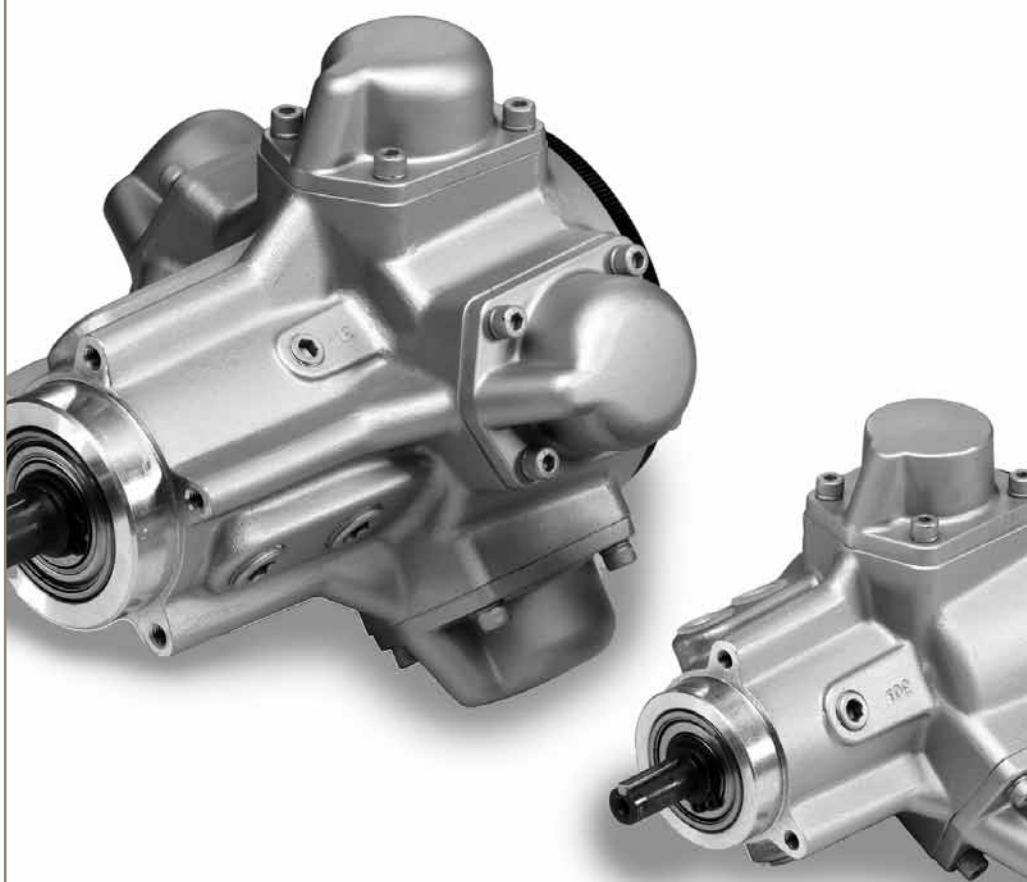


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Air Motors

P1V-P Radial Piston Type
0.066 to 0.228 kW

Catalogue PDE2538TCUK November 2014



ENGINEERING YOUR SUCCESS.

P1V-P - Radial Piston 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

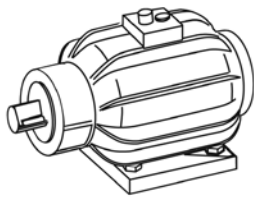
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P1V-P - Radial Piston Air Motors

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.



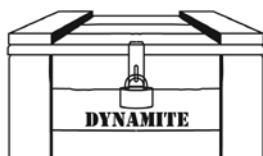
Air motors can be stopped and started continually without damage.



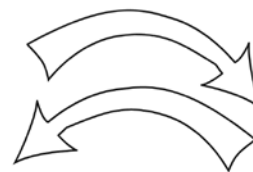
The simple design principle of air motors makes them very easy to service.



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



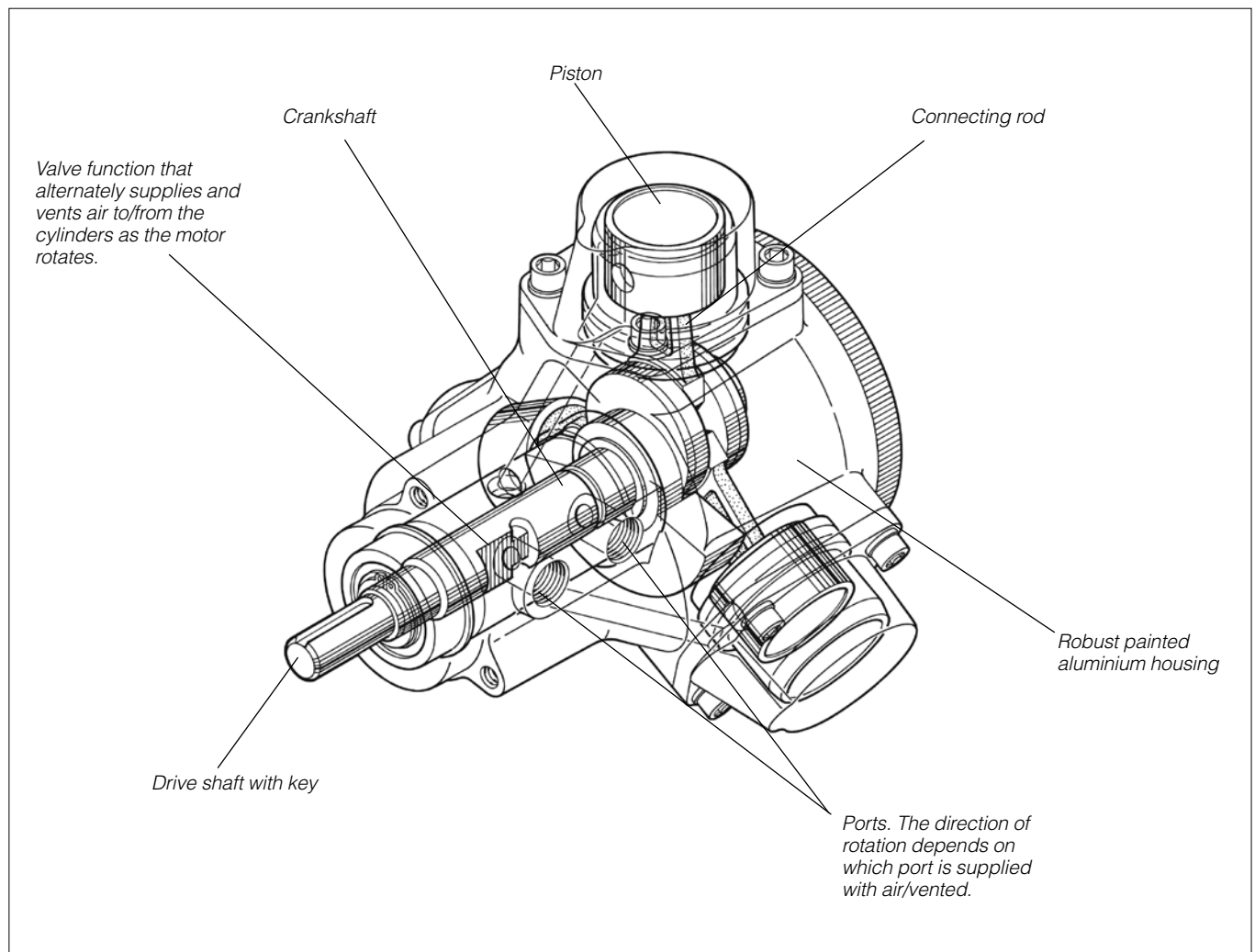
Air motors can be used in the harshest environments. Most P1V-S motors are ATEX certified.



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.



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

$$P = M \times n / 9550 \text{ with } P \text{ power output in kW, } M \text{ nominal torque in Nm, } n \text{ nominal speed in rpm}$$

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?

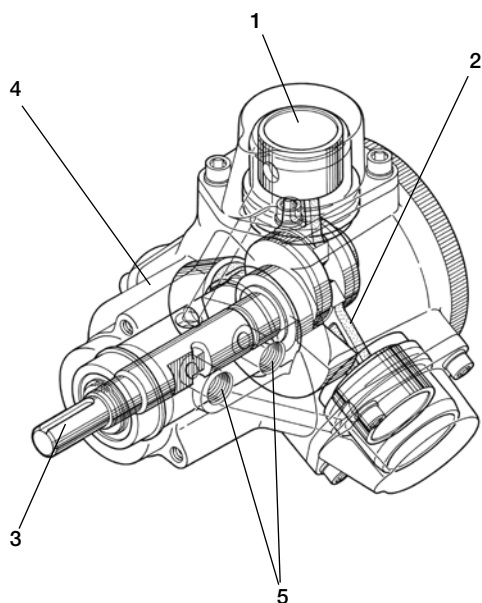
⑤ How do you ensure a long life and high performance of the air motor?

- 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

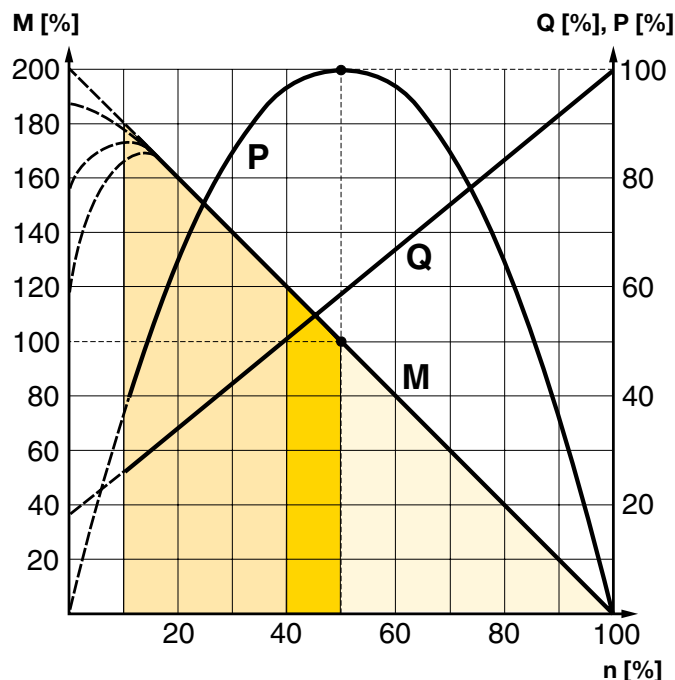
Air motors come in a wide range of different designs. For these motors, we have chosen the radial piston principle because of the low speed, high torque, low noise level and long service life with no service intervals.

