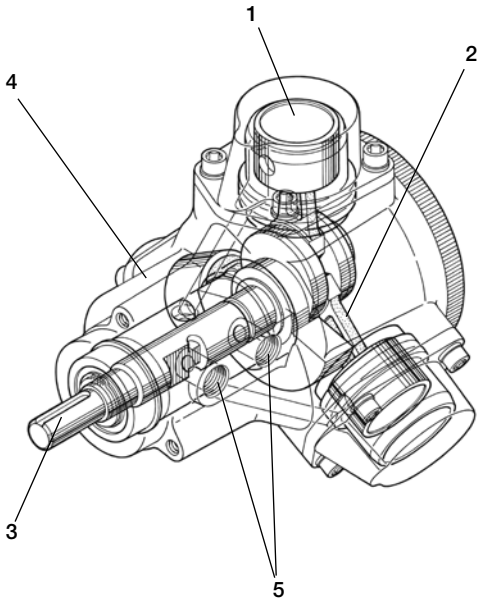
5 How do you ensure a long life and high performance of the air motor?

- 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?

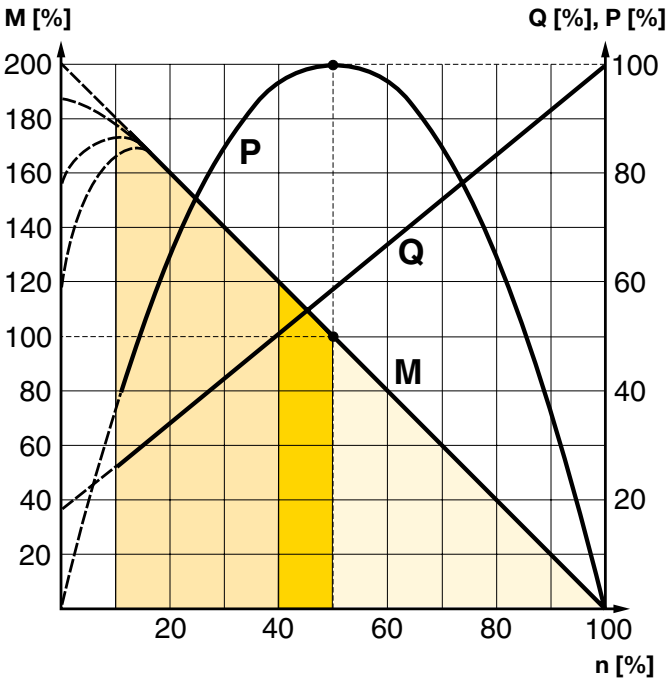
- Keep same level of your air quality.

Principles of radial piston motor functioning



1 Piston
2 Connection rod
3 Shaft
4 Motor housing
5 Connection ports

Torque, power and air consumption graphs



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

Possible working range of motor.

Optimum working range of motor.

Working range with shorter service life

Air motors come in a wide range of different designs. For these motors, we have chosen the radial piston principle because of the low speed, high torque, low noise level and long service life with no service intervals.

Their compact dimensions and low weight mean these motors are easy to install in virtually all applications.

The P1V-P motors can also be fitted with a choice of gear-boxes with different gear ratios, to produce the desired speed and torque at the outgoing shaft for every application.

The motor is supplied with air at either port A or port B depending on the desired direction of rotation. If air is supplied to port A, port B is used as the exhaust port. To change the direction of rotation, air is supplied to port B and port A then acts as the exhaust port. The supply air from port A or B is distributed to the pistons (1) by means of the rotating valve function on the outgoing shaft (3). The pistons (1) are attached to the outgoing shaft (3) by means of the connecting rods (2), and the exhaust air from each cylinder is also passed back to port A or B via the rotating valve.

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 braked to 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 stop with the pistons in various positions, it is not possible to specify an exact starting 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.

The radial piston motor should not be used at speeds higher than the load speed (speed at maximum power), as this significantly reduces the service life.

Introduction

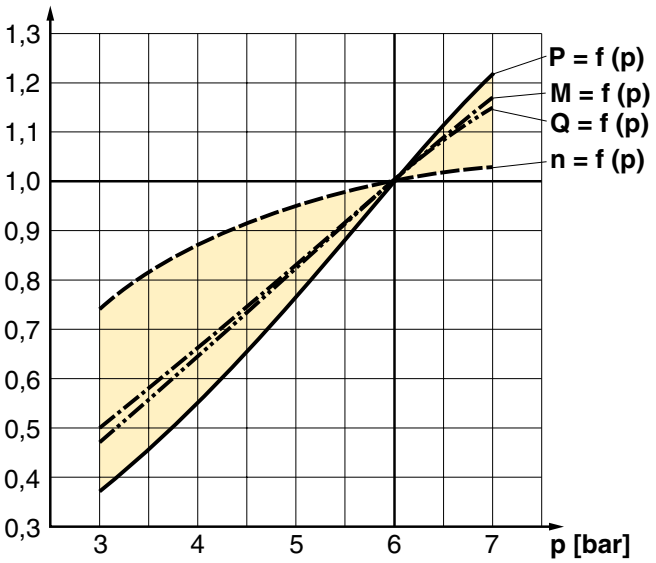
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an 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

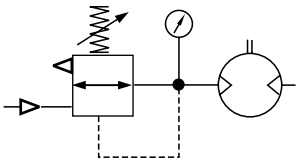


P = Power, M = Torque, Q = Air consumption, N = Speed

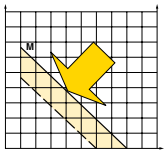
Pressure (p) bar / PSI	Power (P) %	Speed (n) %	Torque (M) %	Air Consumpt. (Q) %
7 / 99	121	103	117	117
6 / 85	100	100	100	100
5 / 71	77	95	83	83
4 / 57	55	87	67	67
3 / 42	37	74	50	50

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.



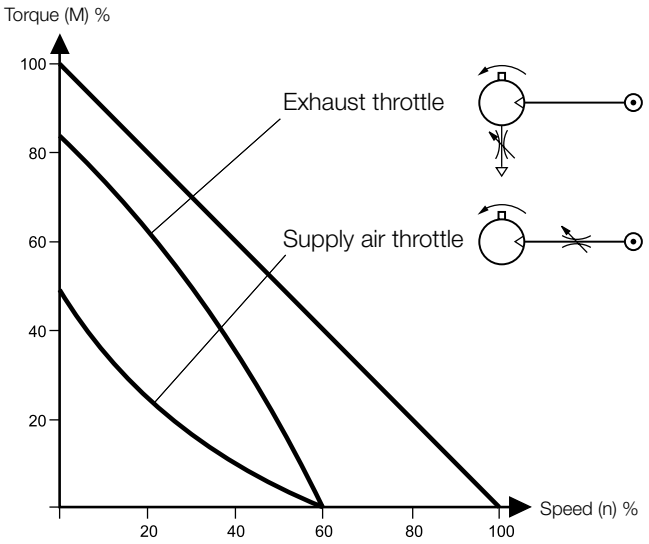
Pressure regulation at motor inlet.



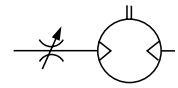
Torque curve change caused by pressure change

Speed regulation, air flow reduction

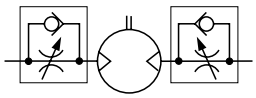
Every size reduction or restriction on the air line, whether of the supply hose itself or fittings, before the air motor affects the amount of the supplied air. By throttling you reduce the speed of your motor and simultaneously, the required torque. That means that you reduce the motor performance. 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.



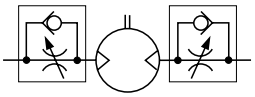
Throttling



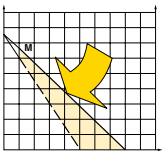
Supply or exhaust throttling, non-reversible motor



Supply throttling, reversible motor



Exhaust throttling, reversible motor

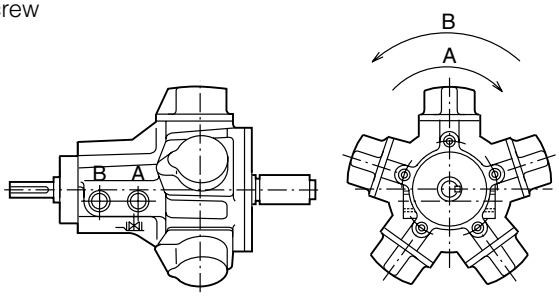


Theoretical torque curve change caused by throttling

Direction of motor rotation

Basic motor - also with brake

The rotation direction on the output shaft is sen from the back of the motor(right-hand rotation = the motor can be used as a screwdriver to assemble one standard right - hand threaded screw

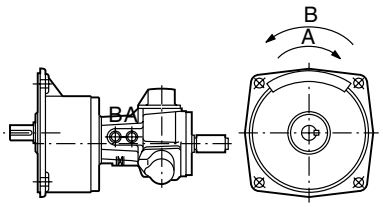


A port = inlet, counter clockwise
B port = inlet, clockwise

Motor with gearbox

Motors equipped with gearboxes with low ratios (with or without brakes) work with rotation directions like the basic motors.

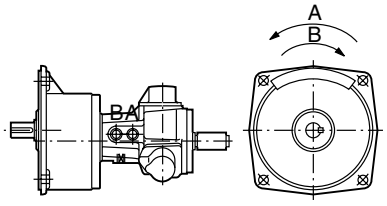
Motor	Ratio
P1V-P007**0440	5
P1V-P007**0220	10
P1V-P007**0147	15
P1V-P007**0110	20
P1V-P012**0360	5
P1V-P012**0180	10
P1V-P012**0120	15
P1V-P012**0090	20
P1V-P012**0060	30
P1V-P012**0050	40
P1V-P023**0300	5
P1V-P023**0150	10
P1V-P023**0100	15
P1V-P023**0075	20
P1V-P023**0050	30
P1V-P023**0038	40



A port = inlet, counter clockwise
B port = inlet, clockwise

All other P1V-P motors with higher ratios in the gearboxes to get the lowest speed and the highest torques are equipped with one more stage inb the gearbox. This makes the direction of the rotation opposite to the basic motors and the motors equipped with gearboxes with low ratios.

Motor	Ratio
P1V-P012**0040	50
P1V-P012**0030	60
P1V-P012**0022	80
P1V-P012**0018	100
P1V-P012**0015	120
P1V-P012**0012	160
P1V-P012**0009	200
P1V-P023**0030	50
P1V-P023**0025	60
P1V-P023**0018	80
P1V-P023**0015	100
P1V-P023**0012	120
P1V-P023**0009	160
P1V-P023**0007	200



A port = inlet, counter clockwise
B port = inlet, clockwise

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.

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: Shell Cassida Fluid HF 32 or 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).

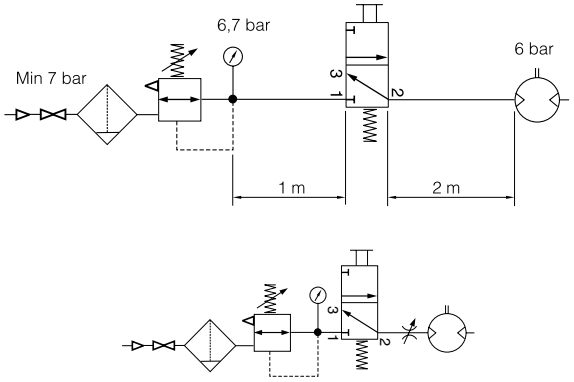
Air supply

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.

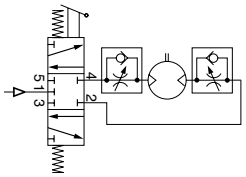
The following data must be complied with:

- 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

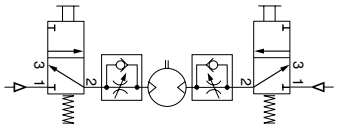
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve

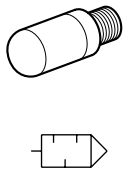


Reversible motor with two 3/2 control valves

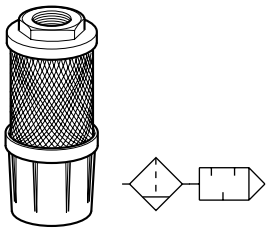
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is 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 defi-ned 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. Nevertheless, most P1V-S motors carry the CE mark because they are ATEX certified (for use in explosive atmospheres).

The following are the currently applicable directives:

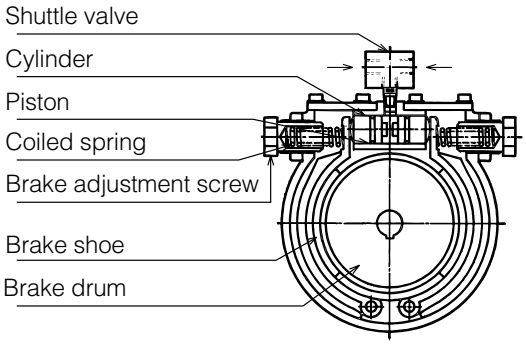
- Machinery Directive(essential health and safety requirements relating to the design and structure of machines and safety components)
- EMC Directive
- Simple Pressure Vessels Directive
- Low Voltage Directive

P1V-P Air Motors with brake

P1V-P Air Motors can be braked by closing the supply exhaust air. This gives a brake torque corresponding the average start torque if piping distance between valve and motor is short. Air Motors with powerful brake is necessary if torque is applied from load side, P1V-P with built on brake can be used in those cases.

Features

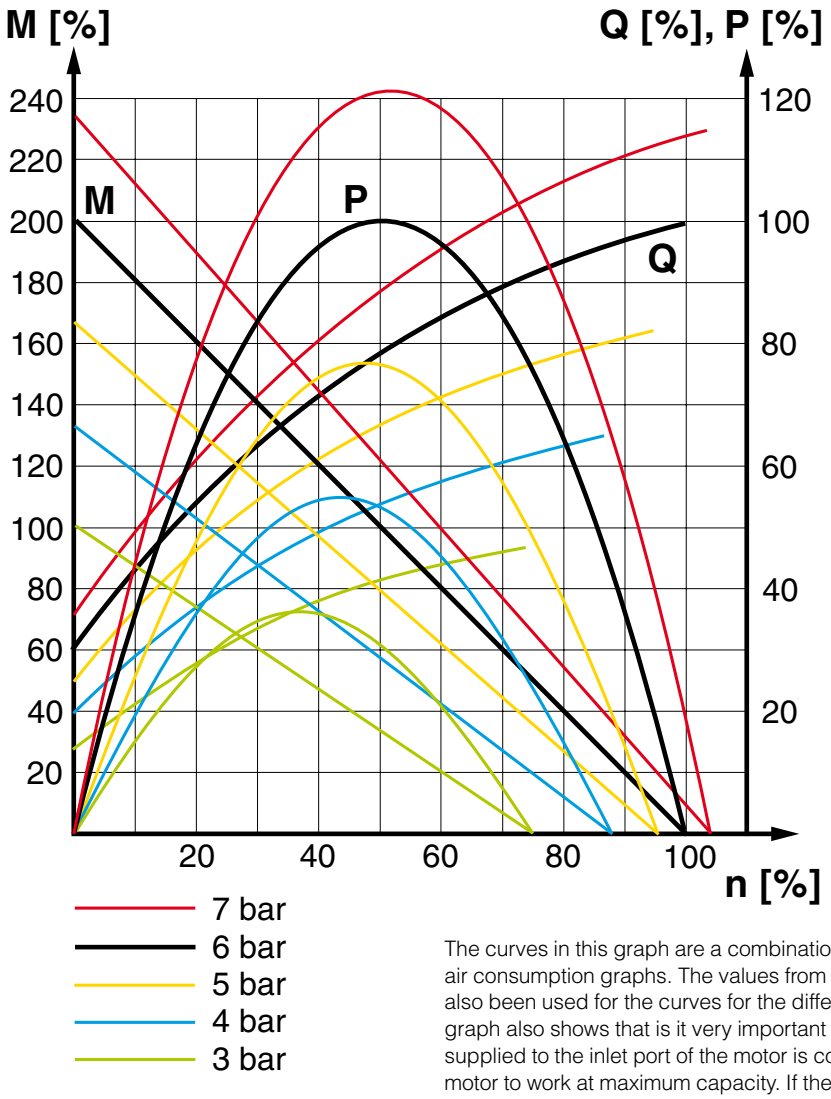
1. Non tase adjustment is available for torque as needed.
2. Simple design with little trouble and long life.
3. The design makes the complete motor with the brake low weight.



It is load working type double lock air brake with brake force turned out by pushing force of coiled spring and release conducted by air pressure as usual. Brake shoe is opened from drum as piston for release works after air pressure is applied to supply port of air motor and simultaniously to brake cylinder.

When the rotation of motor is stopped and air pressure is exhausted, the air pressure of the brake cylinder is also exhausted instantly and brake shoe is pushed to drum with pushing force of the coiled spring. The adjustment of brake torque is conducted with brake adjusting screw from the outside according to the necessary torque.

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.

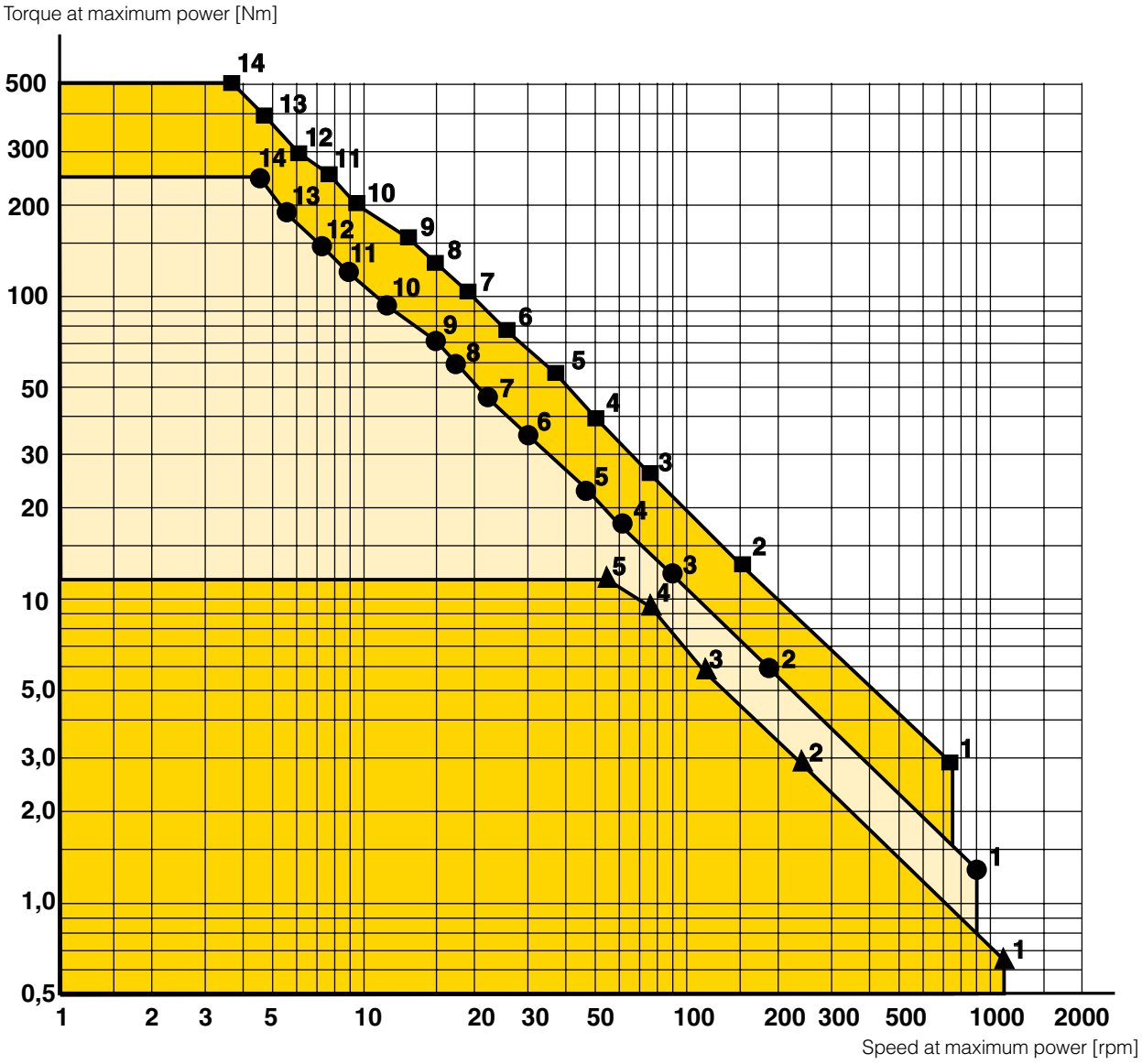
Nano Mist

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.

Choice of an air motor



The motor to be used should be selected by starting with the torque needed at a specific shaft 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 oprating point 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.

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

Use the above graph to choose the correct motor size. The graph contains the points for the maximum torque of each motor at maximum output. Add your operating point to the graph, then select a marked point above and to the right of your point.

Then use the correct working diagram of the chosen motor to get more detailed technical data. Always select a motor whose requisite technical data are in the yellow area. Also use the correction diagram to find out what operation with different supply pressures would mean for the motor.

P1V-P - Radial Piston Air Motors

P1V-P007

▲1 Basic P1V-P007A02200, Flange P1V-P007B02200,Foot P1V-P007F02200
▲2 Flange P1V-P007B00440, Foot P1V-P007F00440
▲3 Flange P1V-P007B00220, Foot P1V-P007F00220
▲4 Flange P1V-P007B00147, Foot P1V-P007F00147
▲5 Flange P1V-P007B00110, Foot P1V-P007F00110

P1V-P012

● 1 Basic P1V-P012A01800, Flange P1V-P012B01800, Foot P1V-P012F01800 or these as brake motors Basic P1V-P012AB1800, Flange P1V-P012BB1800,Foot P1V-P012FB1800
● 2 Flange P1V-P012B00360, Foot P1V-P012F00360 or these as brake motors Flange P1V-P012BB0360, Foot P1V-P012FB0360
● 3 Flange P1V-P012B00180, Foot P1V-P012F00180 or these as brake motors Flange P1V-P012BB0180, Foot P1V-P012FB0180
● 4 Flange P1V-P012B00120, Foot P1V-P012F00120 or these as brake motors Flange P1V-P012BB0120, Foot P1V-P012FB0120
● 5 Flange P1V-P012B00090, Foot P1V-P012F00090 or these as brake motors Flange P1V-P012BB0090, Foot P1V-P012FB0090
● 6 Flange P1V-P012B00060, Foot P1V-P012F00060 or these as brake motors Flange P1V-P012BB0060, Foot P1V-P012FB0060
● 7 Flange P1V-P012B00050, Foot P1V-P012F00050 or these as brake motors Flange P1V-P012BB0050, Foot P1V-P012FB0050
● 8 Flange P1V-P012B00040, Foot P1V-P012F00040 or these as brake motors Flange P1V-P012BB0040, Foot P1V-P012FB0040
● 9 Flange P1V-P012B00030, Foot P1V-P012F00030 or these as brake motors Flange P1V-P012BB0030 Foot P1V-P012FB0030
● 10 Flange P1V-P012B00022, Foot P1V-P012F00022 or these as brake motors Flange P1V-P012BB0022 , Foot P1V-P012FB0022
● 11 Flange P1V-P012B00018, Foot P1V-P012F00018 or these as brake motors Flange P1V-P012BB0018 , Foot P1V-P012FB0018
● 12 Flange P1V-P012B00015, Foot P1V-P012F00015 or these as brake motors Flange P1V-P012BB0015 , Foot P1V-P012FB0015
● 13 Flange P1V-P012B00012, Foot P1V-P012F00012 or these as brake motors Flange P1V-P012BB0012 , Foot P1V-P012FB0012
● 14 Flange P1V-P012B00009, Foot P1V-P012F00009 o these as brake motors Flange P1V-P012BB0009 , Foot P1V-P012FB0009

P1V-P023

■ 1 Basic P1V-P023A01500, Flange P1V-P023B01500,Foot P1V-P023F01500 or these as brake motors Basic P1V-P023AB1500, Flange P1V-P023BB1500,Foot P1V-P023FB1500
■ 2 Flange P1V-P023B00300, Foot P1V-P023F00300 or these as brake motors Flange P1V-P023BB0300, Foot P1V-P023FB0300
■ 3 Flange P1V-P023B00150, Foot P1V-P023F00150 or these as brake motors Flange P1V-P023BB0150, Foot P1V-P023FB0150
■ 4 Flange P1V-P023B00050, Foot P1V-P023F00050 or these as brake motors Flange P1V-P023BB0100, Foot P1V-P023FB0100
■ 5 Flange P1V-P023B00075, Foot P1V-P023F00075 or these as brake motors Flange P1V-P023BB0075, Foot P1V-P023FB0075
■ 6 Flange P1V-P023B00050, Foot P1V-P023F00050 or these as brake motors Flange P1V-P023BB0050, Foot P1V-P023FB0050
■ 7 Flange P1V-P023B00038, Foot P1V-P023F00038 or these as brake motors Flange P1V-P023BB0038, Foot P1V-P023FB0038
■ 8 Flange P1V-P023B00030, Foot P1V-P023F00030 or these as brake motors Flange P1V-P023BB0030, Foot P1V-P023FB0030
■ 9 Flange P1V-P023B00025, Foot P1V-P023F00025 or these as brake motors Flange P1V-P023BB0025 Foot P1V-P023FB0025
■ 10 Flange P1V-P023B00018, Foot P1V-P023F00018 or these as brake motors Flange P1V-P023BB0018 , Foot P1V-P023FB0018
■ 11 Flange P1V-P023B00015, Foot P1V-P023F00015 or these as brake motors Flange P1V-P023BB0015 , Foot P1V-P023FB0015
■ 12 Flange P1V-P023B00012, Foot P1V-P023F00012 or these as brake motors Flange P1V-P023BB0012 , Foot P1V-P023FB0012
■ 13 Flange P1V-P023B00009, Foot P1V-P023F00009 or these as brake motors Flange P1V-P023BB0009 , Foot P1V-P023FB0009
■ 14 Flange P1V-P023B00007, Foot P1V-P023F00007 or these as brake motors Flange P1V-P023BB0007 , Foot P1V-P023FB0007

Technical data

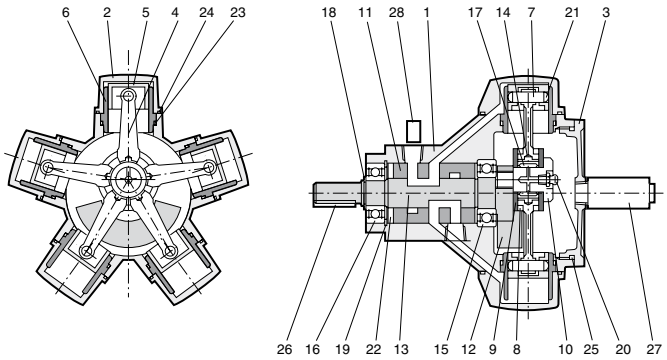
Working pressure	Max 6 bar
Working temperature	-10 °C to +70 °C
Medium	Oil mist, dry compressed air purity class 3.4.4 according to ISO8573-1
Gearboxes	Grease lubricated

Table and diagram data

All values are typical values, with a speed tolerance of ±10%

P1V-P023

P1V-P007 and P1V-P012



Material specification

Nr	Designation	Material	Qnty.
1	housing	Aluminium alloy casting	1
2	Cylinder cover	Aluminium alloy die-casting	3(5)
3	End cover	Synthetic resin	1
4	Connection rod	Aluminium alloy die-casting	3(5)
5	Piston	Brass casting	3(5)
6	Sleeve	Grey cast iron	3(5)
7	Piston pin	Carbon steel	3(5)
8	Ring	Carbon steel	2
9	Thrust washer	Carbon steel	2
10	Crank pin	Chromium-Molybdenum steel	1
11	Valve bush	Grey cast iron	1
12	Balance weight	Carbon steel	1
13	Shaft	Chrome-Molybdenum steel	1
14	Liner	Synthetic resin	3(5)
15	Bearing	-	1
16	Bearing	-	1
17	Needle bearing	-	1
18	Snap ring	-	1
19	Snap ring	-	1
20	Grease nipple	-	1
21	Copper rivet	-	6(10)
22	Oil seal	Nitrile rubber	1
23	O-ring	Nitrile rubber	3(5)
24	O-ring	Nitrile rubber	3(5)
25	O-ring	Nitrile rubber	3(5)
26	Parallel single key	-	1
27	Silencer	-	1
28	Adapter to G-thread	Aluminium	2

Sound levels

Sound levels are measured at free speed with the measuring instrument positioned 1 m away from the air motor, see the table below.

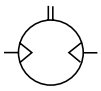
Air motor	Free outlet dB (A)	With outlet silencer dB (A)	Exhaust air removed with pipes to another room dB (A)
P1V-P007	95	75	69
P1V-P012	100	80	72
P1V-P023	100	80	72

Air motors

Air motor	P1V-P007	P1V-P012	P1V-P023
Air flow required, Nl/s	3,34	4,34	6,67
Air flow required, Nl/min	200	260	400
Min. internal diameter of pipe, mm,	6	10	10
Choice of air treatment unit: recommended min. air flow in l/min at 7,5 bar air supply and 0,8 bar pressure drop			
	150		
		210	
			300
Choice of valve: recommended min. air flow in Qn in l/min (Qn is the flow through the valve at 6 bar supply pressure and 1 bar pressure drop over the valve).			
	200		
		260	
			400

P1V-P - Radial Piston Air Motors

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.



Data for reversible basic motor

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,0735	1100	0,637	0,686	1,18	-	3,34	G1/4	6	1,45	**P1V-P007A02200**
0,125	900	1,37	1,96	2,94	-	4,34	G1/4	10	2,5	**P1V-P012A01800**
0,228	750	2,94	4,71	5,88	-	6,67	G3/8	10	4,6	**P1V-P023A01500**

Data for reversible basic motor with flange

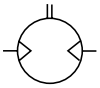
Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,0735	1100	0,637	0,686	1,18	-	3,34	G1/4	6	1,45	**P1V-P007B02200**
0,125	900	1,37	1,96	2,94	-	4,34	G1/4	10	2,5	**P1V-P012B01800**
0,228	750	2,94	4,71	5,88	-	6,67	G3/8	10	4,6	**P1V-P023B01500**

Data for reversible basic motor with foot bracket

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,0735	1100	0,637	0,686	1,18	-	3,34	G1/4	6	1,45	**P1V-P007F02200**
0,125	900	1,37	1,96	2,94	-	4,34	G1/4	10	2,5	**P1V-P012F01800**
0,228	750	2,94	4,71	5,88	-	6,67	G3/8	10	4,6	**P1V-P023F01500**

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.





Data for reversible basic motor with brake

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,125	900	1,37	1,96	2,94	3,24	4,34	G1/4	10	4,4	**P1V-P012AB1800**
0,228	750	2,94	4,71	5,88	6,47	6,67	G3/8	10	7,8	**P1V-P023AB1500**

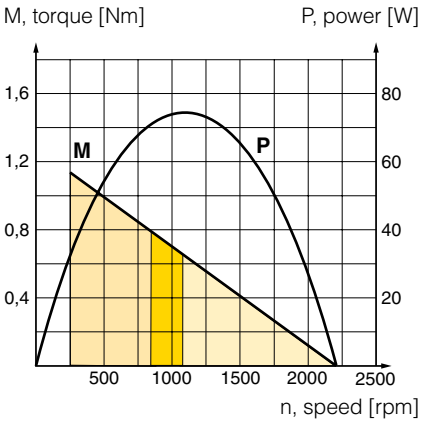
Data for reversible basic motor with brake and flange

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,125	900	1,37	1,96	2,94	3,24	4,34	G1/4	10	4,4	**P1V-P012BB1800**
0,228	750	2,94	4,71	5,88	6,47	6,67	G3/8	10	7,8	**P1V-P023BB1500**

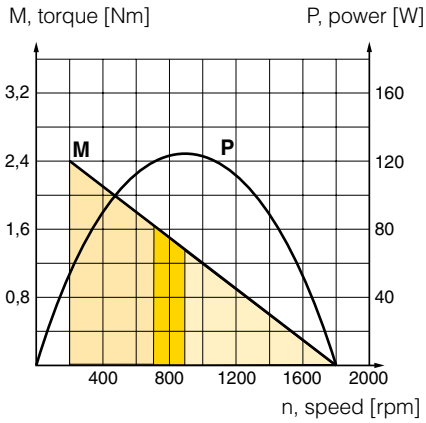
Data for reversible basic motor with brake and foot bracket

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,125	900	1,37	1,96	2,94	3,24	4,34	G1/4	10	5,2	**P1V-P012FB1800**
0,228	750	2,94	4,71	5,88	6,47	6,67	G3/8	10	9,4	**P1V-P023FB1500**

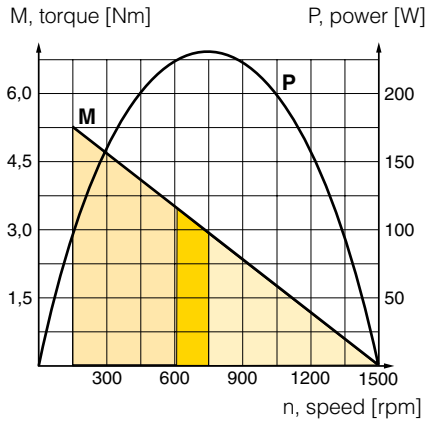
P1V-P007**2200



P1V-P012**1800



P1V-P023**1500



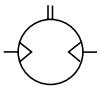
Possible working range of motor.

Optimum working range of motor.

Working range with shorter service life.

P1V-P - Radial Piston Air Motors

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.

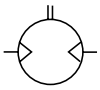


Data for reversible motor with gearbox and flange

Max power	Speed at max power	Torque at max power	Min start torque	Stall torque	Brake torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	Nm	Nm	Nm	Nm	l/s		mm	Kg	
0,0662	220	2,84	2,94	4,90	-	3,34	G1/4	6	4,0	**P1V-P007B00440**
0,0662	110	5,69	5,88	9,81	-	3,34	G1/4	6	4,0	**P1V-P007B00220**
0,0662	73,3	8,53	8,83	15,7	-	3,34	G1/4	6	4,0	**P1V-P007B00147**
0,0662	55	11,5	11,8	20,6	-	3,34	G1/4	6	4,0	**P1V-P007B00110**
0,110	180	5,88	8,83	12,7	-	4,34	G1/4	10	6,7	**P1V-P012B00360**
0,110	90	11,8	17,7	26,5	-	4,34	G1/4	10	6,7	**P1V-P012B00180**
0,110	60	17,7	26,5	39,2	-	4,34	G1/4	10	6,7	**P1V-P012B00120**
0,110	45	23,5	35,3	53,0	-	4,34	G1/4	10	6,7	**P1V-P012B00090**
0,110	30	35,3	53,0	78,5	-	4,34	G1/4	10	8,7	**P1V-P012B00060**
0,110	22,5	47,1	70,6	106	-	4,34	G1/4	10	8,7	**P1V-P012B00050**
0,110	18	58,8	79,4	132	-	4,34	G1/4	10	8,7	**P1V-P012B00040**
0,110	15	70,6	106	157	-	4,34	G1/4	10	8,7	**P1V-P012B00030**
0,110	11,2	93,2	139	206	-	4,34	G1/4	10	8,7	**P1V-P012B00022**
0,103	9	118	175	250	-	4,34	G1/4	10	11,7	**P1V-P012B00018**
0,103	7,5	137	206	300	-	4,34	G1/4	10	11,7	**P1V-P012B00015**
0,103	5,6	176	261	373	-	4,34	G1/4	10	11,7	**P1V-P012B00012**
0,103	4,5	233	350	500	-	4,34	G1/4	10	11,7	**P1V-P012B00009**
0,199	150	12,7	20,6	26,5	-	6,67	G3/8	10	10,5	**P1V-P023B00300**
0,199	75	26,5	41,2	53,0	-	6,67	G3/8	10	10,5	**P1V-P023B00150**
0,199	50	39,2	61,8	79,4	-	6,67	G3/8	10	10,5	**P1V-P023B00100**
0,199	37,5	53,0	82,4	106	-	6,67	G3/8	10	10,5	**P1V-P023B00075**
0,199	25	78,5	124	159	-	6,67	G3/8	10	14,0	**P1V-P023B00050**
0,199	18,7	106	165	212	-	6,67	G3/8	10	14,0	**P1V-P023B00038**
0,199	15	132	206	265	-	6,67	G3/8	10	14,0	**P1V-P023B00030**
0,199	12,5	157	247	318	-	6,67	G3/8	10	14,0	**P1V-P023B00025**
0,199	9,3	203	314	402	-	6,67	G3/8	10	14,0	**P1V-P023B00018**
0,191	7,5	250	392	490	-	6,67	G3/8	10	20,5	**P1V-P023B00015**
0,191	6,2	300	471	598	-	6,67	G3/8	10	20,5	**P1V-P023B00012**
0,191	4,6	396	628	785	-	6,67	G3/8	10	20,5	**P1V-P023B00009**
0,191	3,7	500	785	981	-	6,67	G3/8	10	20,5	**P1V-P023B00007**

P1V-P - Radial Piston Air Motors

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.

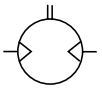


Data for reversible motor with gearbox and foot bracket

Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,0662	220	2,84	2,94	4,90	-	3,34	G1/4	6	3,5	**P1V-P007F00440**
0,0662	110	5,69	5,88	9,81	-	3,34	G1/4	6	4,0	**P1V-P007F00220**
0,0662	73,3	8,53	8,83	15,7	-	3,34	G1/4	6	3,5	**P1V-P007F00147**
0,0662	55	11,5	11,8	20,6	-	3,34	G1/4	6	3,5	**P1V-P007F00110**
0,110	180	5,88	8,83	12,7	-	4,34	G1/4	10	6,2	**P1V-P012F00360**
0,110	90	11,8	17,7	26,5	-	4,34	G1/4	10	6,2	**P1V-P012F00180**
0,110	60	17,7	26,5	39,2	-	4,34	G1/4	10	6,2	**P1V-P012F00120**
0,110	45	23,5	35,3	53,0	-	4,34	G1/4	10	6,2	**P1V-P012F00090**
0,110	30	35,3	53,0	78,5	-	4,34	G1/4	10	8,2	**P1V-P012F00060**
0,110	22,5	47,1	70,6	106	-	4,34	G1/4	10	8,2	**P1V-P012F00050**
0,110	18	58,8	79,4	132	-	4,34	G1/4	10	8,2	**P1V-P012F00040**
0,110	15	70,6	106	157	-	4,34	G1/4	10	8,2	**P1V-P012F00030**
0,110	11,2	93,2	139	206	-	4,34	G1/4	10	8,2	**P1V-P012F00022**
0,103	9	118	175	250	-	4,34	G1/4	10	11,2	**P1V-P012F00018**
0,103	7,5	137	206	300	-	4,34	G1/4	10	11,2	**P1V-P012F00015**
0,103	5,6	176	261	373	-	4,34	G1/4	10	11,2	**P1V-P012F00012**
0,103	4,5	233	350	500	-	4,34	G1/4	10	11,2	**P1V-P012F00009**
0,199	150	12,7	20,6	26,5	-	6,67	G3/8	10	10,0	**P1V-P023F00300**
0,199	75	26,5	41,2	53,0	-	6,67	G3/8	10	10,0	**P1V-P023F00150**
0,199	50	39,2	61,8	79,4	-	6,67	G3/8	10	10,0	**P1V-P023F00100**
0,199	37,5	53,0	82,4	106	-	6,67	G3/8	10	10,0	**P1V-P023F00075**
0,199	25	78,5	124	159	-	6,67	G3/8	10	13,5	**P1V-P023F00050**
0,199	18,7	106	165	212	-	6,67	G3/8	10	13,5	**P1V-P023F00038**
0,199	15	132	206	265	-	6,67	G3/8	10	13,5	**P1V-P023F00030**
0,199	12,5	157	247	318	-	6,67	G3/8	10	13,5	**P1V-P023F00025**
0,199	9,3	203	314	402	-	6,67	G3/8	10	13,5	**P1V-P023F00018**
0,191	7,5	250	392	490	-	6,67	G3/8	10	20,0	**P1V-P023F00015**
0,191	6,2	300	471	598	-	6,67	G3/8	10	20,0	**P1V-P023F00012**
0,191	4,6	396	628	785	-	6,67	G3/8	10	20,0	**P1V-P023F00009**
0,191	3,7	500	785	981	-	6,67	G3/8	10	20,0	**P1V-P023F00007**

P1V-P - Radial Piston Air Motors

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.

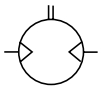


Data for reversible motor with gearbox, brake and flange

Max power	Speed at max power	Torque at max power	Min start torque	Stall torque	Brake torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	Nm	Nm	Nm	Nm	l/s		mm	Kg	
0,110	180	5,88	8,83	12,7	14,7	4,34	G1/4	10	8,0	**P1V-P012BB0360**
0,110	90	11,8	17,7	26,5	29,4	4,34	G1/4	10	8,0	**P1V-P012BB0180**
0,110	60	17,7	26,5	39,2	44,1	4,34	G1/4	10	8,0	**P1V-P012BB0120**
0,110	45	23,5	35,3	53,0	58,8	4,34	G1/4	10	8,0	**P1V-P012BB0090**
0,110	30	35,3	53,0	78,5	88,3	4,34	G1/4	10	10,0	**P1V-P012BB0060**
0,110	22,5	47,1	70,6	106	118	4,34	G1/4	10	10,0	**P1V-P012BB0050**
0,110	18	58,8	79,4	132	147	4,34	G1/4	10	10,0	**P1V-P012BB0040**
0,110	15	70,6	106	157	177	4,34	G1/4	10	10,0	**P1V-P012BB0030**
0,110	11,2	93,2	139	206	235	4,34	G1/4	10	10,0	**P1V-P012BB0022**
0,103	9	118	175	250	283	4,34	G1/4	10	11,7	**P1V-P012BB0018**
0,103	7,5	137	206	300	339	4,34	G1/4	10	13,0	**P1V-P012BB0015**
0,103	5,6	176	261	373	453	4,34	G1/4	10	13,0	**P1V-P012BB0012**
0,103	4,5	233	350	500	567	4,34	G1/4	10	13,0	**P1V-P012BB0009**
0,199	150	12,7	20,6	26,5	29,4	6,67	G3/8	10	13,5	**P1V-P023BB0300**
0,199	75	26,5	41,2	53,0	58,8	6,67	G3/8	10	13,5	**P1V-P023BB0150**
0,199	50	39,2	61,8	79,4	88,3	6,67	G3/8	10	13,5	**P1V-P023BB0100**
0,199	37,5	53,0	82,4	106	118	6,67	G3/8	10	13,5	**P1V-P023BB0075**
0,199	25	78,5	124	159	177	6,67	G3/8	10	17,0	**P1V-P023BB0050**
0,199	18,7	106	165	212	235	6,67	G3/8	10	17,0	**P1V-P023BB0038**
0,199	15	132	206	265	294	6,67	G3/8	10	17,0	**P1V-P023BB0030**
0,199	12,5	157	247	318	353	6,67	G3/8	10	17,0	**P1V-P023BB0025**
0,199	9,3	203	314	402	471	6,67	G3/8	10	17,0	**P1V-P023BB0018**
0,191	7,5	250	392	490	549	6,67	G3/8	10	24,5	**P1V-P023BB0015**
0,191	6,2	300	471	598	657	6,67	G3/8	10	24,5	**P1V-P023BB0012**
0,191	4,6	396	628	785	873	6,67	G3/8	10	24,5	**P1V-P023BB0009**
0,191	3,7	500	785	981	1100	6,67	G3/8	10	24,5	**P1V-P023BB0007**

Dimensions, see page 31-32
Permitted shaft loadings, see page 37

NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is -+10%.