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

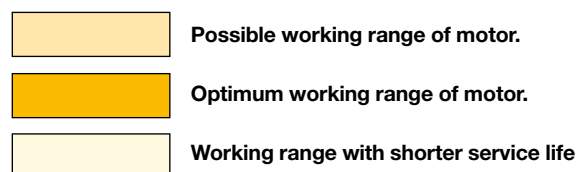
The P1V-P motors can also be fitted with a choice of gear-boxes with different gear ratios, to produce the desired speed and torque at the outgoing shaft for every application.

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.

Torque, power and air consumption graphs



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



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

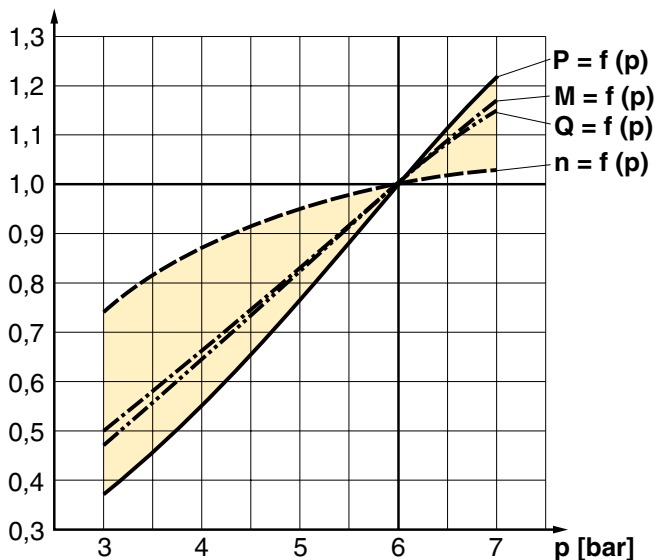
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an 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 ($M_{max} = 2 \times M_o$). At nominal speed (n_n), for example in the middle of the speed range, air motor reaches its maximum power output (P_{max}).

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



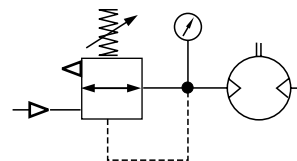
P = Power, M = Torque, Q = Air consumption, N = Speed

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

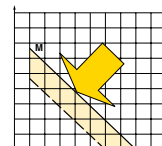
All catalogue data and curves are specified at a supply pressure of 6 bar to the motor. This diagram shows the effect of pressure on speed, specified torque, power and air consumption. Start off on the curve at the pressure used and then look up to the lines for power, torque and air consumption. Read 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.

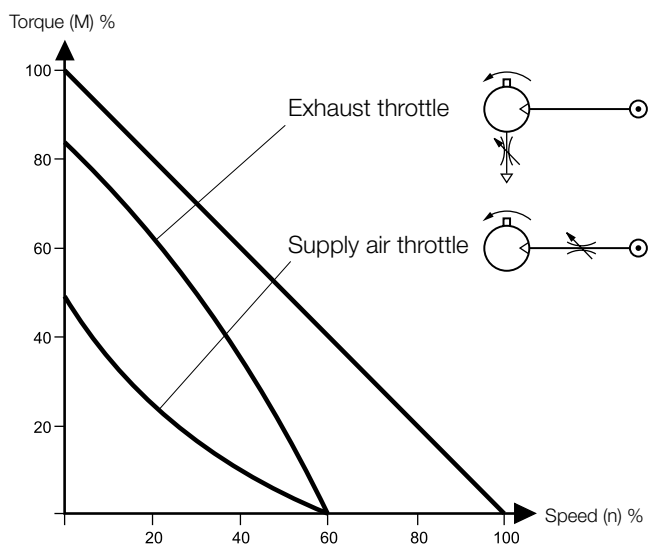


Torque curve change caused by pressure change

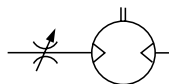
Speed regulation, air flow reduction

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.

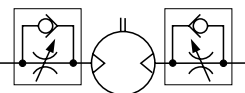
P1V-P - Radial Piston Air Motors



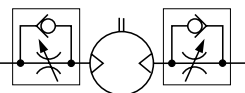
Throttling



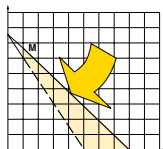
Supply or exhaust throttling,
non-reversible motor



Supply throttling, re-
versible motor



Exhaust throttling, rever-
sible motor

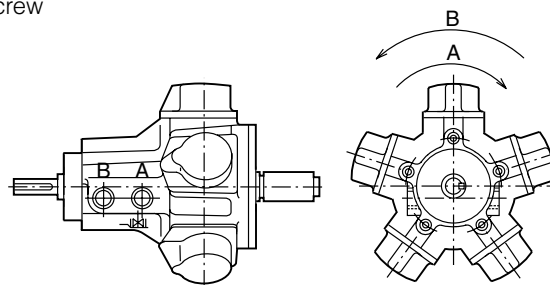


Theoretical torque
curve change
caused by throttling

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)

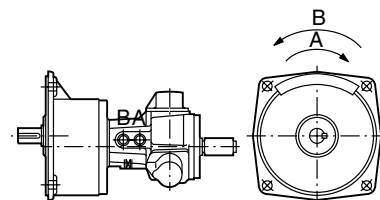


A port = inlet, counter clockwise
B port = inlet, clockwise

Motor with gearbox

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

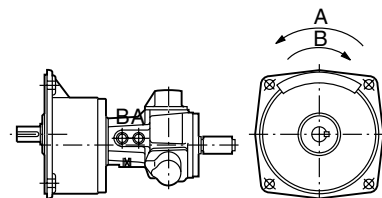
Motor	Ratio
P1V-P007**0440	5
P1V-P007**0220	10
P1V-P007**0147	15
P1V-P007**0110	20
P1V-P012**0360	5
P1V-P012**0180	10
P1V-P012**0120	15
P1V-P012**0090	20
P1V-P012**0060	30
P1V-P012**0050	40
P1V-P023**0300	5
P1V-P023**0150	10
P1V-P023**0100	15
P1V-P023**0075	20
P1V-P023**0050	30
P1V-P023**0038	40



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 in 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 m³ 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	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/m³ (as supplied by a standard compressor with a standard filter).

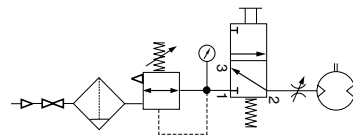
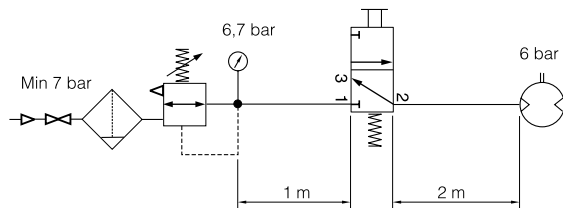
Air supply

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.

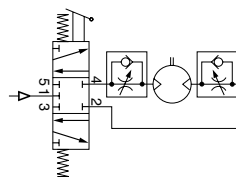
The following data must be complied with:

- 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

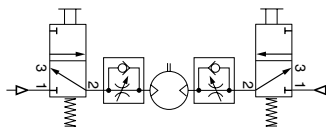
The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.



Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve



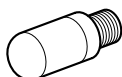
Reversible motor with two 3/2 control valves

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.

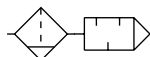
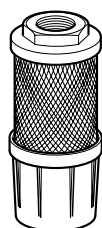
One flow control valve with by-pass is needed to regulate each direction of rotation if the motor is used as a reversible motor. The built-in check valve will then allow air from the residual air outlet to escape through the outlet port in the control valve. The compressed air supply must have sufficiently 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:

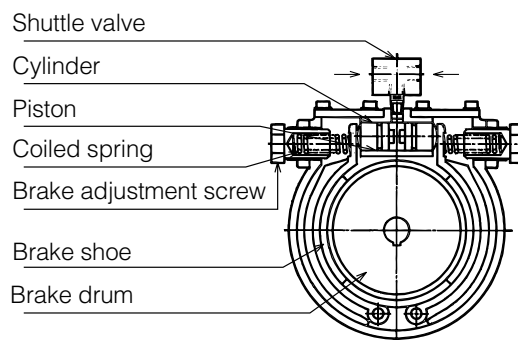
- Machinery Directive (essential health and safety requirements relating to the design and structure of machines and safety components)
- EMC Directive
- Simple Pressure Vessels Directive
- Low Voltage Directive

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 to 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

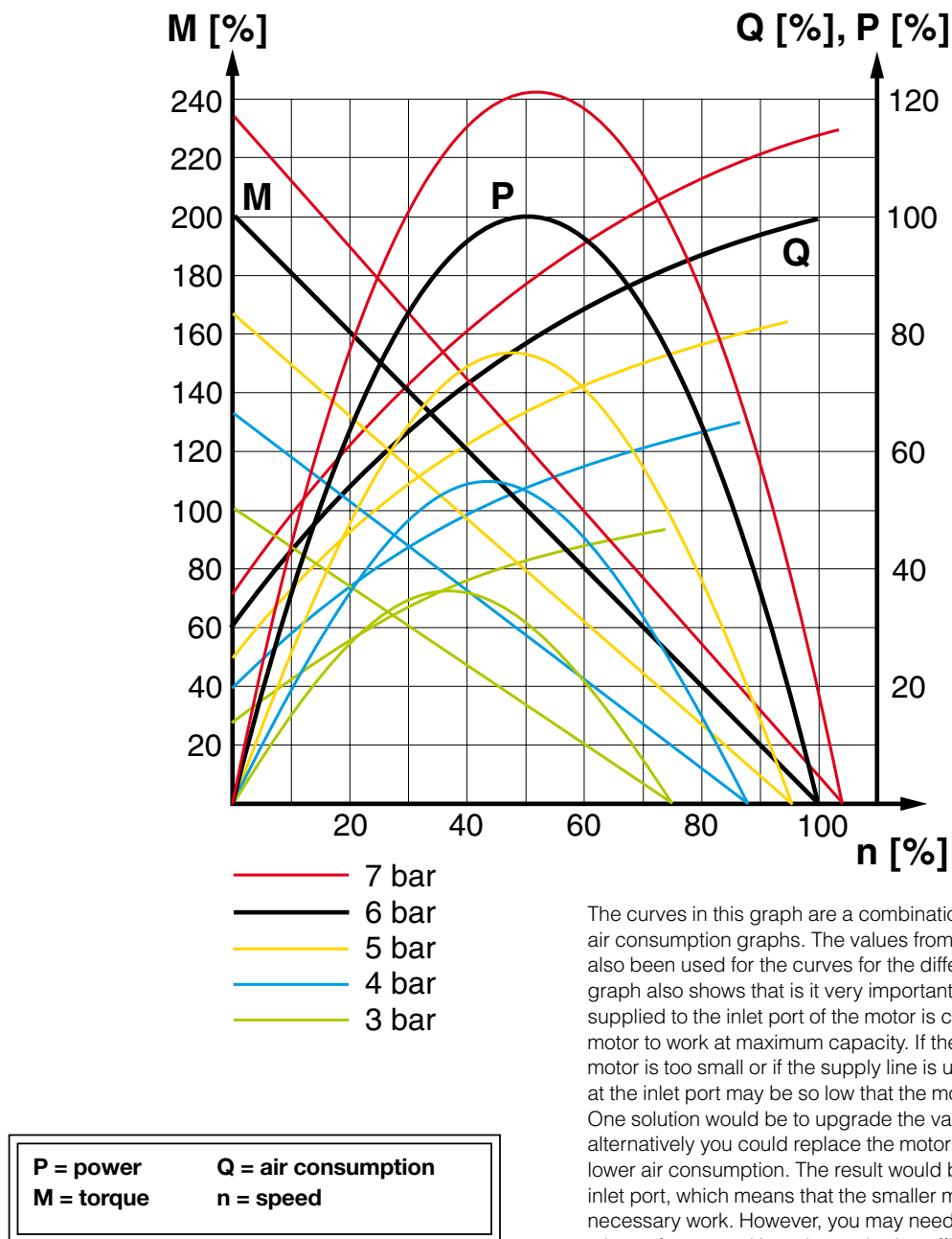
1. Non tase adjustment is available for torque as needed.
2. Simple design with little trouble and long life.
3. The design makes the complete motor with the brake low weight.