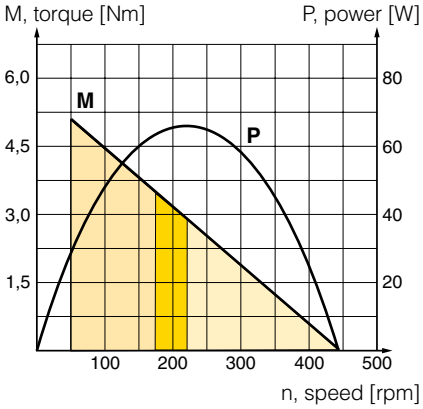


Data for reversible motor with gearbox, brake and foot bracket

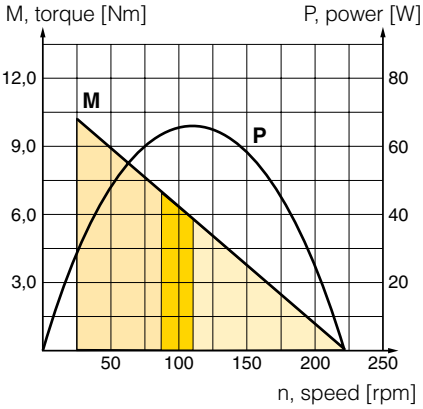
Max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,110	180	5,88	8,83	12,7	14,7	4,34	G1/4	10	8,5	**P1V-P012FB0360**
0,110	90	11,8	17,7	26,5	29,4	4,34	G1/4	10	8,5	**P1V-P012FB0180**
0,110	60	17,7	26,5	39,2	44,1	4,34	G1/4	10	8,5	**P1V-P012FB0120**
0,110	45	23,5	35,3	53,0	58,8	4,34	G1/4	10	8,5	**P1V-P012FB0090**
0,110	30	35,3	53,0	78,5	88,3	4,34	G1/4	10	10,5	**P1V-P012FB0060**
0,110	22,5	47,1	70,6	106	118	4,34	G1/4	10	10,5	**P1V-P012FB0050**
0,110	18	58,8	79,4	132	147	4,34	G1/4	10	10,5	**P1V-P012FB0040**
0,110	15	70,6	106	157	177	4,34	G1/4	10	10,5	**P1V-P012FB0030**
0,110	11,2	93,2	139	206	235	4,34	G1/4	10	10,5	**P1V-P012FB0022**
0,103	9	118	175	250	283	4,34	G1/4	10	13,5	**P1V-P012FB0018**
0,103	7,5	137	206	300	339	4,34	G1/4	10	13,5	**P1V-P012FB0015**
0,103	5,6	176	261	373	453	4,34	G1/4	10	13,5	**P1V-P012FB0012**
0,103	4,5	233	350	500	567	4,34	G1/4	10	13,5	**P1V-P012FB0009**
0,199	150	12,7	20,6	26,5	29,4	6,67	G3/8	10	13,0	**P1V-P023FB0300**
0,199	75	26,5	41,2	53,0	58,8	6,67	G3/8	10	13,0	**P1V-P023FB0150**
0,199	50	39,2	61,8	79,4	88,3	6,67	G3/8	10	13,0	**P1V-P023FB0100**
0,199	37,5	53,0	82,4	106	118	6,67	G3/8	10	13,0	**P1V-P023FB0075**
0,199	25	78,5	124	159	177	6,67	G3/8	10	16,5	**P1V-P023FB0050**
0,199	18,7	106	165	212	235	6,67	G3/8	10	16,5	**P1V-P023FB0038**
0,199	15	132	206	265	294	6,67	G3/8	10	16,5	**P1V-P023FB0030**
0,199	12,5	157	247	318	353	6,67	G3/8	10	16,5	**P1V-P023FB0025**
0,199	9,3	203	314	402	471	6,67	G3/8	10	16,5	**P1V-P023FB0018**
0,191	7,5	250	392	490	549	6,67	G3/8	10	24,0	**P1V-P023FB0015**
0,191	6,2	300	471	598	657	6,67	G3/8	10	24,0	**P1V-P023FB0012**
0,191	4,6	396	628	785	873	6,67	G3/8	10	24,0	**P1V-P023FB0009**
0,191	3,7	500	785	981	1100	6,67	G3/8	10	24,0	**P1V-P023FB0007**

P1V-P - Radial Piston Air Motors

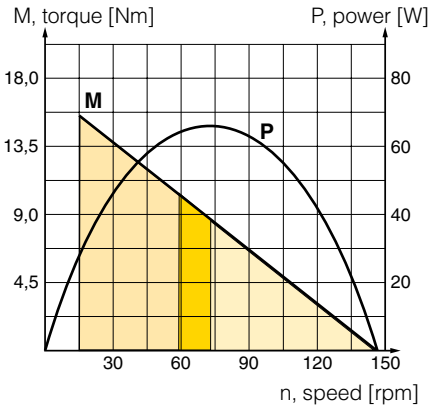
P1V-P007**0440



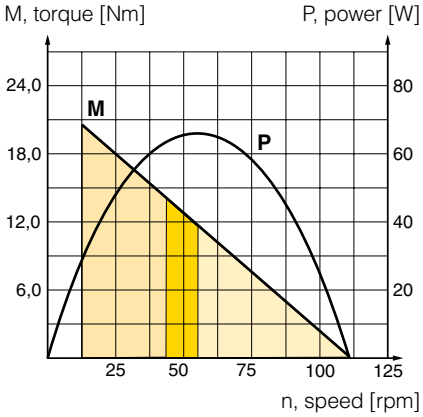
P1V-P007**0220



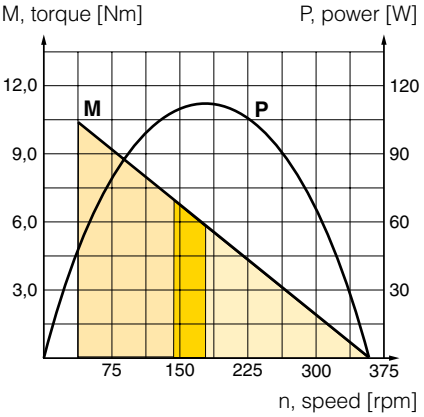
P1V-P007**0147



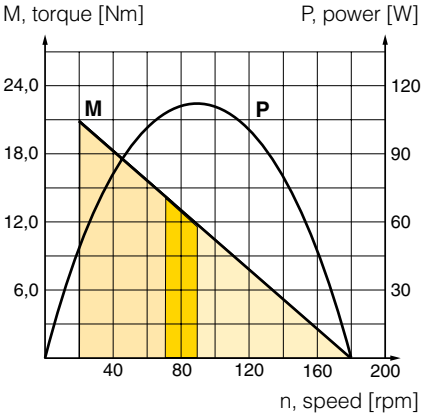
P1V-P007**0110



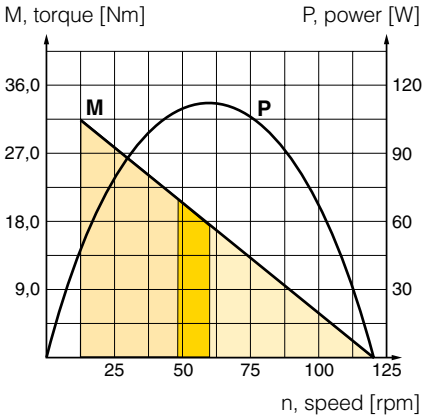
P1V-P012**0360



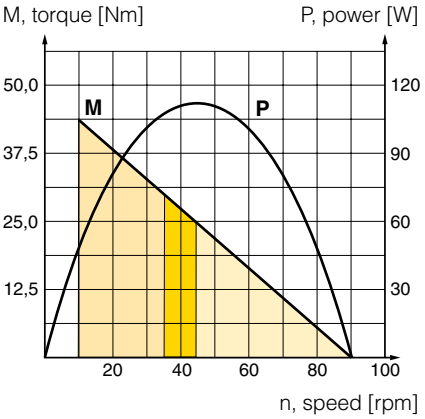
P1V-P012**0180



P1V-P012**0120



P1V-P012**0090



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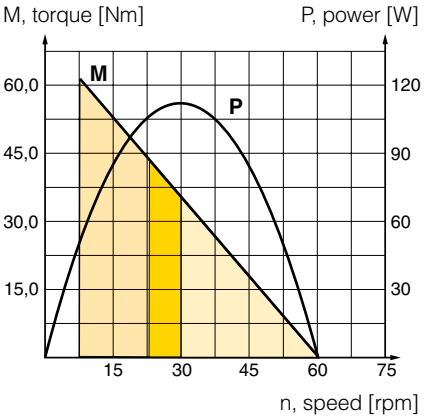
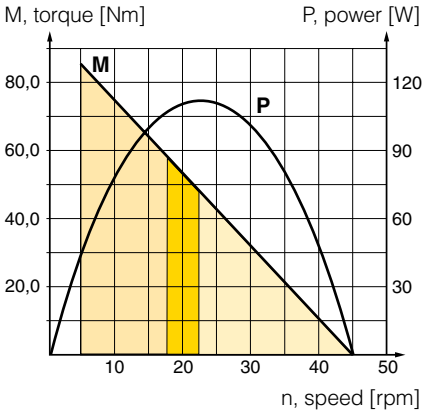


P1V-P012**0050



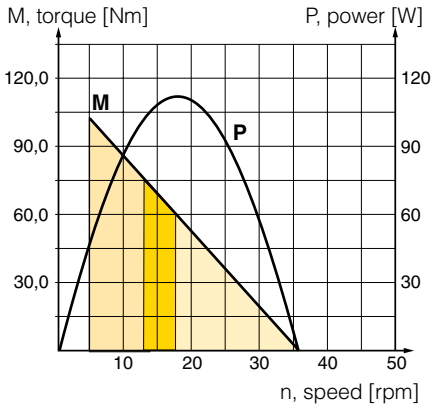
Possible working range of motor.

Optimum working range of motor.

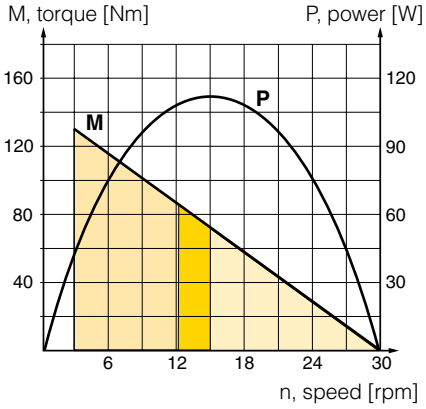
Working range with shorter service life.

P1V-P - Radial Piston Air Motors

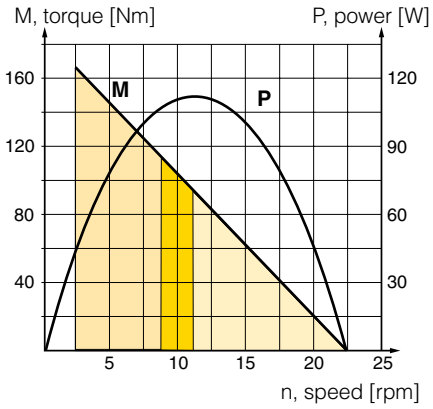
P1V-P012**0040



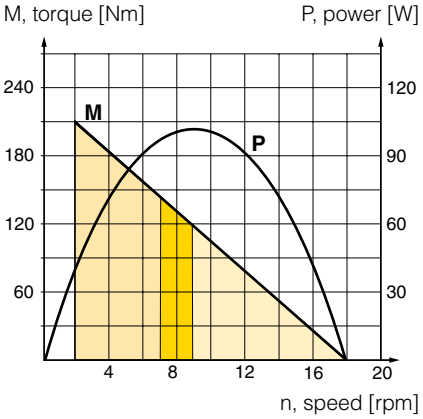
P1V-P012**0030



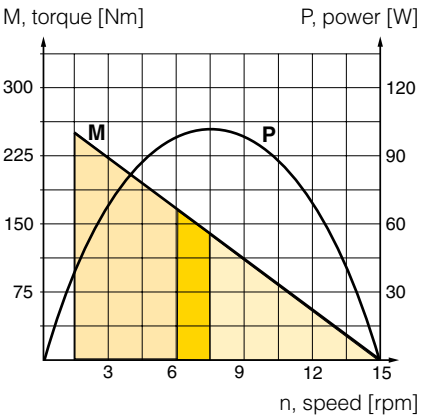
P1V-P012**0022



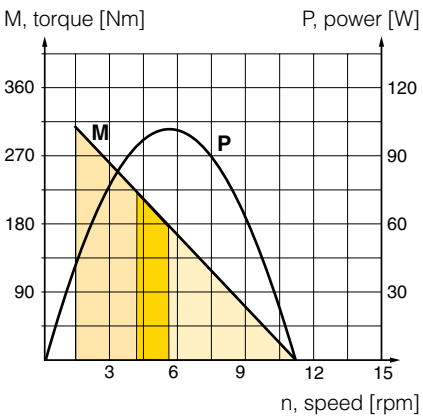
P1V-P012**0018



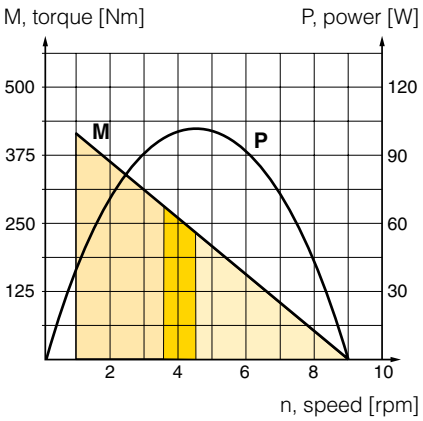
P1V-P012**0015



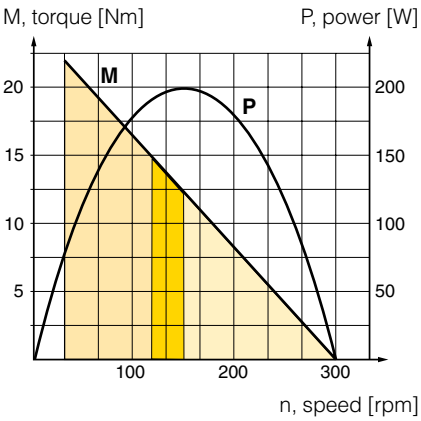
P1V-P012**0012



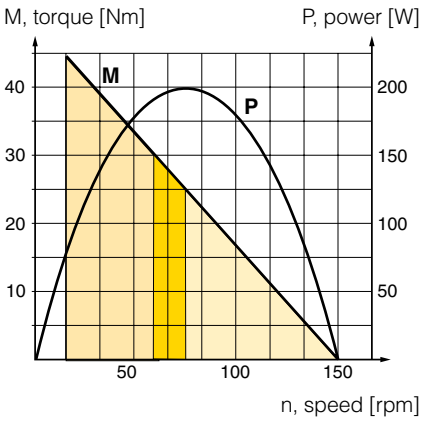
P1V-P012**0009



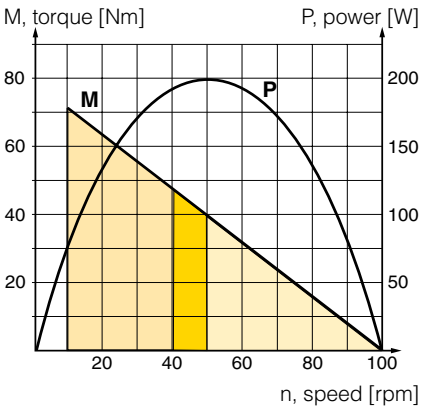
P1V-P023**0300



P1V-P023**0150



P1V-P023**0100



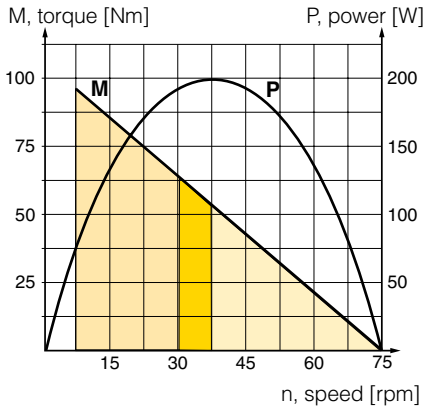
Possible working range of motor.

Optimum working range of motor.

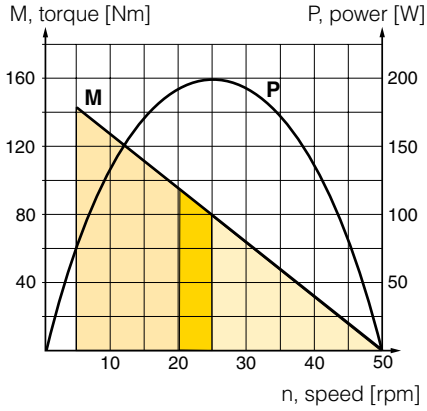
Working range with shorter service life.

P1V-P - Radial Piston Air Motors

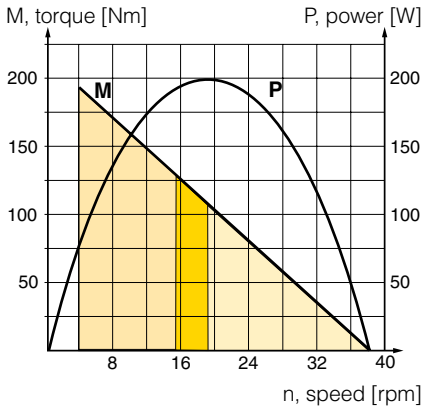
P1V-P023**0075



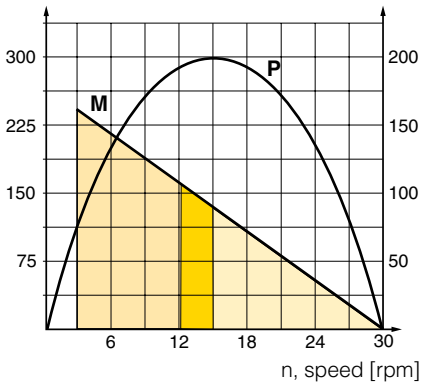
P1V-P023**0050



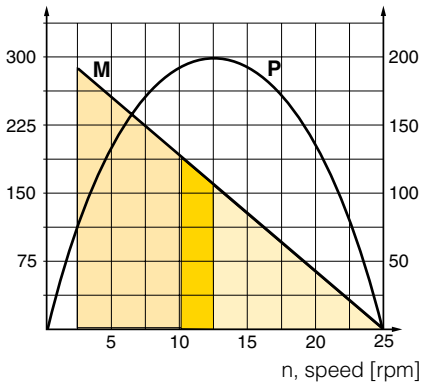
P1V-P023**0038



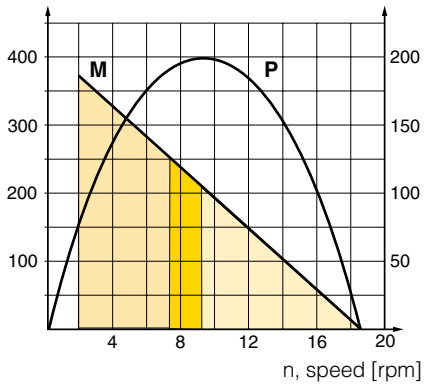
P1V-P023**0030



P1V-P023**0025



P1V-P023**0018



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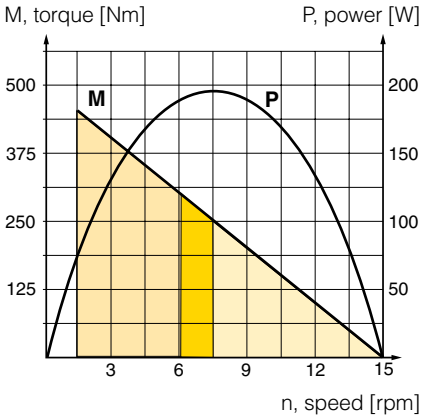
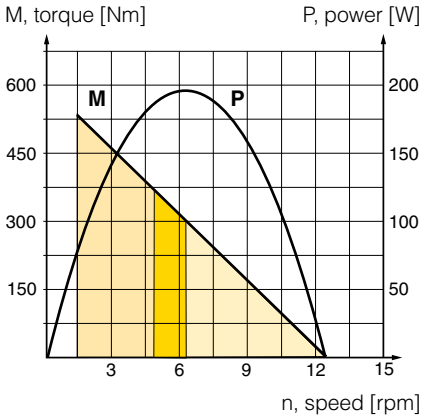


P1V-P023**0012



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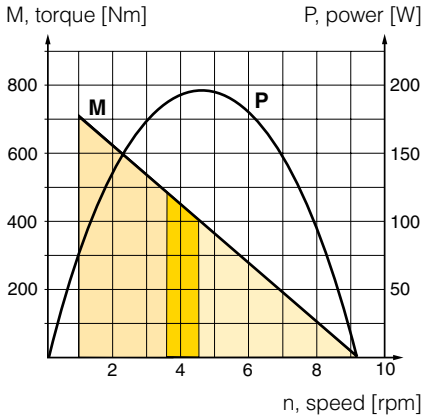

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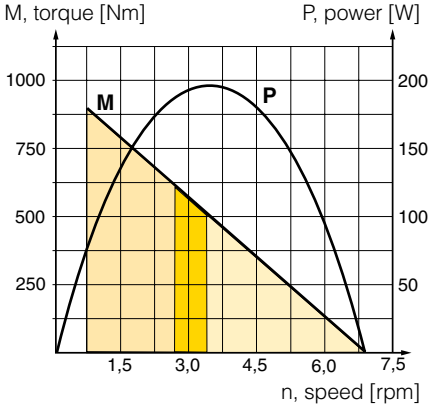


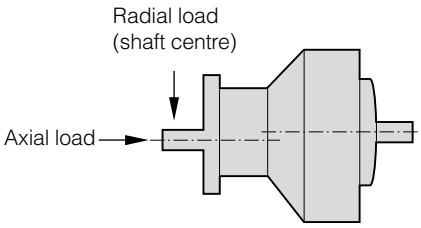
Possible working range of motor.

Optimum working range of motor.

Working range with shorter service life.

Permitted shaft loadings

Max. permitted load on output shaft for motors according to tables below.



Basic motors - also with brake

Motor	Radial load [N]	Axial load [N]
P1V-P0072200**	98	59
P1V-P0121800**	137	98
P1V-P0231500**	196	137

**

A0 = Basic motor
B0 = Basic motor with flange
F0 = Basic motor with foot
AB = Basic motor - with brake
BB = Basic motor with flange - with brake
FB = Basic motor with foot - with brake

Motors with gearboxes and mountings - also with brake

Motor	Radial load [N]	Axial load [N]
P1V-P0070440**	245	147
P1V-P0070220**	539	245
P1V-P0070147**	785	343
P1V-P0070110**	1080	441
P1V-P0120360**	392	245
P1V-P0120180**	785	343
P1V-P0120120**	1080	539
P1V-P0120090**	1370	686
P1V-P0120060**	2160	1130
P1V-P0120050**	2260	1230
P1V-P0120040**	2350	1320
P1V-P0120030**	2450	1370
P1V-P0120022**	1550	1470
P1V-P0120018**	4610	2260
P1V-P0120015**	4710	2550
P1V-P0120012**	5000	2840
P1V-P0120009**	5100	3140
P1V-P0230300**	490	294
P1V-P0230150**	981	441
P1V-P0230100**	1370	637
P1V-P0230075**	1770	834
P1V-P0230050**	3970	1420
P1V-P0230038**	4170	1570
P1V-P0230030**	4320	1670
P1V-P0230025**	4410	1810
P1V-P0230018**	4510	1960
P1V-P0230015**	6470	2550
P1V-P0230012**	6620	2750
P1V-P0230009**	6910	2940
P1V-P0230007**	7060	3140

**

För P1V-P007, P1V-P012 and P1V-P023

B0 = Motor with gearbox and flange
F0 = Motor with gearbox and foot

För P1V-P012 and P1V-P023

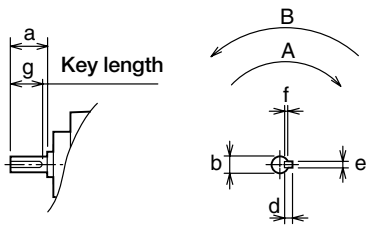
BB = Motor with gearbox and flange - with brake
FB = Motor with gearbox and foot - with brake

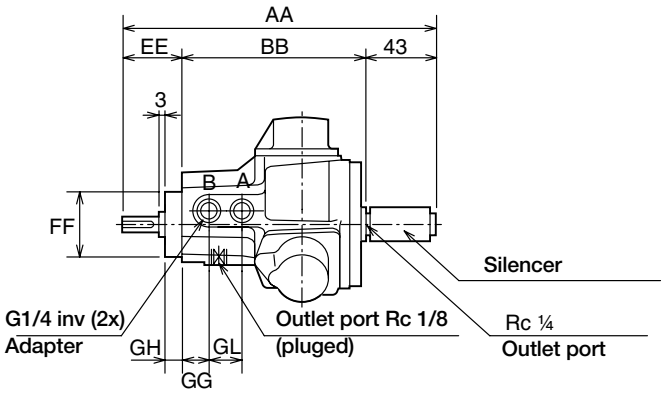
Reversible basic motor

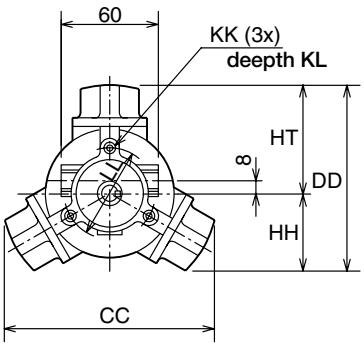
P1V-P007A02200
P1V-P012A01800

Shaft end for all basic motors

B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise rotation

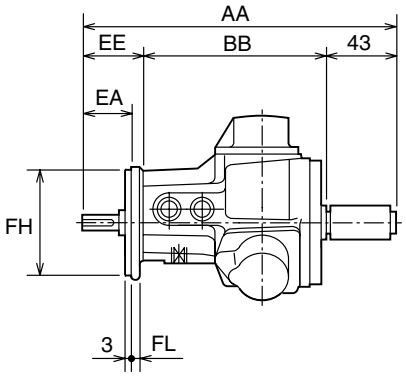


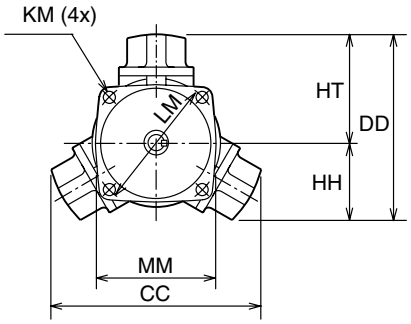




Reversible basic motor with flange

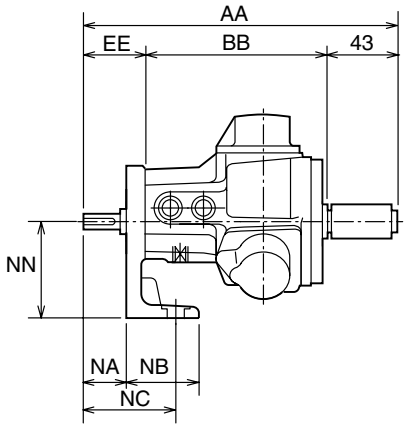
P1V-P007B02200
P1V-P012B01800

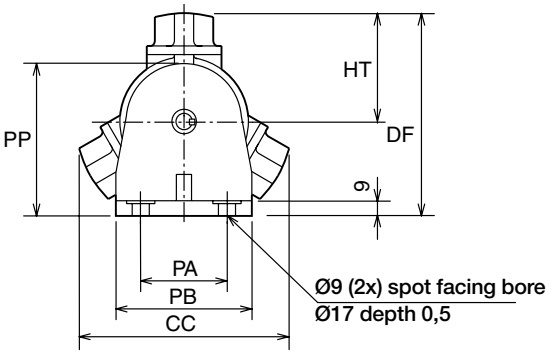




Reversible basic motor with foot bracket

P1V-P007F02200
P1V-P012F01800





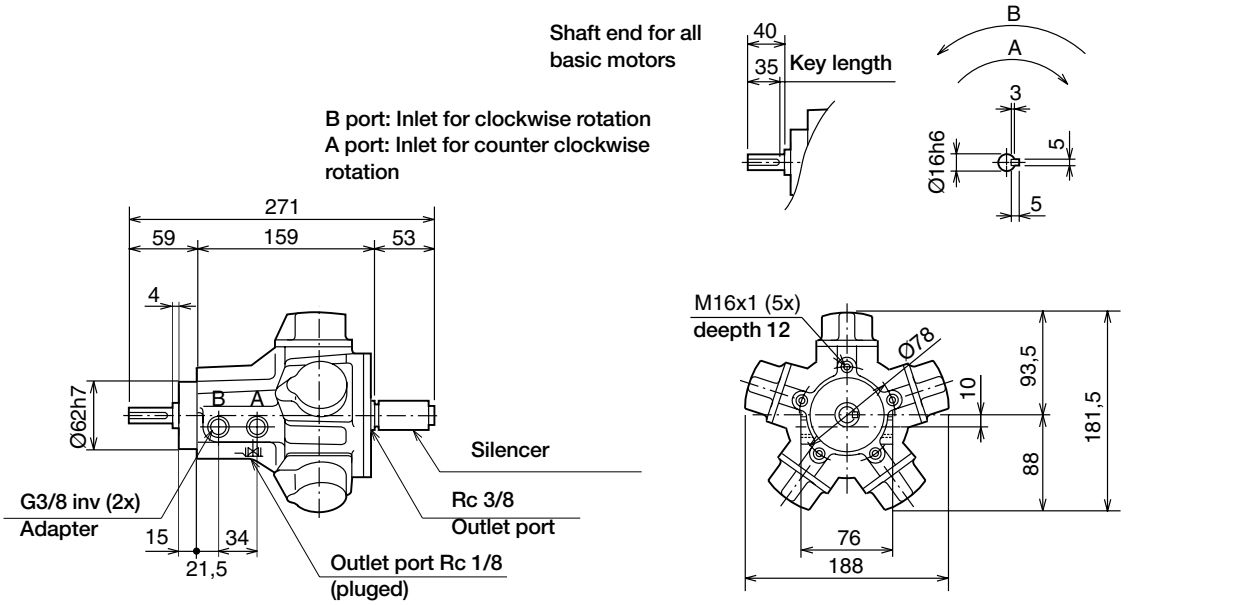
Dimensions (mm)

Motor	AA	BB	CC	DD	DF	EA	EE	FF	FH	FL	GG	GH	GL	HH	HT	KK	KL	KM
P1V-P007*02200	192	113	130	115	127	29	36	Ø42 h7	Ø68h7	5	17	10	20	48	67	M5x0,8	8	Ø6
P1V-P012*01800	225	137	164	142	152	36	45	Ø48 h7	Ø78h7	7	19	12	28	60	82	M6x1	12	Ø7

Motor	LL	LM	MM	NA	NB	NC	NN	PA	PB	PP	Shaft end a	b	d	e	f	g
P1V-P007*02200	Ø55	Ø80	72	26	45	56	60+/-0,1	50	80	94	23	Ø10h6	3	3	1,8	20
P1V-P012*01800	Ø62	Ø92	86	33	50	63	70+/-0,1	70	100	110	30	Ø12h6	4	4	2,5	27

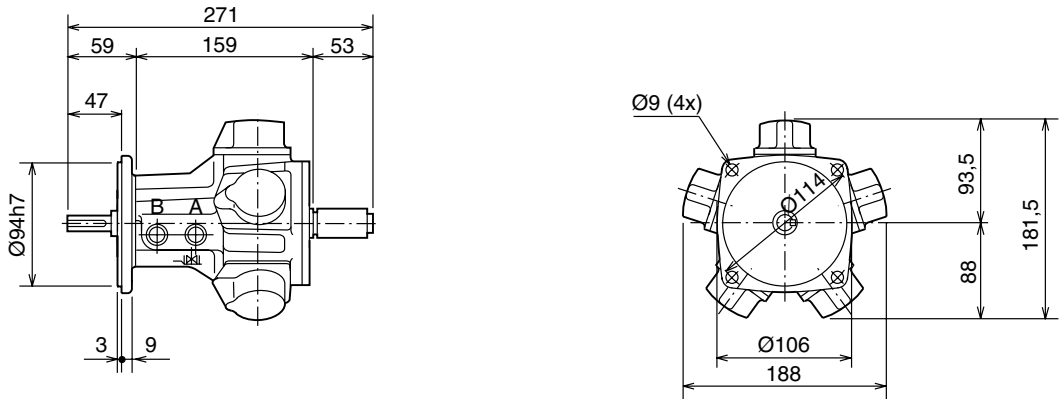
Reversible basic motor

P1V-P023A01500



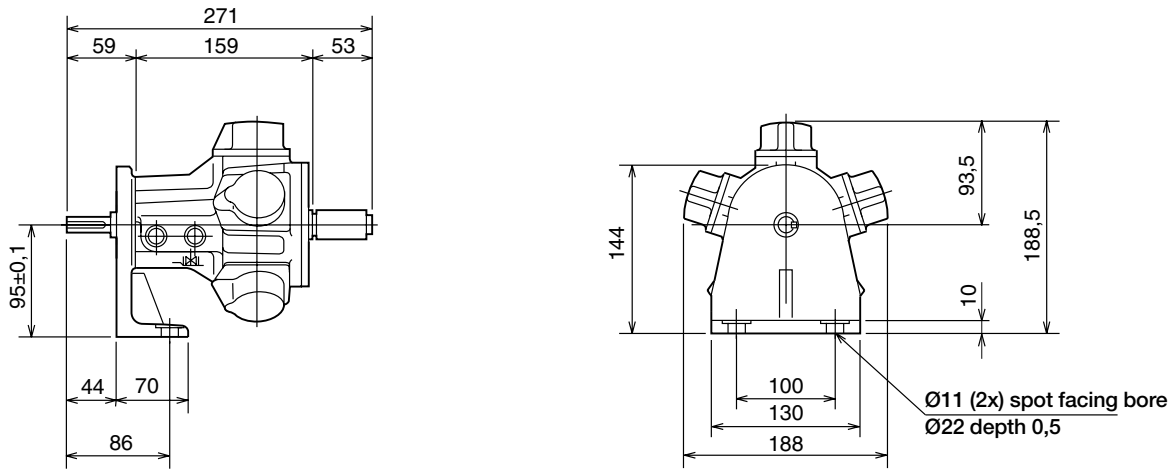
Reversible basic motor with flange

P1V-P023B01500



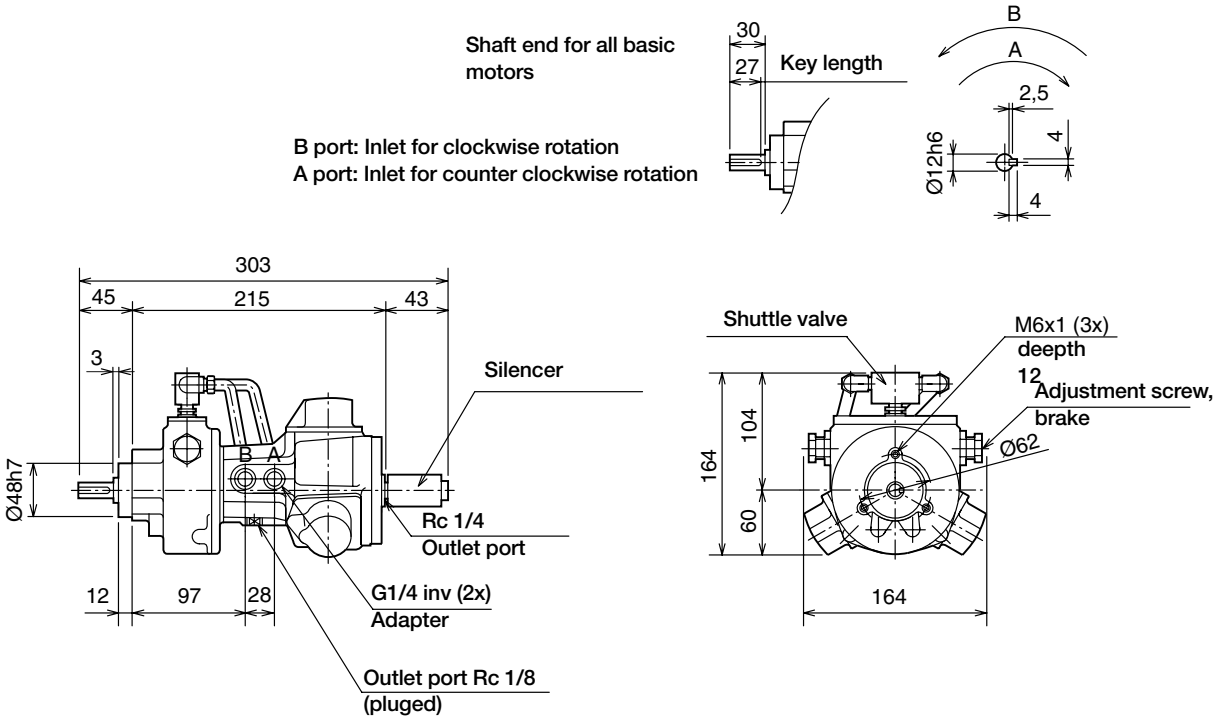
Reversible basic motor with foot bracket

P1V-P023F01500



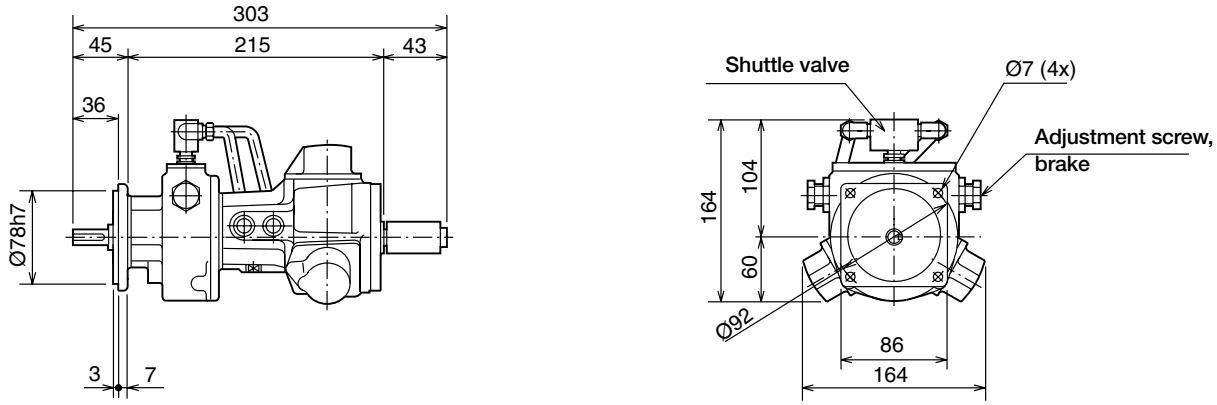
Reversible basic motor with brake

P1V-P012AB1800



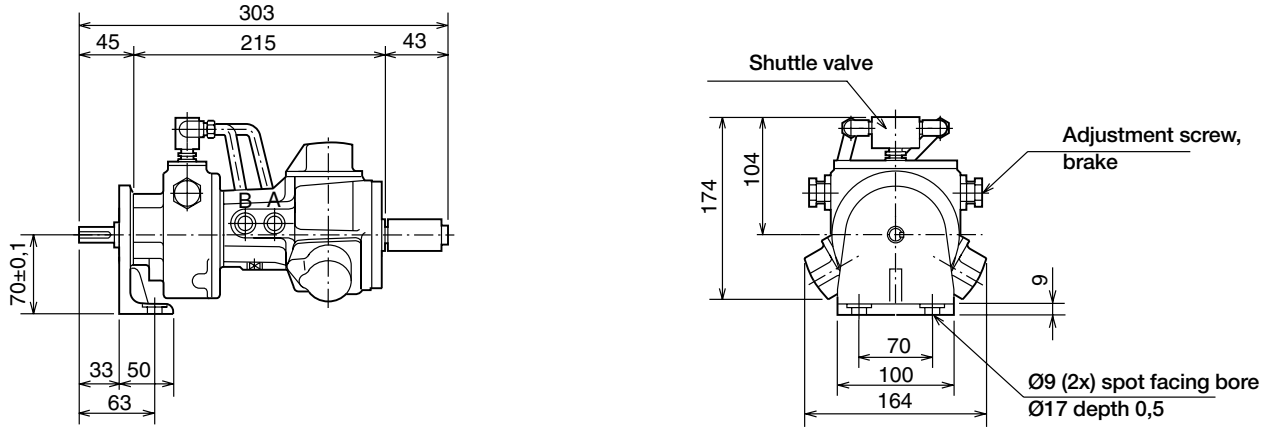
Reversible basic motor with brake and flange

P1V-P012BB1800



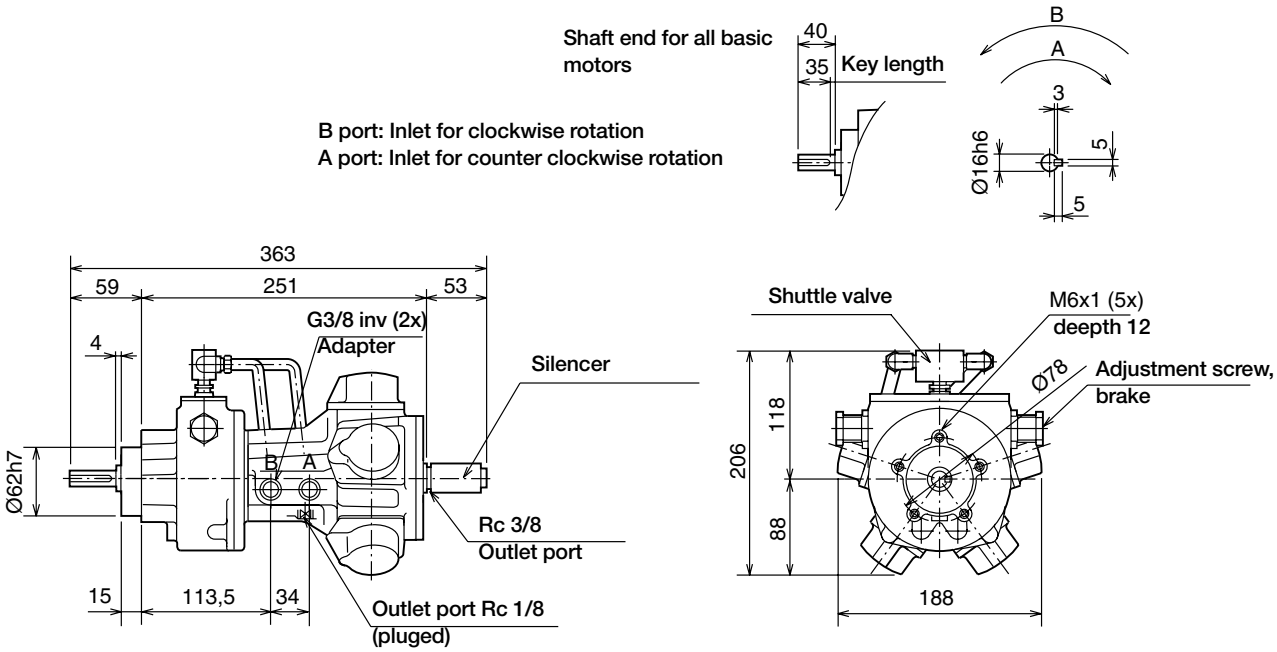
Reversible basic motor with brake and foot bracket