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 simultaneously 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



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 it is 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 m³			Mass Concentration mg/m³	Vapour Pressure Dewpoint	Liquid g/m³	Total Oil (aerosol liquid and vapour)
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				mg/m³
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.

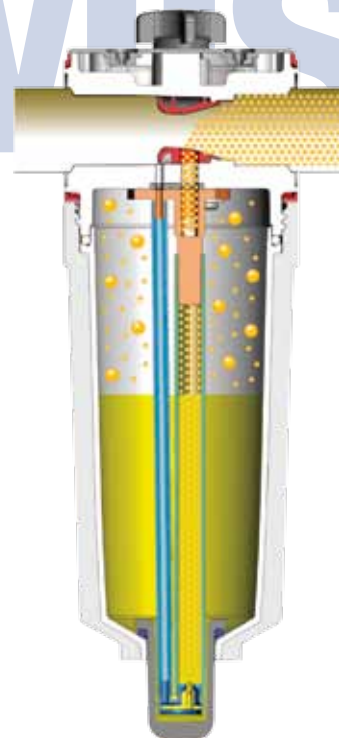
The use of technopolymers in the design of P3X Lite has facilitated a universal body design, this has resulted in reducing the number of variants required to cover the full spectrum of applications. This can dramatically lower logistic costs and simplify stock holding for customers making the P3X Lite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



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

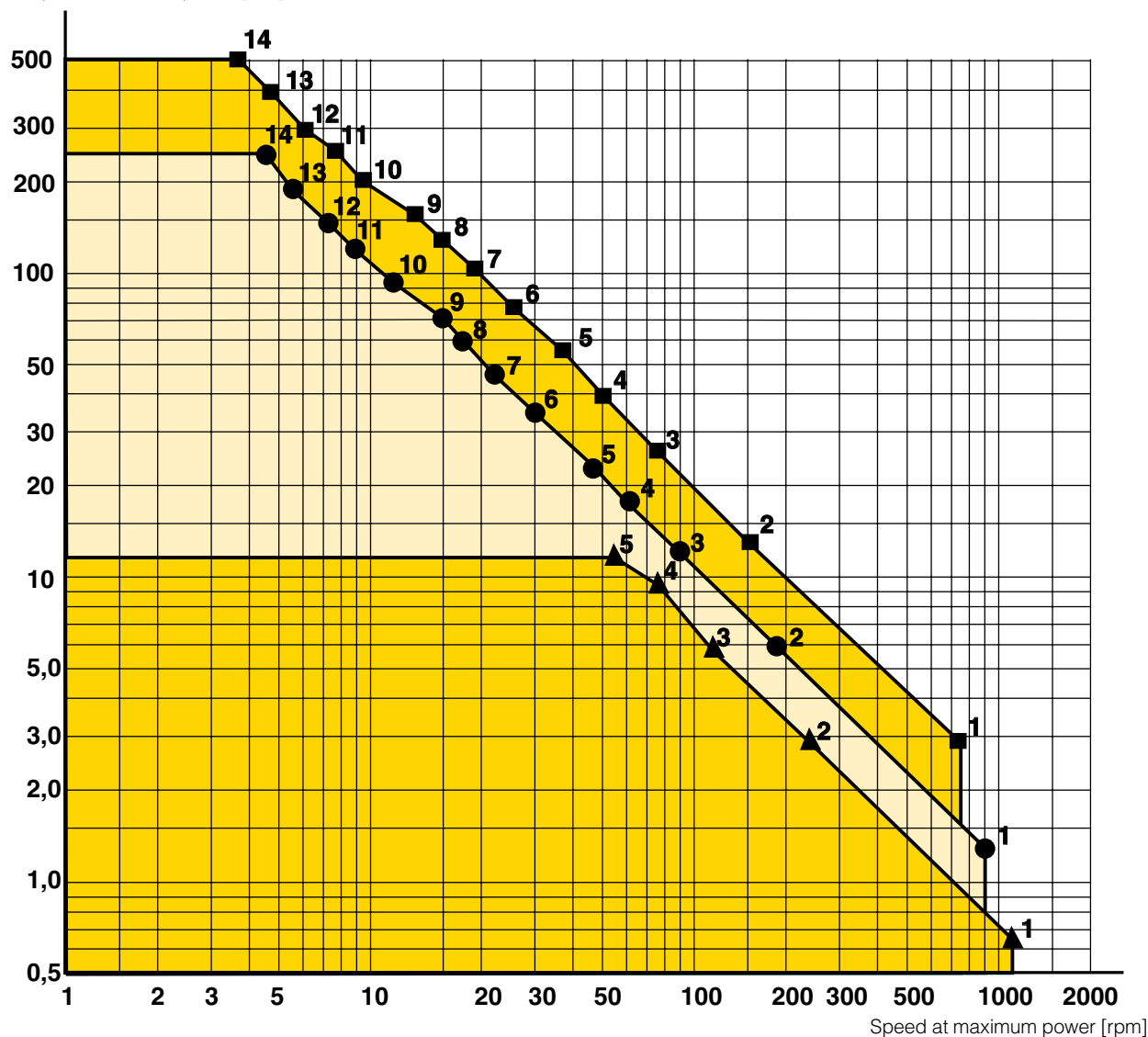
With conventional lubricators, only the oil volume per time unit can be adjusted. If the demand changes, the quantity dispensed still remains constant.

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

Torque at maximum power [Nm]



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.

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

- ▲ 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-P007

- 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 or these as brake motors Flange P1V-P012BB0009, Foot P1V-P012FB0009

P1V-P012

- 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

P1V-P023

P1V-P - Radial Piston Air Motors

Technical data

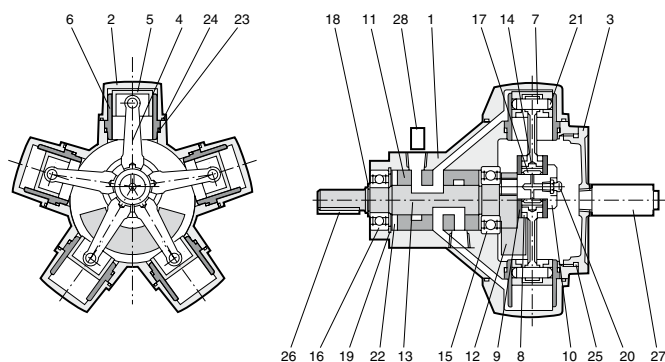
Working pressure	Max 6 bar
Working temperature	-10 °C to +70 °C
Medium	Oil mist, dry compressed air purity class 3.4.4 according to ISO8573-1
Gearboxes	Grease lubricated

Table and diagram data

All values are typical values, with a speed tolerance of $\pm 10\%$

P1V-P023

P1V-P007 and P1V-P012



Material specification

Nr	Designation	Material	Qty.
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.

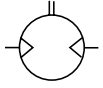
Air motor	Free outlet dB (A)	With outlet silencer dB (A)	Exhaust air removed with pipes to another room dB (A)
P1V-P007	95	75	69
P1V-P012	100	80	72
P1V-P023	100	80	72

Air motors

Air motor	P1V-P007	P1V-P012	P1V-P023
Air flow required, NI/s	3,34	4,34	6,67
Air flow required, NI/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 $\pm 10\%$.

**Data for reversible basic motor**

Max power at 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 at 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 at 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

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 $\pm 10\%$.



Data for reversible basic motor with brake

Max power at 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

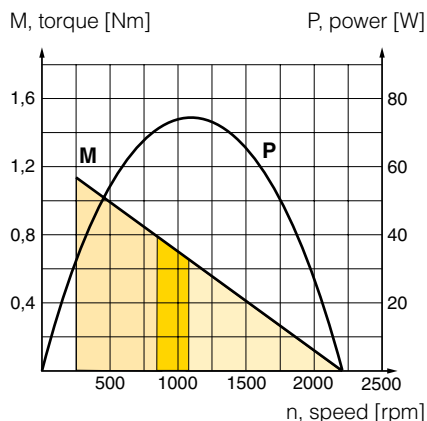
Data for reversible basic motor with brake and flange

Max power at 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

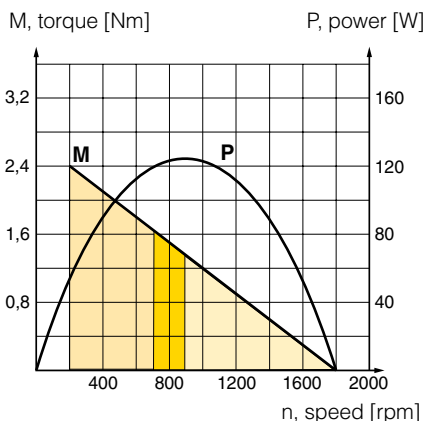
Data for reversible basic motor with brake and foot bracket

Max power at 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

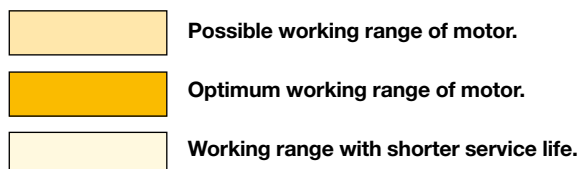
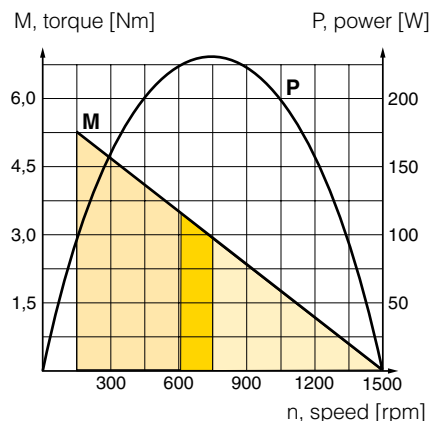
P1V-P007**2200



P1V-P012**1800

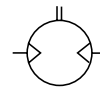


P1V-P023**1500



P1V-P - Radial Piston Air Motors

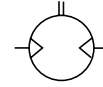
NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is $\pm 10\%$.