P1V-P012FB1800



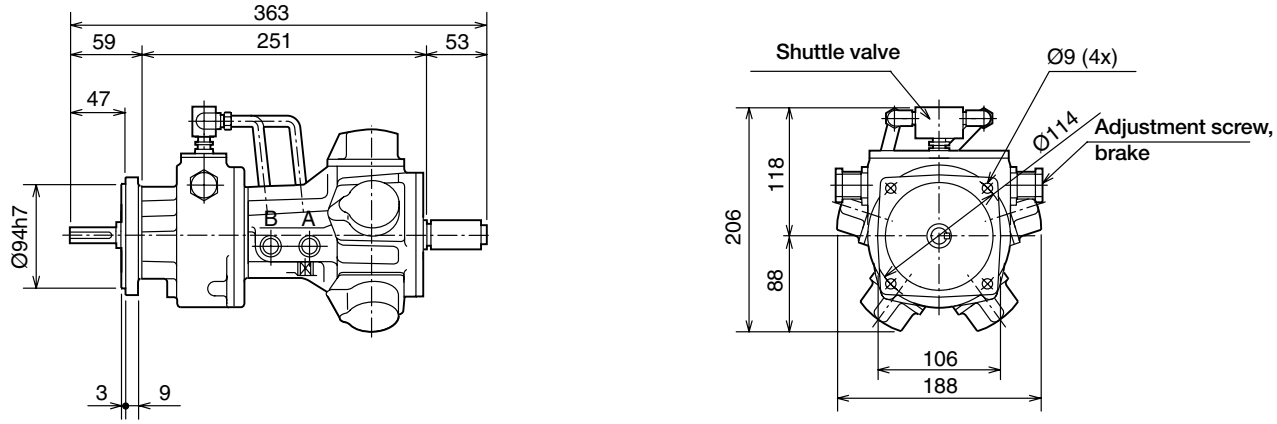
Reversible basic motor with brake

P1V-P023AB1500



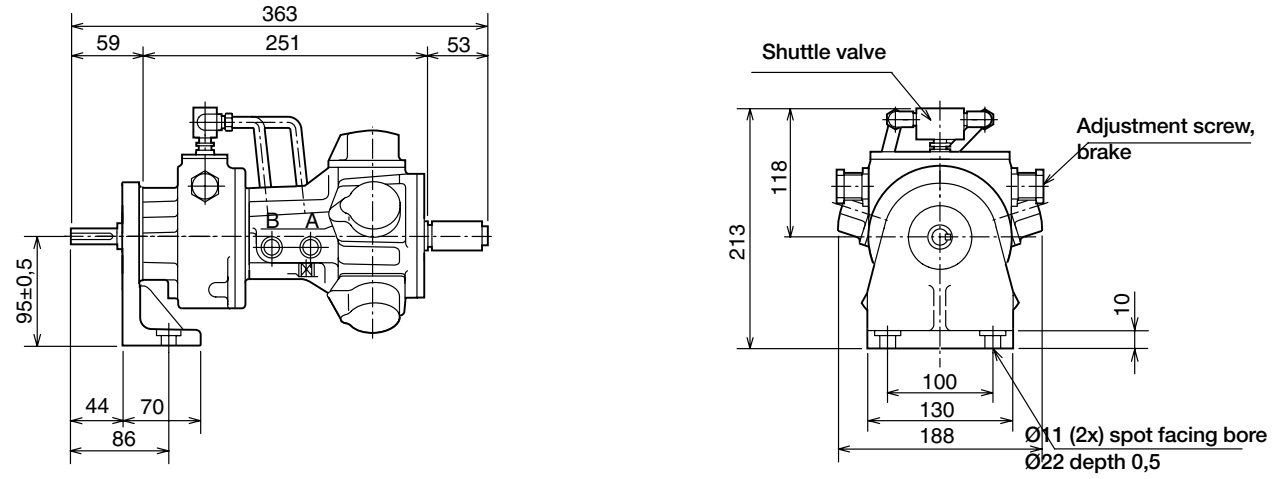
Reversible basic motor with brake and flange

P1V-P023BB1500



Reversible basic motor with brake and foot bracket

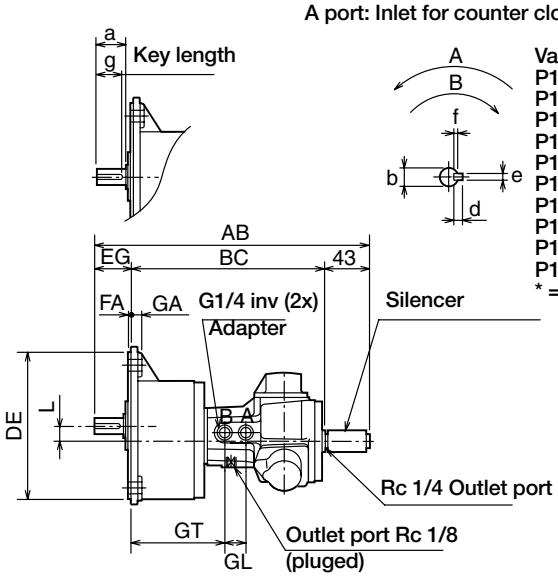
P1V-P023FB1500



Reversible motor with gearbox and flange

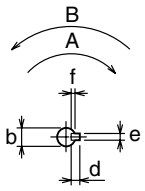
P1V-P007B00440
P1V-P007B00220
P1V-P007B00147
P1V-P007B00110
P1V-P012B00360
P1V-P012B00180
P1V-P012B00120
P1V-P012B00090
P1V-P012B00060
P1V-P012B00050
P1V-P012B00040
P1V-P012B00030
P1V-P012B00022
P1V-P012B00018
P1V-P012B00015
P1V-P012B00012
P1V-P012B00009

B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise rotation

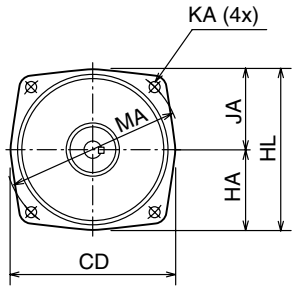


Valid for
P1V-P007*00440
P1V-P007*00220
P1V-P007*00147
P1V-P007*00110
P1V-P012*00360
P1V-P012*00180
P1V-P012*00120
P1V-P012*00090
P1V-P012*00060
P1V-P012*00050
* = B or F

A port: Inlet for clockwise rotation
B port: Inlet for counter clockwise rotation

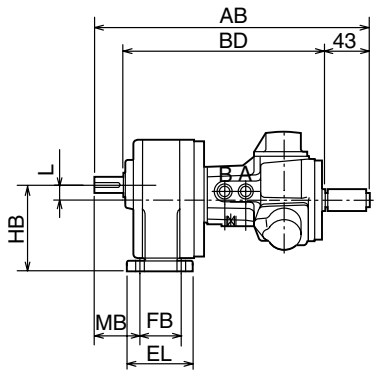


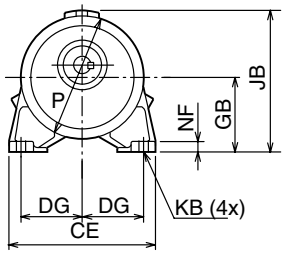
Valid for
P1V-P012*00040
P1V-P012*00030
P1V-P012*00022
P1V-P012*00018
P1V-P012*00015
P1V-P012*00012
P1V-P012*00009
* = B or F



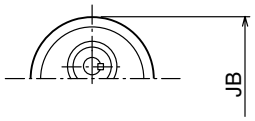
Reversible motor with gearbox and foot bracket

P1V-P007F00440
P1V-P007F00220
P1V-P007F00147
P1V-P007F00110
P1V-P012F00360
P1V-P012F00180
P1V-P012F00120
P1V-P012F00090
P1V-P012F00060
P1V-P012F00050
P1V-P012F00040
P1V-P012F00030
P1V-P012F00022
P1V-P012F00018
P1V-P012F00015
P1V-P012F00012
P1V-P012F00009





Valid for
P1V-P012F00018
P1V-P012F00015
P1V-P012F00012
P1V-P012F00009



Dimensions (mm)

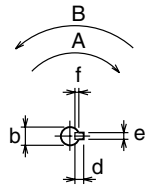
Motor	AB	BC	BD	CD	CE	DE	DG	EG	EL	FA	FB	GA	GB	GL	GT	HA	HB	HL
P1V-P007*00440 P1V-P007*00220 P1V-P007*00147 P1V-P007*00110	272	194	199	154	134	Ø145 h7	55	35	64	3	40	10	68,5	20	98	80,0	85	157,0
P1V-P012*00360 P1V-P012*00180 P1V-P012*00120 P1V-P012*00090	323	233	240	164	154	Ø148 h7	65	47	90	4	65	12	71,0	28	115	89,0	90	171,5
P1V-P012*00060 P1V-P012*00050 P1V-P012*00040 P1V-P012*00030 P1V-P012*00022	340	247	252	186	175	Ø170 h7	70	50	125	4	90	15	86,5	28	128	105,5	110	199,0
P1V-P012*00018 P1V-P012*00015 P1V-P012*00012 P1V-P012*00009	360	257	262	215	208	Ø180 h7	85	60	168	4	130	15	101,5	28	139	126,5	130	234,0

Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end a	b	d	e	f	g
P1V-P007*00440 P1V-P007*00220 P1V-P007*00147 P1V-P007*00110	77,0	135,5	Ø11	Ø9	16,5	Ø170	45	10	Ø112	30	Ø18h6	6	6	3,5	27
P1V-P012*00360 P1V-P012*00180 P1V-P012*00120 P1V-P012*00090	82,5	153,0	Ø11	Ø11	19,0	Ø185	55	12	Ø125	40	Ø22h6	6	6	3,5	35
P1V-P012*00060 P1V-P012*00050 P1V-P012*00040 P1V-P012*00030 P1V-P012*00022	94,0	169,0	Ø11	Ø11	23,5	Ø215	65	15	Ø152	45	Ø28h6	7	8	4	40
P1V-P012*00018 P1V-P012*00015 P1V-P012*00012 P1V-P012*00009	107,5	198,0	Ø13	Ø13	28,5	Ø250	70	18	Ø184	55	Ø32h6	8	10	5	50

Reversible motor with gearbox and flange

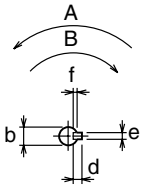
P1V-P023B00300
P1V-P023B00150
P1V-P023B00100
P1V-P023B00075
P1V-P023B00050
P1V-P023B00038
P1V-P023B00030
P1V-P023B00025
P1V-P023B00018
P1V-P023B00015
P1V-P023B00012
P1V-P023B00009
P1V-P023B00007

B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise rotation

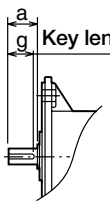


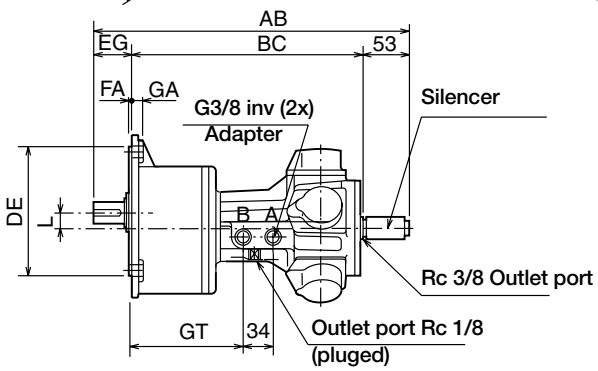
Valid for
P1V-P023*00300
P1V-P023*00150
P1V-P023*00100
P1V-P023*00075
P1V-P023*00050
P1V-P023*00038
* = B or F

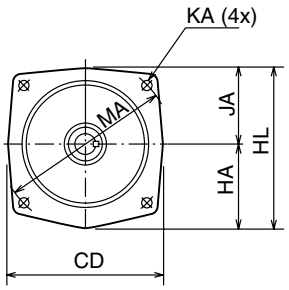
A port: Inlet for clockwise rotation
B port: Inlet for counter clockwise rotation



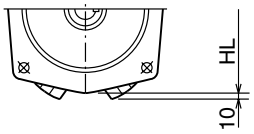
Valid for
P1V-P023*00030
P1V-P023*00025
P1V-P023*00018
P1V-P023*00015
P1V-P023*00012
P1V-P023*00009
P1V-P023*00007
* = B or F





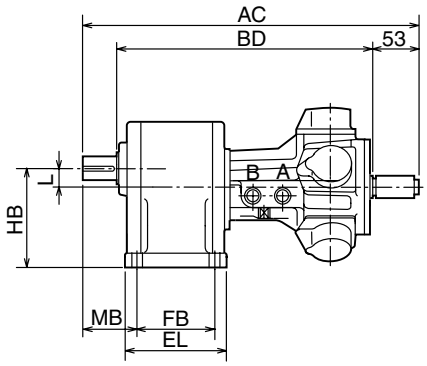


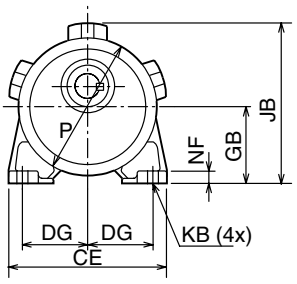
Valid for
P1V-P023B00300
P1V-P023B00150
P1V-P023B00100
P1V-P023B00075



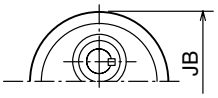
Reversible motor with gearbox and foot bracket

P1V-P023F00300
P1V-P023F00150
P1V-P023F00100
P1V-P023F00075
P1V-P023F00050
P1V-P023F00038
P1V-P023F00030
P1V-P023F00025
P1V-P023F00018
P1V-P023F00015
P1V-P023F00012
P1V-P023F00009
P1V-P023F00007





Valid for
P1V-P023F00015
P1V-P023F00012
P1V-P023F00009
P1V-P023F00007



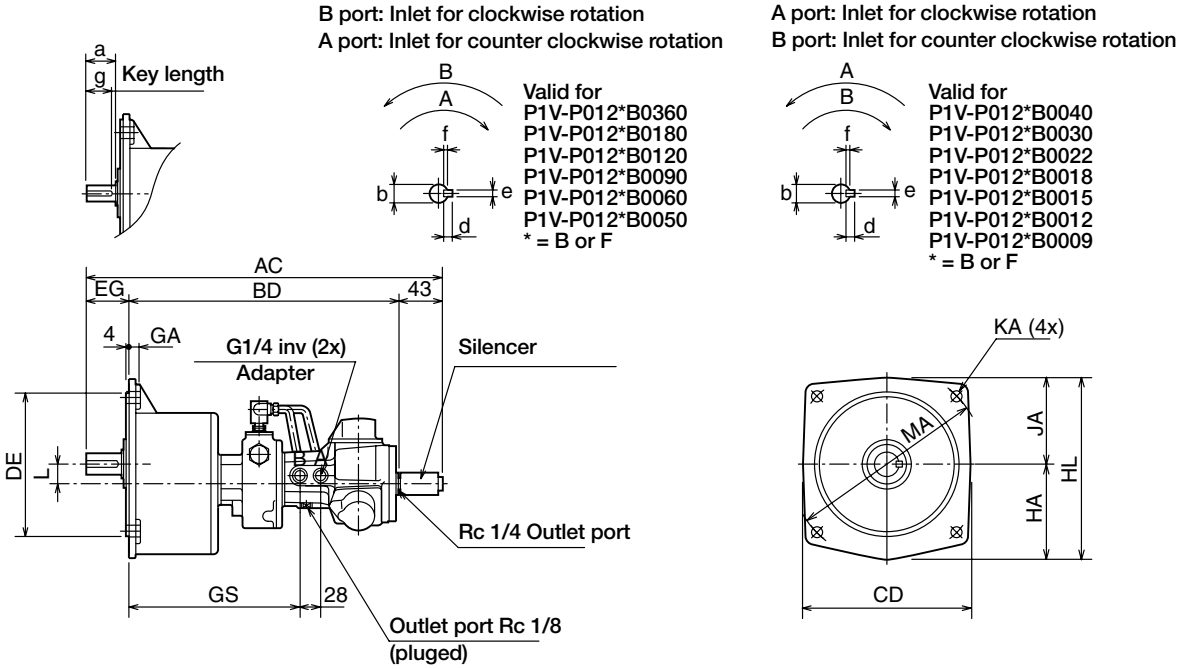
Dimensions (mm)

Motor	AB	AC	BC	BD	CD	CE	DE	DG	EG	EL	FA	FB	GA	GB	GT	HA	HB	HL
P1V-P023*00300 P1V-P023*00150 P1V-P023*00100 P1V-P023*00075	374	-	271	276	186	175	Ø170h7	70	50	125	4	90	15	86,5	133	105,5	110	198,5
P1V-P023*00050 P1V-P023*00038 P1V-P023*00030 P1V-P023*00025 P1V-P023*00018	403	-	290	295	215	208	Ø180h7	85	60	168	4	130	15	101,5	152	126,5	130	234,0
P1V-P023*00015 P1V-P023*00012 P1V-P023*00009 P1V-P023*00007	431	428	307	310	270	254	Ø230h7	105	71	196	5	150	18	116,0	170	149,0	150	284,0

Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end a	b	d	e	f	g
P1V-P023*00300 P1V-P023*00150 P1V-P023*00100 P1V-P023*00075	93,0	180,0	Ø11	Ø11	23,5	Ø215	65	15	Ø152	45	Ø28h6	7	8	4	40
P1V-P023*00050 P1V-P023*00038 P1V-P023*00030 P1V-P023*00025 P1V-P023*00018	107,5	198,0	Ø13	Ø13	28,5	Ø250	70	18	Ø184	55	Ø32h6	8	10	5	50
P1V-P023*00015 P1V-P023*00012 P1V-P023*00009 P1V-P023*00007	135,0	230,0	Ø18	Ø15	23,5	Ø310	90	20	Ø218	65	Ø40h6	8	12	5	60

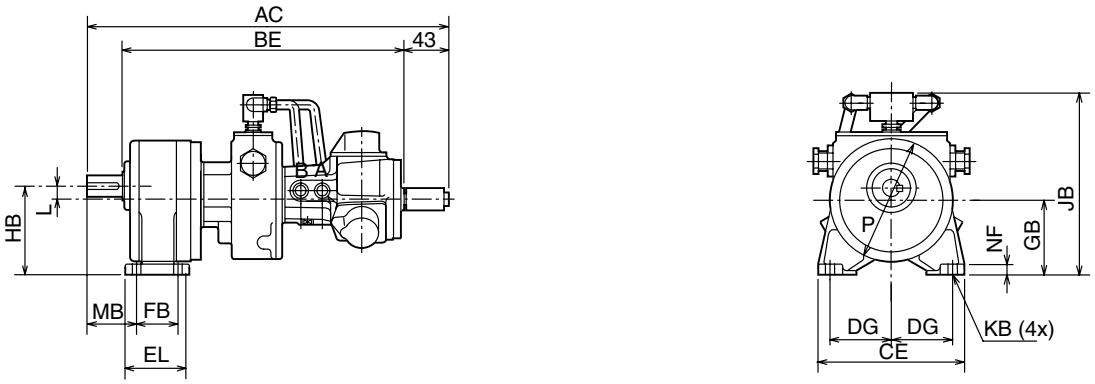
Reversible motor with gearbox, brake and flange

P1V-P012BB0360
P1V-P012BB0180
P1V-P012BB0120
P1V-P012BB0090
P1V-P012BB0060
P1V-P012BB0050
P1V-P012BB0040
P1V-P012BB0030
P1V-P012BB0022
P1V-P012BB0018
P1V-P012BB0015
P1V-P012BB0012
P1V-P012BB0009



Reversible motor with gearbox, brake and foot bracket

P1V-P012FB0360
P1V-P012FB0180
P1V-P012FB0120
P1V-P012FB0090
P1V-P012FB0060
P1V-P012FB0050
P1V-P012FB0040
P1V-P012FB0030
P1V-P012FB0022
P1V-P012FB0018
P1V-P012FB0015
P1V-P012FB0012
P1V-P012FB0009



Dimensions (mm)

Motor	AC	BD	BE	CD	CE	DE	DG	EG	EL	FB	GA	GB	GS	HA	HB	HL
P1V-P012*B0360 P1V-P012*B0180 P1V-P012*B0120 P1V-P012*B0090	401	311	318	164	154	Ø148h7	65	47	90	65	12	71,0	193	89,0	90	174,0
P1V-P012*B0060 P1V-P012*B0050 P1V-P012*B0040 P1V-P012*B0030 P1V-P012*B0022	417	324	329	186	175	Ø170h7	70	50	125	90	15	86,5	206	105,5	110	198,5
P1V-P012*B0018 P1V-P012*B0015 P1V-P012*B0012 P1V-P012*B0009	438	335	340	215	208	Ø180h7	85	60	168	130	15	101,5	217	126,5	130	234,0

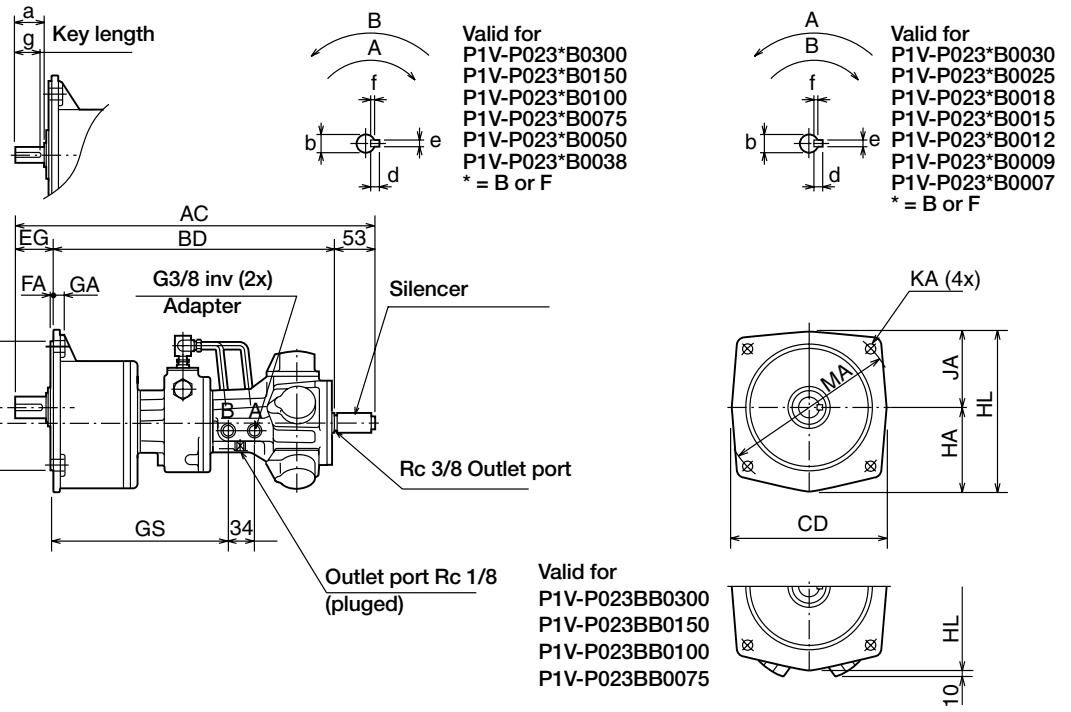
Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end a	b	d	e	f	g
P1V-P012*B0360 P1V-P012*B0180 P1V-P012*B0120 P1V-P012*B0090	82,5	175	Ø11	Ø11	19,0	Ø185	55	12	Ø125	40	Ø22H6	45	Ø28h6	7	8
P1V-P012*B0060 P1V-P012*B0050 P1V-P012*B0040 P1V-P012*B0030 P1V-P012*B0022	93,0	191	Ø11	Ø11	23,5	Ø215	65	15	Ø152	45	Ø28H6	55	Ø32h6	8	10
P1V-P012*B0018 P1V-P012*B0015 P1V-P012*B0012 P1V-P012*B0009	107,5	206	Ø13	Ø13	28,5	Ø250	70	18	Ø184	55	Ø32H6	65	Ø40h6	8	12

Reversible motor with gearbox, brake and flange

P1V-P023BB0300
P1V-P023BB0150
P1V-P023BB0100
P1V-P023BB0075
P1V-P023BB0050
P1V-P023BB0038
P1V-P023BB0030
P1V-P023BB0025
P1V-P023BB0018
P1V-P023BB0015
P1V-P023BB0012
P1V-P023BB0009
P1V-P023BB0007

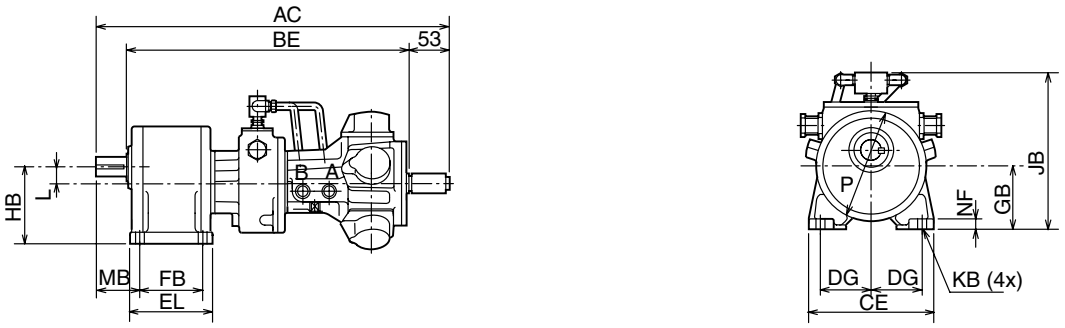
B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise rotation

A-port: Inlet for clockwise rotation
B-port: Inlet for counter clockwise rotation



Reversible motor with gearbox, brake and foot bracket

P1V-P023FB0300
P1V-P023FB0150
P1V-P023FB0100
P1V-P023FB0075
P1V-P023FB0050
P1V-P023FB0038
P1V-P023FB0030
P1V-P023FB0025
P1V-P023FB0018
P1V-P023FB0015
P1V-P023FB0012
P1V-P023FB0009
P1V-P023FB0007



Dimensions (mm)

Motor	AC	BD	BE	CD	CE	DE	DG	EG	EL	FA	FB	GA	GB	GS	HA	HB	HL
P1V-P023*B0300 P1V-P023*B0150 P1V-P023*B0100 P1V-P023*B0075	466	363	368	186	175	Ø170h7	70	50	125	4	90	15	86,5	225	105,5	110	198,5
P1V-P023*B0050 P1V-P023*B0038 P1V-P023*B0030 P1V-P023*B0025 P1V-P023*B0018	495	382	387	215	208	Ø180h7	85	60	168	4	130	15	101,5	244	126,5	130	234,0
P1V-P023*B0015 P1V-P023*B0012 P1V-P023*B0009 P1V-P023*B0007	520	396	402	270	254	Ø230h7	105	71	196	5	150	18	116,0	259	149,0	150	284,0

Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end a	b	d	e	f	g
P1V-P023*B0300 P1V-P023*B0150 P1V-P023*B0100 P1V-P023*B0075	493,0	205	Ø11	Ø11	23,5	Ø215	65	15	Ø152	45	Ø28H6	7	8	4	40
P1V-P023*B0050 P1V-P023*B0038 P1V-P023*B0030 P1V-P023*B0025 P1V-P023*B0018	107,5	220	Ø13	Ø13	28,5	Ø250	70	18	Ø184	55	Ø32H6	8	10	5	50
P1V-P023*B0015 P1V-P023*B0012 P1V-P023*B0009 P1V-P023*B0007	135,0	234	Ø18	Ø15	34,0	Ø310	90	20	Ø218	65	Ø40H6	8	12	5	60

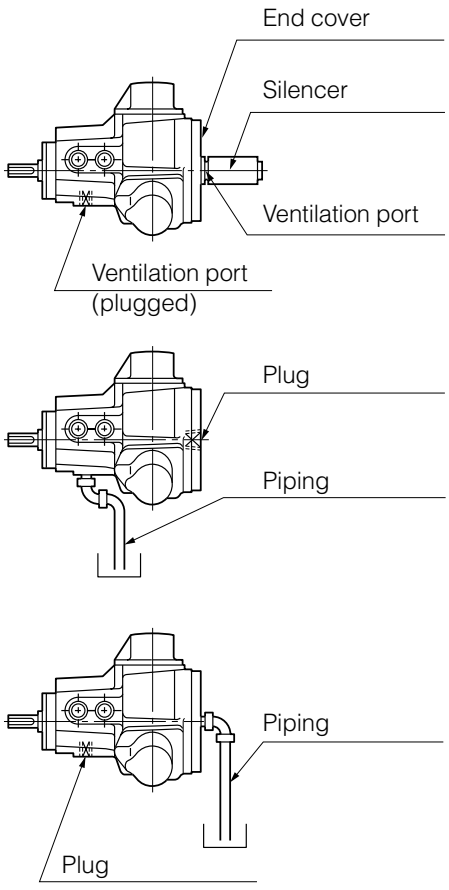
Installation instructions

Mounting

P1V-P Air Motors can be built-in in all positions. It is important to get the output spindle in centre to the driven part to avoid unnecessary axial or side load on the motor. Axial couplings are recommended to be used between the motor and the driven part to get the longest possible service life on the P1V-P Motor.

Ventilation port

- Ventilation port is to remove air pressure in the Air Motor. It shall always be kept open. If it is plugged will the internal pressure in the motor increase, resulting in reduction of the output power. Further, a trouble of come-off of the end cover will be caused.
- When delivered the silencer is not mounted on the ventilation port. It has to be assembled before start of the motor.
- When the motor is running can dirty and/or air with oil mist come out of the ventilation port. To avoid it to come out in the air in the surroundings creating environmental problems will it be necessary to take it away to one dirt/oil exhaust filter.



Piping

- The pneumatic equipment (filter, regulator, lubricator, directional control valve, speed control valves….) has to be mounted as closed as possible to the P1V-P motor.
- Trouble of pneumatic equipment is mainly caused by foreign matters included dust, chips, scrap of tape seal, rust etc. Before piping, the piping shall be cleaned with compressed.
- For piping bore and pneumatic equipment (filter, regulator, directional control valve etc.) bore corresponding to the air consumption of the air motor has to be used to avoid pressure drop in the inlet port of the motor. When pipe or pneumatic equipment with smaller bore are used will the inlet pressure of the motor be too low and the performance will decrease. Piping with larger bores than the port connection is preferred.
- Clean, dry and lubricated compressed air ahs to be used (see the chapter ”Compressed air quality on page 10)
- Use one as effective silencer as possible on the exhaust air. One silencer/oil absorption filer is preferred.
- All components on the exhaust side has to be enough large to avoid backpressure to the motor. Backpressure will reduce the output performance of the motor.
- Be sure to use one motor with the right speed for the application. The motor ahs to work with a speed of 20 – 50% of the free speed. A lower speed will not give a stabile function and a higher speed will increase the internal wear.

Lubrication

- P1V-P has to be supplied with lubricated compressed air.
- Oil for air tools type VG32 has to be used.
- 2 – 3 drops/minute from the lubricator gives the right amount of oil.

Note!

Insufficient lubrication will cause troubles such as shortening of life and seizure of rotary valve, piston and sleeve. Mount an air lubricator as close to the motor as possible.

Order key

P1V-P 012 F B 0060

	Air motor range
P1V-P	Radial piston motor

	Motor size
007	74 W
012	125 W
023	228 W

	Function
A	Basic motor
B	Flange version
F	Foot version

	Optional function
0	Standard
B	Brake

	Free speed/min
2200	2200
–	–
0007	7

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 except optional function.

Possible combinations

Data for:
Reversible basic motor
Reversible basic motor with flange
Reversible basic motor with foot bracket



Reversible basic motor with brake
Reversible basic motor with brake and flange
Reversible basic motor with brake and foot bracket



Reversible motor with gearbox and flange
Reversible motor with gearbox and foot bracket


Reversible motor with gearbox, brake and flange
Reversible motor with gearbox, brake and foot bracket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Catalogue PDE2538TCUK - V2 - November 2014

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Air Motors

P1V-S, stainless steel type - 0.02 to 1.2 kW
P1V-S, high torque type - 0.28, 0.57 & 0.86 kW
P1V-S, drilling, milling & grinding types - 0.08 to 1 kW

Catalogue PDE2554TCUK February 2015

Parker

ENGINEERING YOUR SUCCESS.

Features	Air motor	Hydraulic motor	Electric motor	Electric motor regulated	Electric motor regulated with feed back
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	*	*	***	***	**
Accuracy, speed	*	**	*	**	***
Regulating dynamic	*	*	*	*	***
Communication	*	*	*	***	***

* = 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 Page

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?

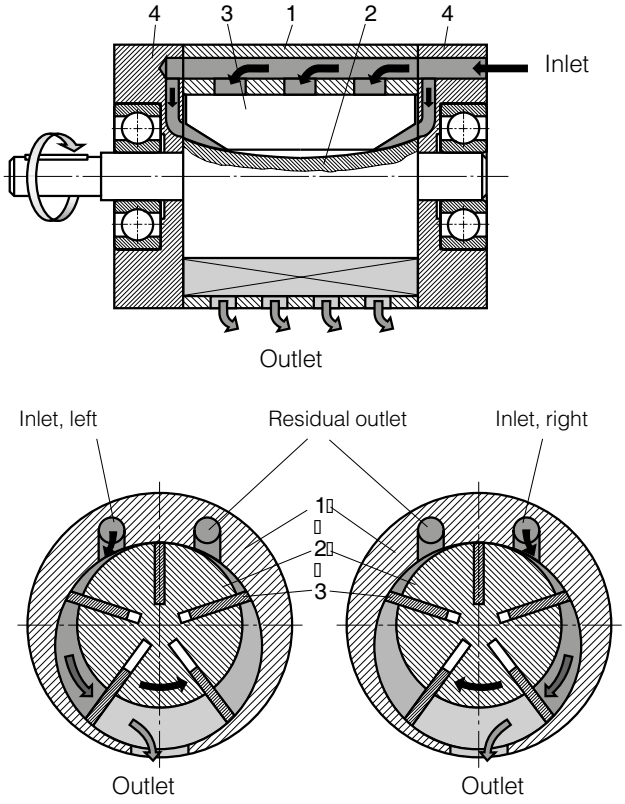
5 How do you ensure a long life and high performance of the air motor?

- 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?

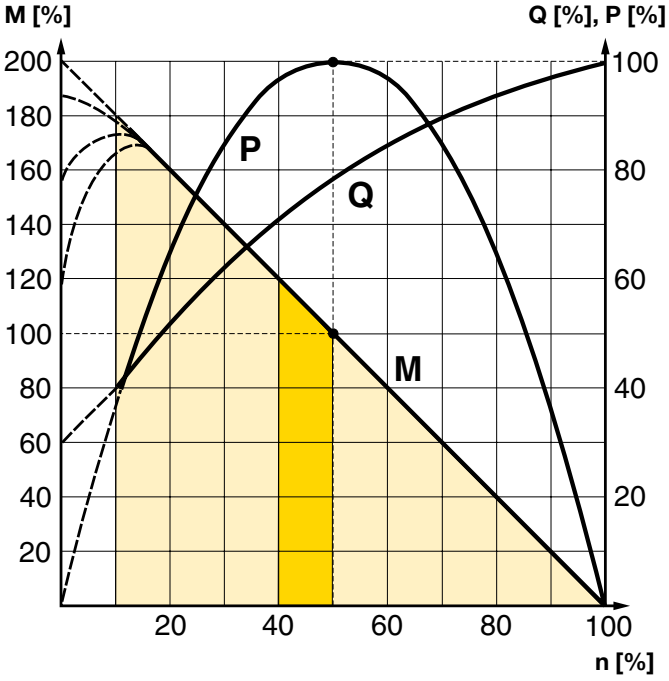
- Keep same level of your air quality.

Principles of motor functioning



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

Torque, power and air consumption graphs



The curve is for 6 bar
P = power **Q = air consumption**
M = torque **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

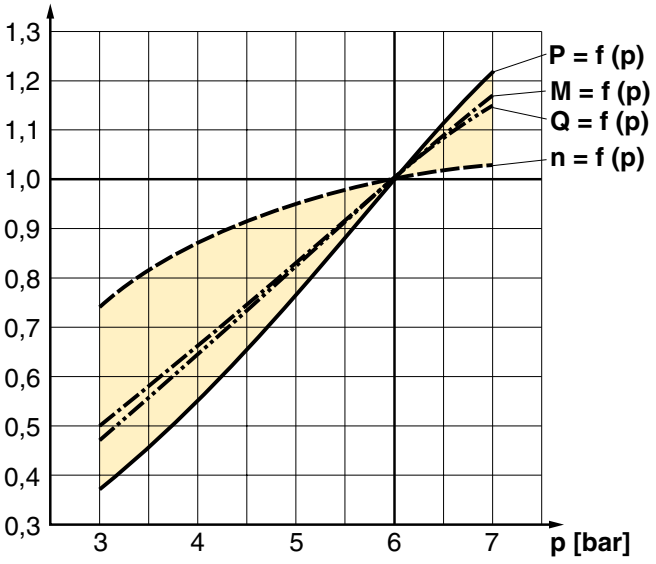
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an 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

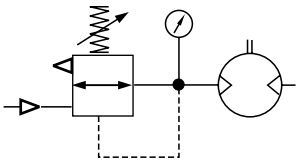


P = Power, M = Torque, Q = Air consumption, N = Speed

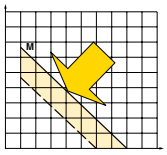
Pressure (p) bar / PSI	Power (P) %	Speed (n) %	Torque (M) %	Air Consumpt. (Q) %
7 / 99	121	103	117	117
6 / 85	100	100	100	100
5 / 71	77	95	83	83
4 / 57	55	87	67	67
3 / 42	37	74	50	50

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.



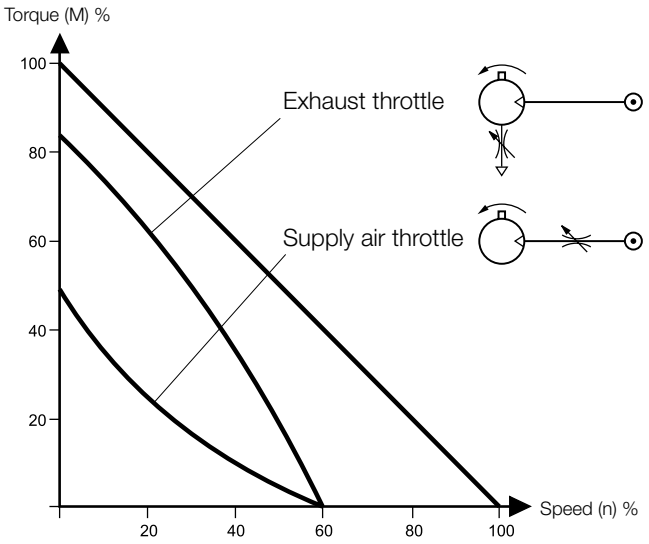
Pressure regulation at motor inlet.



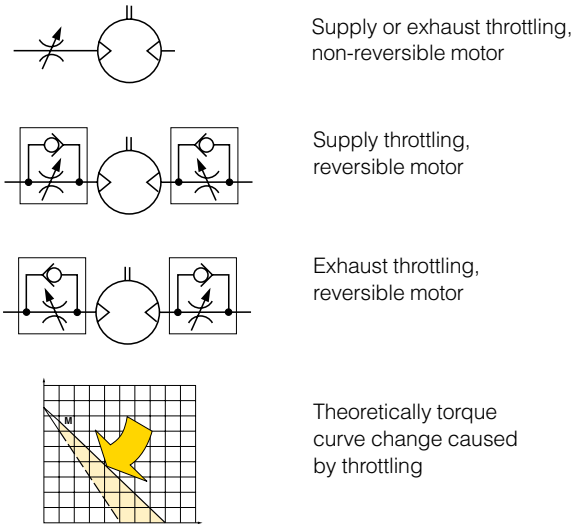
Theoretically torque curve change caused by pressure change

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.

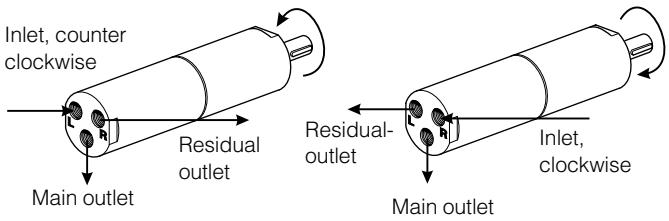


Throttling



Component choice for air supply

Direction of motor rotation



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

As the motor begins to rotate air is trapped between the vanes and is compressed. This air is exhausted through the exhaust port. As the rotor continues it's rotation, trapped air is compressed and exhausted through the residual port. If this air is not exhausted, the motor will be braked and maximum power will not be obtained.

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.

Dry unlubricated compressed air

If unlubricated compressed air is used, the compressed air should comply with the purity standards below in order to guarantee the longest possible overall service life. If the unlubricated compressed air has a high water content, condensation forms inside the motor, causing corrosion in all internal components. A ball bearing can be destroyed in a remarkably short time if it comes into contact with a single water droplet. For indoor use, we recommend ISO8573-1 purity class 3.4.1. To achieve this, compressors must befitted with after coolers, oil filters, refrigerant air dryers and air filters. For indoor/ outdoor use, we recommend ISO8573-1 purity class 1.2.1. To achieve this, compressors must be fitted with after coolers, oil filters, adsorption dryers and dust filters.

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: Shell Cassida Fluid HF 32 or 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).

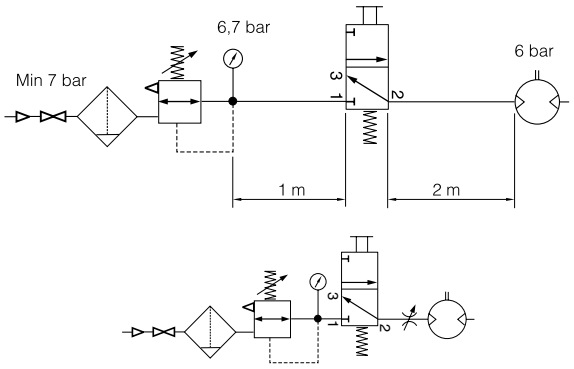
Air supply

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.

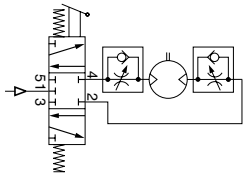
The following data must be complied with:

- 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

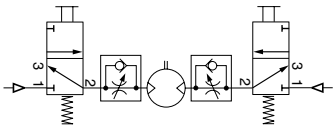
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve

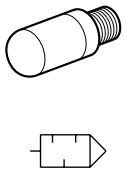


Reversible motor with two 3/2 control valves

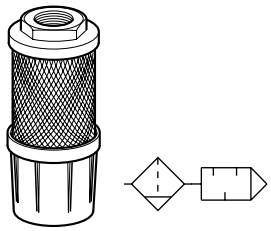
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is 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

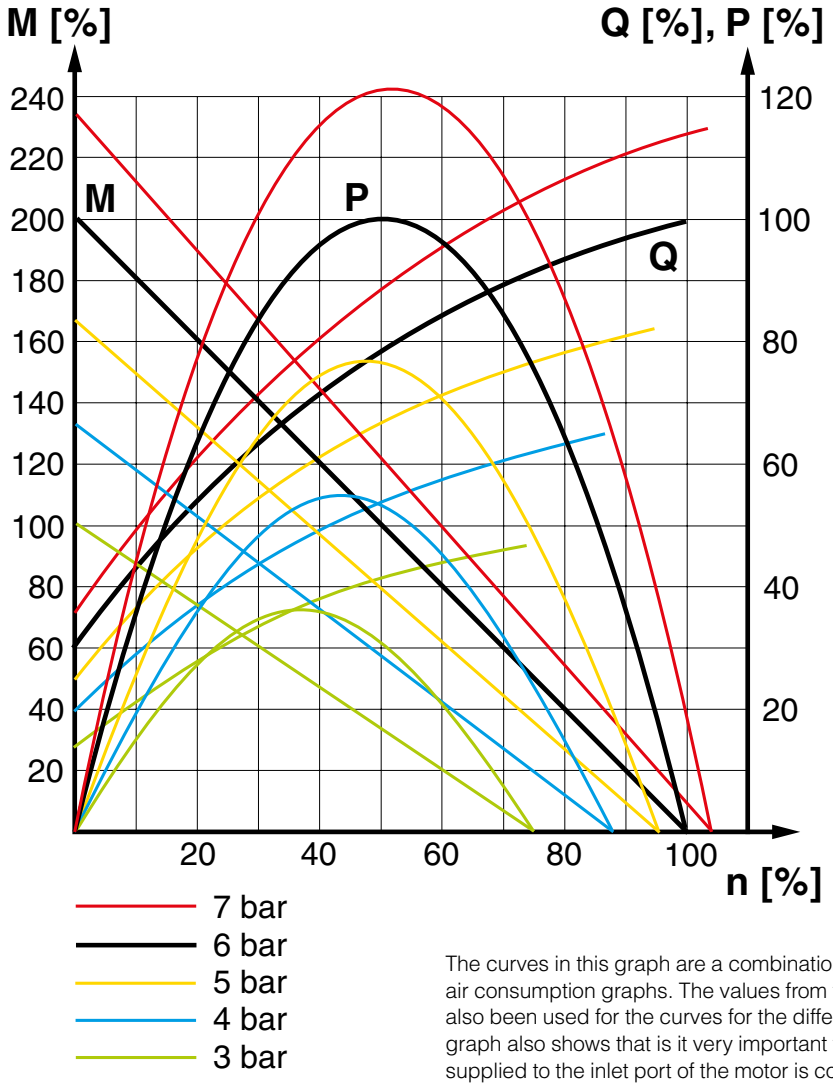
The air motors are supplied as “Components for installation” – the installer is responsible for ensuring that the motors are installed safely in the overall system. Parker Pneumatic guarantees that its products are safe, and as a supplier of pneumatic equipment we ensure that the equipment is designed 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. Nevertheless, most P1V-S motors carry the CE mark because they are ATEX certified (for use in explosive atmospheres).