**Data for reversible motor with gearbox and flange**

Max power at 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	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

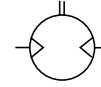
NOTE! All technical data are based on a working pressure of 5 bar and with oil. Speed tolerance accuracy is $\pm 10\%$.

**Data for reversible motor with gearbox and foot bracket**

Max power at 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 $\pm 10\%$.

**Data for reversible motor with gearbox, brake and flange**

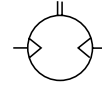
Max power at max power kW	Speed at max power rpm	Torque at max power Nm	Min start torque Nm	Stall torque Nm	Brake torque Nm	Air consumption at max power l/s	Conn.	Min pipe ID mm	Weight Kg	Order code
0,110	180	5,88	8,83	12,7	14,7	4,34	G1/4	10	8,0	P1V-P012BB0360
0,110	90	11,8	17,7	26,5	29,4	4,34	G1/4	10	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

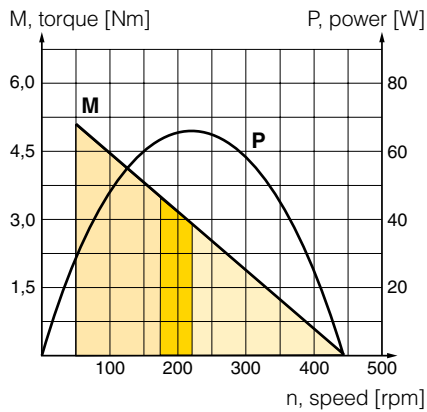
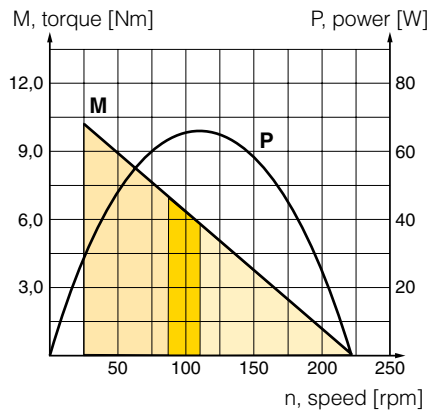
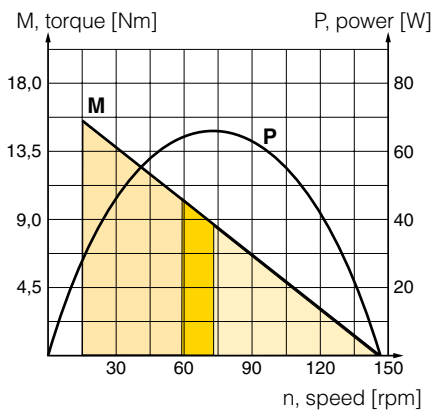
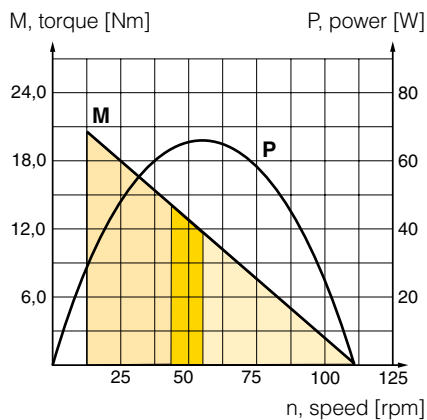
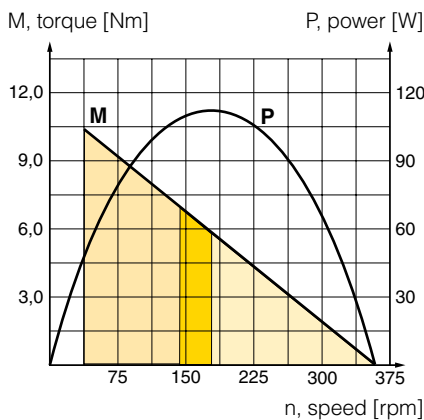
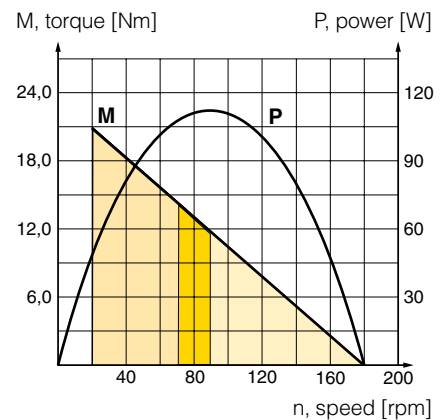
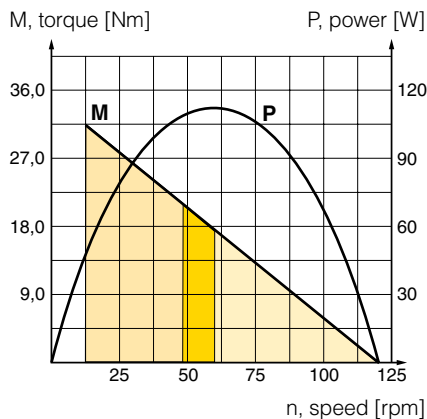
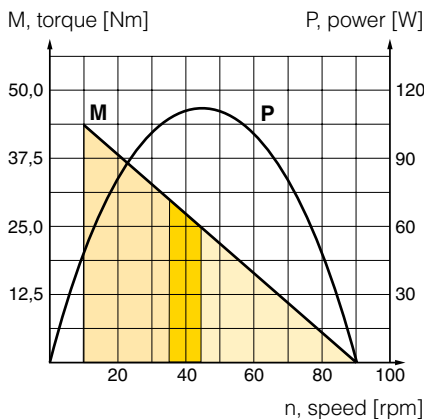
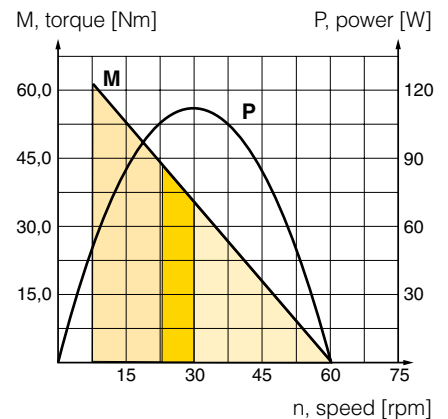
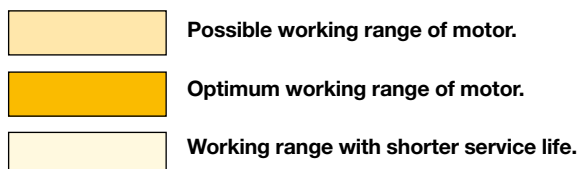
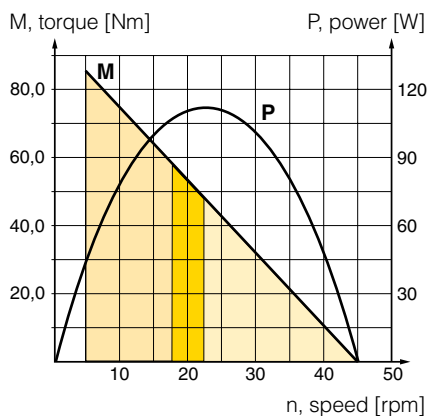
Permitted shaft loadings, see page 37

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 $\pm 10\%$.

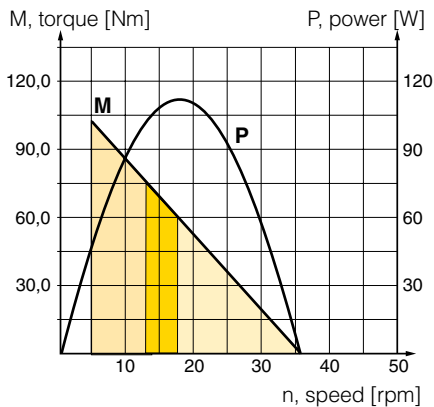
**Data for reversible motor with gearbox, brake and foot bracket**

Max power at 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

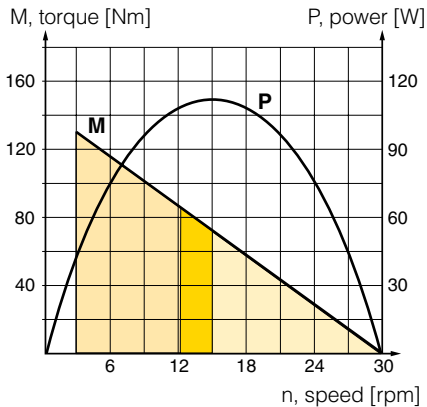
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P1V-P - Radial Piston Air Motors