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
- ATEX Directive (ATEX = ATmosphere EXplosive)

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.

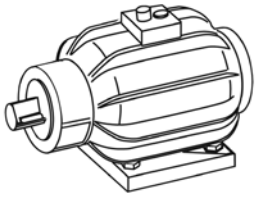
With conventional lubricators, only the oil volume per time unit can be adjusted. If the demand changes, the quantity dispensed still remains constant.

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.

Air Motors

P1V-S, Stainless Steel Type
20 to 1200 Watts

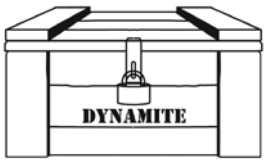
Contents Page



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

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

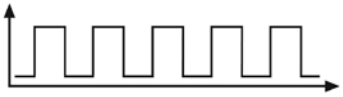
The weight of an air motor is several times less than corresponding electric motors.



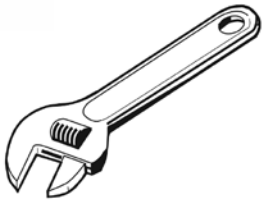
Air motors can be used in the harshest environments. Most P1V-S motors are ATEX certified.

The choice of materials means that they can be used in damp and aggressive environments.

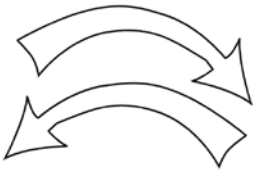
The shape, design and non-lubricated operation allow the motor to be suitable for use in the food industry.



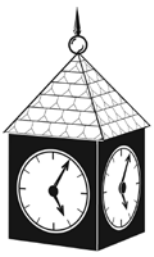
Air motors can be stopped and started continually without damage.



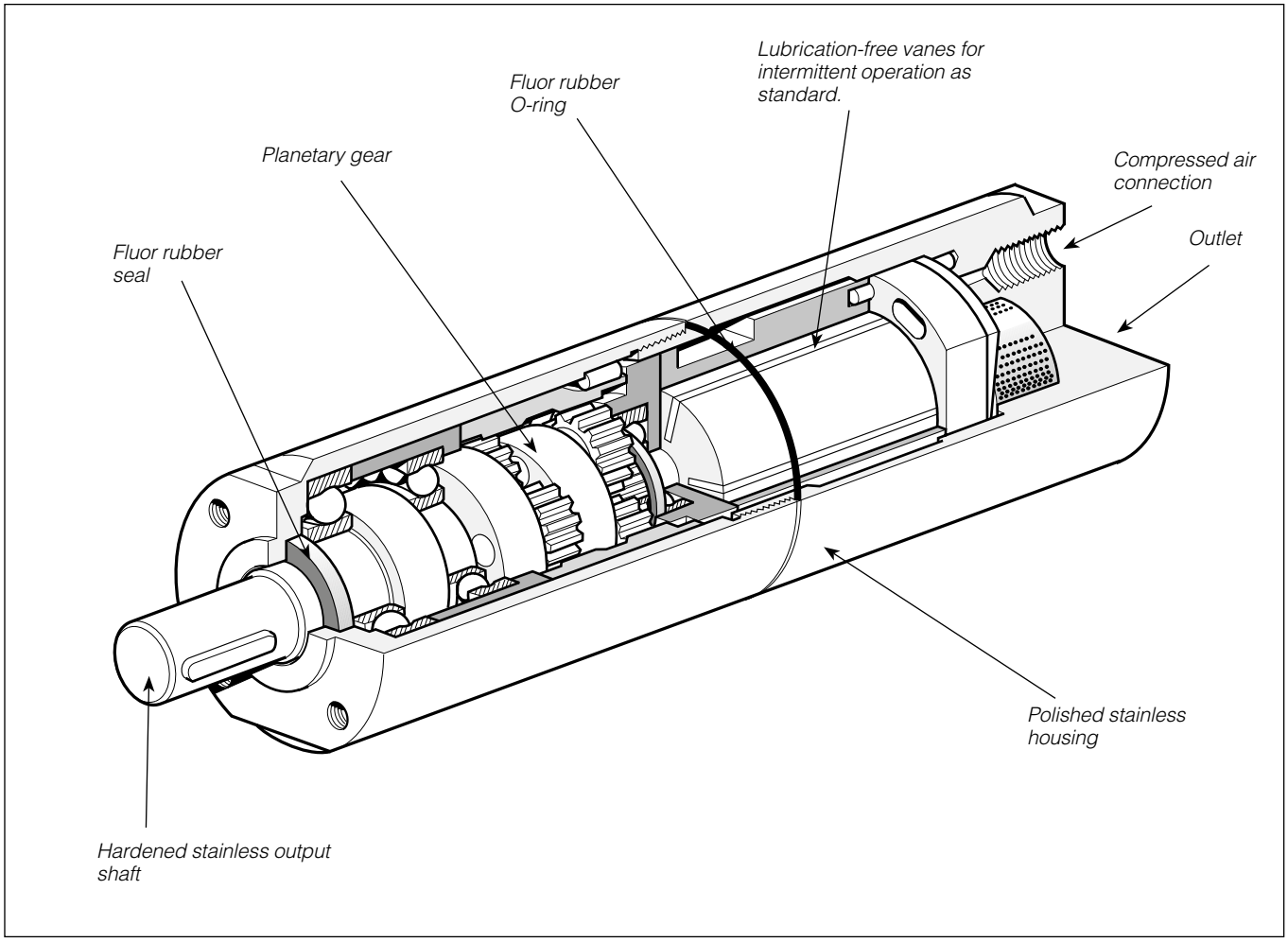
The simple design principle of air motors makes them very easy to service.



The motors are reversible as standard.



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



Stainless Steel Air Motors

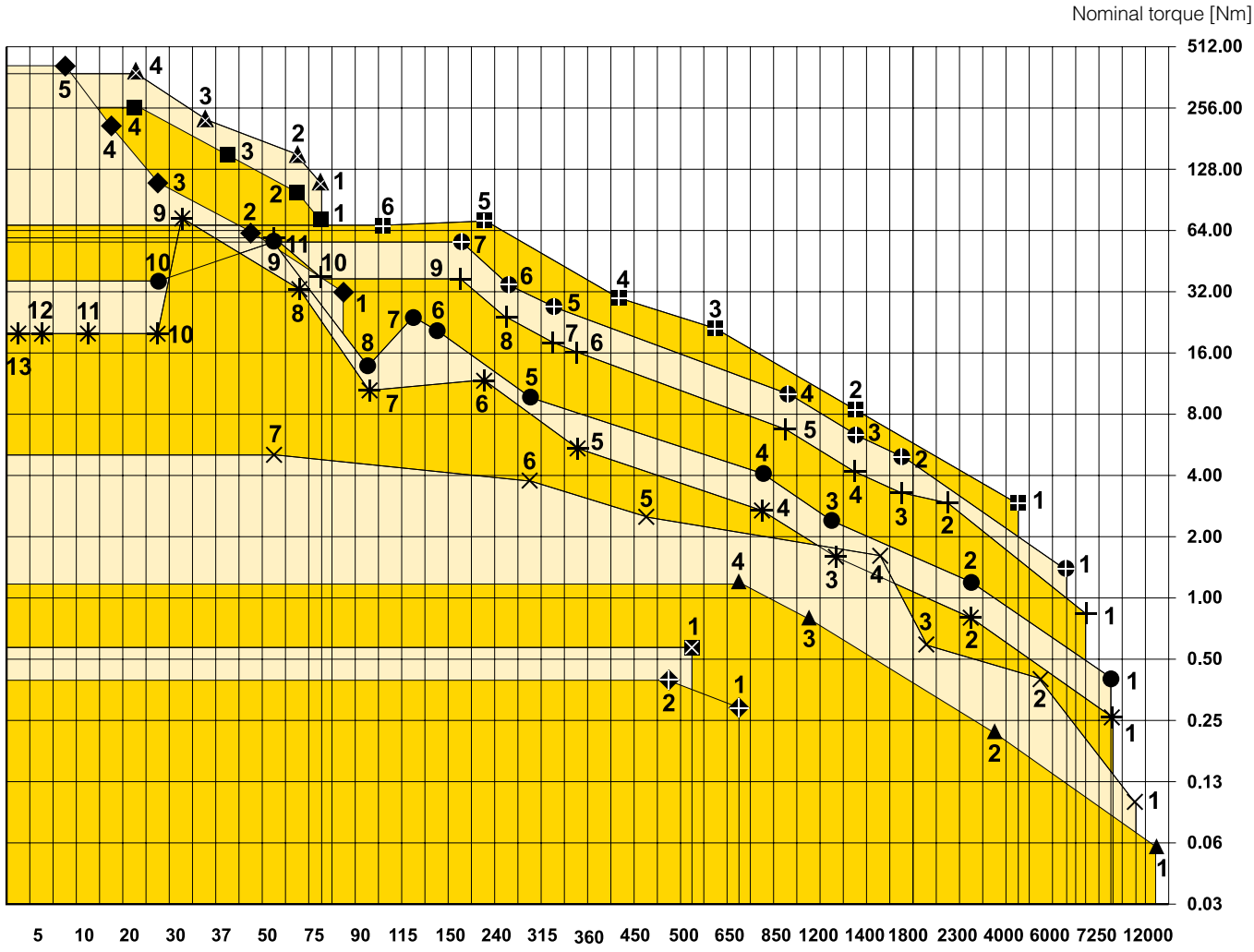
P1V-S is a range of air motors with all external components made of stainless steel, which means that they can be used in food grade applications, and in all other applications where there is a risk of corrosion.

The range contains seven different sizes, with powers ranging from 20 to 1 200 Watts, and speeds from 5 to 24 000 rpm. The air motor and planetary reduction gear are built into a polished stainless steel housing, which is sealed by a fluor rubber O-ring. The output shaft, which is made of polished stainless steel, is also sealed by a fluor rubber seal .

Consideration for achieving a clean, hygienic design was given early on in the development of this range of air motors. Thanks to the cylindrical shape, there are no pockets which can accumulate dirt or bacteria. Additionally, the two halves of the motor body are sealed with an o-ring to prevent contamination. The choice of materials reflects the fact that aggressive cleaning materials are used in food grade applications.

The P1V-S series is designed to be operated in intermittent intervals under non-lubrication conditions. For this reason, no particles of lubricant escape with the exhaust air and the service costs are reduced. This means that the motors can be used directly in food grade applications. The planetary gear, which has one or more reduction stages, is lubricated with an USDA-H1 standard grease, approved for use in food grade applications.

Choice of an air motor



The motor to be used should be selected by starting with the torque needed at a specific shaft 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 oprating point 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 above graph to choose the correct motor size. The graph contains the points for the maximum torque of each motor at maximum output. Add your operating point to the graph, then select a marked point above and to the right of your point.

Then use the correct working diagram of the chosen motor to get more detailed technical data. Always select a motor whose requisite technical data are in the shaded area. Also use the correction diagram to find out what operation with different supply pressures would mean for the motor.

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

P1V-S - Stainless Steel Air Motors

1	P1V-S002A0130	**20 Watt**
2	P1V-S002A0095	**P1V-S002A**

1	P1V-S003B0100	**30 Watt**
		P1V-S003A

1	P1V-S008A0Q00	**80 Watt**
2	P1V-S008A0700	
3	P1V-S008A0190	
4	P1V-S008A0130	**P1V-S008A**

1	P1V-S012A0N00, P1V-S012D0N00	**120 Watt**
2	P1V-S012A0550, P1V-S012D0550	
3	P1V-S012A0360, P1V-S012D0360	
4	P1V-S012A0140, P1V-S012D0140	
5	P1V-S012A0090, P1V-S012D0090	
6	P1V-S012A0060, P1V-S012D0060	
7	P1V-S012A0010, P1V-S012D0010	**P1V-S012**

1	P1V-S020A0E50, P1V-S020D0E50	**200 Watt**
2	P1V-S020A0460, P1V-S020D0460	
3	P1V-S020A0240, P1V-S020D0240	
4	P1V-S020A0140, P1V-S020D0140	
5	P1V-S020A0070, P1V-S020D0070	
6	P1V-S020A0032, P1V-S020D0032	
7	P1V-S020A0018, P1V-S020D0018	
10	P1V-S020A0005, P1V-S020D0005	
11	P1V-S020A0002	
12	P1V-S020A0001	
13	P1V-S020A00005	**P1V-S020**

1	P1V-S030A0E50, P1V-S030D0E50	**High torque**	**300 Watt**
2	P1V-S030A0460, P1V-S030D0460	1 P1V-S028A0017	
3	P1V-S030A0240, P1V-S030D0240	2 P1V-S028A0008	
4	P1V-S030A0140, P1V-S030D0140	3 P1V-S028A0005	
5	P1V-S030A0060, P1V-S030D0060	4 P1V-S028A0003	
6	P1V-S030A0034, P1V-S030D0034	5 P1V-S028A0002	
7	P1V-S030A0023		
8	P1V-S030A0018, P1V-S030D0018		
9	P1V-S030A0010		
10	P1V-S030A0005, P1V-S030D0005		**P1V-S030**

1	P1V-S060A0E00	1 P1V-S057A0015	**600 Watt**
2	P1V-S060A0350	2 P1V-S057A0011	
3	P1V-S060A0270	3 P1V-S057A0007	
4	P1V-S060A0170	4 P1V-S057A0004	
5	P1V-S060A0063		
6	P1V-S060A0048		
7	P1V-S060A0030		
8	P1V-S060A0015		**P1V-S060A**

1	P1V-S090A0C00	1 P1V-S086A0015	**900 Watt**
2	P1V-S090A0350	2 P1V-S086A0011	
3	P1V-S090A0270	3 P1V-S086A0007	
4	P1V-S090A0170	4 P1V-S086A0004	
5	P1V-S060A0063		
6	P1V-S060A0048		
7	P1V-S060A0030		**P1V-S090A**

1	P1V-S120A0900	**1200 Watt**
2	P1V-S120A0250	
3	P1V-S120A0110	
4	P1V-S120A0070	
5	P1V-S120A0032	
6	P1V-S120A0020	**P1V-S120A**

Technical data

Air motor size & type	P1V-S002	P1V-S003	P1V-S008	P1V-S012	P1V-S020	P1V-S030	P1V-S060	P1V-S090	P1V-S120
Nominal power (watts)	20	30	80	120	200	300	600	900	1200
Working pressure (bar)	3 to 7, 6 in explosive atmosphere								
Working temperature (°C)	-20 to +110								
Ambient temperature (°C)	-20 to +40 in explosive atmosphere								
Air flow required (Nl/min)	100	100	230	300	370	470	850	1400	1600
Min pipe ID, inlet (mm)	3	3	4	6	10	10	12	12	19
Min pipe ID, outlet (mm)	3	3	4	6	10	10	12	12	19
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop									
	120	120	260	340	410	510	900	1500	1800
Medium	40µm filtered, oil mist or dry unlubricated compressed air								
Oil free operation, indoor	ISO8573-1 purity class 3.4.1								
Oil free operation, outdoor	ISO8573-1 purity class 1.2.1								
Oil operation	1-2 drop per cube meter, ISO8573-1 purity class 3.-.5								
Recommended oil	Foodstuffs industry Klüber oil 4 UH1- 32 N								
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop									
	140	140	290	380	450	550	950	1600	2000
Sound level free outlet (dB(A))	98	98	95	99	100	103	103	106	108
With outlet silencer (dB(A))	85	85	85	92	82	91	94	88	95
Exhaust air removed with pipes to another room	74	74	71	70	71	70	76	80	87

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.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower.
Data tolerance accuracy -+10%

Material specification

Air motor size & type	P1V-S002	P1V-S003	P1V-S008	P1V-S012	P1V-S020	P1V-S030	P1V-S060	P1V-S090	P1V-S120
Planetary gearbox housing	Stainless steel								
Planetary gearbox housing for last planet stage including installation flange	-	-	-	-		Black oxidised steel (not stainless)	-	-	-
Air motor housing	Stainless steel								
Shaft	Hardened stainless steel								
Key	Hardened stainless steel								
External seal Fluor rubber	Fluor rubber FPM								
Internal steel parts	High grade steel (not stainless)								
Planetary gear grease used in	Grease, Shell Cassida RLS2								
Screws in housing in last planet stage	Surface treated steel (not stainless)								

Accessories	P1V
Flange bracket	Stainless steel
Foot bracket	Stainless steel
Screws for the mountings	Stainless steel DIN A2

Permitted shaft loadings

Max. permitted load on output shaft for motors (based on 10 000 000 rpm at input shaft with 90 % probable service life for ball bearings).

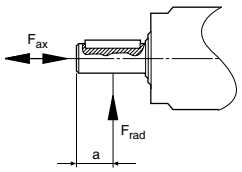


Fig 1: Load on output shaft for basic motor with keyed shaft.

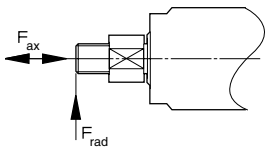


Fig. 2: Load on output shaft for basic motor with threaded shaft.

Motor with keyed shaft

Order code	Fax [N]	Frad [N]	a [mm]
P1V-S002A0130	140	180	6
P1V-S002A0095	140	180	6
P1V-S003B0100	140	180	6
P1V-S008A0Q00	200	220	7
P1V-S008A0700	200	220	7
P1V-S008A0190	200	220	7
P1V-S008A0130	200	220	7
P1V-S012AN00	380	160	9
P1V-S012A550	380	160	9
P1V-S012A360	380	160	9
P1V-S012A140	380	160	9
P1V-S012A090	380	160	9
P1V-S012A060	380	160	9
P1V-S012A010	380	160	9
P1V-S020A0E50	570	720	12
P1V-S020A0460	570	720	12
P1V-S020A0240	570	720	12
P1V-S020A0140	570	720	12
P1V-S020A0070	570	720	12
P1V-S020A0032	570	720	12
P1V-S020A0018	570	720	12
P1V-S020A0005	570	720	12
P1V-S020A0002	570	720	12
P1V-S020A0001	570	720	12
P1V-S020A00005	570	720	12
P1V-S030A0E50	570	1130	14
P1V-S030A0460	570	1130	14
P1V-S030A0240	570	1130	14
P1V-S030A0140	570	1130	14
P1V-S030A0060	790	1070	15
P1V-S030A0034	790	1070	15
P1V-S030A0023	790	1070	15
P1V-S030A0018	790	1070	15
P1V-S030A0010	790	1070	15
P1V-S030A0005	790	1070	15
P1V-S060A0E00	1110	1300	15
P1V-S060A0350	1110	1300	15
P1V-S060A0270	1110	1300	15
P1V-S060A0170	1110	1300	15
P1V-S060A0063	1110	1300	15
P1V-S060A0048	1130	2090	18
P1V-S060A0030	1130	2090	18
P1V-S060A0015	1130	2090	18
P1V-S090A0C00	1110	1300	15
P1V-S090A0350	1110	1300	15
P1V-S090A0270	1110	1300	15
P1V-S090A0170	1110	1300	15
P1V-S090A0063	1110	1300	15
P1V-S090A0048	1130	2090	18
P1V-S090A0030	1130	2090	18
P1V-S120A0900	2330	2260	18
P1V-S120A0250	2330	2260	18
P1V-S120A0110	2330	2260	18
P1V-S120A0070	2330	2700	30
P1V-S120A0032	2330	2700	30
P1V-S120A0020	2330	2700	30
P1V-S028A0017	1500	3500	21
P1V-S028A0008	1500	3500	21
P1V-S028A0005	1500	3500	21
P1V-S028A0003	1500	3500	20
P1V-S028A0002	1500	3500	20
P1V-S057A0015	1500	3500	21
P1V-S057A0011	1500	3500	21
P1V-S057A0007	1500	3500	21
P1V-S057A0004	1500	3500	22.5
P1V-S086A0015	1500	3500	21
P1V-S086A0011	1500	3500	21
P1V-S086A0007	1500	3500	21
P1V-S086A0004	1500	3500	22.5

Motor with threaded shaft

Order code	Fax [N]	Frad [N]	a [mm]
P1V-S012DN00	380	110	0
P1V-S012D550	380	110	0
P1V-S012D360	380	110	0
P1V-S012D140	380	110	0
P1V-S012D090	380	110	0
P1V-S012D060	380	110	0
P1V-S012D010	380	110	0
P1V-S020D0E50	570	450	0
P1V-S020D0460	570	450	0
P1V-S020D0240	570	450	0
P1V-S020D0140	570	450	0
P1V-S020D0070	570	450	0
P1V-S020D0032	570	450	0
P1V-S020D0018	570	450	0
P1V-S020D0005	570	450	0
P1V-S030D0E50	570	860	0
P1V-S030D0460	570	860	0
P1V-S030D0240	570	860	0
P1V-S030D0140	570	860	0
P1V-S030D0060	790	820	0
P1V-S030D0034	790	820	0
P1V-S030D0018	790	820	0
P1V-S030D0005	790	820	0

Frad = Radial loading (N)
Fax = Axial loading (N)
a = distance from shaft's end (mm)

Order key

(This model code can not be used for creating new part numbers except for optional function.
All possible combinations between motor size, function and free speed are in the next pages).

P1V-S | 020 | A | 0 | E50

	Motor size
002	20 W
003	30 W
008	80 W
012	120 W
020	200 W
028	285 W High torque
030	300 W
057	570 W High torque
060	600 W
086	860 W High torque
090	900 W
120	1200 W

	Function
A	Keyed or flattened shaft
B	Keyed or flattened shaft right rotation
D	Threaded shaft

	Optional function
0	Standard vanes
C	Continuous lubrication-free operation
Z*	Standard spring loaded vanes
M*	Cont. spring loaded vanes
D**	Standard with brake
E**	Option C with brake
F**	Option Z with brake
G**	Option M with brake

* Not for P1V-S002, P1V-S003 and P1V-S008

** Only for P1V-S020, P1V-S030 and P1V-S120

	Free speed per min
0005	5
001 … 999	10 … 9990
A00 … E00	10000 … 14000
E50 … N00	14500 … 22000
Q00	24000

	Air motor range
P1V-S	Stainless steel motor

Choice of vanes

0 = Standard vanes	C = Vanes for continuous lubrication-free operation	Z = Standard spring loaded vanes	M = Spring loaded vanes for continuous lubrication-free operation
These motors are of the vane type for intermittent lubrication-free operation. They can operate 70% of the time for up to 15 minutes without lubrication. With lubrication, these motors can operation 100% of the time.	This motor is equipped with vanes for continuous lubrication-free operation. (To obtain the longest possible service life, we recommend no oil in the air.)	All vanes are spring loaded to ensure that they remain pressed against the cylinder when the motor stops. The spring loaded vane option also prevents the vanes from sliding down in their track if vibration is introduced. The spring loaded vanes therefore provide a higher starting torque, improved starting and low speed characteristics, because the leakage over the vanes is reduced to a minimum.	Multi (combination of Z + C) see previous columns

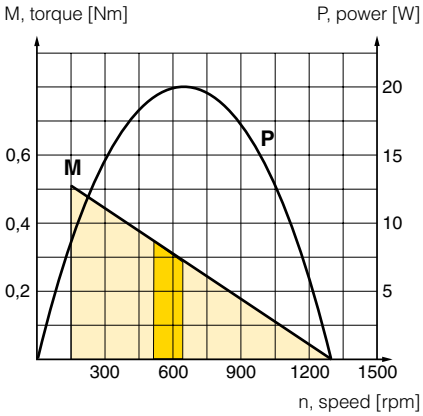
NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

Data for reversible air motor with flattened shaft, P1V-S002A series

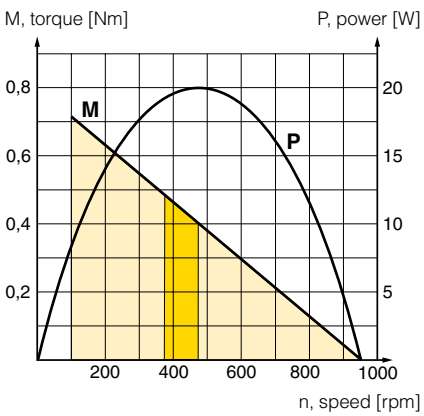
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,02	1300	650	0,29	0,44	1,7	M5	3	0,16	**P1V-S002A0130**
0,02	950	475	0,40	0,60	1,7	M5	3	0,16	**P1V-S002A0095**

NOTE! Not available with vane options C, Z or M.
The P1V-S002A requires oil mist for lubricating the gearbox.
* maximum admissible speed (idling)

P1V-S002A0130



P1V-S002A0095

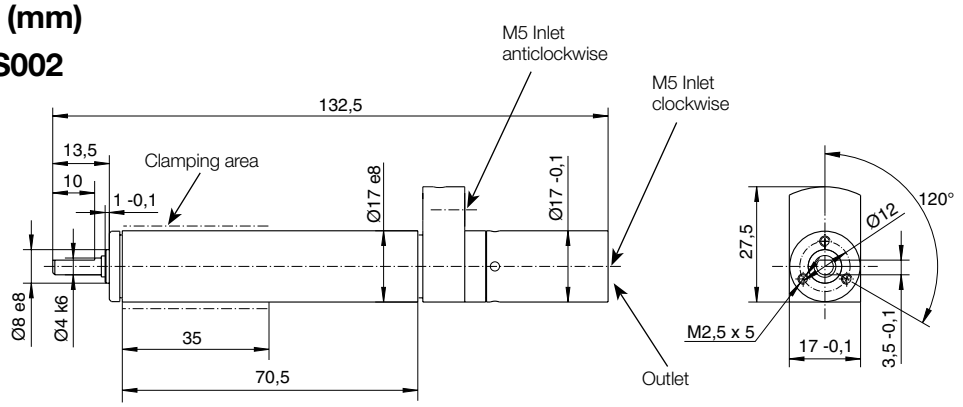


Possible working range of motor.

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

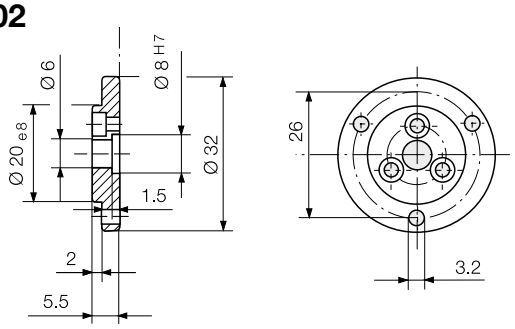
Dimensions (mm)

Motor P1V-S002

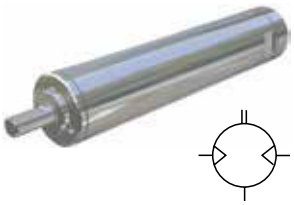


Flange for P1V-S002

P1V-S4002B



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

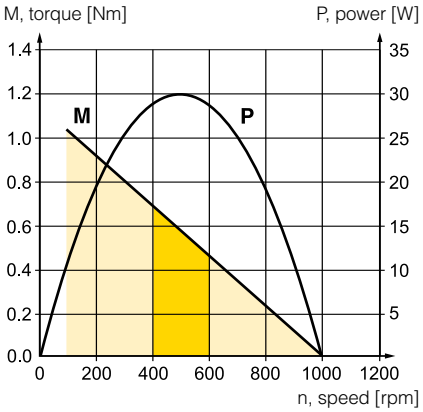


Data for right rotation air motor with flattened shaft, P1V-S003A series

Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,03	1000	500	0,57	0,85	1,7	M8x0,75	3	0,13	**P1V-S003B0100**

NOTE! Not available with vane options C, Z or M.
The P1V-S003A requires oil mist for lubricating the gearbox.
* maximum admissible speed (idling)

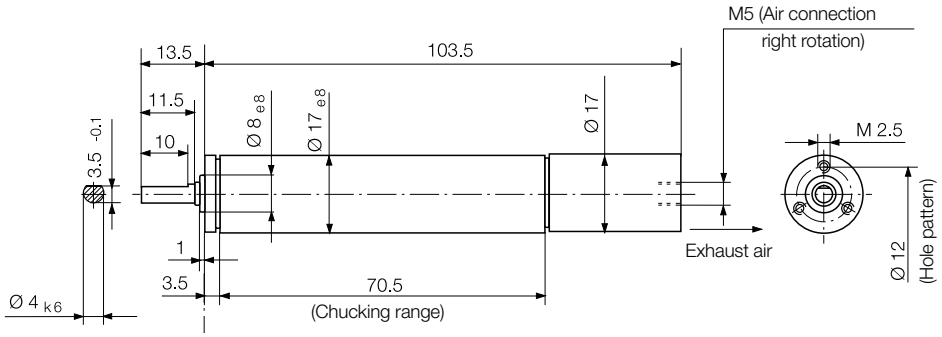
P1V-S003B0100



Possible working range of motor.

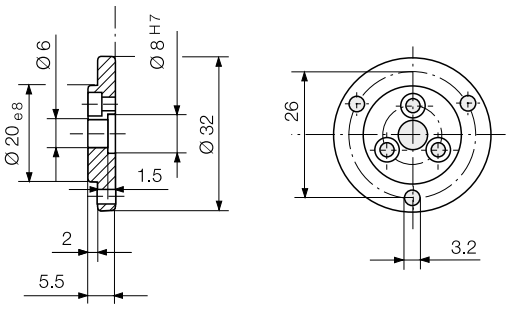
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Motor P1V-S003

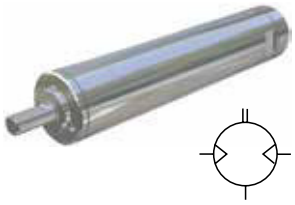


Flange for P1V-S003

P1V-S4002B



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

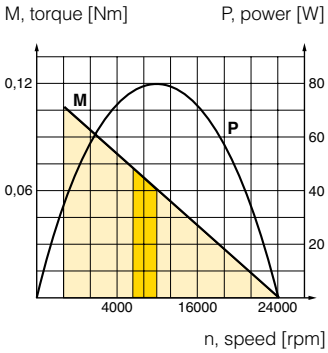


Data for reversible air motor with flattened shaft, P1V-S008A series

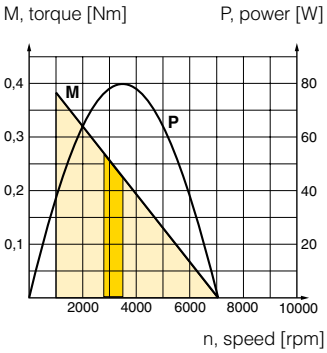
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,08	22000	11000	0,06	0,09	3,8	M8x0,75**	4	0,20	**P1V-S008A0Q00**
0,08	7000	3500	0,22	0,33	3,8	M8x0,75**	4	0,20	**P1V-S008A0700**
0,08	1900	950	0,80	1,20	3,8	M8x0,75**	4	0,22	**P1V-S008A0190**
0,08	1300	650	1,20	1,80	3,8	M8x0,75**	4	0,22	**P1V-S008A0130**

** 3 push in nipples for plastic pipe Ø6/4 supplied
NOTE! Not available with vane options C, Z or M.
The P1V-S008A requires oil mist for lubricating the gearbox.
* maximum admissible speed (idling)

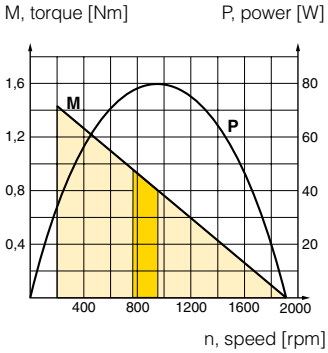
P1V-S008A0Q00



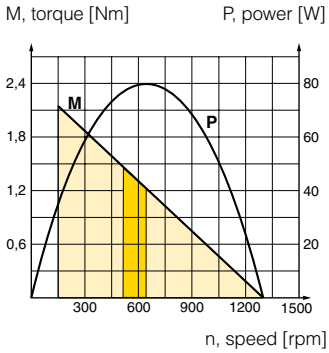
P1V-S008A0700



P1V-S008A0190



P1V-S008A0130

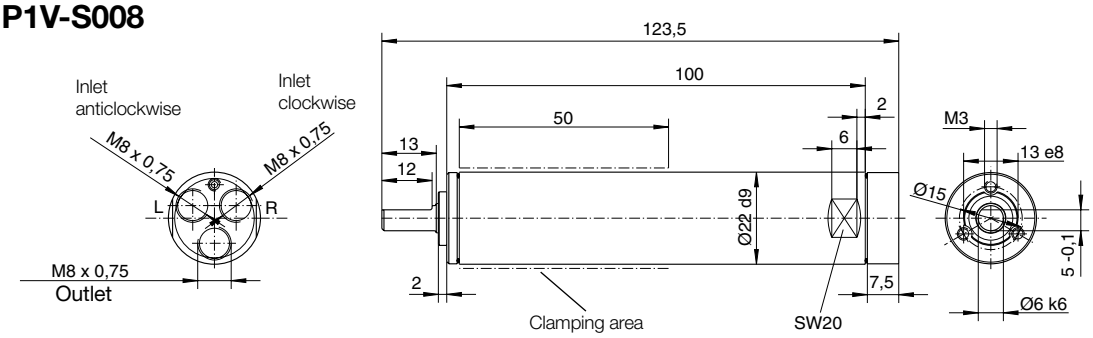


Possible working range of motor.

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

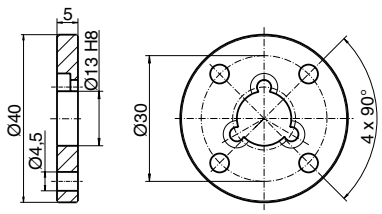
Dimensions (mm)

Motor P1V-S008



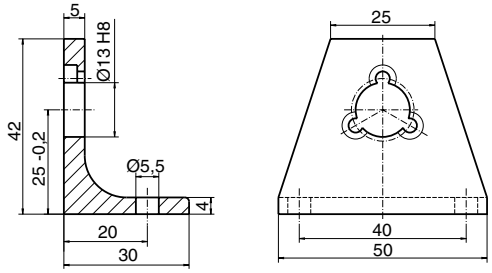
Flange

P1V-S4008B

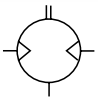


Foot bracket

P1V-S4008F



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%



II2 GD c IIC T6 (80 °C) X

Data for reversible air motor, P1V-S012A series

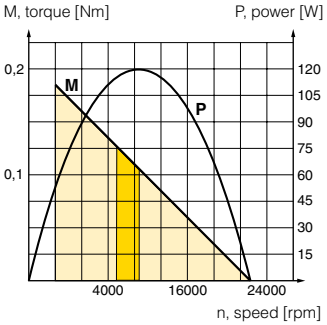
Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,120	22000	11000	0,10	0,15	5,0	G1/8	6	0,350	**P1V-S012•0N00**
0,120	5500	2750	0,40	0,60	5,0	G1/8	6	0,350	**P1V-S012•0550**
0,120	3600	1800	0,60	0,90	5,0	G1/8	6	0,350	**P1V-S012•0360**
0,120	1400	700	1,60	2,40	5,0	G1/8	6	0,400	**P1V-S012•0140**
0,120	900	450	2,50	3,80	5,0	G1/8	6	0,400	**P1V-S012•0090**
0,120	600	300	3,80	5,00**	5,0	G1/8	6	0,400	**P1V-S012•0060**
0,090	100	50	5,00**	5,00**	5,0	G1/8	6	0,450	**P1V-S012•0010**

** Max permitted torque for the gearbox

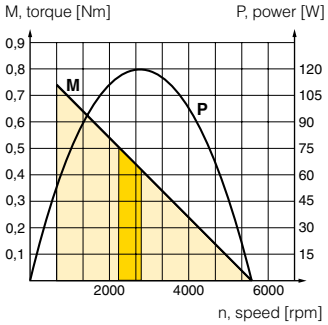
* maximum admissible speed (idling)
The P1V-S012D with threaded shaft may be reversed, but when operated anticlockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

• A letter for keyed shaft, D for threaded end shaft

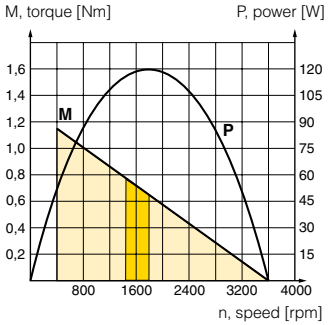
P1V-S012•0N00



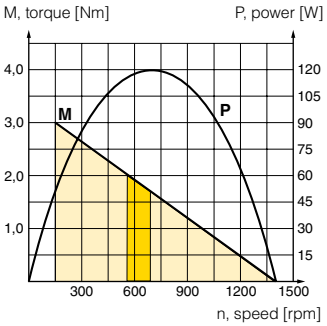
P1V-S012•0550



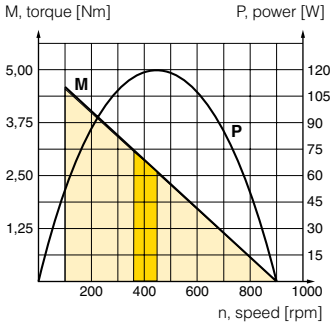
P1V-S012•0360



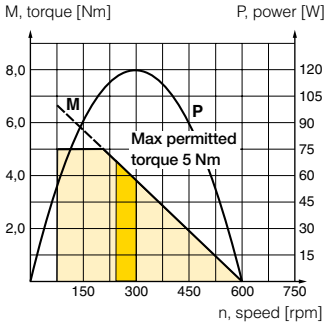
P1V-S012•0140



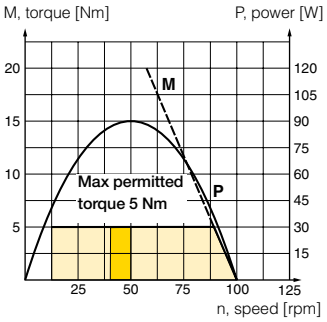
P1V-S012•0090



P1V-S012•0060



P1V-S012•0010

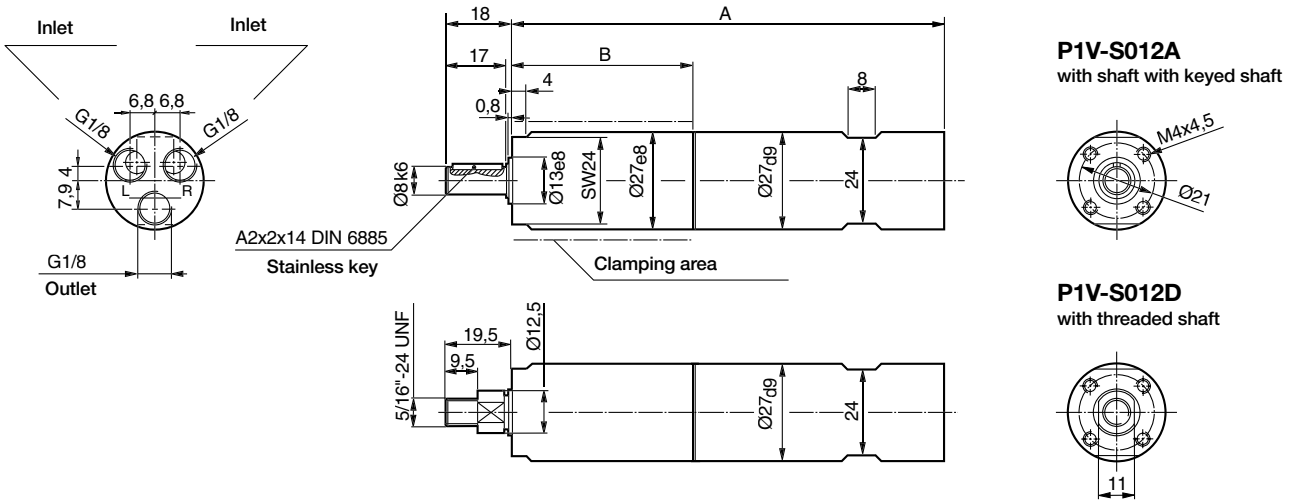


Possible working range of motor.

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

Dimensions (mm)

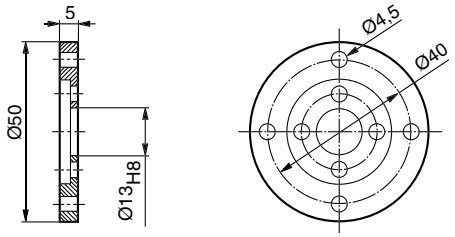
Motor P1V-S012



	A	B
P1V-S012A0N00, P1V-S012D0N00	117,0	46,5
P1V-S012A0550, P1V-S012D0550	117,0	46,5
P1V-S012A0360, P1V-S012D0360	117,0	46,5
P1V-S012A0140, P1V-S012D0140	129,5	59,0
P1V-S012A0090, P1V-S012D0090	129,5	59,0
P1V-S012A0060, P1V-S012D0060	129,5	59,0
P1V-S012A0010, P1V-S012D0010	142,0	71,5

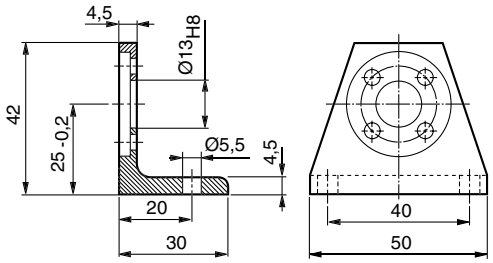
Flange

P1V-S4012B



Foot bracket

P1V-S4012F



P1V-S - Stainless Steel Air Motors

200 watts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S020A series

Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,200	14500	7250	0,26	0,40	6,2	G1/8	10	0,700	**P1V-S020•0E50**
0,200	4600	2300	0,80	1,20	6,2	G1/8	10	0,750	**P1V-S020•0460**
0,200	2400	1200	1,60	2,40	6,2	G1/8	10	0,750	**P1V-S020•0240**
0,200	1400	700	2,70	4,10	6,2	G1/8	10	0,850	**P1V-S020•0140**
0,200	700	350	5,40	8,20	6,2	G1/8	10	0,850	**P1V-S020•0070**
0,200	320	160	12,00	18,00	6,2	G1/8	10	0,850	**P1V-S020•0032**
0,100	180	90	10,50	15,00	4,5	G1/8	10	0,850	**P1V-S020•0018**
0,180	50	25	20**	20**	6,2	G1/8	10	0,950	**P1V-S020•0005**
0,180	20	–	20**	20**	6,2	G1/8	10	0,950	**P1V-S020A0002**
0,180	10	–	20**	20**	6,2	G1/8	10	1,050	**P1V-S020A0001**
0,180	5	–	20**	20**	6,2	G1/8	10	1,050	**P1V-S020A00005**

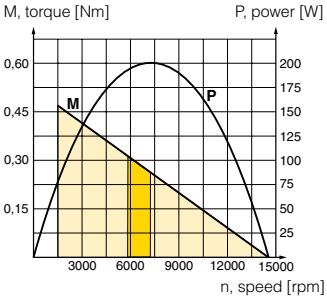
** Max permitted torque to not damage the gearbox.
* maximum admissible speed (idling)
The P1V-S020D with threaded shaft may be reversed, but when operated anticlockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

Possible working range of motor.

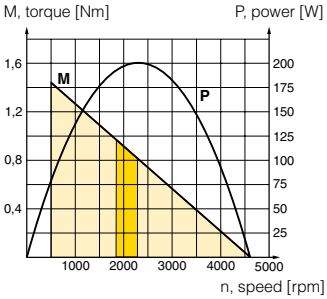
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

- A letter for keyed shaft, D for threaded end shaft

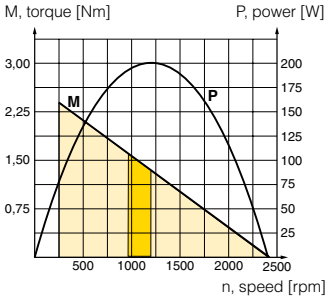
P1V-S020•0E50



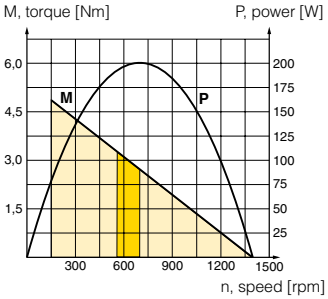
P1V-S020•0460



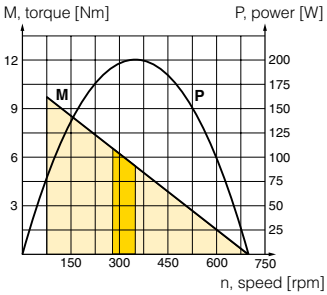
P1V-S020•0240



P1V-S020•0140



P1V-S020•0070



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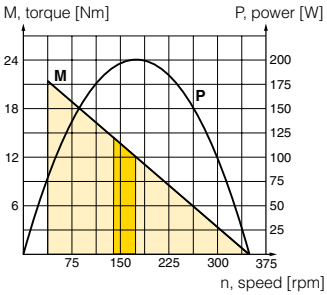

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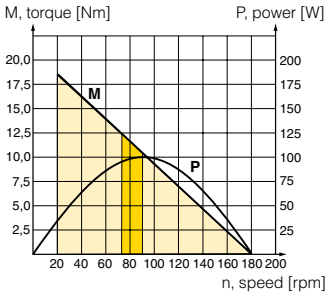
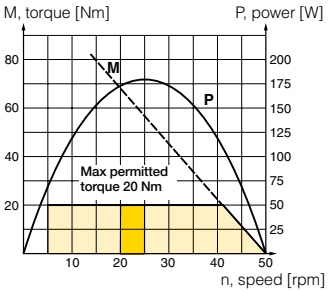
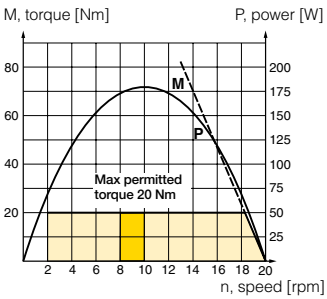


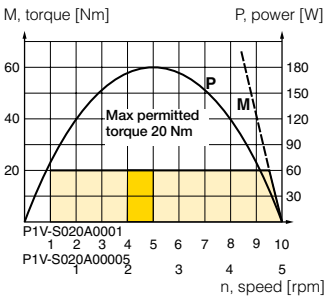
P1V-S020•0005



P1V-S020A0002



P1V-S020A0001 & P1V-S020A00005



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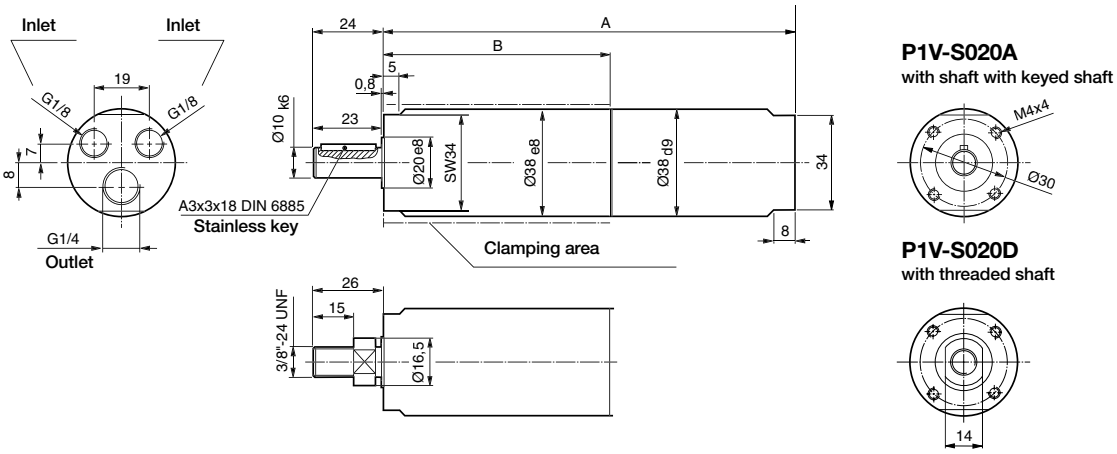
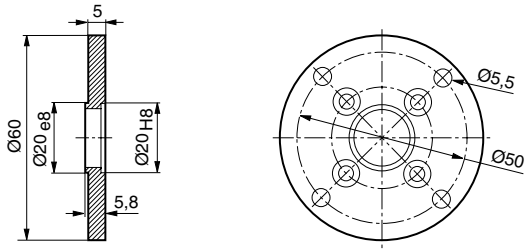
Pneumatic Division - Europe

Dimensions (mm)
Motor P1V-S020

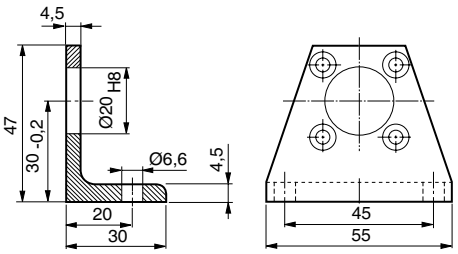


	A	B
P1V-S020A0E50, P1V-S020D0E50	127	63,5
P1V-S020A0460, P1V-S020D0460	127	63,5
P1V-S020A0240, P1V-S020D0240	127	63,5
P1V-S020A0140, P1V-S020D0140	143	79,5
P1V-S020A0070, P1V-S020D0070	143	79,5
P1V-S020A0032, P1V-S020D0032	143	79,5
P1V-S020A0018, P1V-S020D0018	143	79,5
P1V-S020A0005, P1V-S020D0005	159	95,5
P1V-S020A0002	159	95,5
P1V-S020A0001	175	111,5
P1V-S020A00005	175	111,5

Flange
P1V-S4020B



Foot bracket
P1V-S4020F



P1V-S - Stainless Steel Air Motors

300 watts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S030A series

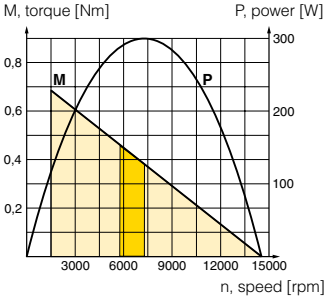
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,300	14500	7250	0,40	0,60	7,8	G1/4	10	1,000	**P1V-S030•0E50**
0,300	4600	2300	1,20	1,90	7,8	G1/4	10	1,050	**P1V-S030•0460**
0,300	2400	1200	2,40	3,60	7,8	G1/4	10	1,050	**P1V-S030•0240**
0,300	1400	700	4,10	6,10	7,8	G1/4	10	1,100	**P1V-S030•0140**
0,300	600	300	9,60	14,30	7,8	G1/4	10	1,150	**P1V-S030•0060**
0,300	340	170	16,90	25,30	7,8	G1/4	10	1,150	**P1V-S030•0034**
0,300	230	115	24,00	36,00	7,8	G1/4	10	3,300	**P1V-S030A0023**
0,130	180	90	13,80	21,00	4,7	G1/4	10	1,150	**P1V-S030•0018**
0,300	100	50	57,00	85,50	7,8	G1/4	10	3,300	**P1V-S030A0010**
0,280	50	25	36**	36**	7,8	G1/4	10	1,250	**P1V-S030•0005**

** Max permitted torque to not damage the gearbox.

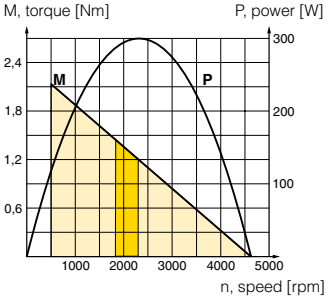
* maximum admissible speed (idling)
The P1V-S030D with threaded shaft may be reversed, but when operated anticlockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

- A letter for keyed shaft, D for threaded end shaft

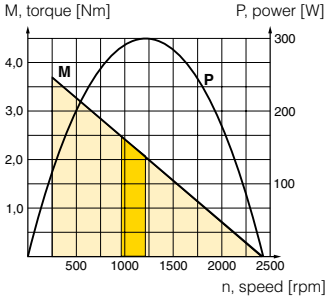
P1V-S030•0E50



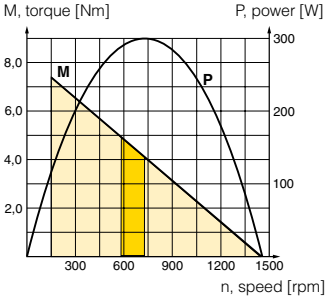
P1V-S030•0460



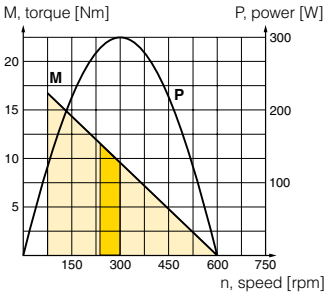
P1V-S030•0240



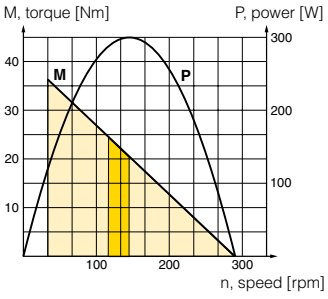
P1V-S030•0140



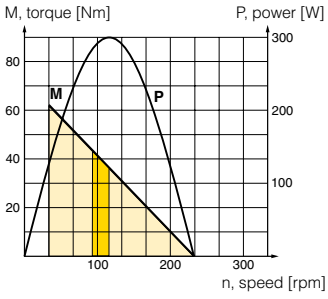
P1V-S030•0060



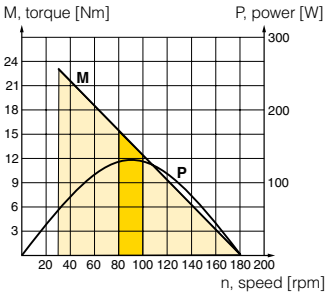
P1V-S030•0034



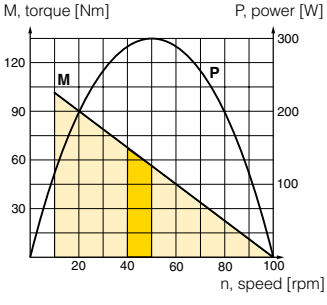
P1V-S030A0023



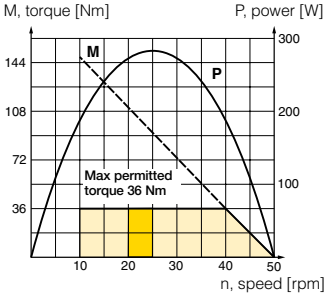
P1V-S030•0018



P1V-S030A0010



P1V-S030•0005



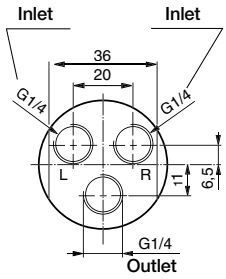
Possible working range of motor.

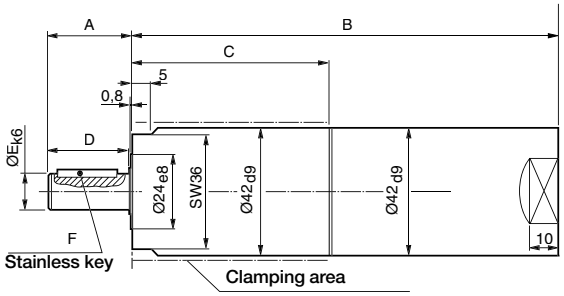
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

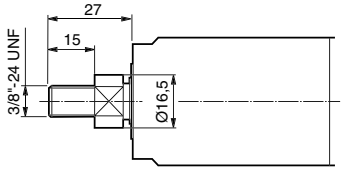
Parker Hannifin Corporation
Pneumatic Division - Europe

Dimensions (mm)

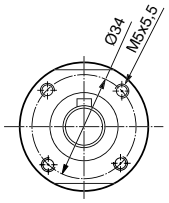
Motor P1V-S030



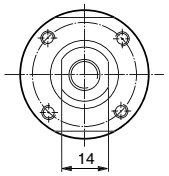




P1V-S030A
with shaft with keyed shaft



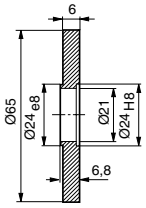
P1V-S030D
with threaded shaft

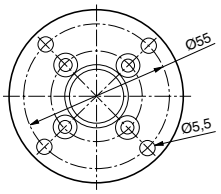


	A	B	C	D	E	F
P1V-S030A0E50, P1V-S030D0E50	28,5	143	66	27	12	A4x4x20 DIN 6885
P1V-S030A0460, P1V-S030D0460	28,5	143	66	27	12	A4x4x20 DIN 6885
P1V-S030A0240, P1V-S030D0240	28,5	143	66	27	12	A4x4x20 DIN 6885
P1V-S030A0140, P1V-S030D0140	28,5	159	82	27	12	A4x4x20 DIN 6885
P1V-S030A0060, P1V-S030D0060	32,0	159	82	30	14	A5x5x20 DIN 6885
P1V-S030A0034, P1V-S030D0034	32,0	159	82	30	14	A5x5x20 DIN 6885
P1V-S030A0018, P1V-S030D0018	32,0	159	82	30	14	A5x5x20 DIN 6885
P1V-S030A0005, P1V-S030D0005	32,0	164	82	30	14	A5x5x20 DIN 6885

Flange

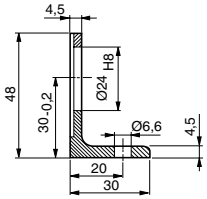
P1V-S4030B

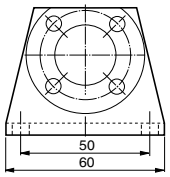




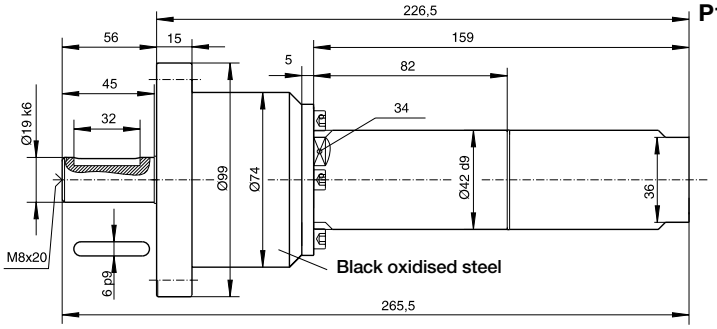
Foot bracket

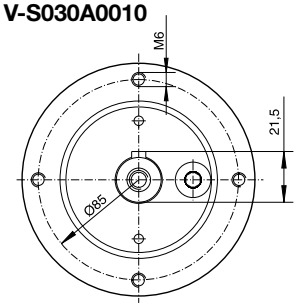
P1V-S4030F





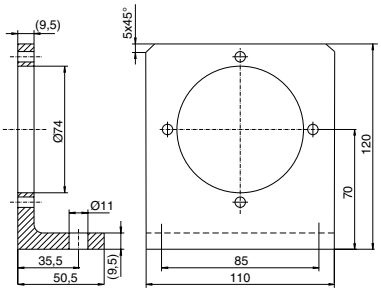
P1V-S030A0023
P1V-S030A0010





Foot bracket for motors
P1V-S030A0023 and P1V-S030A0010

P1V-S4020C



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

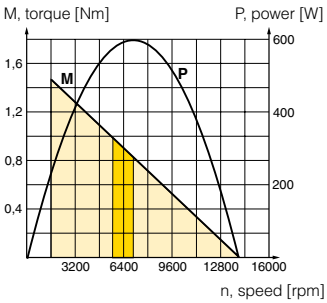
II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S060A series

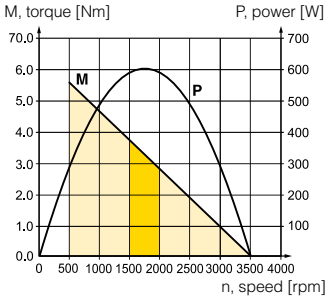
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,600	14000	7000	0,82	1,23	14,2	G3/8	12	2,200	**P1V-S060A0E00**
0,600	3500	1750	3,20	4,80	14,2	G3/8	12	2,300	**P1V-S060A0350**
0,600	2700	1350	4,20	6,40	14,2	G3/8	12	2,300	**P1V-S060A0270**
0,600	1700	850	6,70	10,10	14,2	G3/8	12	2,300	**P1V-S060A0170**
0,600	630	315	18,00	27,00	14,2	G3/8	12	2,600	**P1V-S060A0063**
0,600	480	240	24,00	36,00	14,2	G3/8	12	2,700	**P1V-S060A0048**
0,600	300	150	38,00	57,00	14,2	G3/8	12	2,700	**P1V-S060A0030**
0,300	150	75	38,00	57,00	14,2	G3/8	12	2,700	**P1V-S060A0015**

* maximum admissible speed (idling)

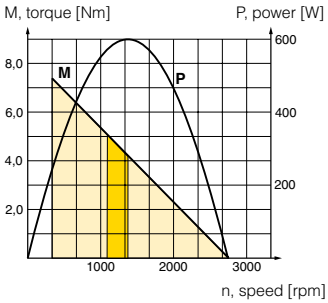
P1V-S060A0E00



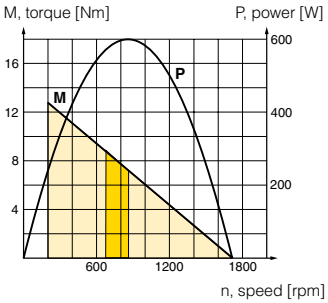
P1V-S060A0350



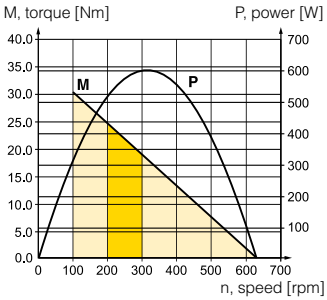
P1V-S060A0270



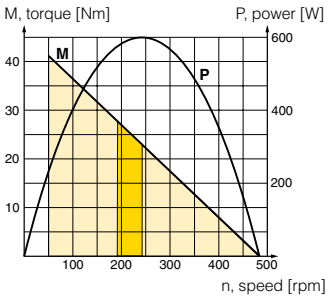
P1V-S060A0170



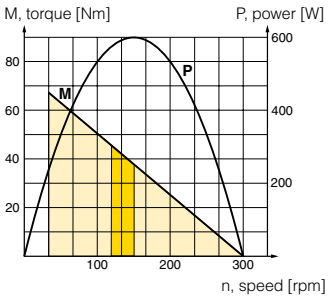
P1V-S060A0063



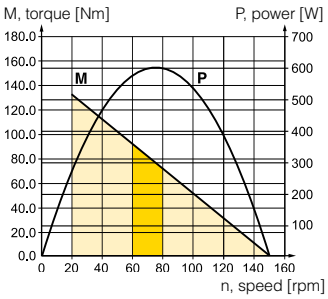
P1V-S060A0048



P1V-S060A0030



P1V-S060A0015

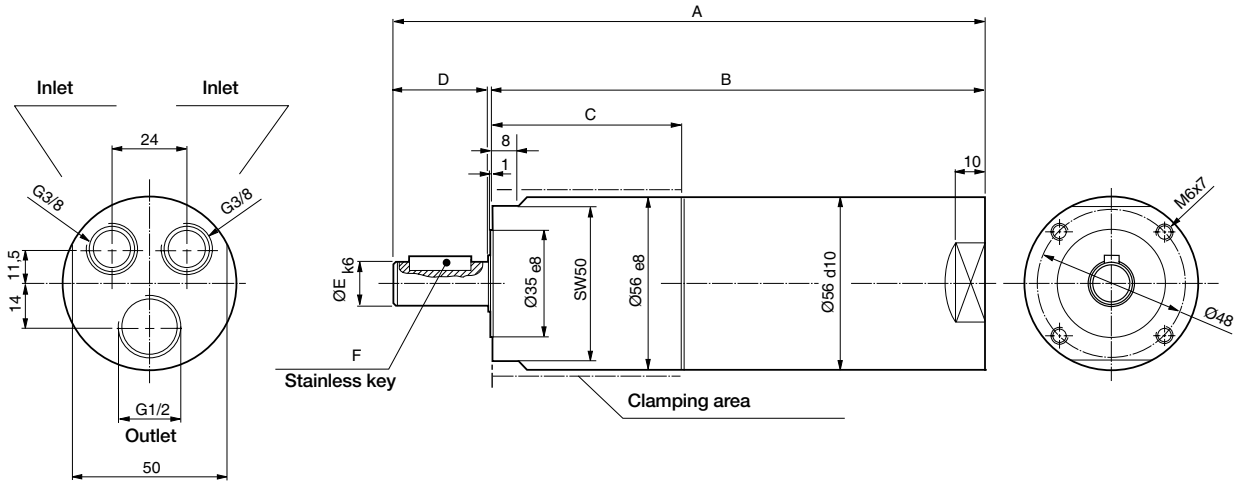


Possible working range of motor.

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

Dimensions (mm)

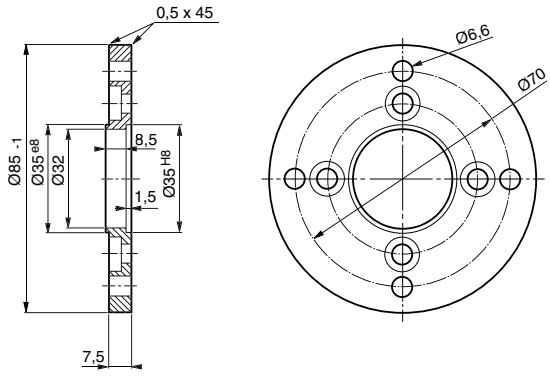
Motor P1V-S060



	A	B	C	D	E	F
P1V-S060A0E00	197	165,5	66	30	14	A5x5x20 DIN 6885
P1V-S060A0350	197	165,5	66	30,5	14	A5x5x20 DIN 6885
P1V-S060A0270	197	165,5	66	30,5	14	A5x5x20 DIN 6885
P1V-S060A0170	197	165,5	66	30,5	14	A5x5x20 DIN 6885
P1V-S060A0063	215	183,5	84	30,5	14	A5x5x20 DIN 6885
P1V-S060A0048	217	180,0	80,5	36	19	A6x6x22 DIN 6885
P1V-S060A0030	217	180,0	80,5	36	19	A6x6x22 DIN 6885
P1V-S060A0015	217	180,0	80	35	19	A6x6x22 DIN 6885

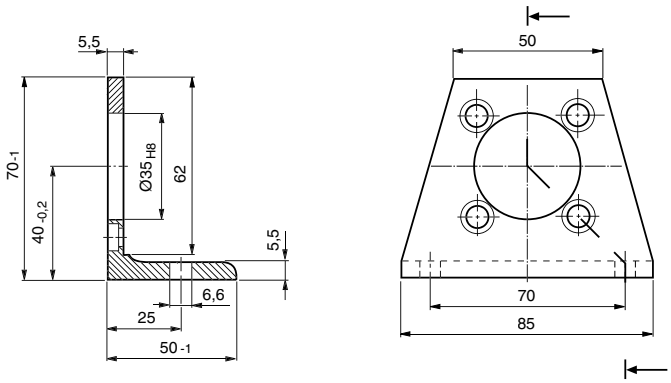
Flange

P1V-S4060B



Foot bracket

P1V-S4060F



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

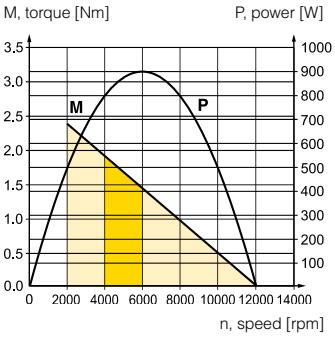
II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S090A series

Max power kW	Free speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,900	12000	6000	1,40	2,10	23,3	G1/2	12	2,500	**P1V-S090A0C00**
0,900	3500	1750	4,90	7,30	23,3	G1/2	12	2,600	**P1V-S090A0350**
0,900	2700	1350	6,30	9,50	23,3	G1/2	12	2,600	**P1V-S090A0270**
0,900	1700	850	10,10	15,20	23,3	G1/2	12	2,600	**P1V-S090A0170**
0,900	630	315	27,00	40,00	23,3	G1/2	12	2,900	**P1V-S090A0063**
0,900	480	240	35,00	53,00	23,3	G1/2	12	3,000	**P1V-S090A0048**
0,900	300	150	57,00	85,00	23,3	G1/2	12	3,000	**P1V-S090A0030**

** Max permitted torque to not damage the gearbox.
* Maximum admissible speed (idling)

P1V-S090A0C00



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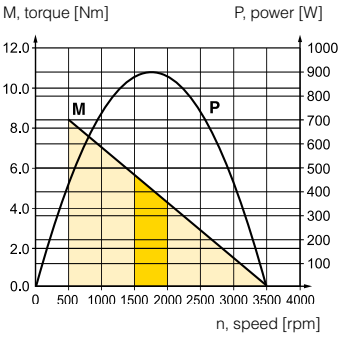
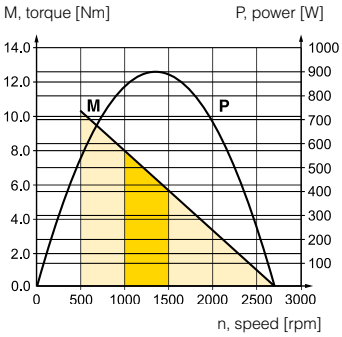


P1V-S090A0270



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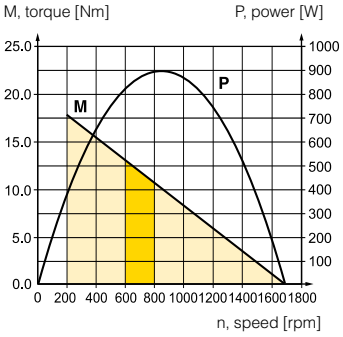

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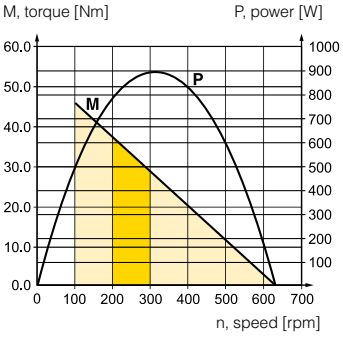

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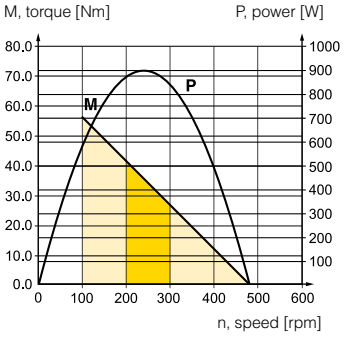

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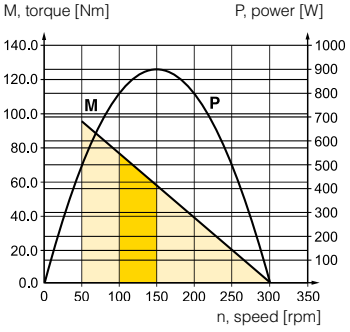
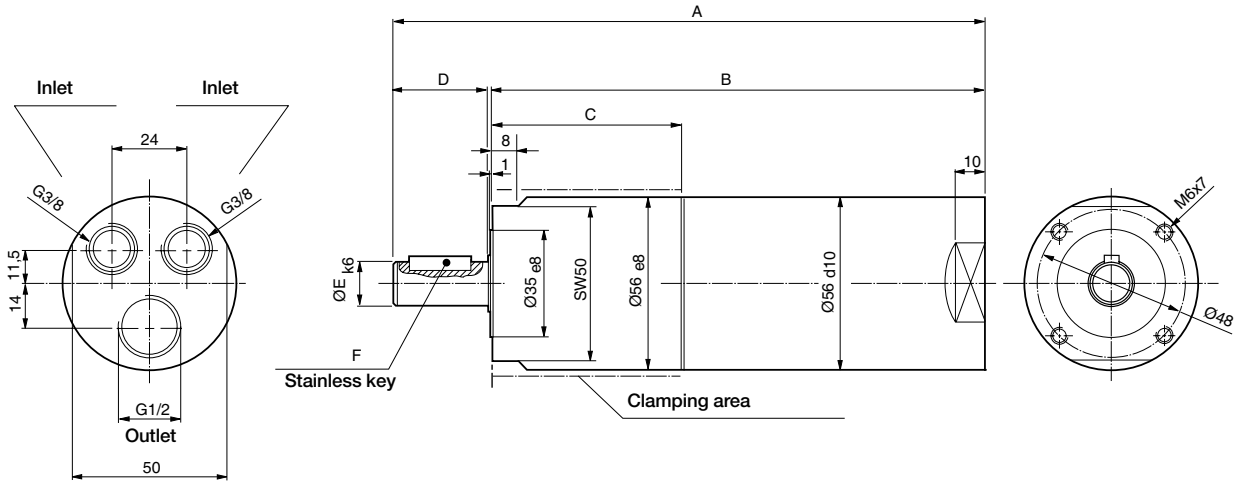


Possible working range of motor.

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

Dimensions (mm)

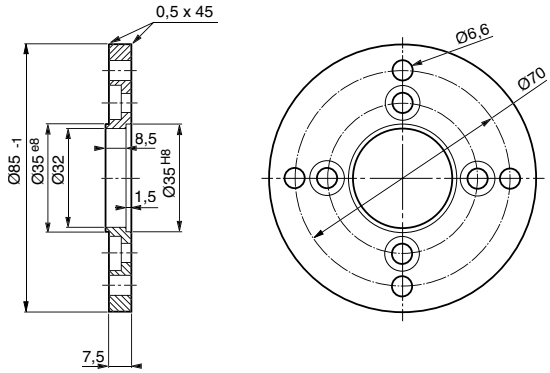
Motor P1V-S090



	A	B	C	D	E	F
P1V-S090A0C00	217	185,5	67	30,5	14	A5x5x20 DIN 6885
P1V-S090A0350	217	185,5	67	30,5	14	A5x5x20 DIN 6885
P1V-S090A0270	217	185,5	67	30,5	14	A5x5x20 DIN 6885
P1V-S090A0170	217	185,5	67	30,5	14	A5x5x20 DIN 6885
P1V-S090A0063	235	203,5	85	30,5	14	A5x5x20 DIN 6885
P1V-S090A0048	237	200,0	81	36	19	A6x6x22 DIN 6885
P1V-S090A0030	237	200,0	81	36	19	A6x6x22 DIN 6885

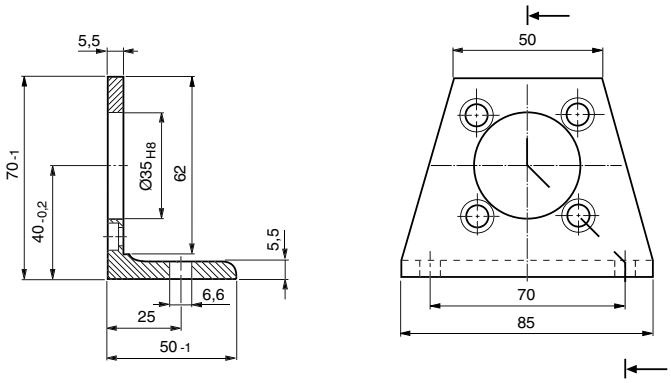
Flange

P1V-S4060B



Foot bracket

P1V-S4060F



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

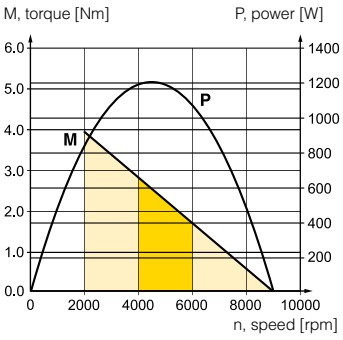
II2 GD c IIC T5 (95 °C) X

Data for reversible air motor with keyed shaft, P1V-S120A series

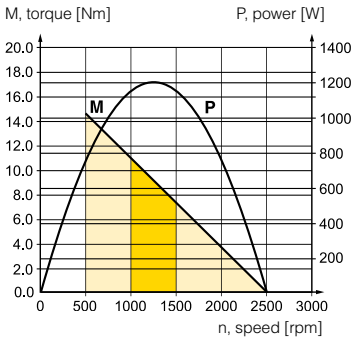
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
1,200	9000	4500	2,50	3,80	26,7	G3/4	19	5,5	**P1V-S120A0900**
1,200	2500	1250	9,20	13,70	26,7	G3/4	19	5,5	**P1V-S120A0250**
1,200	1100	550	21,00	31,00	26,7	G3/4	19	6,1	**P1V-S120A0110**
1,200	700	350	33,00	49,00	26,7	G3/4	19	5,6	**P1V-S120A0070**
1,200	320	160	71,00	107,00	26,7	G3/4	19	6,7	**P1V-S120A0032**
0,700	200	100	66,90	100.00	19	G3/4	19	6,7	**P1V-S120A0020**

* Maximum admissible speed (idling)

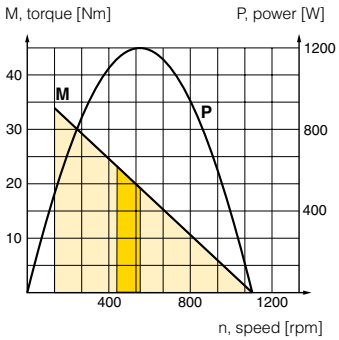
P1V-S120A0900



P1V-S120A0250



P1V-S120A0110



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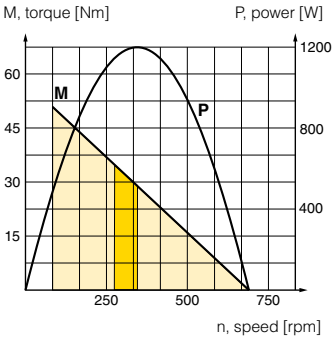

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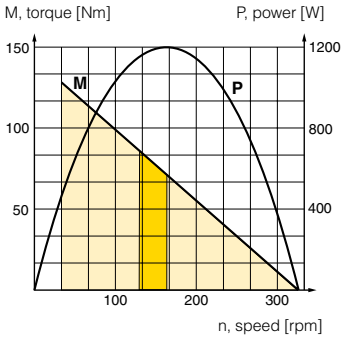
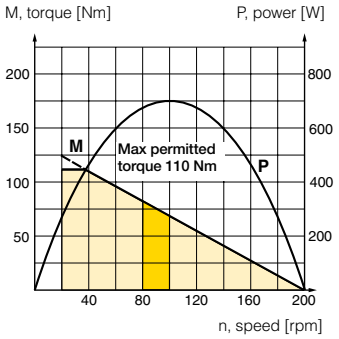


P1V-S120A0020



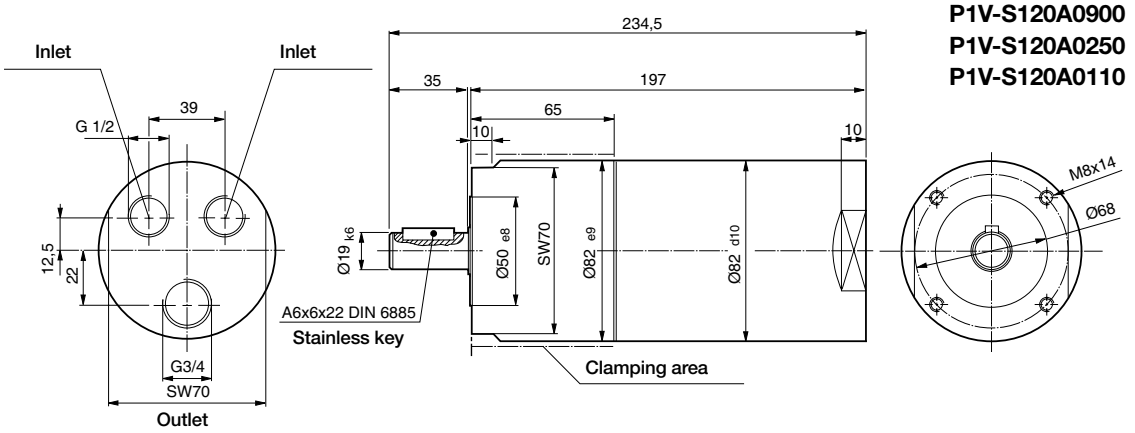
Possible working range of motor.

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

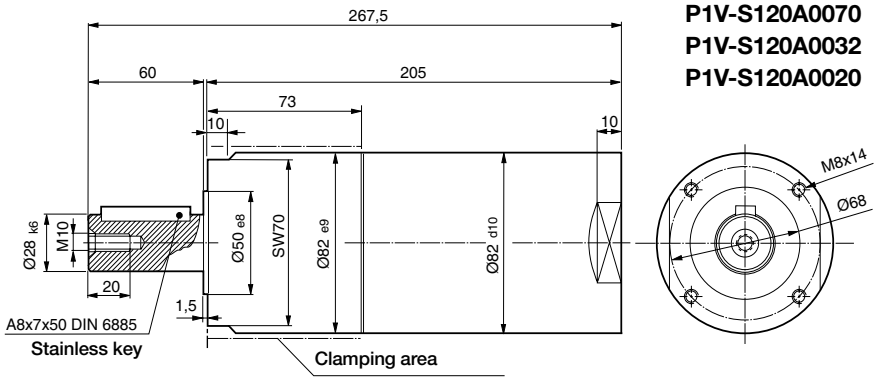
Dimensions (mm)

Motor P1V-S120

P1V-S120A0900
P1V-S120A0250
P1V-S120A0110

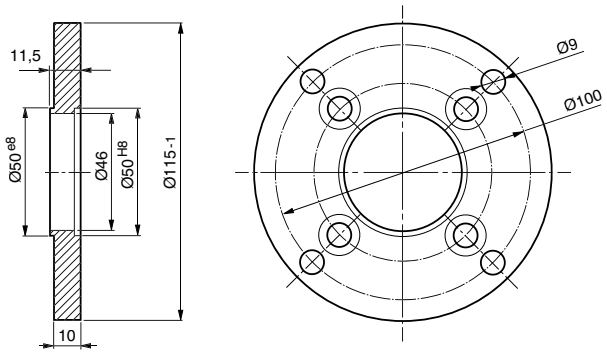


P1V-S120A0070
P1V-S120A0032
P1V-S120A0020



Flange

P1V-S4120B



Foot bracket

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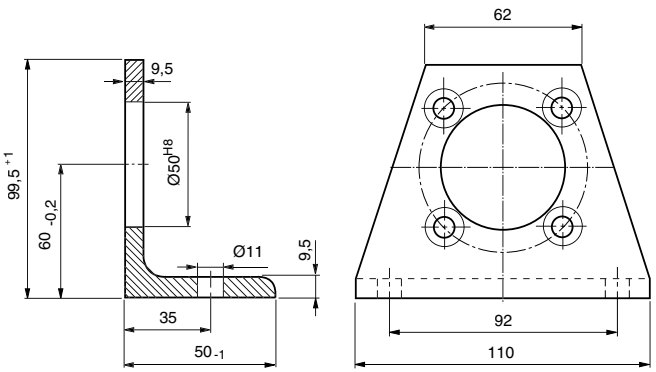
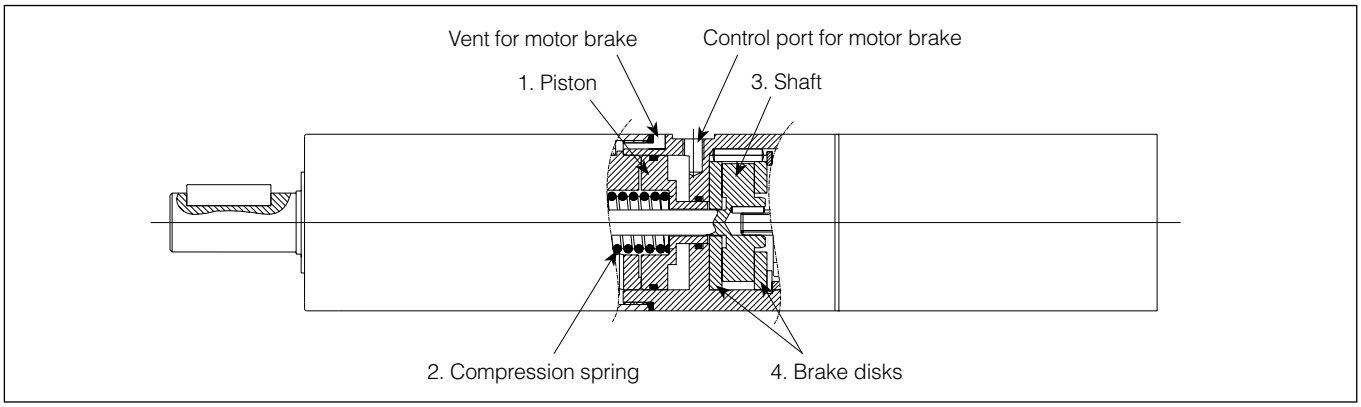


Air Motors

P1V-S Stainless Steel with Brake Type
200, 300 & 1200 Watts

Contents Page

Introduction



Applications

The integrated brake is a spring-loaded disk brake, which is released at a minimum air pressure of 5 bar. The brake is applied in the absence of pressure. As soon as the control port for the brake is placed under pressure, the piston (1) is pressurised and the spring (2) is compressed. The motor can now start and the torque is passed to the shaft (3). The ventilation air from the brake is connected with the atmosphere. In order to brake the motor, the control air to the brake is simply vented. The piston (1) is pushed to the right by the spring (2), and the axle (3) is jammed between the two brake disks (4).

The technology and the size of air motors with stationary brake make them ideal for applications requiring short stops after having cutting air pressure inside the air motors for blocking the rotation. Another typical application for brake motors is when the output shaft needs to be held in one position when the motor stops delivering torque and must stays in position. The brake can handle more than 1500 braking operations per hour at maximum braking torque.

Disassembly and Reassembly

Detach the connections with the motor and gearbox. Pull off the motor and gearbox part. The brake disks can be lifted off after the lock ring has been removed.

Service and Maintenance

After 20 000 braking operations as a stationary brake or 10 000 braking operations as an operating brake, the brake must be disassembled in order to check for wear.

Warning:

If the number of braking operations is exceeded, the degree of wear might be greater than permitted and the braking effect might be lost. If this happens, you simply need to replace the worn brake linings. Tests show that the brake lining needs to be replaced after approx. 90 000 braking cycles.

NOTE!
Brake motors must only ever be supplied with unlubricated air, otherwise there is a risk of oil from the supply air getting into the brake unit, resulting in poor brake performance or no braking effect.