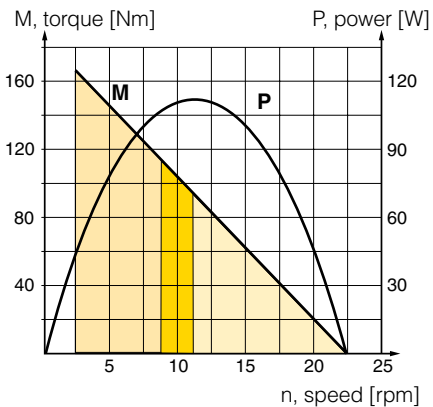
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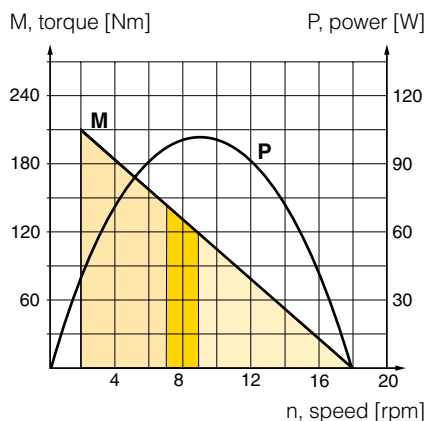
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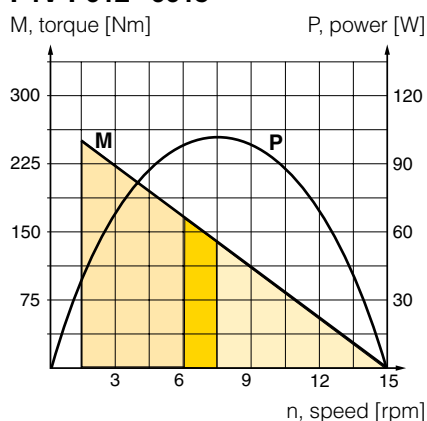
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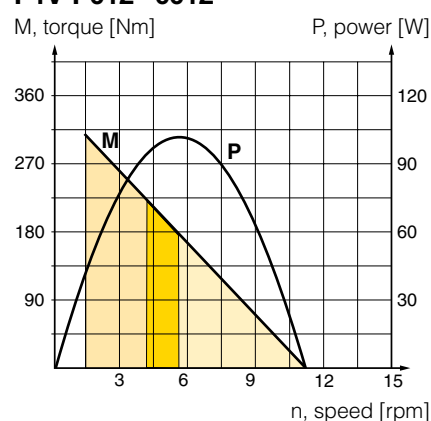
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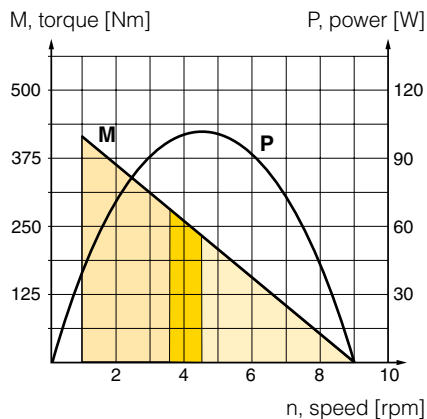
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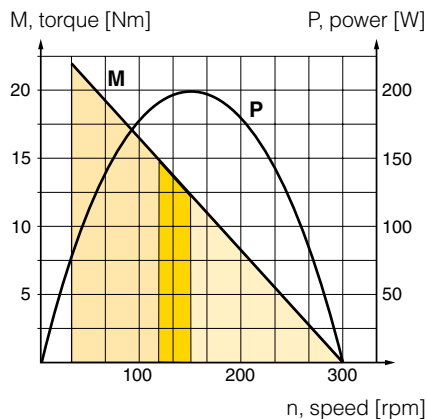
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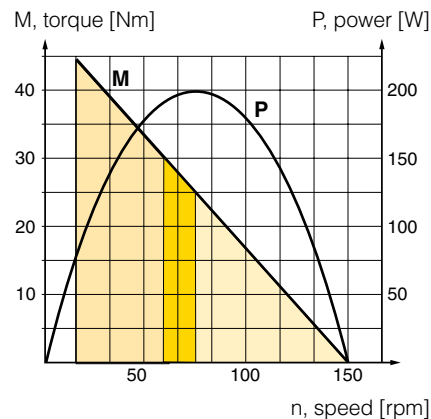
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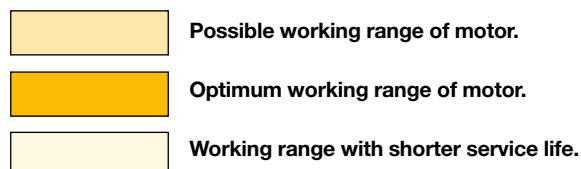
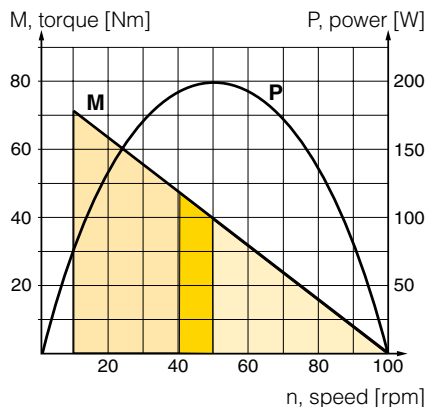
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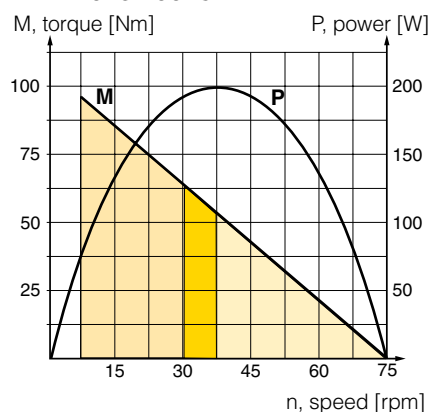
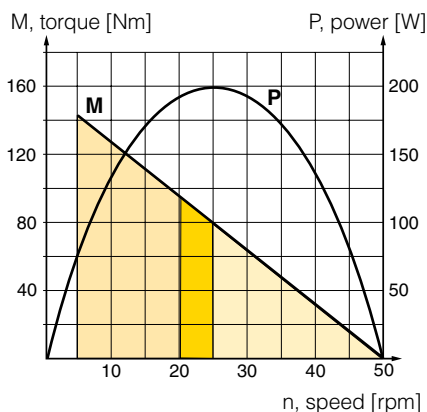
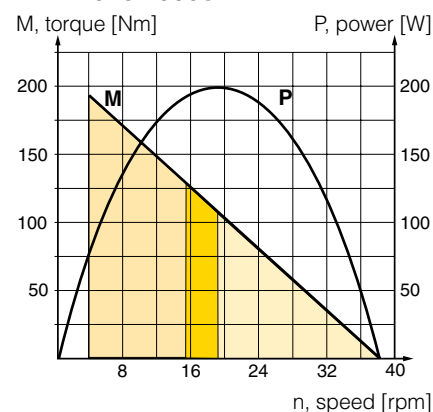
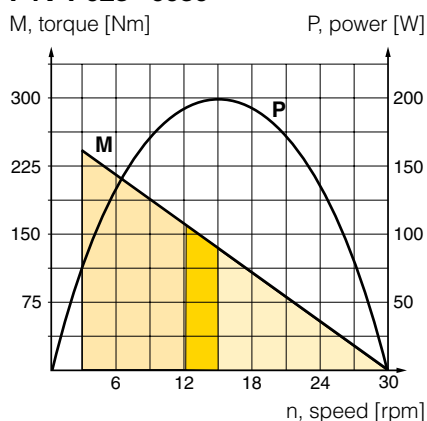
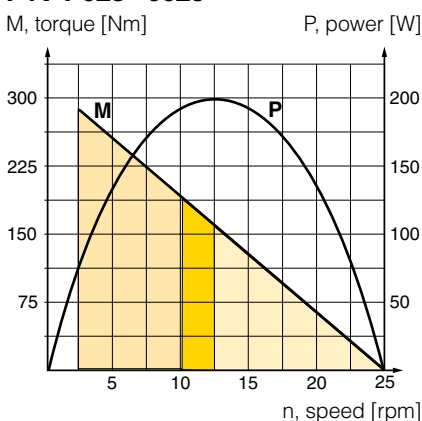
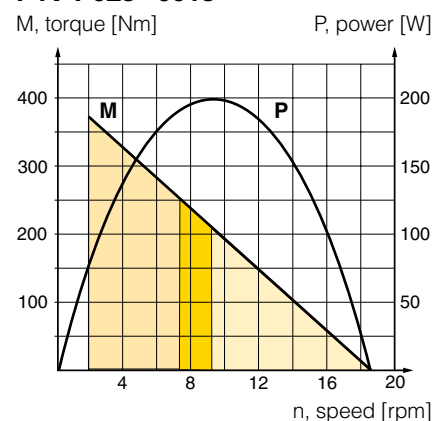
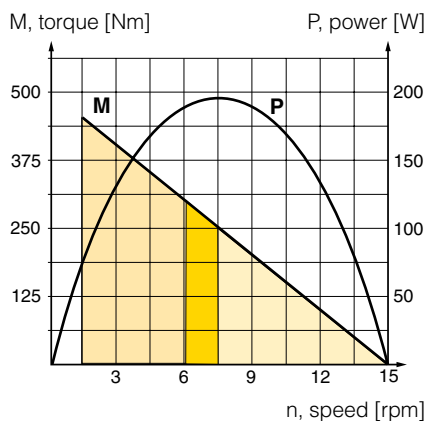
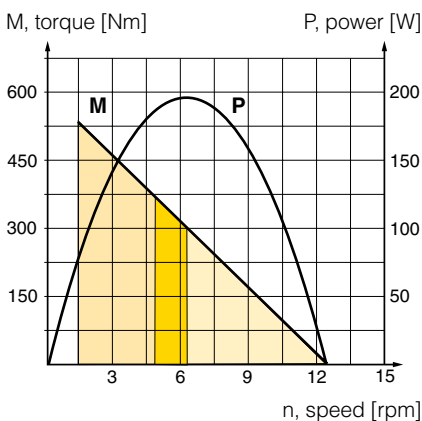
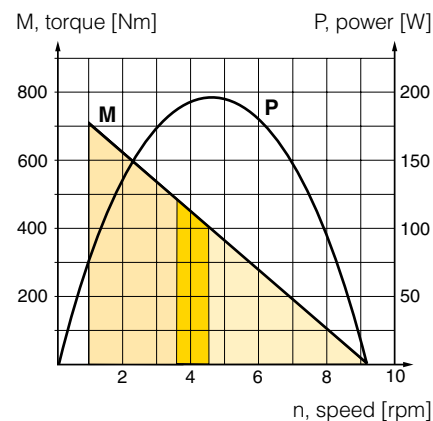
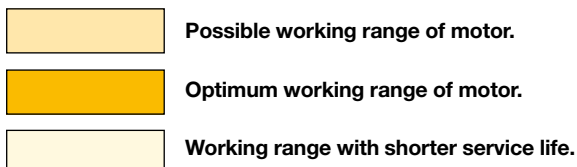
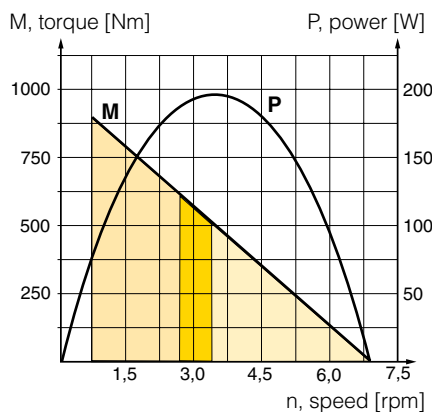


P1V-P023**0150



P1V-P023**0100



P1V-P - Radial Piston Air Motors**P1V-P023**0075****P1V-P023**0050****P1V-P023**0038****P1V-P023**0030****P1V-P023**0025****P1V-P023**0018****P1V-P023**0015****P1V-P023**0012****P1V-P023**0009****P1V-P023**0007**