Air motor size & type	200 watts, ••• = 020		300 watts, ••• = 030		1200 watts, ••• = 120	
	Motor Max torque Nm	Theoretical min braking torque Nm	Motor Max torque Nm	Theoretical min braking torque Nm	Motor Max torque Nm	Theoretical min braking torque Nm
P1V-S•••ADE50	0.52	1	0.8	1	-	-
P1V-S120AD900	-	-	-	-	5	6.2
P1V-S•••AD460	1.6	3.4	2.4	34	-	-
P1V-S120AD250	-	-	-	-	18.4	2.3
P1V-S•••AD240	3.2	6.7	4.8	6.7	-	-
P1V-S•••AD140	5.4	11.8	8.2	11.8	-	-
P1V-S120AD110	-	-	-	-	42	52
P1V-S•••AD070	10.8	20	-	-	66	83
P1V-S•••AD034	-	-	19.2	36	-	-
P1V-S•••AD032	24	44.4	-	-	142	177
P1V-S030AD023	-	-	48	70.8	-	-
P1V-S•••AD018	21	44.4	47.2	123.6	-	-
P1V-S020AD011	66	137.2	-	-	-	-
P1V-S030AD010	-	-	114	123.6	-	-
P1V-S020AD006	144	266.4	-	-	-	-
P1V-S•••AD005	20*	44.4	36*	40	-	-
P1V-S020AD002	20*	44.4	-	-	-	-
P1V-S020AD001	20*	44.4	-	-	-	-
P1V-S020AD0005	20*	44.4	-	-	-	-

***Warning !:** the permitted torque for the specific gearbox must not be exceeded.

Brake release: minimum air pressure of 5 bar

Technical data

Air motor size & type	P1V-S020	P1V-S030	P1V-S120
Nominal power (watts)	200	300	1200
Working pressure (bar)	3 to 7, 6 in explosive atmosphere (with brake not atex certified)		
Working temperature (°C)	-20 to +110		
Ambient temperature (°C)	-20 to +40 in explosive atmosphere (with brake not atex certified)		
Air flow required (Nl/min)	370	470	1600
Min pipe ID, inlet (mm)	10	10	19
Min pipe ID, outlet (mm)	10	10	19
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop			
	410	510	1800
Medium	40µm filtered, oil mist or dry unlubricated compressed air		
Oil free operation, indoor	ISO8573-1 purity class 3.4.1		
Oil free operation, outdoor	ISO8573-1 purity class 1.2.1		
Oil operation	1-2 drop per cube meter, ISO8573-1 purity class 3.-.5		
Recommended oil	Foodstuffs industry Klüber oil 4 UH1- 32 N		
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop			
	450	550	2000
Sound level free outlet (dB(A))	100	103	108
With outlet silencer (dB(A))	82	91	95
Exhaust air removed with pipes to another room	71	70	87

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.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower.
Data tolerance accuracy -+10%

Material specification

Air motor size & type	P1V-S020	P1V-S030	P1V-S120
Planetary gearbox housing	Stainless steel		
Planetary gearbox housing for last planet stage including installation flange	Stainless Steel or Black oxidised steel (not stainless)		Stainless steel
Air motor housing	Stainless steel		
Shaft	Hardened stainless steel		
Key	Hardened stainless steel		
External seal Fluor rubber	Fluor rubber FPM		
Internal steel parts	High grade steel (not stainless)		
Planetary gear grease used in	Grease, Shell Cassida RLS2		
Screws in housing in last planet stage	Surface treated steel (not stainless)		

Accessories	P1V
Flange bracket	Stainless steel
Foot bracket	Stainless steel
Screws for the mountings	Stainless steel DIN A2

P1V-S - Stainless Steel Air Motors with Brakes

200 watts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

IMPORTANT! Non Atex certified

Data for reversible brake motor with keyed shaft, P1V-S020AD series

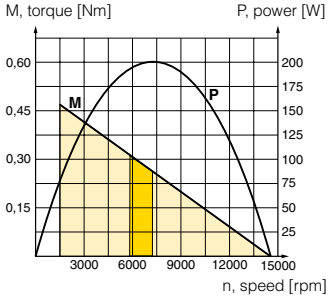
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,200	14500	7250	0,26	0,40	6,2	G1/8	10	1,000	**P1V-S020ADE50**
0,200	4600	2300	0,80	1,20	6,2	G1/8	10	1,050	**P1V-S020AD460**
0,200	2400	1200	1,60	2,40	6,2	G1/8	10	1,050	**P1V-S020AD240**
0,200	1400	700	2,70	4,10	6,2	G1/8	10	1,150	**P1V-S020AD140**
0,200	700	350	5,40	8,20	6,2	G1/8	10	1,150	**P1V-S020AD070**
0,200	320	160	12,00	18,00	6,2	G1/8	10	1,150	**P1V-S020AD032**
0,100	180	90	10,50	15,00	4,5	G1/8	10	1,150	**P1V-S020AD018**
0,180	50	25	20,00**	20,00**	6,2	G1/8	10	1,250	**P1V-S020AD005**
0,180	20	–	20,00**	20,00**	6,2	G1/8	10	1,250	**P1V-S020AD002**
0,180	10	–	20,00**	20,00**	6,2	G1/8	10	1,350	**P1V-S020AD001**
0,180	5	–	20,00**	20,00**	6,2	G1/8	10	1,350	**P1V-S020AD0005**

** Max permitted torque to not damage the gearbox.
* maximum admissible speed (idling)
The P1V-S020D with threaded shaft may be reversed, but when operated anticlockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

Possible working range of motor.

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

P1V-S020ADE50



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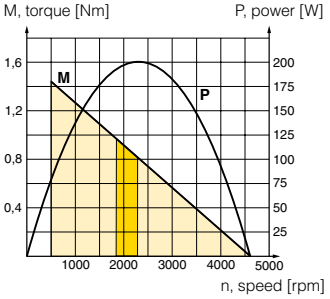

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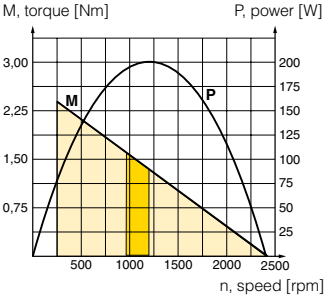

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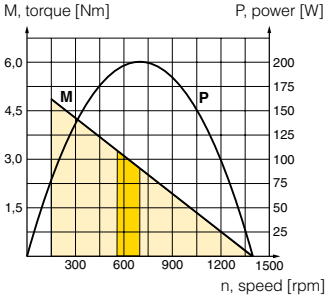

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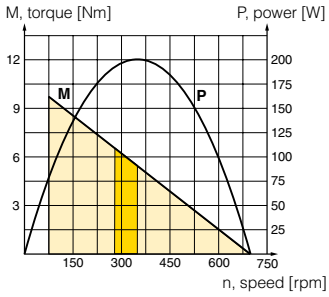

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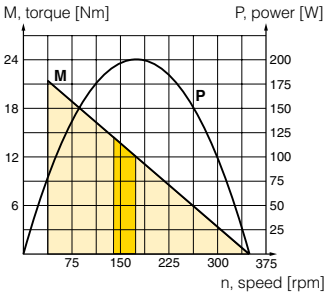

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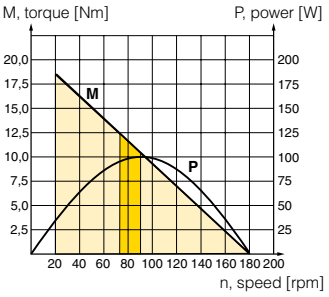

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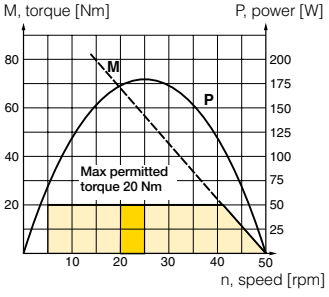

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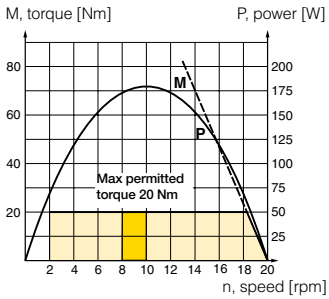
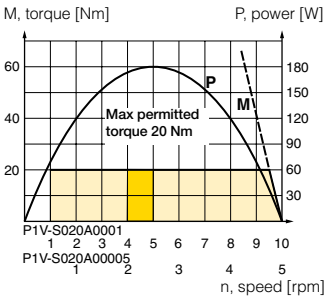


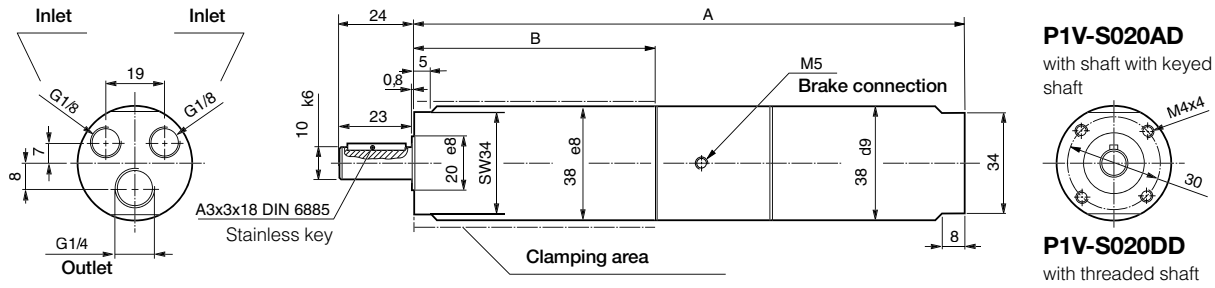
P1V-S020AD001 & P1V-S020AD0005



Parker Hannifin Corporation
Pneumatic Division - Europe

Dimensions (mm)

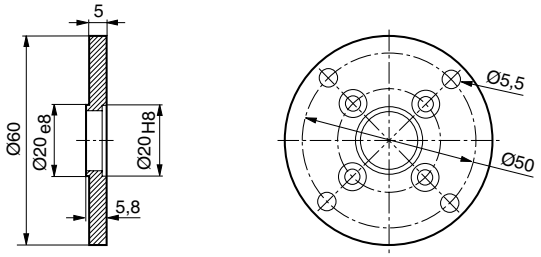
Brake motor P1V-S020



	A	B
P1V-S020ADE50	170	63,5
P1V-S020AD460	170	63,5
P1V-S020AD240	170	63,5
P1V-S020AD140	186	79,5
P1V-S020AD070	186	79,5
P1V-S020AD032	186	79,5
P1V-S020AD018	186	79,5
P1V-S020AD005	202	95,5
P1V-S020AD002	202	95,5
P1V-S020AD001	218	111,5
P1V-S020AD0005	218	111,5

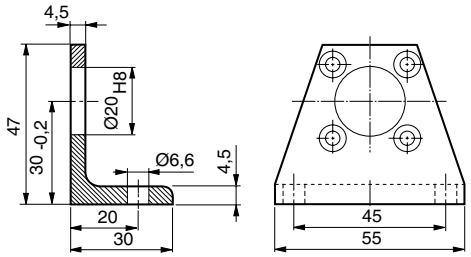
Flange

P1V-S4020B



Foot bracket

P1V-S4020F



P1V-S - Stainless Steel Air Motors with Brakes

300 watts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

IMPORTANT! Non Atex certified

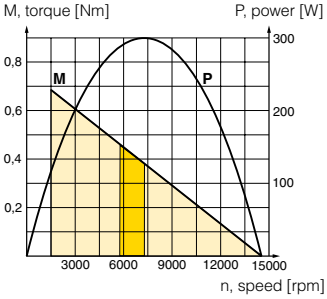
Data for reversible brake motor with keyed shaft, P1V-S030AD series

Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,300	14500	7250	0,40	0,60	8,0	G1/4	10	1,350	**P1V-S030ADE50**
0,300	4600	2300	1,20	1,90	8,0	G1/4	10	1,400	**P1V-S030AD460**
0,300	2400	1200	2,40	3,60	8,0	G1/4	10	1,400	**P1V-S030AD240**
0,300	1400	700	4,10	6,10	8,0	G1/4	10	1,450	**P1V-S030AD140**
0,300	600	300	9,60	14,30	8,0	G1/4	10	1,500	**P1V-S030AD060**
0,300	340	170	16,90	25,30	8,0	G1/4	10	1,500	**P1V-S030AD034**
0,300	230	115	24,00	36**	8,0	G1/4	10	3,650	**P1V-S030AD023**
0,130	180	90	13,80	21,00	4,7	G1/4	10	1,150	**P1V-S030AD018**
0,300	100	50	57,00	85,50	8,0	G1/4	10	3,650	**P1V-S030AD010**
0,280	50	25	36**	36**	8,0	G1/4	10	1,600	**P1V-S030AD005**

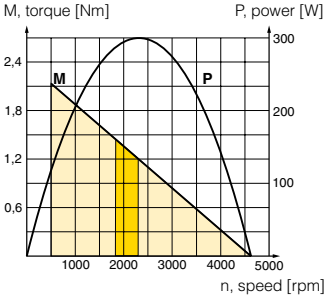
** Max permitted torque to not damage the gearbox.

* maximum admissible speed (idling)
The P1V-S030D with threaded shaft may be reversed, but when operated anticlockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

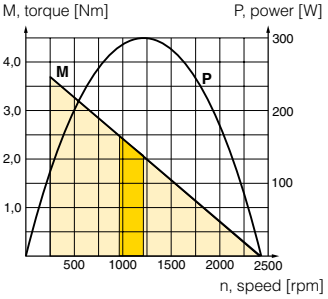
P1V-S030ADE50



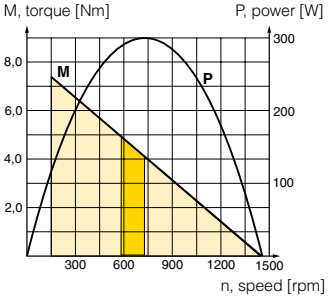
P1V-S030AD460



P1V-S030AD240



P1V-S030AD140



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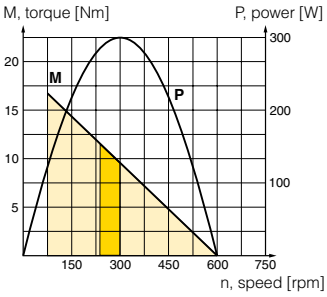
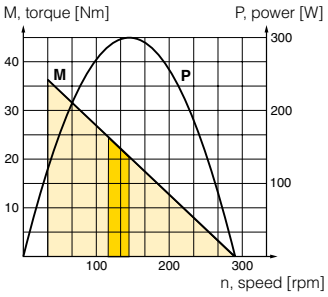
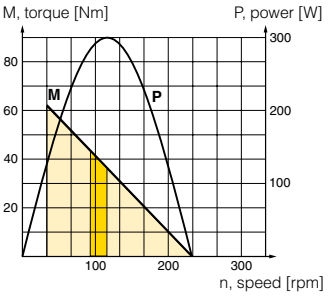


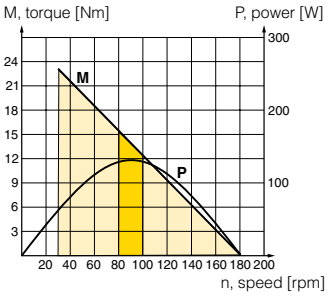
P1V-S030AD034



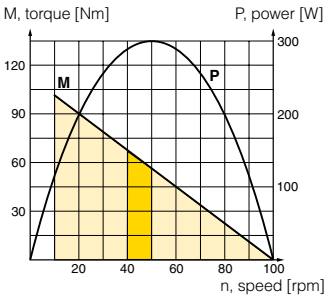
P1V-S030AD023



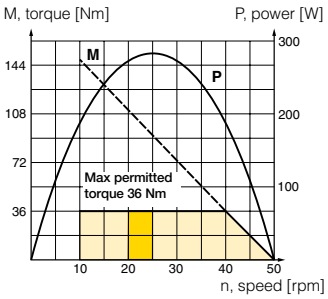
P1V-S030AD018



P1V-S030AD010



P1V-S030AD005

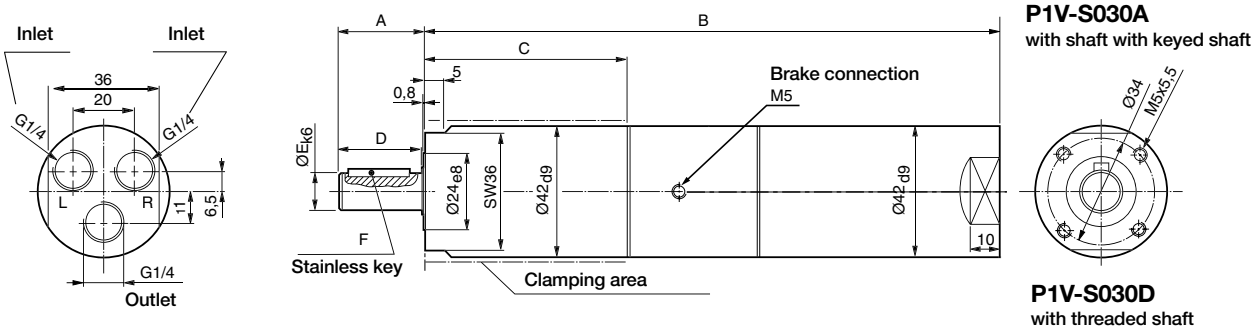


Possible working range of motor.

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

Dimensions (mm)

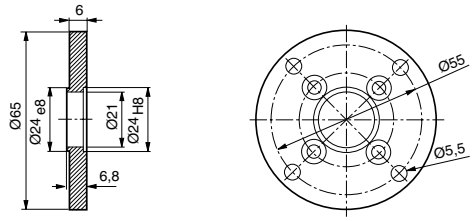
Brake motor P1V-S030



	A	B	C	D	E	F
P1V-S030ADE50	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S030AD460	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S030AD240	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S030AD140	28,5	202	82	27	12	A4x4x20 DIN 6885
P1V-S030AD060	32,0	202	82	30	14	A5x5x20 DIN 6885
P1V-S030AD034	32,0	202	82	30	14	A5x5x20 DIN 6885
P1V-S030AD018	32,0	202	82	30	14	A5x5x20 DIN 6885
P1V-S030AD005	32,0	207	82	30	14	A5x5x20 DIN 6885

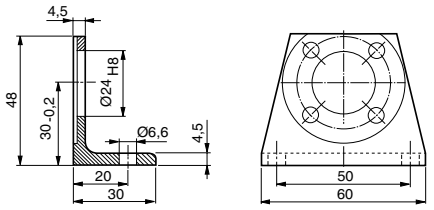
Flange

P1V-S4030B

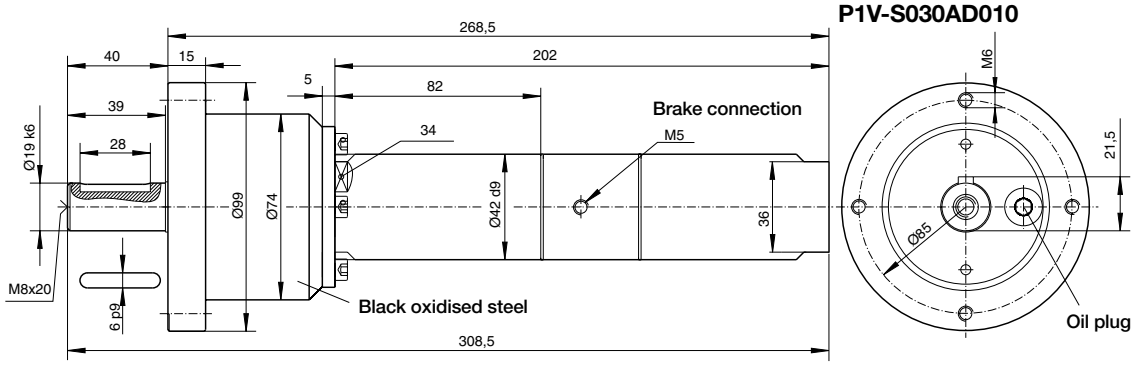


Foot bracket

P1V-S4030F

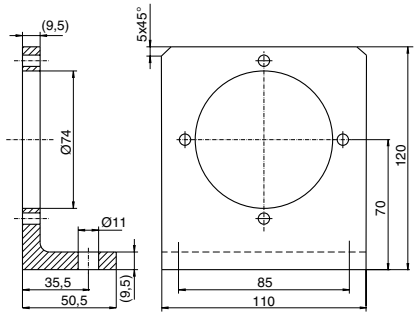


P1V-S030AD023
P1V-S030AD010



Foot bracket for motors P1V-S030AD0023 and P1V-S030AD0010

P1V-S4020C



P1V-S - Stainless Steel Air Motors with Brakes

1200 watts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

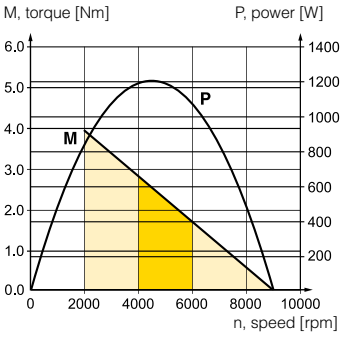
IMPORTANT! Non Atex certified

Data for reversible brake motor with keyed shaft, P1V-S120AD series

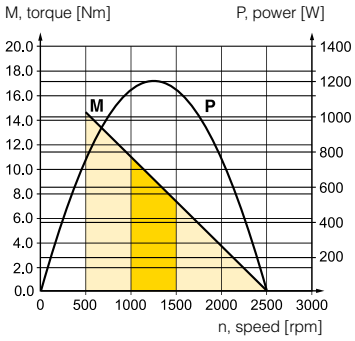
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
1,200	9000	4500	2,50	3,80	26,7	G3/4	19	9,000	**P1V-S120AD900**
1,200	2500	1250	9,20	13,70	26,7	G3/4	19	9,200	**P1V-S120AD250**
1,200	1100	550	21,00	31,00	26,7	G3/4	19	9,200	**P1V-S120AD110**
1,200	700	350	33,00	49,00	26,7	G3/4	19	9,700	**P1V-S120AD070**
1,200	320	160	71,00	107,00	26,7	G3/4	19	9,700	**P1V-S120AD032**

* maximum admissible speed (idling)

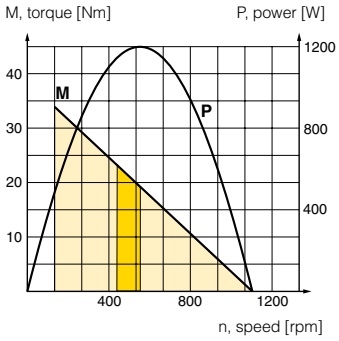
P1V-S120AD900



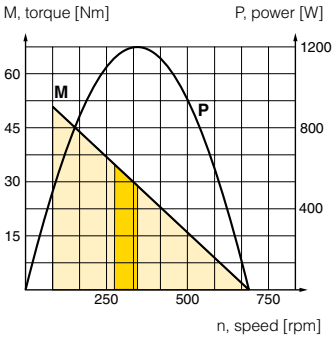
P1V-S120AD250



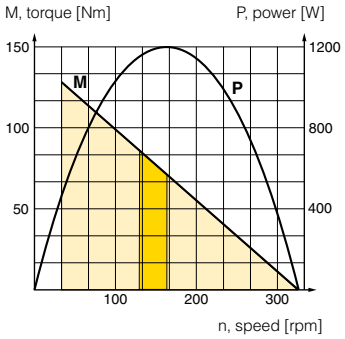
P1V-S120AD110



P1V-S120AD070



P1V-S120AD032



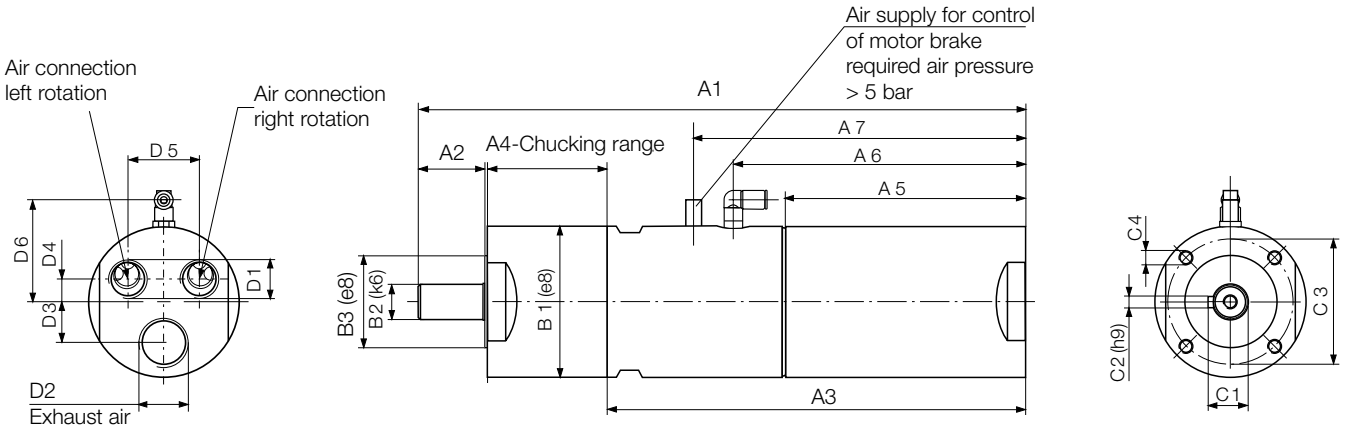
Possible working range of motor.

Optimum working range of motor.

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

Dimensions (mm)

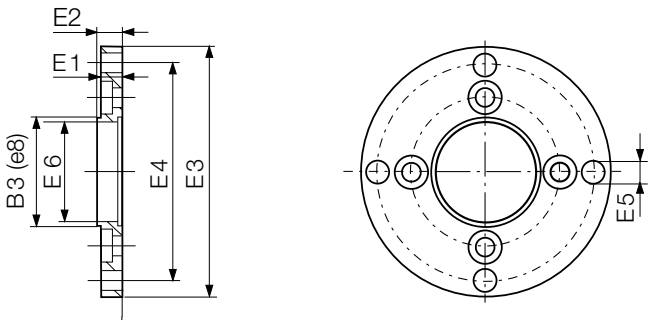
Brake motor P1V-S120



	A	B	C	D	E	F
P1V-S120AD900	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S120AD250	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S120AD110	28,5	186	66	27	12	A4x4x20 DIN 6885
P1V-S120AD070	28,5	202	82	27	12	A4x4x20 DIN 6885
P1V-S120AD032	32,0	202	82	30	14	A5x5x20 DIN 6885

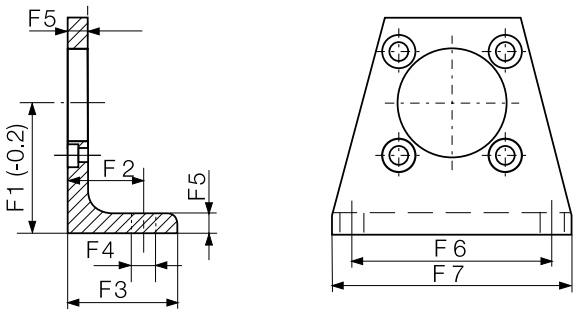
Flange

P1V-S4120B



Foot bracket

P1V-S4120F



Air Motors

P1V-S, Stainless Steel High Torque Type
285, 570 & 860 Watts

Contents Page

Technical data

Air motor size & type	P1V-S028	P1V-S057	P1V-S086
Nominal power (watts)	285	570	860
Working pressure (bar)	3 to 7, 6 in explosive atmosphere (high torque not atex certified)		
Working temperature (°C)	-20 to +110		
Ambient temperature (°C)	-20 to +40 in explosive atmosphere (high torque not atex certified)		
Air flow required (Nl/min)	470	850	1400
Min pipe ID, inlet (mm)	10	12	12
Min pipe ID, outlet (mm)	10	12	12
Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop			
	510	900	1500
Medium	40µm filtered, oil mist or dry unlubricated compressed air		
Oil free operation, indoor	ISO8573-1 purity class 3.4.1		
Oil free operation, outdoor	ISO8573-1 purity class 1.2.1		
Oil operation	1-2 drop per cube meter, ISO8573-1 purity class 3.-.5		
Recommended oil	Foodstuffs industry Klüber oil 4 UH1- 32 N		
Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop			
	550	950	1600
Sound level free outlet (dB(A))	103	103	106
With outlet silencer (dB(A))	91	94	88
Exhaust air removed with pipes to another room	70	76	80

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.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower.
Data tolerance accuracy -+10%

Material specification

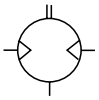
Air motor size & type	P1V-S028	P1V-S057	P1V-S086
Planetary gearbox housing	Stainless steel		
Air motor housing	Stainless steel		
Shaft	Hardened stainless steel		
Key	Hardened stainless steel		
External seal Fluor rubber	Fluor rubber FPM		
Internal steel parts	High grade steel (not stainless)		
Planetary gear grease used in	Grease, Shell Cassida RLS2		
Screws in housing in last planet stage	Surface treated steel (not stainless)		

Accessories	P1V
Flange bracket	Stainless steel
Foot bracket	Stainless steel
Screws for the mountings	Stainless steel DIN A2

P1V-S - Stainless Steel High Torque Air Motors

285 watts

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

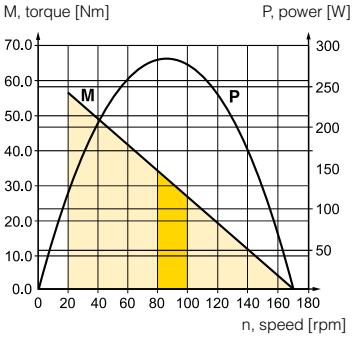
II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S028A series

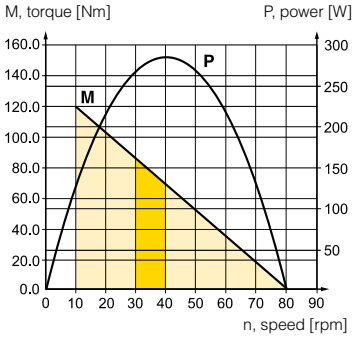
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,285	170	85	32	47	7,8	G3/8	10	2,700	**P1V-S028A0017**
0,285	80	40	62	92	7,8	G3/8	10	2,600	**P1V-S028A0008**
0,285	50	25	110	162	7,8	G3/8	10	2,900	**P1V-S028A0005**
0,280	26	13	210	320	7,8	G3/8	10	3,500	**P1V-S028A0003**
0,280	14	7	410	615	7,8	G3/8	10	3,500	**P1V-S028A0002**

* maximum admissible speed (idling)

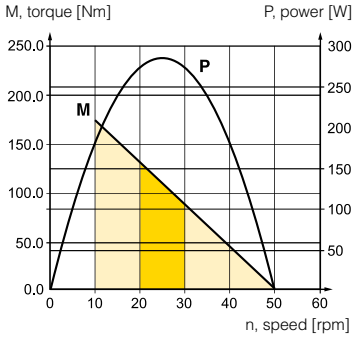
P1V-S028A0017



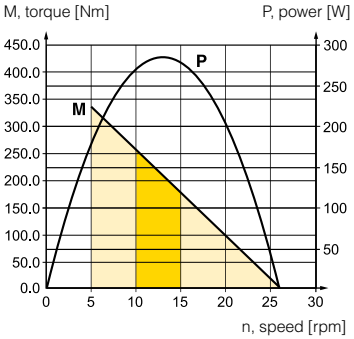
P1V-S028A0008



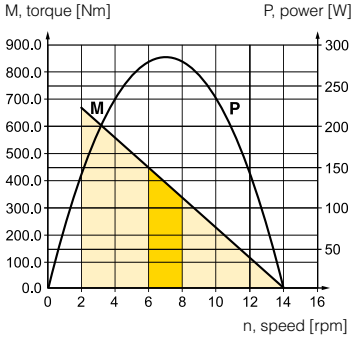
P1V-S028A00005



P1V-S028A0003



P1V-S028A0002



Possible working range of motor.

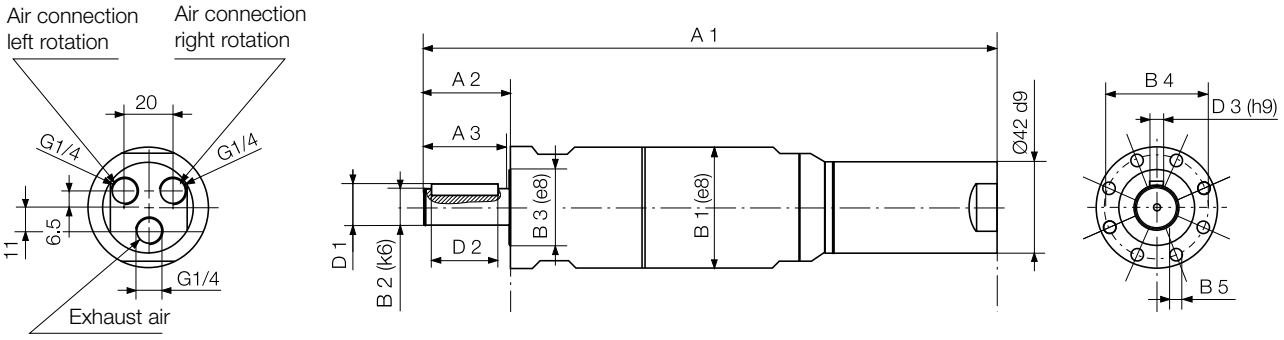
Optimum working range of motor.

Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear

Dimensions (mm)

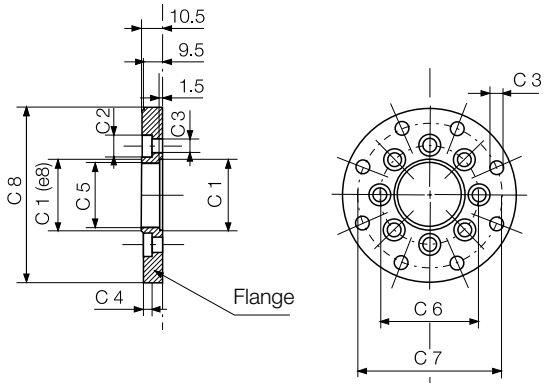
High Torque Motor P1V-S028



	A1	A2	A3	D1	D2	D3 (h9)	B1 (e8)	B2 (k6)	B3	B4	B5
P1V-S028A0017	254	44	42	21.5	32	A6x6x32 DIN6885	56	19	35	48	M6
P1V-S028A0008	254	44	42	21.5	32	A6x6x32 DIN6885	56	19	35	48	M6
P1V-S028A0005	270	44	42	21.5	32	A6x6x32 DIN6885	56	19	35	48	M6
P1V-S028A0003	270	47	45	27	32	A6x6x32 DIN6885	63	24	34	45	M8
P1V-S028A0002	279	47	45	27	32	A6x6x32 DIN6885	63	24	34	45	M8

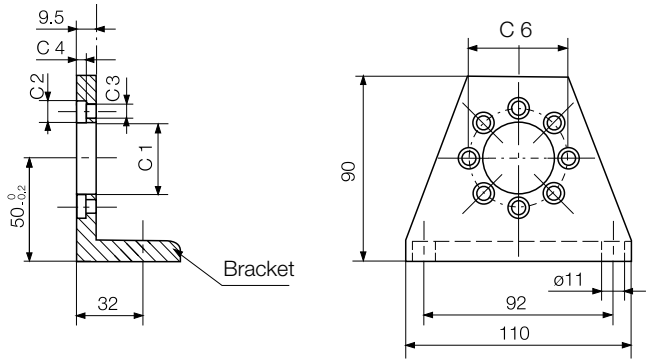
Flange

P1V-S4028B1 & B2



Foot bracket

P1V-S4028F1 & F2



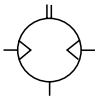
	C1 (e8)	C2	C3	C4	C5	C6	C7	C8
P1V-S028F1	35	11	6.6	4		48		
P1V-S028F2	34	13	8.4	5		45		
P1V-S028B1	35	11	6.6	4	32	48	70	85
P1V-S028B2	34	13	8.4	5	30	45	79	95

P1V-S - Stainless Steel High Torque Air Motors

570 watts

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%



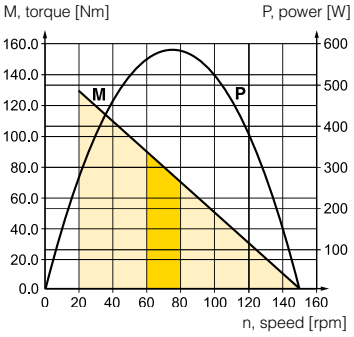
II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S057A series

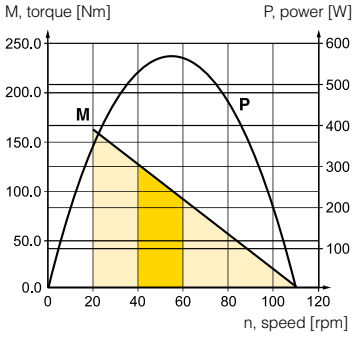
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,570	150	75	72	108	14,2	G1/2	10	3,600	**P1V-S057A0015**
0,570	110	55	98	147	14,2	G1/2	10	3,600	**P1V-S057A0011**
0,570	74	37	150	225	14,2	G1/2	10	3,600	**P1V-S057A0007**
0,565	40	20	265	400	14,2	G1/2	10	4,400	**P1V-S057A0004**

* maximum admissible speed (idling)

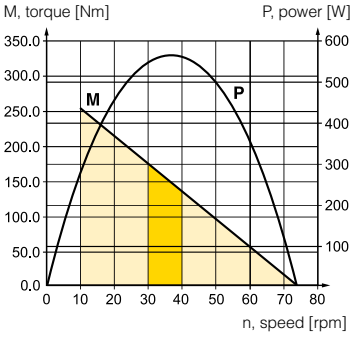
P1V-S057A0015



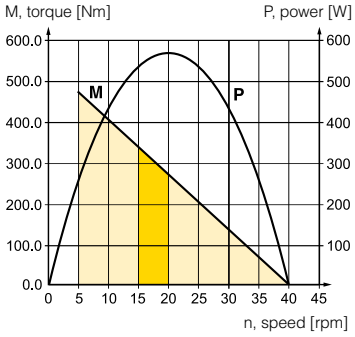
P1V-S057A0011



P1V-S057A0007



P1V-S057A0004

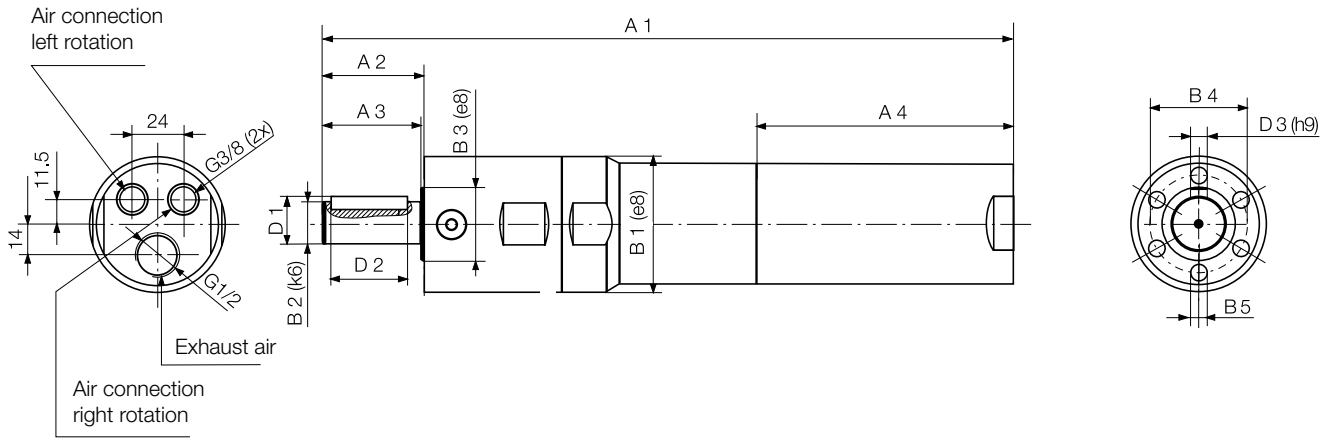


Possible working range of motor.

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

Dimensions (mm)

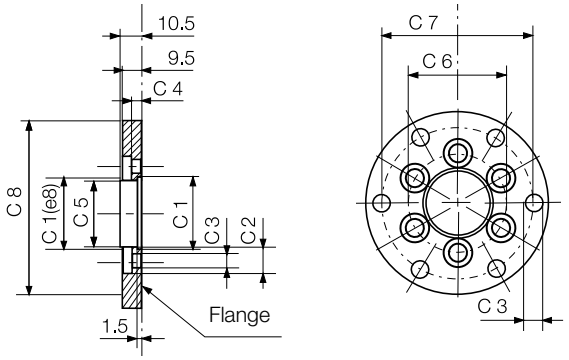
High Torque Motor P1V-S057



	A1	A2	A3	A4	D1	D3 (h9)	D2	B1 (e8)	B2 (k6)	B3 (e8)	B4	B5
P1V-S057A0015	283.5	44	42	98.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S057A0011	283.5	44	42	98.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S057A0007	283.5	44	42	98.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S057A0004	347	47	45	98.5	27	A6x6x32 DIN6885	32	63	24	34	45	M8

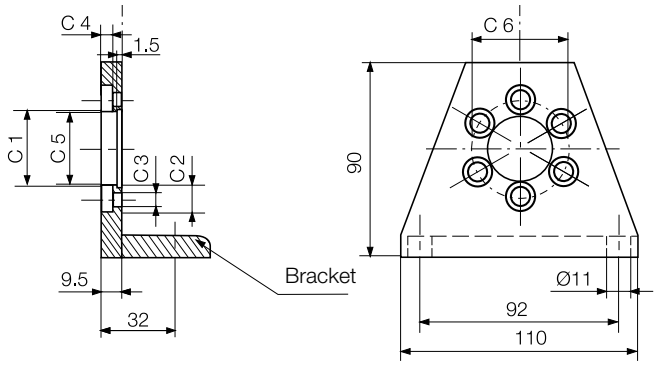
Flange

P1V-S4028B1 & B2



Foot bracket

P1V-S4028F1 & F2



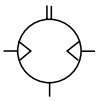
	C1 (e8)	C2	C3	C4	C5	C6	C7	C8
P1V-S028F1	35	11	6.6	4		48		
P1V-S028F2	34	13	8.4	5		45		
P1V-S028B1	35	11	6.6	4	32	48	70	85
P1V-S028B2	34	13	8.4	5	30	45	79	95

P1V-S - Stainless Steel High Torque Air Motors

860 watts

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%



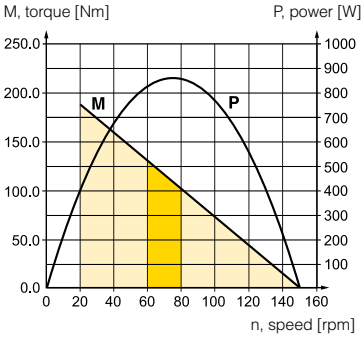
II2 GD c IIC T6 (80 °C) X

Data for reversible air motor with keyed shaft, P1V-S086A series

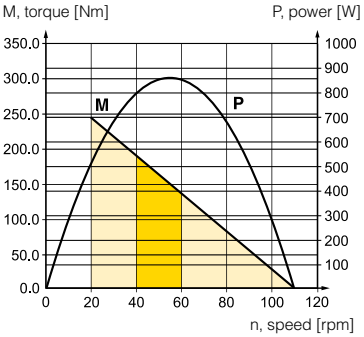
Max power	Free speed*	Nominal speed	Nominal torque	Min start torque	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm	rpm	Nm	Nm	l/s		mm	Kg	
0,860	150	75	160	110	23,3	G1/2	10	3,800	**P1V-S086A0015**
0,860	110	55	220	150	23,3	G1/2	10	3,900	**P1V-S086A0011**
0,860	70	35	335	225	23,3	G1/2	10	3,900	**P1V-S086A0007**
0,850	40	20	600	400	23,3	G1/2	10	4,700	**P1V-S086A0004**

* maximum admissible speed (idling)

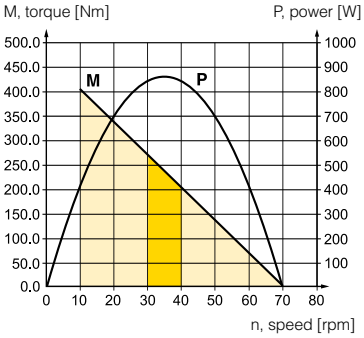
P1V-S086A0015



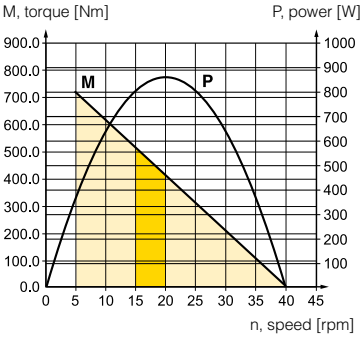
P1V-S086A0011



P1V-S086A0007



P1V-S086A0004



Possible working range of motor.

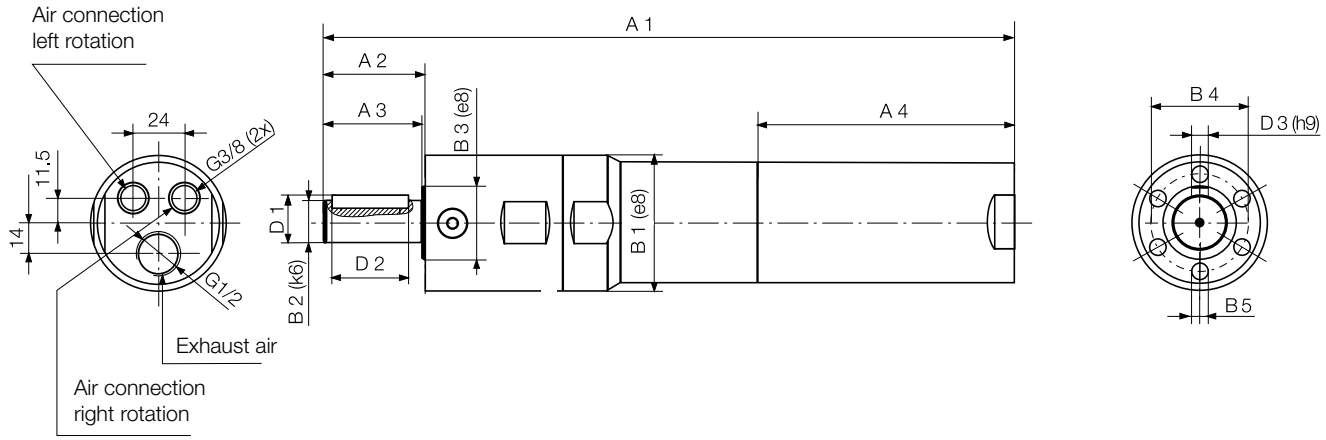
Optimum working range of motor.

Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear

Dimensions (mm)

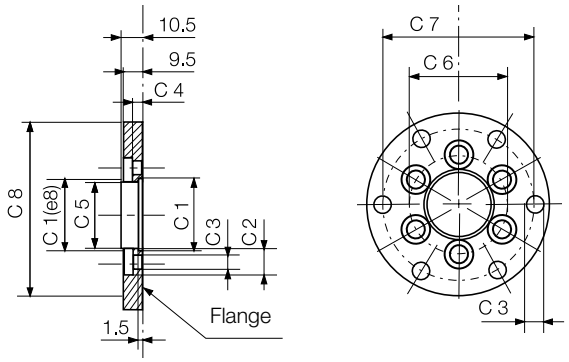
High Torque Motor P1V-S086



	A1	A2	A3	A4	D1	D3 (h9)	D2	B1 (e8)	B2 (k6)	B3 (e8)	B4	B5
P1V-S086A0015	303.5	44	42	118.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S086A0011	303.5	44	42	118.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S086A0007	303.5	44	42	118.5	21.5	A6x6x32 DIN6885	32	56	19	35	48	M6
P1V-S086A0004	320	47	45	98.5	27	A6x6x32 DIN6885	32	63	24	34	45	M8

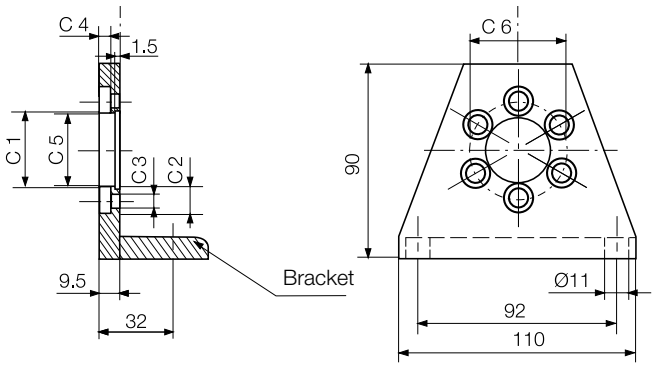
Flange

P1V-S4028B1 & B2



Foot bracket

P1V-S4028F1 & F2



	C1 (e8)	C2	C3	C4	C5	C6	C7	C8
P1V-S028F1	35	11	6.6	4		48		
P1V-S028F2	34	13	8.4	5		45		
P1V-S028B1	35	11	6.6	4	32	48	70	85
P1V-S028B2	34	13	8.4	5	30	45	79	95

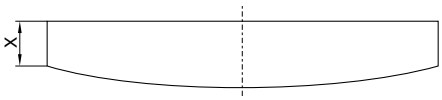
Mountings for P1V-S air motors

Type	For air motor	Weight Kg	Order code
Flange			
	P1V-S002 & P1V-S003	0,04	**P1V-S4002B**
	P1V-S008	0,04	**P1V-S4008B**
	P1V-S012	0,05	**P1V-S4012B**
	P1V-S020	0,09	**P1V-S4020B**
	P1V-S028 high torque	0,10	**P1V-S4028B1**
	P1V-S028 high torque	0,10	**P1V-S4028B2**
	P1V-S030	0,12	**P1V-S4030B**
	P1V-S057 high torque	0,30	**P1V-S4028B1**
	P1V-S057 high torque	0,30	**P1V-S4028B2**
	P1V-S060 & P1V-S090	0,30	**P1V-S4060B**
	P1V-S086 high torque	0,30	**P1V-S4028B1**
	P1V-S086 high torque	0,30	**P1V-S4028B2**
	P1V-S120	0,60	**P1V-S4120B**
Foot bracket			
	P1V-S008	0,08	**P1V-S4008F**
	P1V-S012	0,09	**P1V-S4012F**
	P1V-S020	0,11	**P1V-S4020F**
	P1V-S028 high torque	0,11	**P1V-S4028F1**
	P1V-S028 high torque	0,11	**P1V-S4028F2**
	P1V-S030A0023	0,55	**P1V-S4020C**
	P1V-S030A0010	0,55	**P1V-S4020C**
	P1V-S030	0,11	**P1V-S4030F**
	P1V-S057 high torque	0,30	**P1V-S4028F1**
	P1V-S057 high torque	0,30	**P1V-S4028F2**
	P1V-S060 & P1V-S090	0,30	**P1V-S4060F**
	P1V-S086 high torque	0,30	**P1V-S4028F1**
	P1V-S086 high torque	0,30	**P1V-S4028F2**
	P1V-S120	0,80	**P1V-S4120F**

All brackets supplied with fastening screws for the motor.

Lubrication and service life

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 and the minimum dimensions of worn vanes.



Air motor	Dimensions on new vanes X (mm), type of vanes			
	Standard	Z	C	M
P1V-S002	3,3	-	-	-
P1V-S003	X	-	-	-
P1V-S008	4,3	-	-	-
P1V-S012	4,2	4,2	4,2	4,2
P1V-S020	6,5	6,0	6,0	6,0
P1V-S028	X	X	X	X
P1V-S030	6,8	6,2	6,8	6,2
P1V-S057	X	X	X	X
P1V-S060	9,0	9,0	9,0	9,0
P1V-S086	X	X	X	X
P1V-S090	X	X	X	X
P1V-S120	14,7	14,0	14,0	14,0

Air motor	Dimensions on vanes X (mm), type of vanes			
	Standard	Z	C	M
P1V-S002	3,0	-	-	-
P1V-S003	X	-	-	-
P1V-S008	4,0	-	-	-
P1V-S012	3,3	3,3	3,3	3,3
P1V-S020	5,8	5,3	5,3	5,3
P1V-S028	X	X	X	X
P1V-S030	6,0	5,2	6,0	5,2
P1V-S057	X	X	X	X
P1V-S060	6,0	6,0	6,0	6,0
P1V-S086	X	X	X	X
P1V-S090	X	X	X	X
P1V-S120	14,2	13,5	13,5	13,5

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-free operation of motors with standard vanes, option 0

Duty cycle :	70%
Max. duration of intermittent use :	15 minutes
Filtering 40 µm :	750 hours of operation*
Filtering 5 µm :	1,000 hours of operation*

Continuous lubricated operation of motors with standard vanes, option 0

Duty cycle :	Continuous
Quantity of oil :	1 drop per m^3 of air
Filtering 40 µm :	1,000 hours of operation*
Filtering 5 µm :	2,000 hours of operation*

Note! After 1000 hours of operation, the grease in the planetary gearbox must be changed

Continuous lubrication-free operation of motors equipped with vanes, option C

Duty cycle :	Continuous
Filtering 40 µm :	750 hours of operation*
Filtering 5 µm :	1,000 hours of operation*

* The specified hours of operation apply when the motor is running at the speed corresponding to maximum power (load speed).
This is approximately half free speed.If the motor operates at higher speeds, the service interval is shorter.If the motor operates at lower speeds, the service interval is longer.

Service kits

The following kits are available for the basic motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease. (USDA-H1 approved)

Optional function "0" and "D"

Service kits, vanes for intermittent lubrication-free operation

For motors		Order code
P1V-S002A		**P1V-6/446083A**
P1V-S003A		**P1V-6/446083A**
P1V-S008A		**P1V-6/446084A**
P1V-S012A0 / D0	(to serial no 948688)	**9121720601**
P1V-S012A0 / D0	(from serial no 948689)	**9121720636**
P1V-S020A• / D•		**9121720602**
P1V-S030A• / D•		**9121720603**
P1V-S060A0E00		**9121720604**
P1V-S060A0400		**9121720604**
P1V-S060A0350		**9121720604**
P1V-S060A0270		**9121720604**
P1V-S060A0170		**9121720604**
P1V-S060A0072		**9121720604**
P1V-S060A0063		**9121720604**
P1V-S060A0048		**9121720605**
P1V-S060A0030		**9121720605**
P1V-S060A0015		**9121720605**
P1V-S060A0010		**9121720605**
P1V-S090A0C00		**P1V-6/444919A**
P1V-S090A0350		**P1V-6/444919A**
P1V-S090A0270		**P1V-6/444919A**
P1V-S090A0170		**P1V-6/444919A**
P1V-S090A0063		**P1V-6/444919A**
P1V-S090A0048		**P1V-6/444919B**
P1V-S090A0030		**P1V-6/444919B**
P1V-S120A•800		**9121720606**
P1V-S120A•270		**9121720606**
P1V-S120A•110		**9121720606**
P1V-S120A•078		**9121720607**
P1V-S120A•032		**9121720607**
P1V-S120A•012		**9121720607**

Service kits for high torque motors

For motors	Order code
P1V-S028A0017	**P1V-6/4447861B**
P1V-S028A0008	**P1V-6/4447861B**
P1V-S028A0005	**P1V-6/4447861B**
P1V-S028A0003	**P1V-6/4447861C**
P1V-S028A0002	**P1V-6/4447861C**
P1V-S057A0015	**P1V-6/4447871D**
P1V-S057A0011	**P1V-6/4447871D**
P1V-S057A0007	**P1V-6/4447871D**
P1V-S057A0004	**P1V-6/4447871E**
P1V-S086A0015	**P1V-6/4449191C**
P1V-S086A0011	**P1V-6/4449191C**
P1V-S086A0007	**P1V-6/4449191C**
P1V-S086A0004	**P1V-6/4449191D**

Optional function "C" and "E"

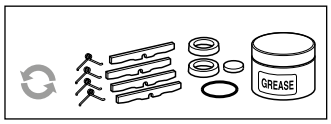
Service kits, vanes for continuous lubrication-free operation

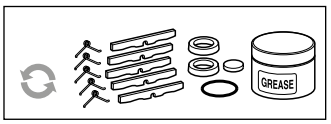
For motors		Order code
P1V-S012AC / DC	(to serial no 948688)	**9121720608**
P1V-S012AC / DC	(from serial no 948689)	**9121720637**
P1V-S020A• / D•		**9121720609**
P1V-S030A• / D•		**9121720610**
P1V-S060ACE00		**9121720611**
P1V-S060AC400		**9121720611**
P1V-S060AC350		**9121720611**
P1V-S060AC270		**9121720611**
P1V-S060AC170		**9121720611**
P1V-S060AC072		**9121720611**
P1V-S060AC063		**9121720611**
P1V-S060AC048		**9121720612**
P1V-S060AC030		**9121720612**
P1V-S060AC015		**9121720612**
P1V-S060AC010		**9121720612**
P1V-S090ACC00		**On request**
P1V-S090AC350		**On request**
P1V-S090AC270		**On request**
P1V-S090AC170		**On request**
P1V-S090AC063		**On request**
P1V-S090AC048		**On request**
P1V-S090AC030		**On request**
P1V-S120A•800		**9121720613**
P1V-S120A•270		**9121720613**
P1V-S120A•110		**9121720613**
P1V-S120A•078		**9121720614**
P1V-S120A•032		**9121720614**
P1V-S120A•012		**9121720614**

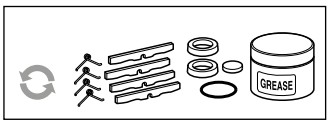
• : 0 or D, C or E

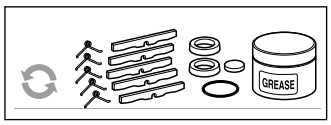
Service kits

The following kits are available for the basic motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease. (USDA-H1 approved)









Optional function "Z" and "F"

Service kits, spring-loaded vanes for intermittent lubrication-free operation

For motors		Order code
P1V-S012AZ / DZ	(to serial no 948688)	**9121720615**
P1V-S012AZ / DZ	(from serial no 948689)	**9121720638**
P1V-S020A• / D•		**9121720616**
P1V-S030A• / D•		**9121720617**
P1V-S060AZE00		**9121720618**
P1V-S060AZ400		**9121720618**
P1V-S060AZ350		**9121720618**
P1V-S060AZ270		**9121720618**
P1V-S060AZ170		**9121720618**
P1V-S060AZ072		**9121720618**
P1V-S060AZ048		**9121720619**
P1V-S060AZ072		**9121720619**
P1V-S060AZ063		**9121720619**
P1V-S060AZ010		**9121720619**
P1V-S090AZC00		**On request**
P1V-S090AZ350		**On request**
P1V-S090AZ270		**On request**
P1V-S090AZ170		**On request**
P1V-S090AZ063		**On request**
P1V-S090AZ048		**On request**
P1V-S090AZ030		**On request**
P1V-S120A•800		**9121720620**
P1V-S120A•270		**9121720620**
P1V-S120A•110		**9121720620**
P1V-S120A•078		**9121720621**
P1V-S120A•032		**9121720621**
P1V-S120A•012		**9121720621**

• : Z or F, M or G

Optional function "M" and "G"

Service kits, spring-loaded vanes for continuous lubrication-free operation

For motors		Order code
P1V-S012AM / DM	(to serial no 948688)	**9121720622**
P1V-S012AM / DM	(from serial no 948689)	**9121720639**
P1V-S020A• / D•		**9121720623**
P1V-S030A• / D•		**9121720624**
P1V-S060AME00		**9121720625**
P1V-S060AM400		**9121720625**
P1V-S060AM270		**9121720625**
P1V-S060AM170		**9121720625**
P1V-S060AM072		**9121720625**
P1V-S060AM048		**9121720626**
P1V-S060AM030		**9121720626**
P1V-S060AM010		**9121720626**
P1V-S090AMC00		**On request**
P1V-S090AM350		**On request**
P1V-S090AM270		**On request**
P1V-S090AM170		**On request**
P1V-S090AM063		**On request**
P1V-S090AM048		**On request**
P1V-S090AM030		**On request**
P1V-S120A•800		**9121720627**
P1V-S120A•270		**9121720627**
P1V-S120A•110		**9121720627**
P1V-S120A•078		**9121720628**
P1V-S120A•032		**9121720628**
P1V-S120A•012		**9121720628**

Service kits for brake module for motors with brakes

For motors	Order code
P1V-S020AD and P1V-S030AD	**P1V-6/446096A**
P1V-S120AD	**P1V-6/4460961B**

Comment: To perform a full service on a brake motor, you will need a normal service kit as well as a service kit for the brake module.

Introduction to the ATEX directive

Explosive atmospheres

Directive 94/9/EC defines an explosive atmosphere as a mixture of:

a) **flammable substances** – gases, vapours, mists or dusts
b) with **air**
c) under specific **atmospheric conditions**
d) in which, after ignition has occurred, combustion spreads to the entire flammable mixture

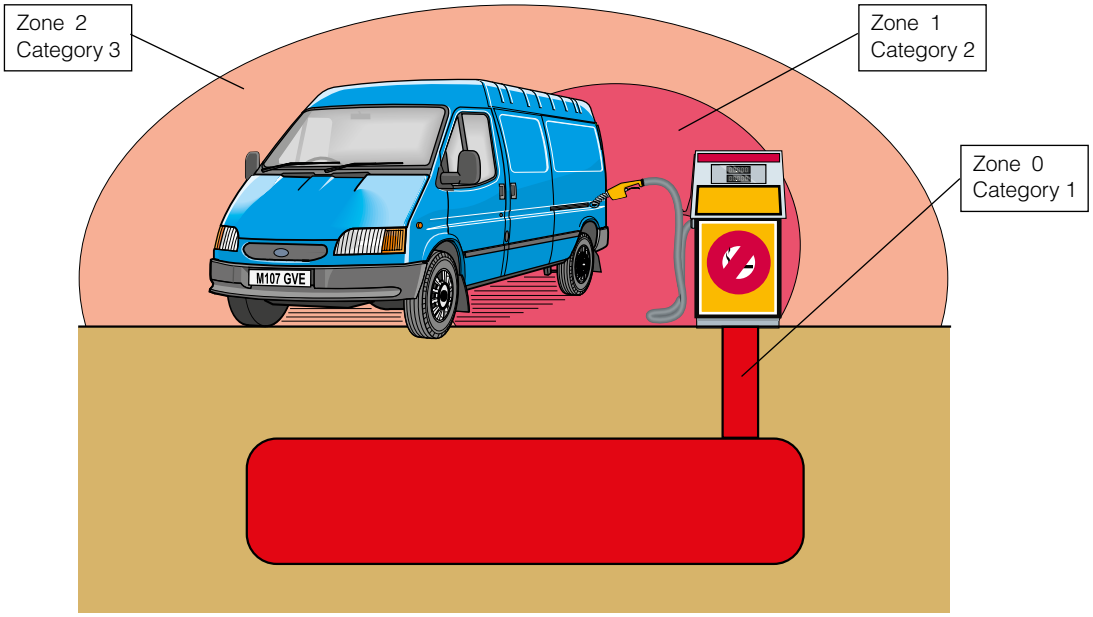
(NB: with regard to dust, it may be that not all dust is combusted after ignition has occurred)

An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a **potentially explosive atmosphere**. Products covered by directive 94/9/EC are defined as intended for use in potentially explosive atmospheres.

Harmonised European ATEX standard

The European Union has adopted two harmonised directives in the field of health and safety. The directives are known as ATEX 100a and ATEX 137.

Directive ATEX 100a (94/9/EC) lays down minimum safety requirements for products intended for use in potentially explosive atmospheres in European Union member states. Directive ATEX 137 (99/92/EC) defines minimum requirements for health and safety at the workplace, for working conditions and for the handling of products and materials in potentially explosive atmospheres. This directive also divides the workplace into **zones** and defines criteria by which products are **categorised** within these zones.
The table below describes the **zones** in an installation where there is a potential for explosive atmospheres. The **owner** of the installation must analyse and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into **zones**. This process of zoning then allows the correct plant and equipment to be selected for use in the area.
The ATEX directive has been in force throughout the European Union



Zones Gas G	Zones Dust D	Presence of potentially explosive atmosphere	Type of risk
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but, if it does occur, will persist for a short period only	Minimal

since 1 July 2003, replacing the existing divergent national and European legislation relating to explosive atmospheres.
Please note that for the first time, the directive covers mechanical, hydraulic and pneumatic equipment and not just electrical equipment as before.

With regard to the **Machinery directive** 98/37/EC, note that a number of external requirements in 94/9/EC refer to hazards arising from potentially explosive atmospheres, where the Machinery directive only contains general requirements relating to explosion safety (Annex I 1.5.7).
As a result, directive 94/9/EC (ATEX 100a) takes precedence over the Machinery directive with regard to explosion protection in potentially explosive atmospheres. The requirements in the Machinery directive are applicable to all other risks relating to machinery.

Levels of protection for the various equipment categories

The various equipment categories must be capable of operating in accordance with the manufacturer's operating specifications at defined levels of protection.

Level of protection	Category Group I	Category Group II	Type of protection	Operating specifications
Very high	M1		Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and and functional even with an explosive atmosphere present
Very high		1	Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and functional in zones 0, 1, 2 (G) and/or zones 20, 21, 22 (D)
High	M2		Protection suitable for normal operation and severe operating conditions	The equipment is de-energised in the event of an explosive atmosphere
High		2	Protection suitable for normal operation and frequent faults, or equipment in which faults normally have to be taken into account	The equipment remains energised and functional in zones 1, 2 (G) and/or zones 21, 22 (D)
Normal		3	Protection suitable for normal operation	The equipment remains energised and functional in zones 2 (G) and/or zones 22 (D)

Definition of groups (EN 1127-1)

Group I Equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by flammable vapours and/or flammable dusts.

Group II Equipment intended for use in other places exposed to explosive atmospheres.

Group	I mines, combustible vapours		II other potentially explosive atmospheres (gases, dust)					
Category	**M1**	**M2**	**1**		**2**		**3**	
Atmosphere*			G	D	G	D	G	D
Zone			0	20	1	21	2	22

G = gas and D = dust

Temperature classes

Classification of flammable gases and vapours on the basis of ignition temperature

Temperature class	Ignition temperature °C
T1	Over 450
T2	(300) – 450
T3	(200) – 300
T4	(135) – 200
T5	(100) – 135
T6	(85) - 100

Declaration of conformity

The product catalogues contain copies of the declaration of conformity demonstrating that the product meets the requirements of directive 94/9/EC.
The declaration is only valid in conjunction with the instructions contained in the installation manual relating to the safe use of the product throughout its service life.
The instructions relating to the conditions in the surrounding area are particularly important, as the certificate is invalidated if the instructions are found not to have been adhered to during operation of the product.
If there is any doubt as to the validity of the certificate of conformity, contact Parker Hannifin customer service.

Operation, installation and maintenance

The installation manual of the product contains instructions relating to the safe storage, handling, operation and servicing of the product.
The manual is available in different languages, and can be downloaded from **www.parker.com/euro_pneumatic**.
This document must be made accessible in a suitable place near where the product is installed. It is used as a reference for all personnel authorised to work with the product throughout its service life.
We, the manufacturer, reserve the right to modify, extend or improve the installation manual in the interests of the users.

For more information about ATEX see EUs homepage: **http://europa.eu.int/comm/enterprise/atex/**

Additional safety instructions for installation in explosive atmospheres

Serious, even fatal, damage or injury may be caused by the hot moving parts of the P1V-S motors in the presence of explosive gas mixtures and concentrations of dust.

All installation, connection, commissioning, servicing and repair work on P1V-S motors must be carried out by qualified personnel taking account of the following

- These instructions
- Notices on the motor
- All other planning documents, commissioning instructions and connection diagrams associated with the application.
- Provisions and requirements specific to the application
- Applicable national/international regulations (explosion protection, safety and accident prevention)

Real life applications

P1V-S motors are designed to provide rotary movement in industrial applications, and should only be used in accordance with the instructions in the technical specifications in the catalogue, and within the operating range indicated on the motor housing. The motors meet the applicable standards and requirements of the Machinery Directive 94/9/EC (ATEX)

The motors must not be used as brakes in explosive atmospheres.
Braking involves driving the motor against the direction of rotation for which the motor is supplied with compressed air. The motor is then operating as a compressor, and there is a corresponding increase in temperature.

The motors must **not** be used underground in mines susceptible to firedamp and/or combustible dust. The motors are intended for use in areas in which explosive atmospheres caused by gases, vapours or mists of combustible liquids, or air/dust mixtures may be expected to occur during normal use (infrequently)

Checklist

Before using the motors in a potentially explosive atmosphere, you should check the following:

Do the motor specifications match the classification of the area of use in accordance with Directive 94/9/EG (previously ATEX 100a)

- Equipment group
- Equipment category
- Zone
- Temperature class
- Max. surface temperature

1. When installing the motor, is it certain that there is no potentially explosive atmosphere, oil, acids, gases, vapours or radiation?
2. Is the ambient temperature as specified in the technical data in the catalogue at all times?
3. Is it certain that the P1V-S motor is adequately ventilated and that no additional heat is added (for example in the shaft connection)?
4. Are all the driven mechanical components ATEX certified?

Installation requirements in potentially explosive atmospheres

- The temperature of the supply air must not exceed the ambient temperature.
- The P1V-S may be installed in any position.
- An air treatment unit must be attached to the inlet of the P1V-S air motor.
- In a potentially explosive atmosphere, none of the motor ports may be blocked because this may cause an increase in temperature. The air from the port must be taken to the silencer or, preferably, outside the potentially explosive area.
- The P1V-S motor must be connected to ground at all times, through its support, a metallic tube or separate conductor.
- The outlet of the P1V-S motor must not open within a potentially explosive area, but must be passed to the silencer or, preferably, removed and released outside the potentially explosive area.
- The P1V-S motor may only drive units that are ATEX certified.
- Ensure that the motor is not exposed to forces greater than those permitted in accordance with the catalogue.

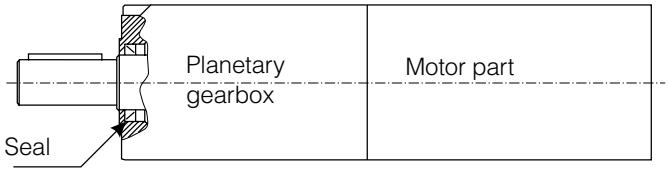
Measuring the temperature on the outside of the P1V-S motor (only when used in potentially explosive areas)

During the commissioning process, it is essential to measure temperature increases at the indicated positions on the outside of the P1V-S motor.
These measurements can be taken using standard thermometers.

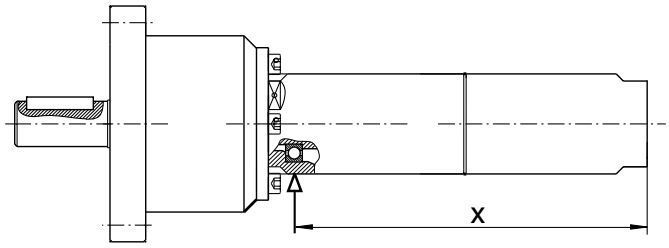
Checking the motor during operation

The motor must be kept clean on the outside, and a layer of dirt thicker than 5 mm must never be allowed to form.
Strong solvents should not be used for cleaning, because they can cause the seal (material NBR/FPM) around the drive shaft to swell, potentially increasing the temperature.

The temperature is measured on the metal surface next to the seal around the output shaft on all P1V-S012, P1V-S020, P1V-S028, P1V-S030, P1V-S057, P1V-S060, P1V-S086 and P1V-S090 motors.



Motors P1V-S030A0023 and P1V-S030A0010

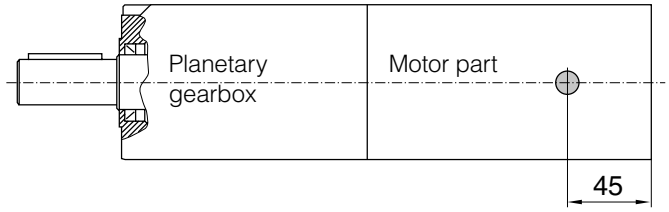


Motor	x [mm]
P1V-S030A0023	146
P1V-S030A0010	147,5

The maximum temperature is reached after approximately 1,5 hours of operation, and the difference in temperature between the motor and the ambient temperature must not exceed 40 °C.

If the temperature difference at the seal of a P1V-S 120 to 900 watts exceeds 40 °C, you should stop the motor immediately and contact Parker Hannifin.

The following applies to the P1V-S120 series:
The temperature is measured on the metal surface at a point 45 mm from the port end of the motor housing, on all P1V-S120.



The maximum temperature is reached after approximately 1,5 hours of operation, and the difference in temperature between the motor and the ambient temperature must not exceed 55 °C.

If the temperature difference at this point on a P1V-S120 exceeds 55 °C, you should stop the motor immediately and contact Parker Hannifin.

Marking of products

For all P1V-S 120 to 900 watts

CE Ex II2 GD c IIC T6 (80 °C) X

For the P1V-S120 1200 watts

CE Ex II2 GD c IIC T5 (95 °C) X

CE — **C**ommunauté **E**uropéenne = EU
CE marking shows that as a manufacturer, Parker Hannifin meets the guidelines specified by the EU

Ex — **Ex** means that this product is intended for use in a potentially explosive area

II — stands for the equipment group (I = mines and II = other places liable to be endangered)

2GD — stands for equipment category
2G means the equipment can be used in zones 1 and 2 where there is a risk involving gas, vapour or mist of combustible liquids and **2D** in zones 21 and 22 where there is a risk involving dust .
2GD means the equipment can be used in zones 1, 2, 21 and 22.

c — Safe design (prEN 13463-5)

IIC — Explosion group, P1V-S air motors are tested to the highest standards in terms of test gases, and can be installed in the presence of all gases without restriction.

T6 — If equipment is in temperature class **T6**, the maximum surface temperature must not exceed 85 °C.
(To guarantee this, the product has been tested to ensure that the maximum is 80 °C. This provides a safety margin of 5 °K.)

T5 — If equipment is in temperature class **T5**, the maximum surface temperature must not exceed 100 °C.
(To guarantee this, the product has been tested to ensure that the maximum is 95 °C. This provides a safety margin of 5 °K.)

(80 °C) — Maximum permitted surface temperature on the motor in atmospheres containing potentially explosive dust.

X — Note special conditions

Test certificate number IBExU04ATEXB004 X from IBExU Institut für Sicherheitstechnik GmbH, D-09599 Freiberg, Germany

P1V-S Declaration of Conformity acc. ATEX 94/9/EC
P1V-S Declaration of Incorporation acc. EC Machinery Directive 2006/42/EC

We Parker Hannifin Manufacturing
Germany GmbH & Co. KG
Pneumatic Division Europe
Industriestrasse 8
70794 Filderstadt Germany

Declare that the following Air Motors have been assessed in accordance with ATEX 94/9/EC (Products for use in potentially explosive atmospheres). Air Motors **P1V-S012, P1V-S020, P1V-S028, P1V-S030, P1V-S057, P1V-S060, P1V-S086** and **P1V-S090** range are compatible for the use in explosive atmosphere **Ex II 2 GD c T6 (T80°C) X.** Air Motors **P1V-S120** range are compatible for the use in explosive atmosphere **Ex II 2 GD c T5 (T95°C) X.**
All without brake option.
P1V-S is designed for utilization in applications falling under the scope of the ATEX 94/9/EC. These products are designed and manufactured in compliance with following elements:

- **EN 1127-1:2007** Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology
- **EN 13463-1:2009** Non electrical equipment for use in potentially explosive atmospheres – Part 1: Basic method and requirements
- **EN 13463-5** Non-electrical equipment intended for use in potentially explosive atmospheres – Part 5: Protection by constructional safety ´c´
- **EN 983+A1:2008** Safety of machinery – Safety requirements for fluid power systems and their components - Pneumatics

As manufacturer of the partly completed machine we declare that:

- The specified Air motor corresponds to the listed essential requirements of the EC Machinery Directive 2006/42/EC
- The relevant technical documentation is compiled in accordance with part B of Annex VII
- The relevant technical documentation in accordance with part B of Annex VII will be transmitted in response to a reasonable request by the national authorities

Product: Air motors P1V-S

Directives	**Date**	**Applied and fulfilled essential requirements**
2006/42/EC	2006-06	1.1.2, 1.1.5, 1.3.4, 1.5.3, 1.7.3, 1.7.4

Standards	**Date**	**Remark**
DIN EN ISO 12100	2011-03	Partly fulfilled

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporates has been declared in conformity with the provisions of the Directive 2006/42/EG, were appropriated.

Sticker

Additional Information
This coverage could only be referred to as long as operations needed for final assembling and starting up of theses products comply with standards relating to the above mentioned directive. Each time this will be required for compliance purpose, the user will have to apply for a complete coverage of the final assembled system according to the above mentioned directive and relating standards

Filderstadt, Germany June 2014

Ing. Franck Roussillon
European Product Manager
Actuators Business Unit, Pneumatic Division Europe

Air Tools

To use in Robots and Automated Machines

Drilling type 80 to 600 Watts
Grinding type 90 to 300 Watts
Milling type 400 to 1000 Watts

Contents Page

Parker Hannifin Corporation
Pneumatic Division - Europe

P1V-S - Drilling, Grinding & Milling Air Motors

Introduction

A large number of drilling motors, milling motors and grinding motors have been developed using the P1V-S as the base motor in order to make it easier to install air motors in machining applications. These motors are all equipped with standard vanes for intermittent lubrication-free operation, although it is recommended to use oil mist if you are planning to operate them for extended periods.

NOTE! These motors are not made of 100% stainless steel.

Drilling motors are available with power ratings of 80, 170, 250, 400 and 600 Watts, and several different speeds for the machining of a range of materials. They can be fitted with collet chucks, drill chucks and quick-release chucks. Many of them also have accessories allowing the exhaust air to be removed.

The milling motor, with a power rating of 400 Watts, runs at a relatively high speed, and is fitted with a collet chuck for a shaft diameter of 8 mm. It is equipped with strong bearings able to handle greater shear forces on the spindle.

The grinding motor, with a power rating of 200 Watts, is fitted with a collet chuck for a shaft diameter of 8 mm and runs at a relatively high speed. It is equipped with strong bearings able to handle greater shear forces on the spindle.

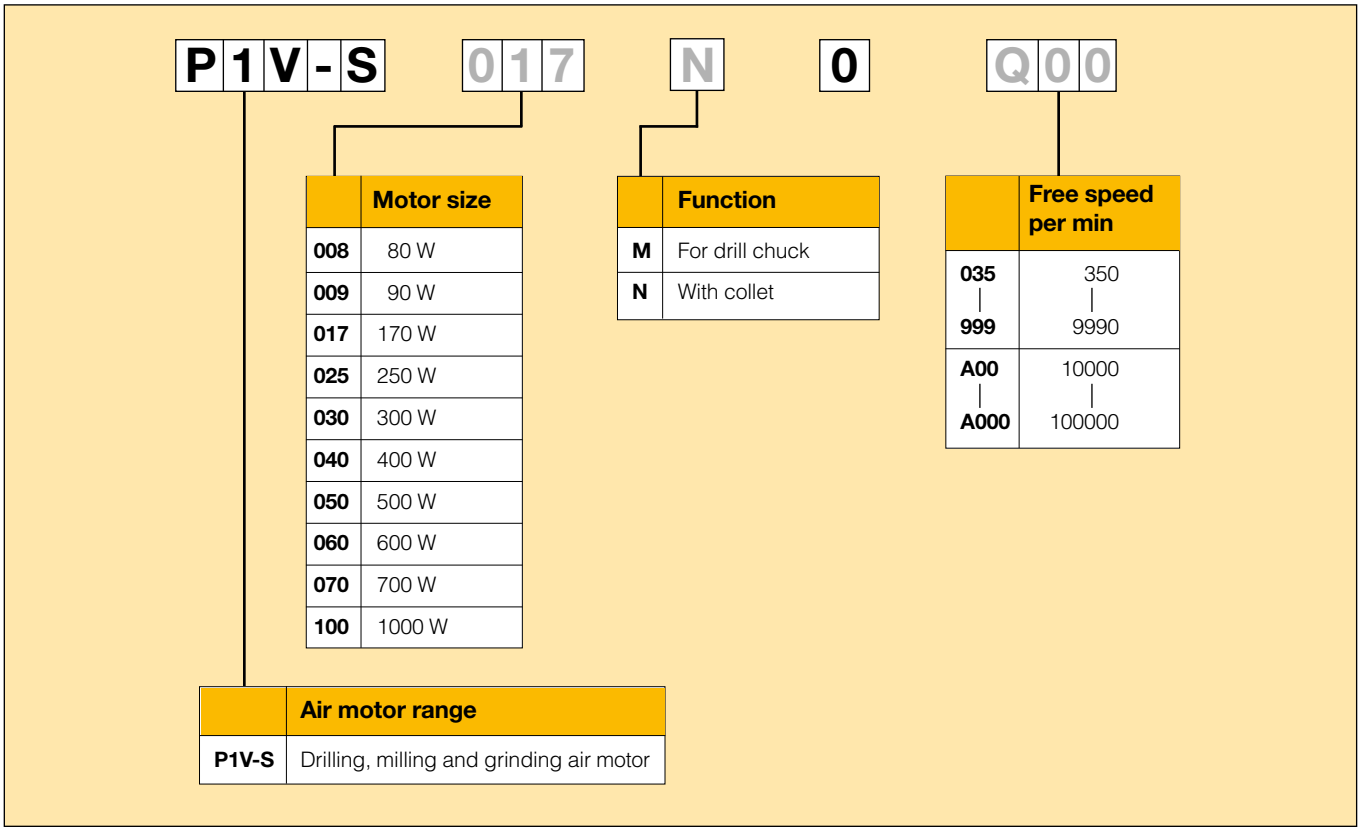
The design principle of the 90 Watt grinding motor is different from the others. The turbine principle means that high speeds are possible without the need for lubrication.

Feed movement in drilling, milling and grinding motors

A slow and even feed movement is necessary in machining applications. During drilling, the feed must not uncontrollably speed up once the drill breaks through the material. One good way of solving the problem is to use a pneumatic cylinder for the feed, which is able to provide force during drilling and a rapid approach before the actual drilling phase. Feed during the drilling phase is controlled using a hydraulic brake cylinder (HYDROCHECK) fitted in parallel with the pneumatic cylinder. This provides even, slow and safe feed movement, without the risk of the uncontrolled feed described above.

Order Code Key

(This model code can not be used for creating new part numbers.
All possible combinations between motor size, function and free speed are in the next pages).



	Motor size
008	80 W
009	90 W
017	170 W
025	250 W
030	300 W
040	400 W
050	500 W
060	600 W
070	700 W
100	1000 W

	Function
M	For drill chuck
N	With collet

	Free speed per min
035 | 999	350 | 9990
A00 | A000	10000 | 100000

	Air motor range
P1V-S	Drilling, milling and grinding air motor

P1V-S - Drilling, Grinding & Milling Air Motors

Technical data (all air motors are non reversible, right rotation only)

Air motor size & type	P1V-S008	P1V-S017	P1V-S025	P1V-S040	P1V-S060	P1V-S009*	P1V-S015	P1V-S025	P1V-S030	P1V-S040	P1V-S050	P1V-S070	P1V-S100
Air motor type	**Drilling**					**Grinding**				**Milling**			
Nominal power (watts)	80	170	250	400	600	90	150	250	300	400	500	700	1000
Working pressure (bar)	3 to 7												
Working temperature (°C)	-20 to +110												
Ambient temperature (°C)	-20 to +110												
Air flow required (Nl/min)	230	300	350	420	850	120	300	350	380	420	700	900	1100
Min pipe ID, inlet (mm)	4	6	6	10	12	4	6	6	6	10	10	10	10
Min pipe ID, outlet (mm)	4	6	6	10	12	4	6	6	6	10	10	10	10
	Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop												
	260	340	400	500	950	140	340	400	440	500	800	1020	1250
	Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop												
	290	380	450	580	1050	160	380	450	510	580	900	1140	1400
Medium	40µm filtered, oil mist or dry unlubricated compressed air												
Oil free operation, indoor	ISO8573-1 purity class 3.4.1												
Oil free operation, outdoor	ISO8573-1 purity class 1.2.1												
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))	-	-	-	-	-	-	-	-	-	-	-	-	-
With outlet silencer (dB(A))	85	74	76	75	94	72	85	76	-	75	-	-	-
Exhaust air removed with pipes to another room	71	70	71	73	76	-	73	71	79	73	79	79	80

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.

* Un lubricated for grinding air motor P1V-S009.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower.
Data tolerance accuracy -+10%

Material specification

Air motor size	P1V-S008	P1V-S017	P1V-S025	P1V-S040	P1V-S060	P1V-S009*	P1V-S015	P1V-S025	P1V-S030	P1V-S040	P1V-S050	P1V-S070	P1V-S100
Air motor type	**Drilling**					**Grinding**				**Milling**			
Housing	Stainless steel X12Cr13	High grade steel (not stainless)	Stainless steel X12Cr13			High grade steel (not stainless)				Stainless steel X12Cr13			
Shaft, collet	Hardened steel (not stainless)												
Shaft for drill chuck	Hardened and tempered steel (not stainless)												
Collet	Hardened and tempered steel (not stainless)												
All internal parts	High grade steel (not stainless)												
Accessories	Surface treated steel, plastic and aluminium												

Accessories	P1V Drilling air motors
Flange bracket	Stainless steel
Foot bracket	Stainless steel
Screws for the mountings	Stainless steel DIN A2

Permitted shaft loadings

Drilling, milling and grinding motors

Max. permitted load on output shaft for motors (based on 10 000 000 rpm at input shaft with 90 % probable service life for ball bearings).

Drilling motors with collet

Order code	Fax [N]	Frad [N]	a [mm]
P1V-S008N0* **	200	75	25
P1V-S017N0* **	380	50	25
P1V-S025N0* **	750	220	25

Grinding motors with collet

Order code	Fax [N]	Frad [N]	a [mm]
P1V-S009N0A000	15	30	25
P1V-S015N0AQ0	15	30	25
P1V-S025N0Z00	25	50	25
P1V-S030N0* **	20	40	25

Milling motors with collet

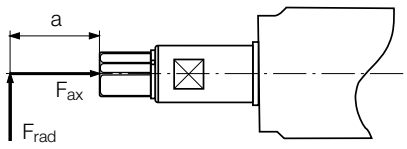
Order code	Fax [N]	Frad [N]	a [mm]
P1V-S040N0L00	750	150	25
P1V-S050N0L00	25	50	25
P1V-S070N0N00	40	90	25
P1V-S100N0F30	55	120	25

Drilling motors for drill chuck

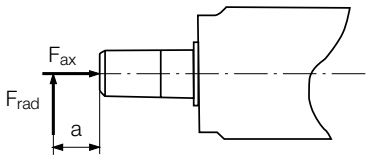
Order code	Fax [N]	Frad [N]	a [mm]
P1V-S017M0* **	380	35	60
P1V-S025M0* **	750	150	70
P1V-S040M0* **	750	150	70
P1V-S060M0350	1100	150	80
P1V-S060M0270	1100	150	80
P1V-S060M0170	1100	150	80
P1V-S060M0063	1100	265	80
P1V-S060M0048	1100	265	80
P1V-S060M0030	1100	265	80
P1V-S060M0015	1100	150	80

Frad = Radial loading (N)
Fax = Axial loading (N)
a = distance from shaft's end (mm)

Collet



Drill chuck



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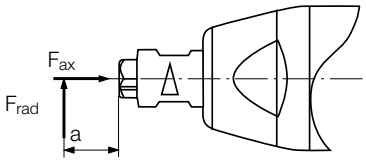

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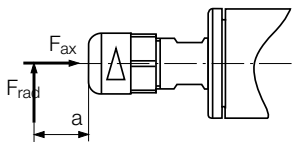
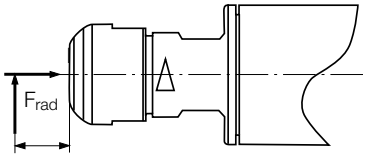


Collet



Load on output shaft for drilling, milling and grinding motors.