P1V-P - Radial Piston Air Motors

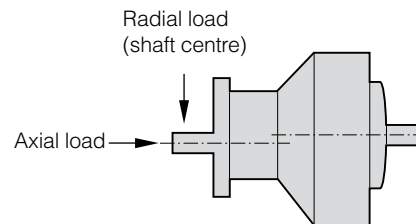
Permitted shaft loadings

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-P007**2200	98	59
P1V-P012**1800	137	98
P1V-P023**1500	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-P007**0440	245	147
P1V-P007**0220	539	245
P1V-P007**0147	785	343
P1V-P007**0110	1080	441
P1V-P012**0360	392	245
P1V-P012**0180	785	343
P1V-P012**0120	1080	539
P1V-P012**0090	1370	686
P1V-P012**0060	2160	1130
P1V-P012**0050	2260	1230
P1V-P012**0040	2350	1320
P1V-P012**0030	2450	1370
P1V-P012**0022	1550	1470
P1V-P012**0018	4610	2260
P1V-P012**0015	4710	2550
P1V-P012**0012	5000	2840
P1V-P012**0009	5100	3140
P1V-P023**0300	490	294
P1V-P023**0150	981	441
P1V-P023**0100	1370	637
P1V-P023**0075	1770	834
P1V-P023**0050	3970	1420
P1V-P023**0038	4170	1570
P1V-P023**0030	4320	1670
P1V-P023**0025	4410	1810
P1V-P023**0018	4510	1960
P1V-P023**0015	6470	2550
P1V-P023**0012	6620	2750
P1V-P023**0009	6910	2940
P1V-P023**0007	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

P1V-P - Radial Piston Air Motors

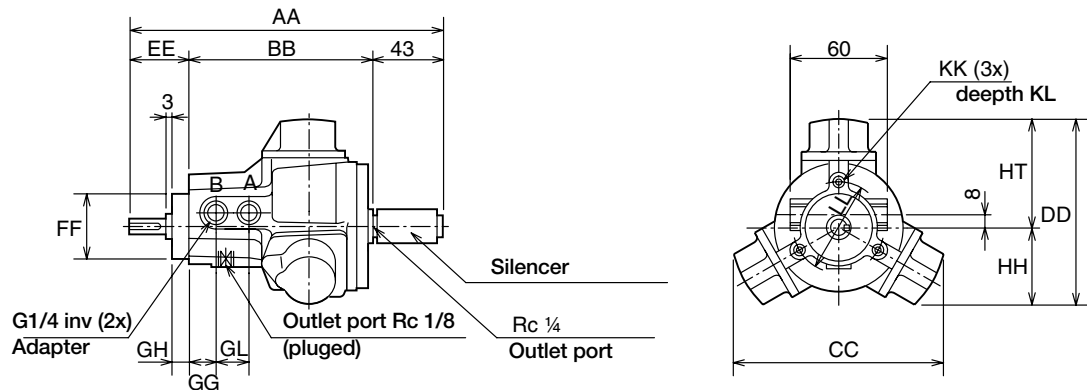
Reversible basic motor

P1V-P007A02200

P1V-P012A01800

Shaft end for all
basic motors

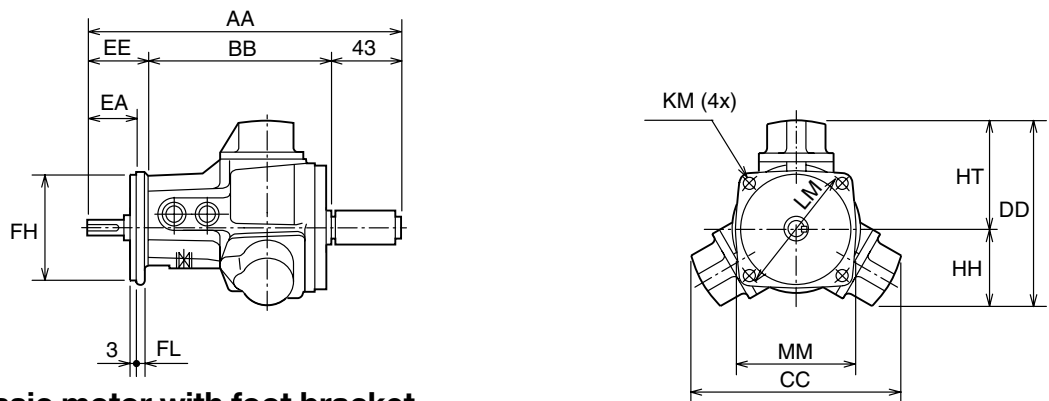
B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise
rotation



Reversible basic motor with flange

P1V-P007B02200

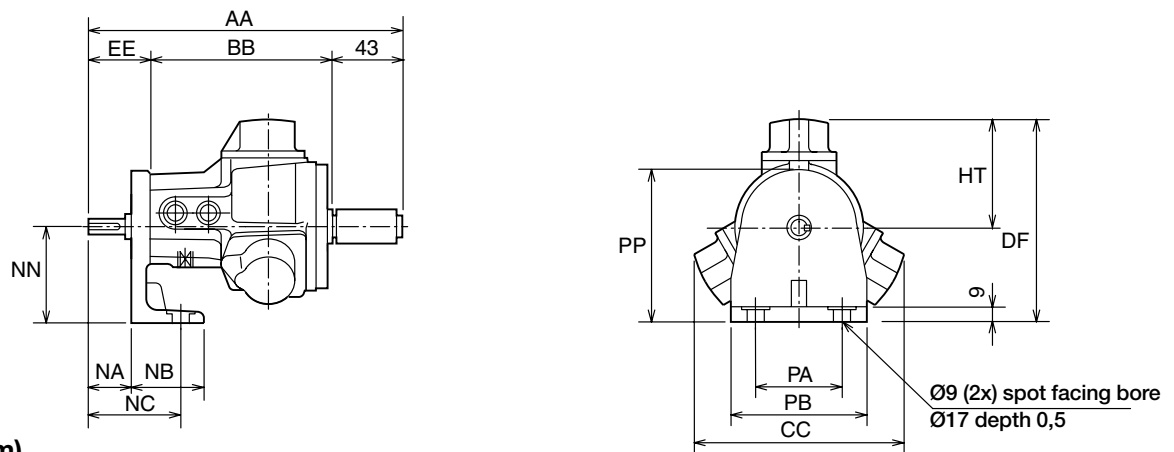
P1V-P012B01800



Reversible basic motor with foot bracket

P1V-P007F02200

P1V-P012F01800



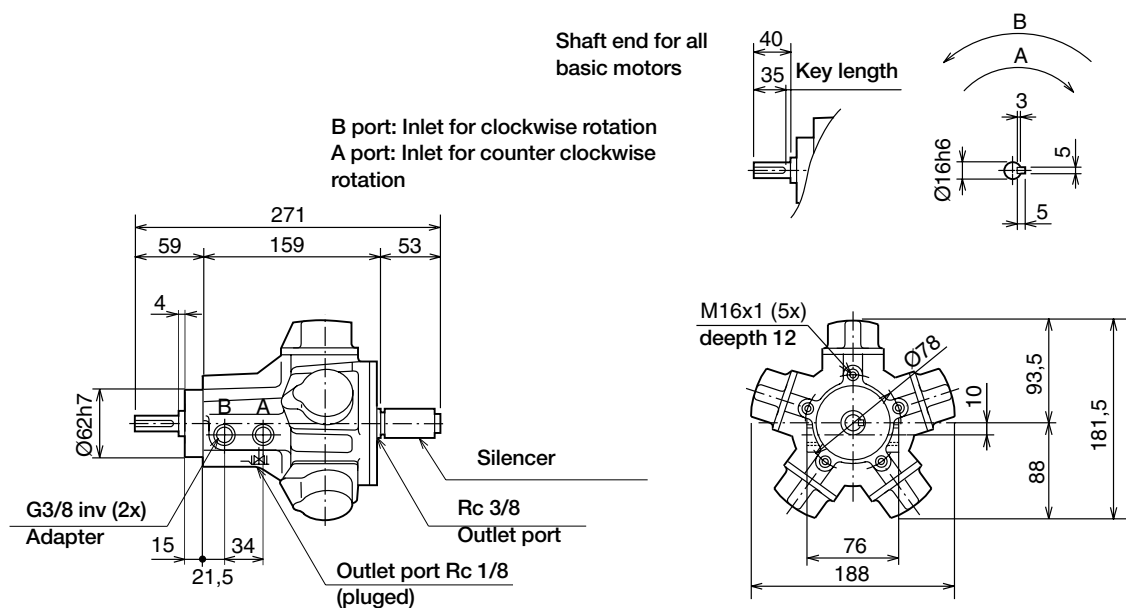
Dimensions (mm)

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

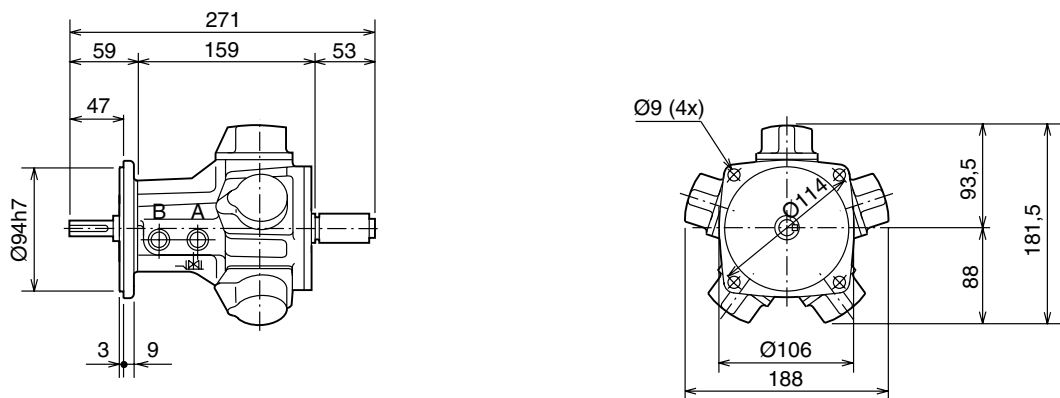
Motor											Shaft end					
	LL	LM	MM	NA	NB	NC	NN	PA	PB	PP	a	b	d	e	f	g
P1V-P007*02200	Ø55	Ø80	72	26	45	56	60+/-0,1	50	80	94	23	Ø10h6	3	3	1,8	20
P1V-P012*01800	Ø62	Ø92	86	33	50	63	70+/-0,1	70	100	110	30	Ø12h6	4	4	2,5	27