Drilling motor with collet P1V-S008N

Our smallest and most versatile drilling motor for small-scale drilling operations.
The standard collet chuck is for 3 mm shaft diameter.
For other diameters, select a different collet chuck as an accessory.
The motor has a port for a 6 mm hose to remove the exhaust air to a silencer.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

Data for drilling motor with collet P1V-S008N

Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,080	22000	Collet 3 mm	-	3	3,8	M8 x 0,75*	4	0,20	**P1V-S008N0N00**
0,080	6000	Collet 3 mm	3	3	3,8	M8 x 0,75*	4	0,20	**P1V-S008N0600**
0,080	1900	Collet 3 mm	3	3	3,8	M8 x 0,75*	4	0,22	**P1V-S008N0190**
0,080	1300	Collet 3 mm	3	3	3,8	M8 x 0,75*	4	0,22	**P1V-S008N0130**

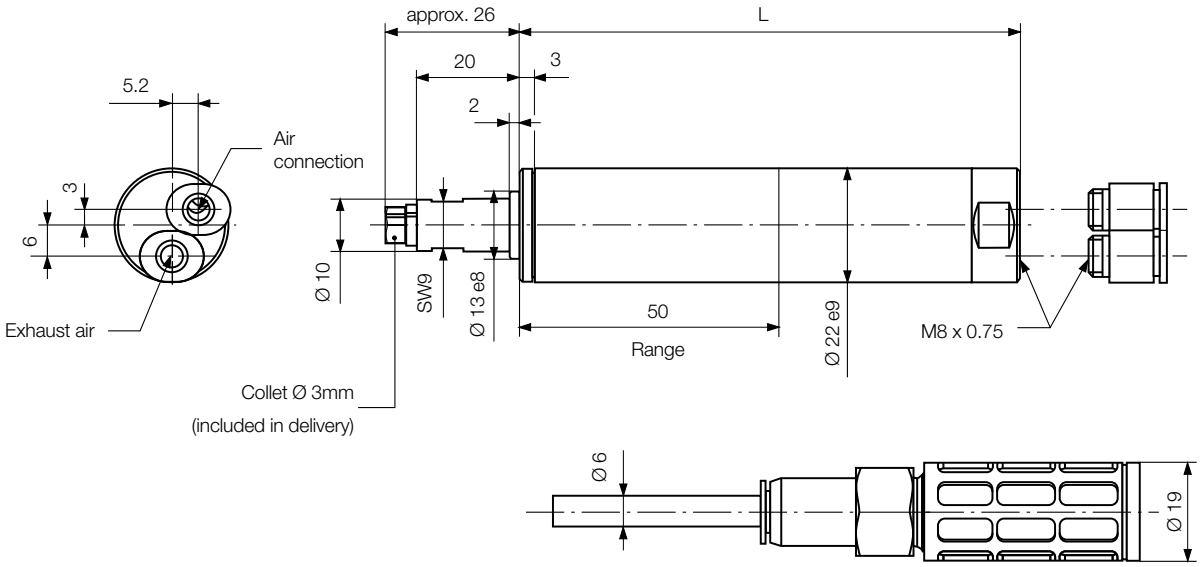
* 2 push in nipples for plastic pipe Ø6/4 supplied

Accessories for drilling motor with collet P1V-S008N

Name	Order code
Collet	
Collet Ø2 mm	**P1V-6/314693**
Collet Ø3 mm **the motor**	**Included with**
Collet Ø3/32"	**P1V-6/314694**
Collet Ø1/8"	**P1V-6/314407**

Dimensions (mm)

Drilling motor with collet P1V-S008N

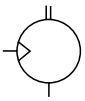


	A	B
P1V-S008N0N00, P1V-S008N0600	98	96
P1V-S008N0190, P1V-S008N0130	107	105

Drilling motor with collet P1V-S017N

A small drilling motor for small-scale, lighter drilling operations.
The standard collet chuck is for 6 mm shaft diameter.
For other diameters, select a different collet chuck as an accessory.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%



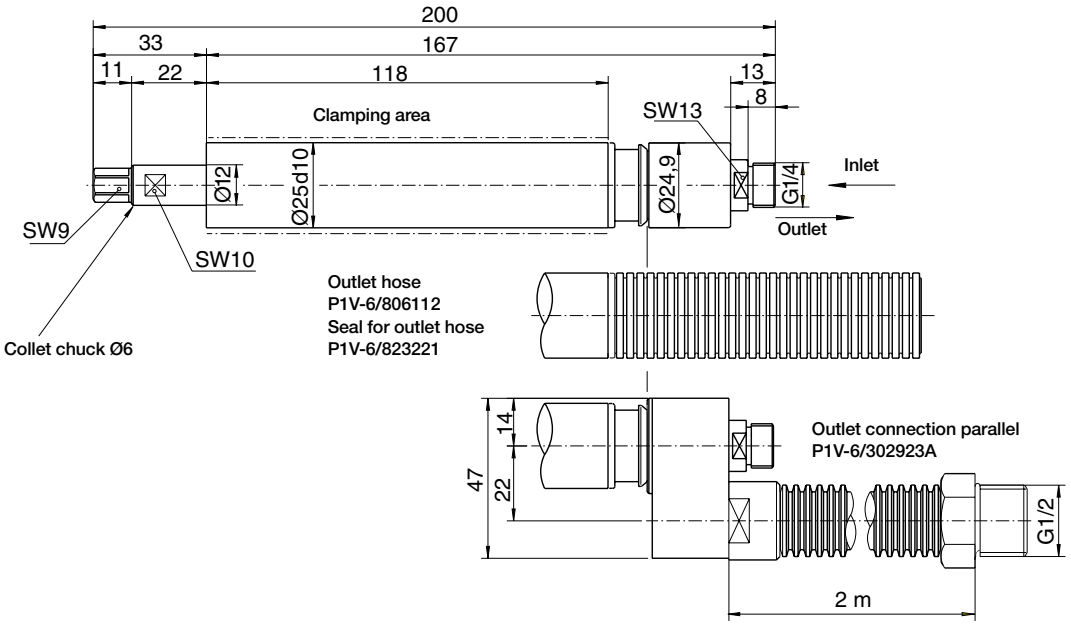
Data for drilling motor with collet P1V-S017N

Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,170	24000	Collet 6 mm	-	4	5,0	G1/4o	6	0,38	**P1V-S017N0Q00**
0,170	6000	Collet 6 mm	3	5	5,0	G1/4o	6	0,38	**P1V-S017N0600**
0,170	4000	Collet 6 mm	4	6	5,0	G1/4o	6	0,38	**P1V-S017N0400**
0,170	1500	Collet 6 mm	4	6	5,0	G1/4o	6	0,43	**P1V-S017N0150**
0,170	1000	Collet 6 mm	4	6	5,0	G1/4o	6	0,43	**P1V-S017N0100**
0,170	660	Collet 6 mm	4	6	5,0	G1/4o	6	0,43	**P1V-S017N0066**

Accessories for drilling motor with collet P1V-S017N

	Name	Order code
Collet		
	Collet Ø3 mm	**P1V-6/312681**
	Collet Ø4 mm	**P1V-6/312684**
	Collet Ø5 mm	**P1V-6/312686**
	Collet Ø6 mm **the motor**	**Included with**
	Collet Ø1/8"	**P1V-6/312682**
	Collet Ø1/4"	**P1V-6/312689**
	Other accessories	
	Outlet hose	**P1V-6/806112**
	Seal for outlet hose	**P1V-6/823221**
	Outlet connection parallel	**P1V-6/302923A**

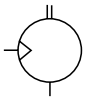
Dimensions (mm)
Drilling motor with collet P1V-S017N



Drilling motor for drill chuck P1V-S017M

A small drilling motor for small-scale, lighter drilling operations.
Select drill chucks as accessories.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%



Data for drilling motor for drill chuck P1V-S017M

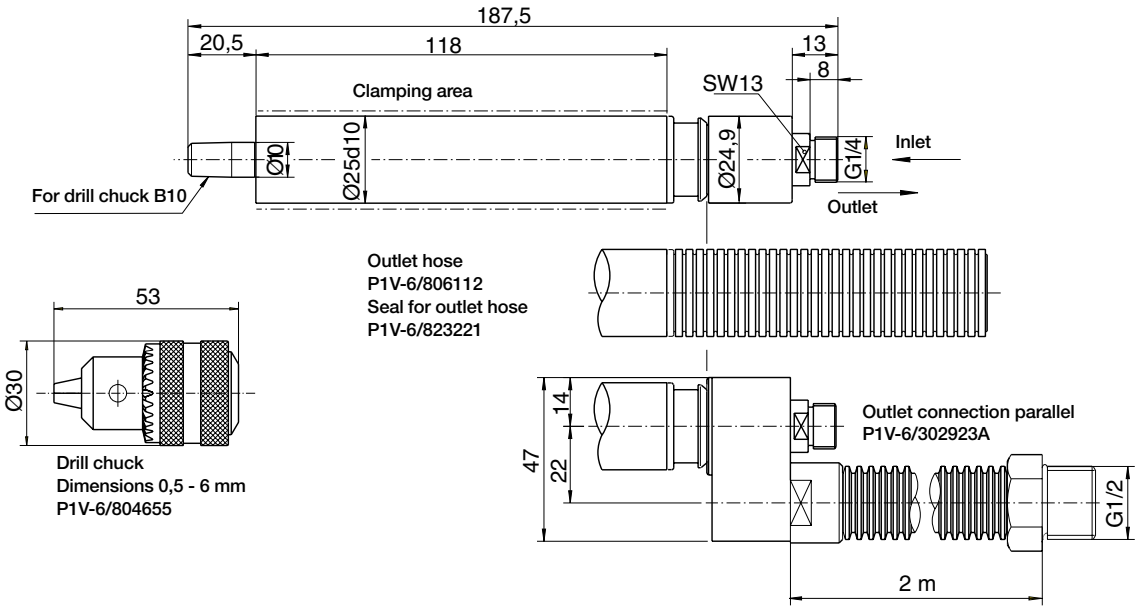
Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,170	6000	For drill chuck B10	3	5	5,0	G1/4o	6	0,38	**P1V-S017M0600**
0,170	4000	For drill chuck B10	4	6	5,0	G1/4o	6	0,38	**P1V-S017M0400**
0,170	1500	For drill chuck B10	4	6	5,0	G1/4o	6	0,43	**P1V-S017M0150**
0,170	1000	For drill chuck B10	4	6	5,0	G1/4o	6	0,43	**P1V-S017M0100**
0,170	660	For drill chuck B10	4	6	5,0	G1/4o	6	0,43	**P1V-S017M0066**

Accessories for drilling motor for drill chuck P1V-S017M

Name	Order code
Standard drill chuck	
Diameters 0,5 – 6 mm/B10	**P1V-6/804655**
Other accessories	
Outlet hose	**P1V-6/806112**
Seal for outlet hose	**P1V-6/823221**
Outlet connection parallel	**P1V-6/302923A**

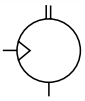
Dimensions (mm)

Drilling motor for drill chuck P1V-S017M



Drilling motor with collet P1V-S025N

A small drilling motor for moderately heavy drilling operations.
The standard collet chuck is for 6 mm shaft diameter.
For other diameters, select a different collet chuck as an accessory.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

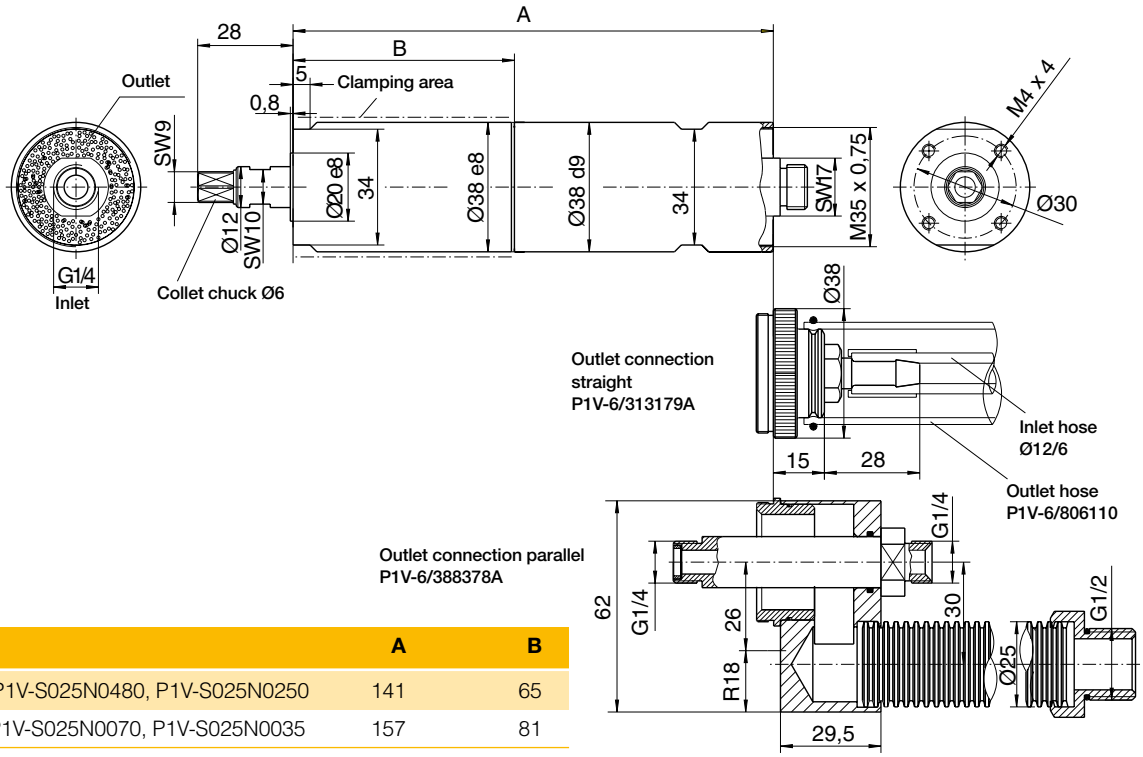
Data for drilling motor with collet P1V-S025N

Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,250	17000	Collet 6 mm	-	6	6,3	G1/4o	6	0,80	**P1V-S025N0H00**
0,250	4800	Collet 6 mm	4	6	6,3	G1/4o	6	0,80	**P1V-S025N0480**
0,250	2500	Collet 6 mm	6	6	6,3	G1/4o	6	0,80	**P1V-S025N0250**
0,250	1400	Collet 6 mm	6	6	6,3	G1/4o	6	0,90	**P1V-S025N0140**
0,250	700	Collet 6 mm	6	-	6,3	G1/4o	6	0,90	**P1V-S025N0070**
0,250	350	Collet 6 mm	6	-	6,3	G1/4o	6	0,90	**P1V-S025N0035**

Accessories for drilling motor with collet P1V-S025N

Name	Order code
Collet	
Collet Ø3 mm	**P1V-6/312681**
Collet Ø4 mm	**P1V-6/312684**
Collet Ø5 mm	**P1V-6/312686**
Collet Ø6 mm	**Included with the motor**
Collet Ø1/8"	**P1V-6/312682**
Collet Ø1/4"	**P1V-6/312689**
Other accessories	
Outlet connection straight	**P1V-6/3131179A**
Outlet hose Ø23 x 28 mm 0,75 m long	**P1V-6/806110**
Outlet connection parallel	**P1V-6/388378A**

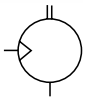
Dimensions (mm)
Drilling motor with collet P1V-S025N



	A	B
P1V-S025N0H00, P1V-S025N0480, P1V-S025N0250	141	65
P1V-S025N0140, P1V-S025N0070, P1V-S025N0035	157	81

Drilling motor for drill chuck P1V-S025M

A small drilling motor for moderately heavy drilling operations.
The standard collet chuck is for 6 mm shaft diameter.
For other diameters, select a different collet chuck as an accessory.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

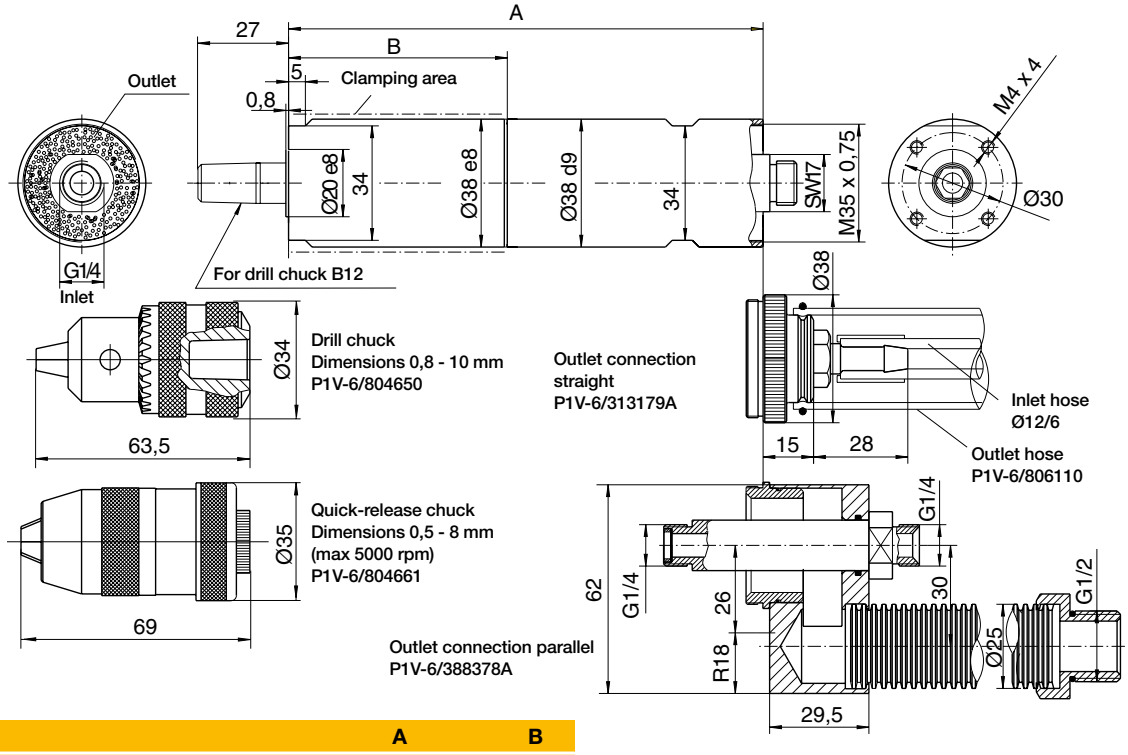
Data for drilling motor for drill chuck P1V-S025M

Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,250	17000	For drill chuck B12	-	6	6,3	G1/4o	6	0,80	**P1V-S025M0H00**
0,250	4800	For drill chuck B12	4	6	6,3	G1/4o	6	0,80	**P1V-S025M0480**
0,250	2500	For drill chuck B12	6	8	6,3	G1/4o	6	0,80	**P1V-S025M0250**
0,250	1400	For drill chuck B12	8	10	6,3	G1/4o	6	0,80	**P1V-S025M0140**
0,250	700	For drill chuck B12	10	-	6,3	G1/4o	6	0,80	**P1V-S025M0070**
0,250	350	For drill chuck B12	10	-	6,3	G1/4o	6	0,80	**P1V-S025M0035**

Accessories for drilling motor for drill chuck P1V-S025M

Name	Order code
Standard drill chuck	
Diameters 0,8 - 10 mm/B12	**P1V-6/804650**
Quick release chuck	
Diameters 0,5 - 8 mm/B12	**P1V-6/804661**
Other accessories	
Outlet connection straight	**P1V-6/3131179A**
Collet Ø1/4"	**P1V-6/312689**
Outlet hose Ø23 x 28 mm 0,75 m long	**P1V-6/806110**
Outlet connection parallel	**P1V-6/388378A**

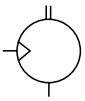
Dimensions (mm)
Drilling motor for drill chuck P1V-S025M



	A	B
P1V-S025M0H00, P1V-S025M0480, P1V-S025M0250	141	65
P1V-S025M0140, P1V-S025M0070, P1V-S025M0035	157	81

Drilling motor for drill chuck P1V-S040M

Our large drilling motor is used for small-scale heavy drilling operations requiring considerable feed force.
Select drill chucks or quick-release chucks as accessories as necessary.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

Data for drilling motor for drill chuck P1V-S040M

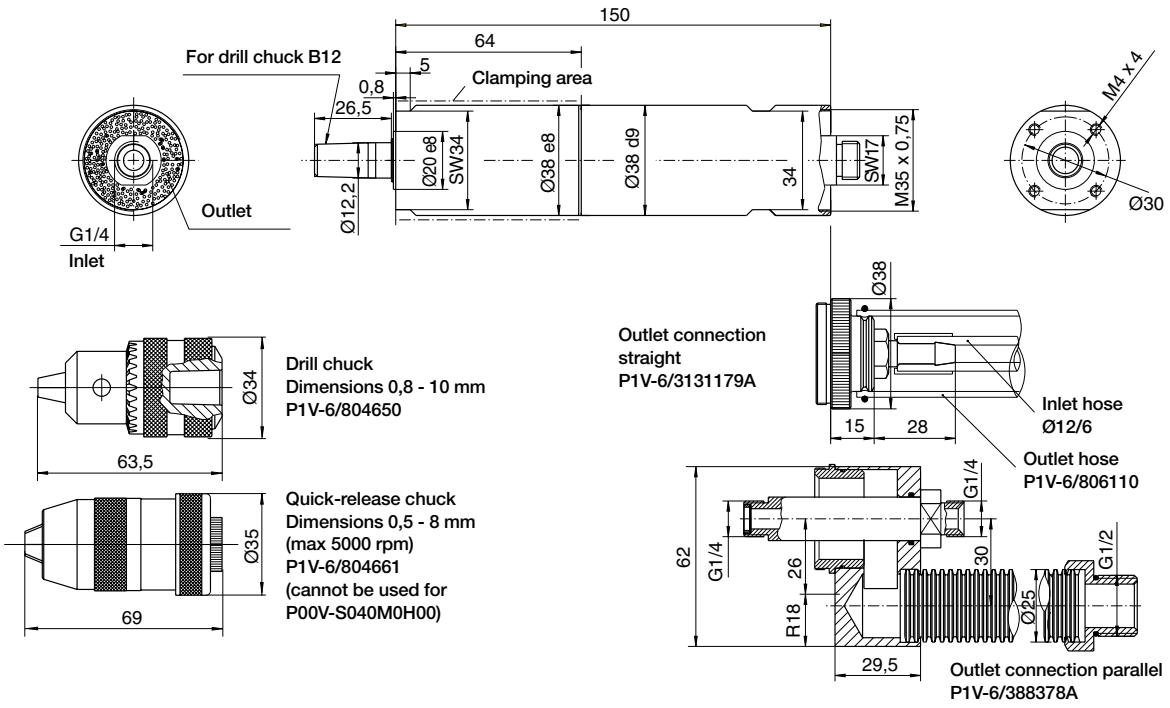
Max power	Free speed	Version	Drilling in steel	Drilling in aluminium	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,400	17000	For drill chuck B12	-	6	8,0	G1/4o	6	0,82	**P1V-S040M0H00**
0,400	4800	For drill chuck B12	4	6	8,0	G1/4o	6	0,82	**P1V-S040M0480**
0,400	2500	For drill chuck B12	6	8	8,0	G1/4o	6	0,82	**P1V-S040M0250**
0,400	1400	For drill chuck B12	8	10	8,0	G1/4o	6	0,92	**P1V-S040M0140**

Accessories for drilling motor for drill chuck P1V-S040M

Name	Order code
Standard drill chuck	
Diameters 0,8 – 10 mm/B12	**P1V-6/804650**
Quick-release chuck	
Diameters 0,5 – 8 mm/B12 (Cannot be used for drilling motor P1V-S040M0H00)	**P1V-6/804661**
Other accessories	
Outlet connection straight	**P1V-6/3131179A**
Outlet hose Ø23 x 28 mm 0,75 m long	**P1V-6/806110**
Outlet connection parallel	**P1V-6/388378A**

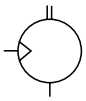
Dimensions (mm)

Drilling motor for drill chuck P1V-S040M



Drilling motor for drill chuck P1V-S060M

Our large drilling motor is used for small-scale heavy drilling operations requiring considerable feed force.
Select drill chucks or quick-release chucks as accessories as necessary.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

Data for drilling motor for drill chuck P1V-S060M

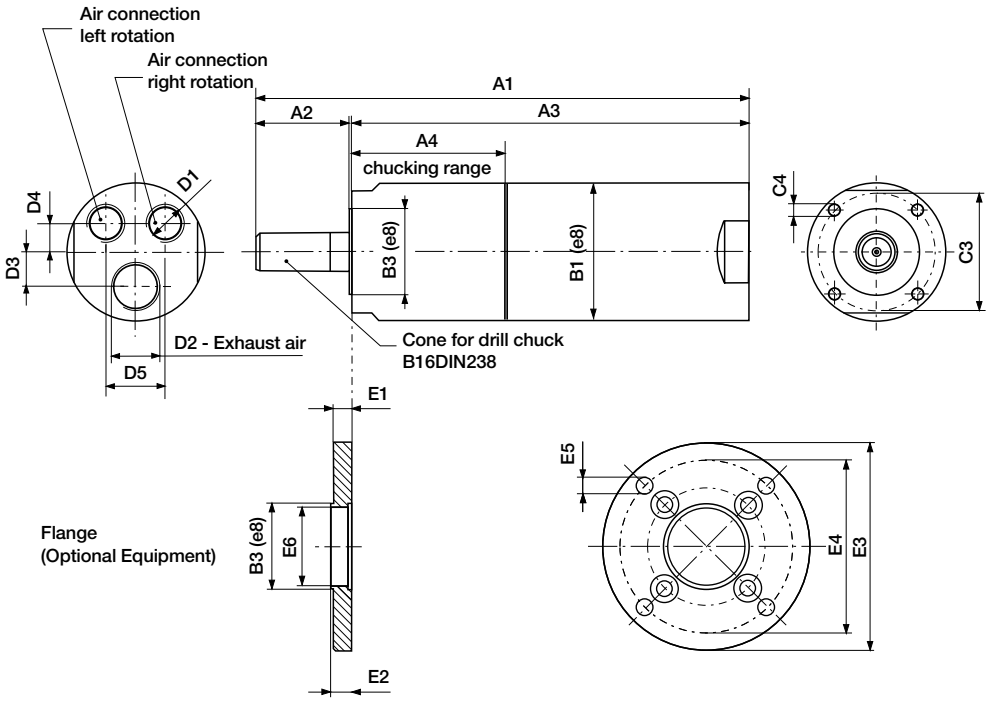
Max power kW	Free speed rpm	Version	Drilling in steel mm	Drilling in aluminium mm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,600	3500	For drill chuck B16	3	3	14,2	G3/8	12	2,1	**P1V-S060M0350**
0,600	2700	For drill chuck B16	5	5	14,2	G3/8	12	2,1	**P1V-S060M0270**
0,600	1700	For drill chuck B16	8	8	14,2	G3/8	12	2,1	**P1V-S060M0170**
0,600	630	For drill chuck B16	13	13	14,2	G3/8	12	2,2	**P1V-S060M0063**
0,600	480	For drill chuck B16	13	13	14,2	G3/8	12	2,3	**P1V-S060M0048**
0,600	300	For drill chuck B16	13	13	14,2	G3/8	12	2,3	**P1V-S060M0030**
0,600	150	For drill chuck B16	13	13	14,2	G3/8	12	2,3	**P1V-S060M0015**

Accessories for drilling motor for drill chuck P1V-S060M

Name	Order code
Standard drill chuck	
Diameters 1 – 13 mm/B16	**P1V-6/804652**
Quick-release chuck	
Diameters 1 – 13 mm/B16	**P1V-6/804663**

Dimensions (mm)

Drilling motor for drill chuck P1V-S060M



Mountings for drilling P1V-S air motors

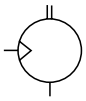
Type	For drilling motor	Weight Kg	Order code
Flange			
	P1V-S008	0,04	**P1V-S4008B**
	P1V-S025	0,09	**P1V-S4020B**
	P1V-S040	0,12	**P1V-S4030B**
	P1V-S060	0,25	**P1V-S4060B**
Foot bracket			
	P1V-S008	0,08	**P1V-S4008F**
	P1V-S025	0,11	**P1V-S4020F**
	P1V-S040	0,11	**P1V-S4030F**
	P1V-S060	0,30	**P1V-S4060F**

All brackets supplied with fastening screws for the motor.

Grinding gear motor with collet (no vanes) P1V-S009N

The grinding motor is used for small-scale point grinding and small-scale milling where the high speed is an advantage. It has proved to be very useful for drilling small holes and milling thin slits in PCBs in the electronics industry.
In this application, the high speed means that the holes and slits are free of burrs on the underside.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

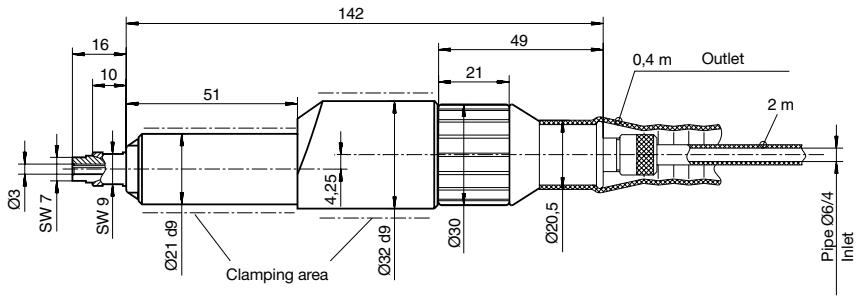


Data for grinding gear motor with collet (no vanes) 90 W

Max power	Free speed	Version	Point grinding diam. max	Milling diam. max	Air consumption at max power	Conn.	Min pipe ID	Weight	Order code
kW	rpm		mm	mm	l/s		mm	Kg	
0,090	100000	Collet 3 mm	5	3	2,0	Pipe 6/4	4	0,3	**P1V-S009N0A000**

Dimensions (mm)

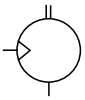
Grinding motor P1V-S009N0A000



Grinding motors with collets 150, 250 & 300 W

This grinding motor is used when larger-scale point grinding is required.
The motor can also be used for light milling operations.
The motor has a built-in silencer for exhaust air.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

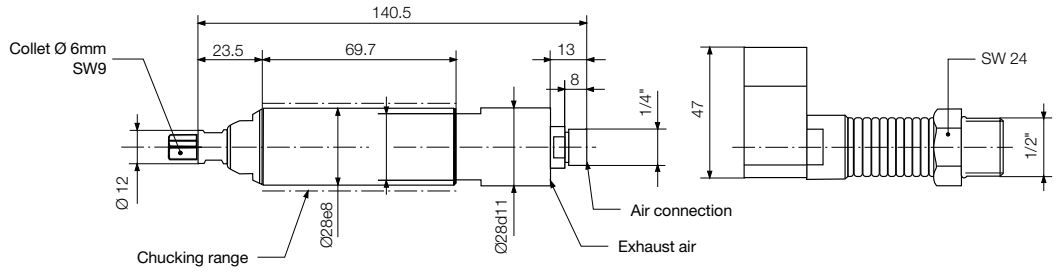


Data for grinding motors with collets 150, 250 & 300 W

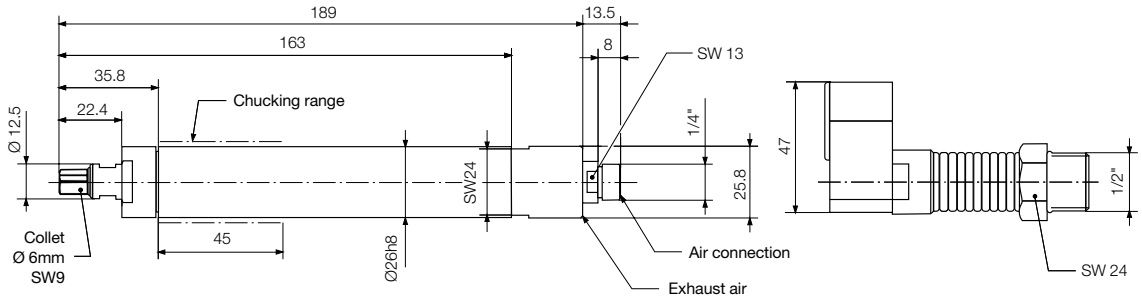
Max power kW	Free speed rpm	Version	Point grinding diam. max mm	Milling diam. max mm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,150	47000	Collet 6 mm	-	-	X	G1/4o	6	0,36	**P1V-S015N0AQ0**
0,250	32000	Collet 6 mm	-	-	X	G1/4o	6	0,80	**P1V-S025N0Z00**
0,300	30000	Collet 6 mm	-	-	X	G1/4o	6	0,70	**P1V-S030N0X00**
0,300	45000	Collet 6 mm	-	-	X	-	6	0,70	**P1V-S030N0AN0**

Dimensions (mm)

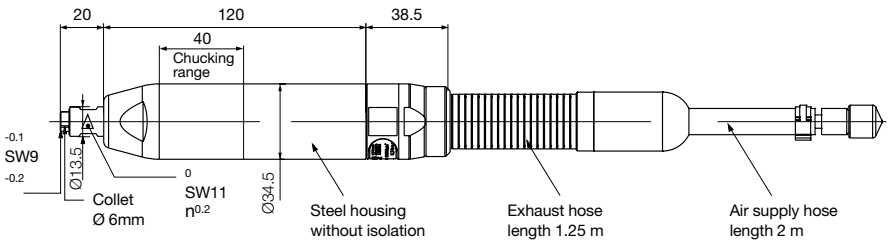
Grinding motor P1V-S015N0AQ0



Grinding motor P1V-S025N0Z00



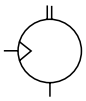
Grinding motor P1V-S030N0X00
Grinding motor P1V-S030N0AN0



Milling motor with collet P1V-S040N

This motor was designed for milling plastic components, but it can also be used for milling other materials. The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 20% lower. Data tolerance accuracy -+10%



Data for milling motor with collet P1V-S040N

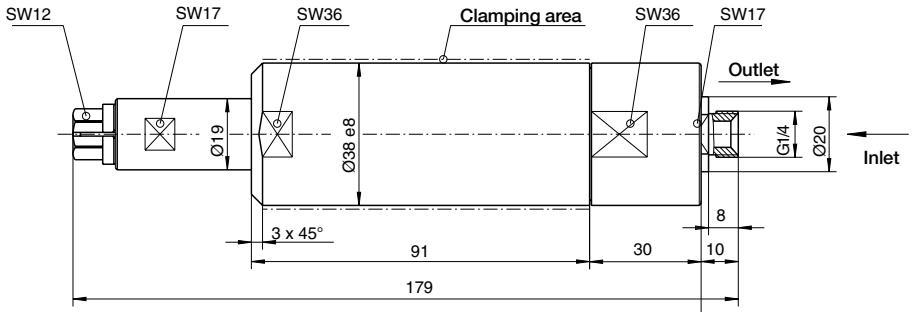
Max power kW	Free speed rpm	Version	Milling of plastic mill dia. max mm	Milling of wood mill dia. max mm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,400	20000	Collet 8mm	8	10	5,0	G1/4o	6	0,80	**P1V-S040N0L00**

Accessories for milling motor with collet P1V-S040N

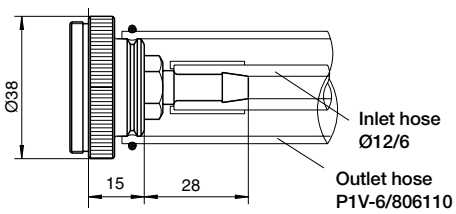
Name	Order code
Collet	
Collet Ø3 mm	**P1V-6/312690**
Collet Ø4 mm	**P1V-6/312692**
Collet Ø5 mm	**P1V-6/312693**
Collet Ø6 mm	**P1V-6/312694**
Collet Ø8 mm	**Included with the motor**
Collet Ø1/8"	**P1V-6/312691**
Collet Ø1/4"	**P1V-6/312695**
Other accessories	
Outlet connection straight	**P1V-6/3131179A**
Outlet hose Ø23 x 28 mm 0,75 m long	**P1V-6/806110**
Outlet connection parallel	**P1V-6/388378A**

Dimensions (mm)

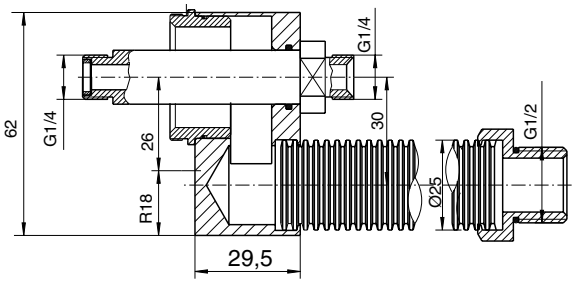
Milling motor with collet P1V-S040N0L00



Outlet connection straight
P1V-6/313179A



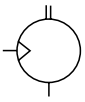
Outlet connection parallel
P1V-6/388378A



Milling motors with collets 500, 700 & 1000 W

This motor was designed for milling plastic components, but it can also be used for milling other materials.
The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

Note! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy -+10%

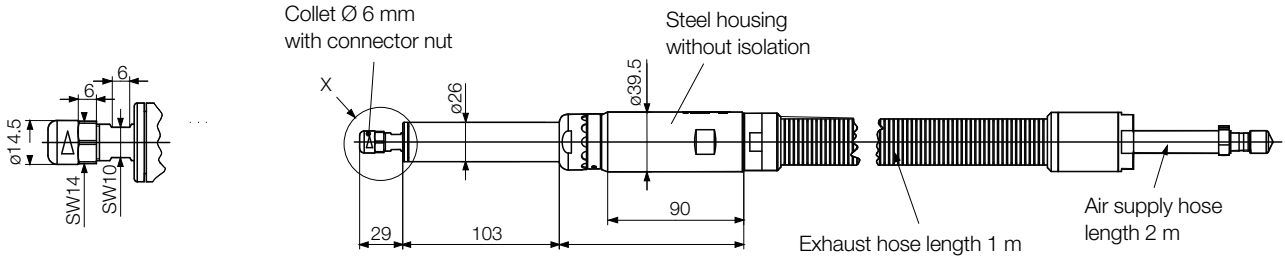


Data for milling motors with collets 500, 700 & 1000 W

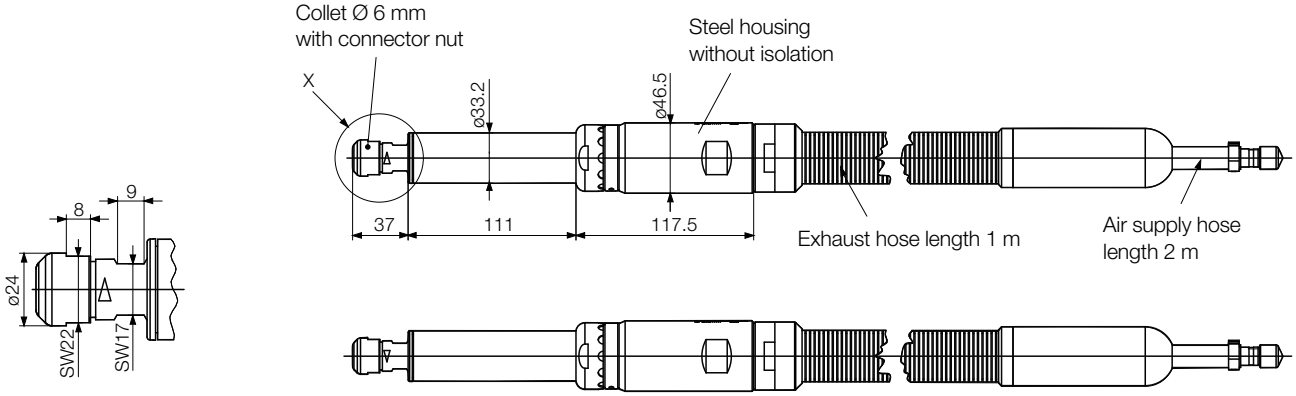
Max power kW	Free speed rpm	Version	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,500	20000	Collet 8 mm	15,0	-	10	1,20	**P1V-S050N0L00**
0,700	19000	Collet 8 mm	15,0	-	10	1,70	**P1V-S070N0N00**
1,000	15300	Collet 8 mm	16,7	-	12	1,70	**P1V-S100N0F30**

Dimensions (mm)

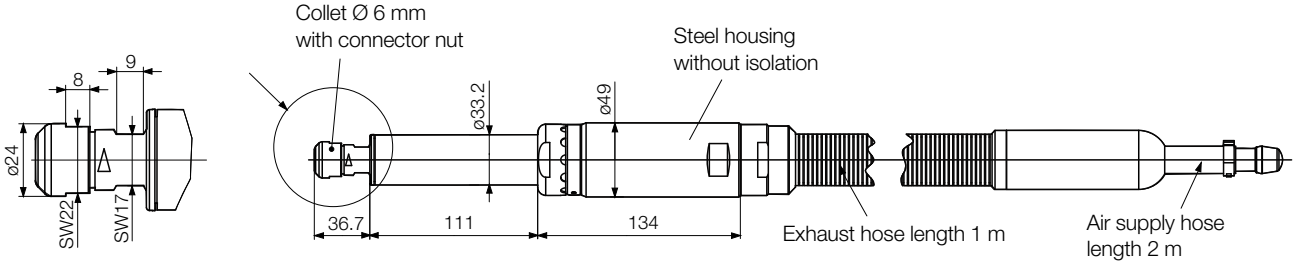
Milling motor with collet P1V-S050N0L00



Milling motor with collet P1V-S070N0N00

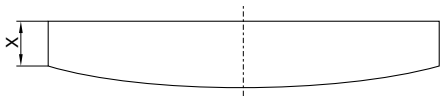


Milling motor with collet P1V-S100N0F30



Lubrication and service life

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 and the minimum dimensions of worn vanes.



Drilling motors	New dimensions X (mm)	Minimum dimensions X (mm)
P1V-S008	4,3	4,0
P1V-S017	4,2	3,3
P1V-S025	6,5	5,8
P1V-S040	6,8	6,0

Milling motors	New dimensions X (mm)	Minimum dimensions X (mm)
P1V-S040	X	X
P1V-S050	X	X
P1V-S070	X	X
P1V-S100	X	X

Grinding motors	New dimensions X (mm)	Minimum dimensions X (mm)
P1V-S009	No vanes	No vanes
P1V-S015	X	X
P1V-S025	X	X
P1V-S030	X	X

* The specified hours of operation apply when the motor is running at the speed corresponding to maximum power (load speed).
This is approximately half free speed.If the motor operates at higher speeds, the service interval is shorter.If the motor operates at lower speeds, the service interval is longer.

Service kits for drilling, milling and grinding motors

The following kits are available for the motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease: (USDA-H1 approved)

Service kits

For drilling motors	Order code
P1V-S008N	**P1V-6/446085A**
P1V-S017N/M	**P1V-6/446086A**
P1V-S025N/M	**P1V-6/446087A**
P1V-S040M	**P1V-6/446088A**
P1V-S060M0350	**9121720604**
P1V-S060M0270	**9121720604**
P1V-S060M0170	**9121720604**
P1V-S060M0063	**9121720604**
P1V-S060M0048	**9121720605**
P1V-S060M0030	**9121720605**
P1V-S060M0015	**9121720605**

For milling motors	Order code
P1V-S040N	**P1V-6/446088A**
P1V-S050N	**P1V-6/4405021B**
P1V-S070N	**P1V-6/4405021C**
P1V-S100N	**P1V-6/4405021D**

For grinding motors	Order code
P1V-S009N	**Service free**
P1V-S015N	**P1V-6/4449221A**
P1V-S025N	**P1V-6/4449211A**
P1V-S030N	**P1V-6/4405021B**

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