Reversible basic motor

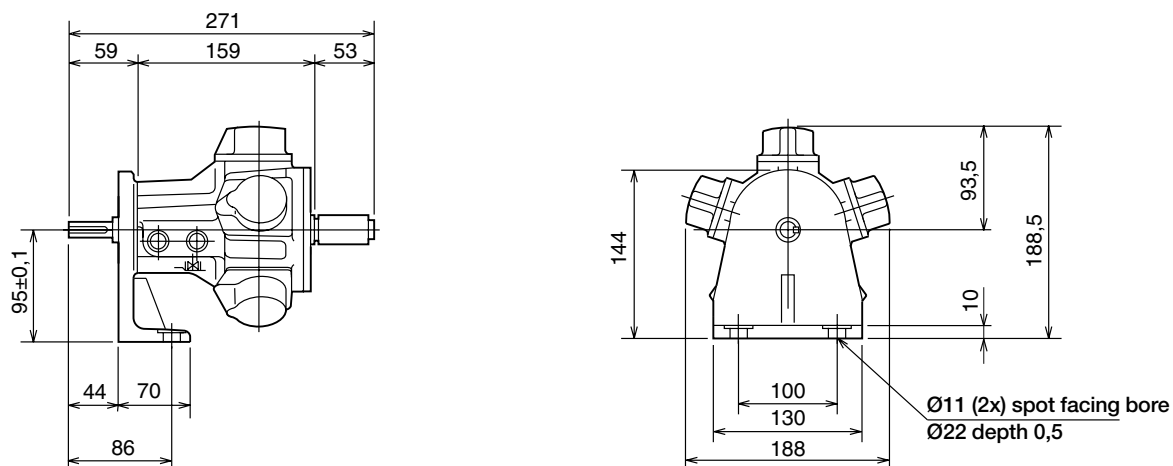
P1V-P023A01500

**Reversible basic motor with flange**

P1V-P023B01500

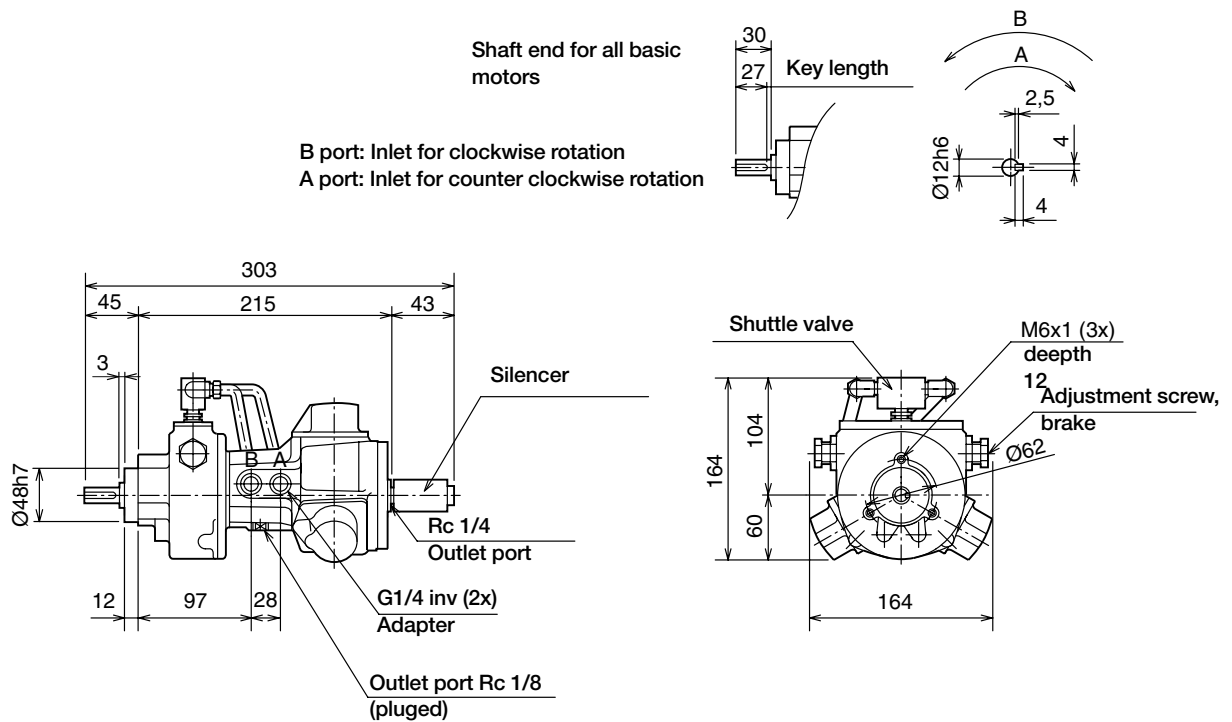
**Reversible basic motor with foot bracket**

P1V-P023F01500

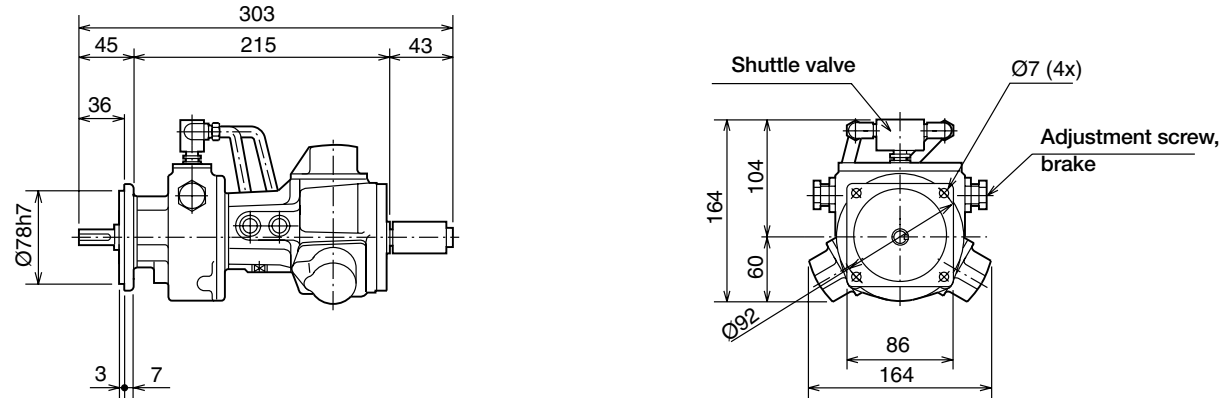


P1V-P - Radial Piston Air Motors**Reversible basic motor with brake**

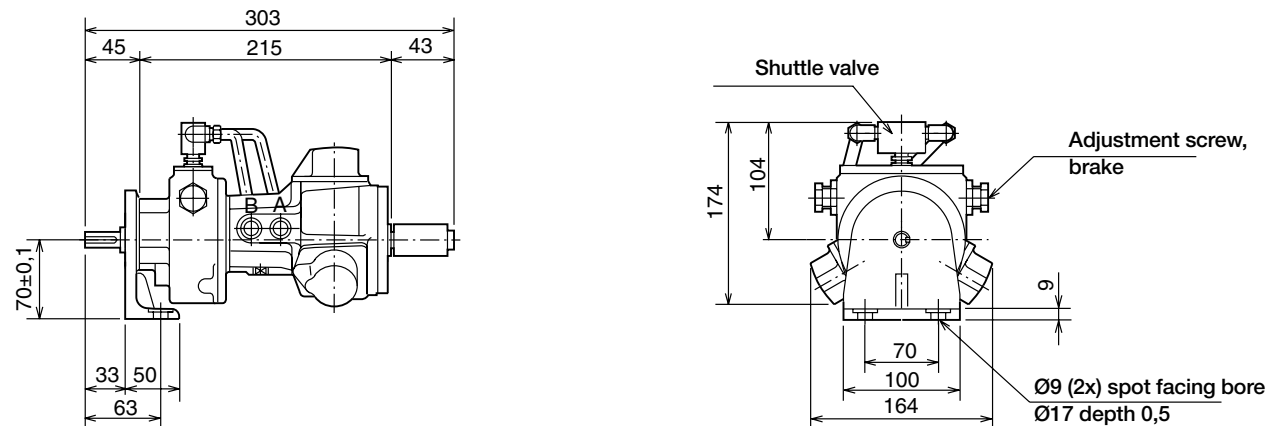
P1V-P012AB1800

**Reversible basic motor with brake and flange**

P1V-P012BB1800

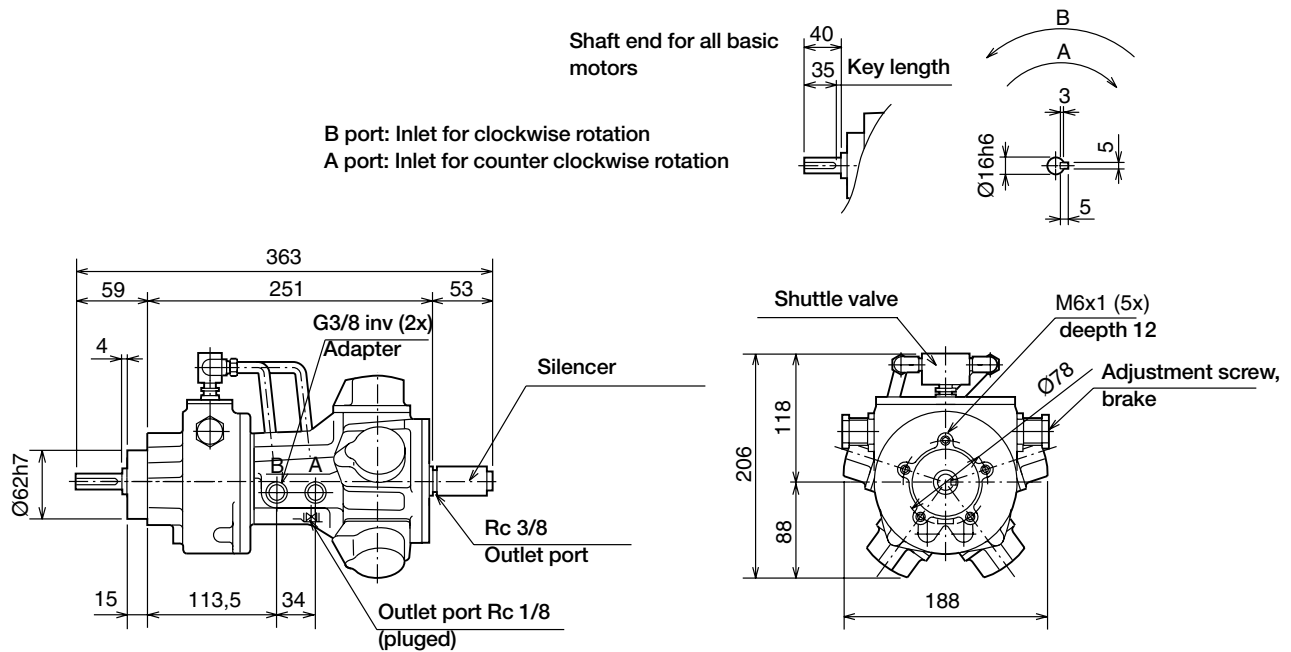
**Reversible basic motor with brake and foot bracket**

P1V-P012FB1800

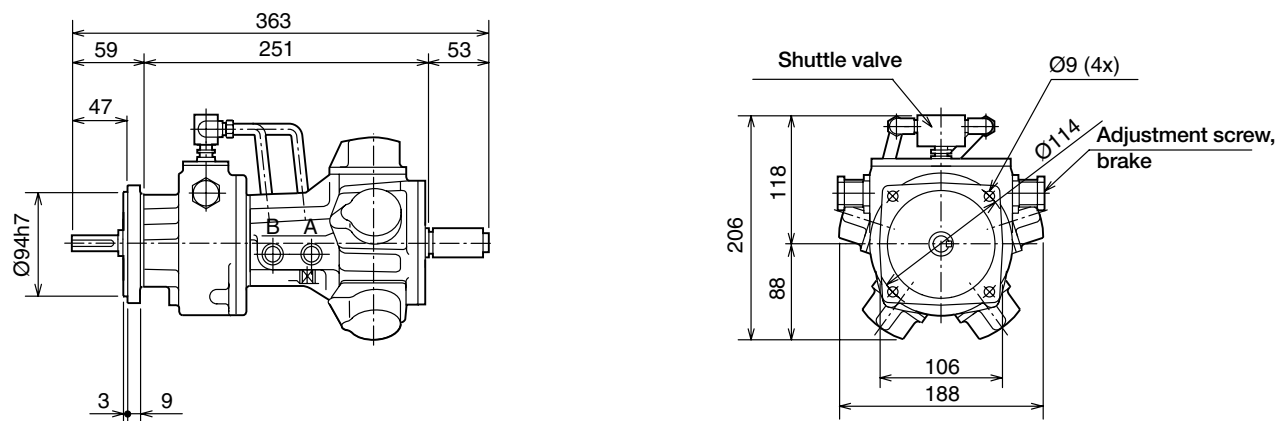


Reversible basic motor with brake

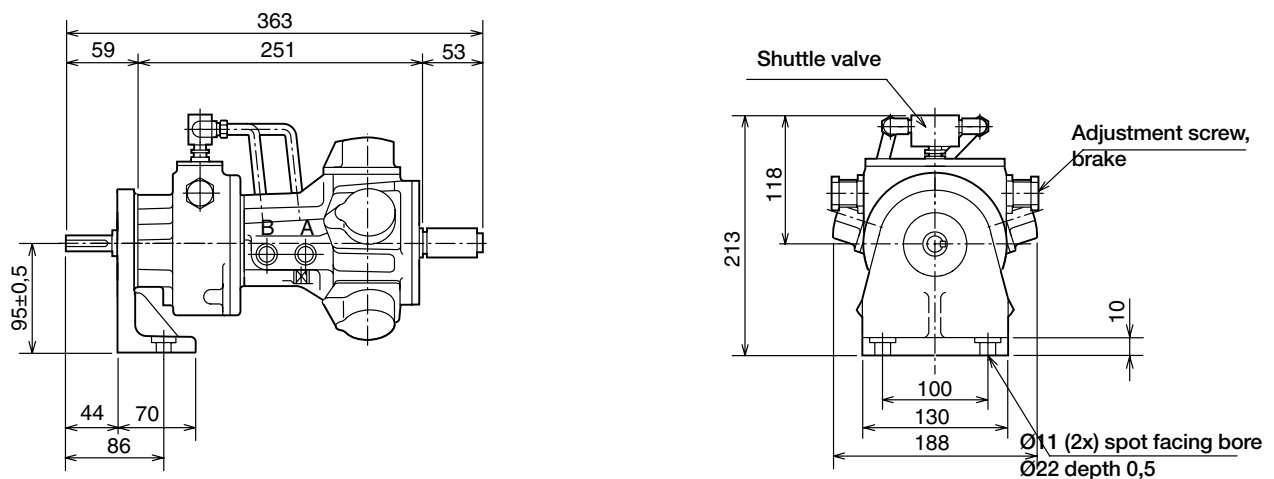
P1V-P023AB1500

**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

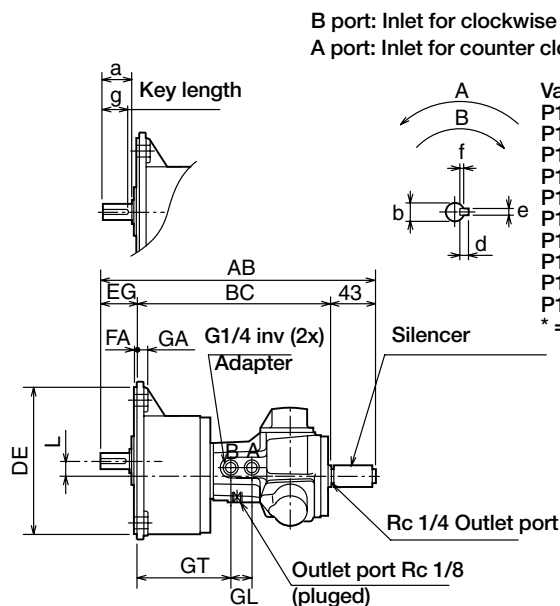
P1V-P012B00022

P1V-P012B00018

P1V-P012B00015

P1V-P012B00012

P1V-P012B00009

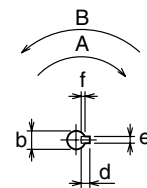


B port: Inlet for clockwise rotation

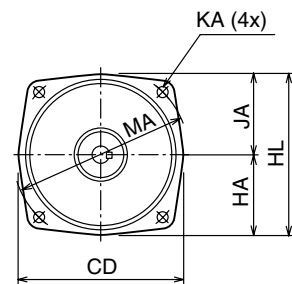
A port: Inlet for counter clockwise rotation

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

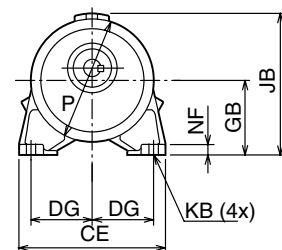
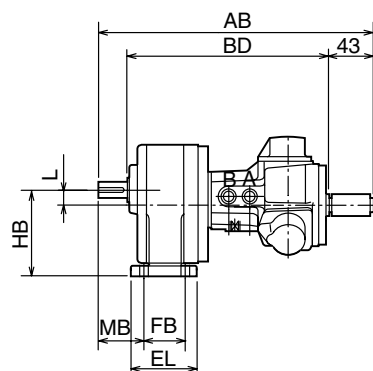
P1V-P012F00022

P1V-P012F00018

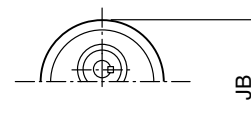
P1V-P012F00015

P1V-P012F00012

P1V-P012F00009



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



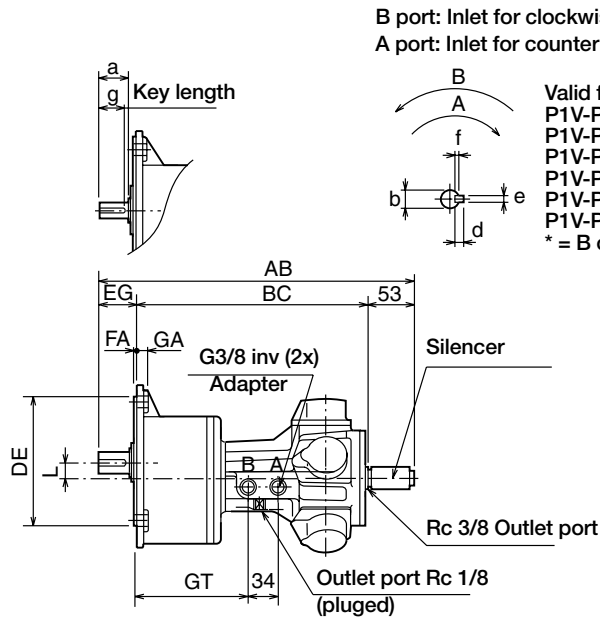
Dimensions (mm)

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

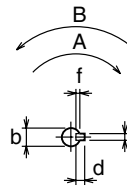
Motor	Shaft end																
	JA	JB	KA	KB	L	MA	MB	NF	P	a	b	d	e	f	g		
P1V-P007*00440 P1V-P007*00220																	
P1V-P007*00147 P1V-P007*00110	77,0	135,5	Ø11	Ø9	16,5	Ø170	45	10	Ø112	30	Ø18h6	6	6	3,5	27		
P1V-P012*00360 P1V-P012*00180																	
P1V-P012*00120 P1V-P012*00090	82,5	153,0	Ø11	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

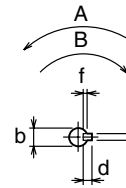


B port: Inlet for clockwise rotation
A port: Inlet for counter clockwise rotation

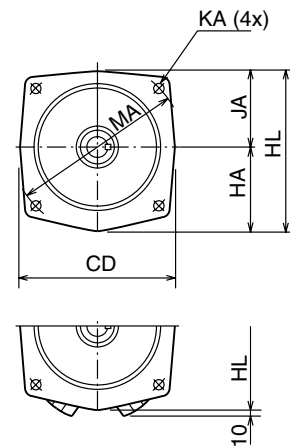


Valid for
P1V-P023*00300
P1V-P023*00150
P1V-P023*00100
P1V-P023*00075
P1V-P023*00050
P1V-P023*00038
* = B or F

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



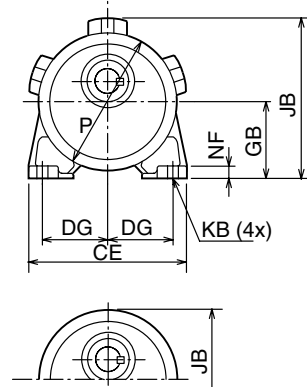
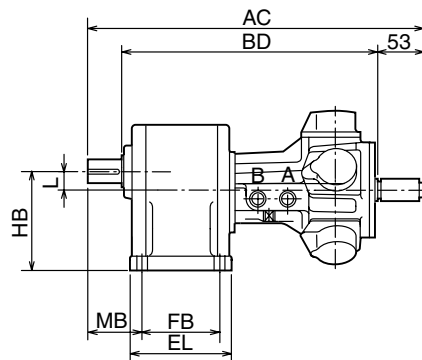
Valid for
P1V-P023*00030
P1V-P023*00025
P1V-P023*00018
P1V-P023*00015
P1V-P023*00012
P1V-P023*00009
P1V-P023*00007
* = B or F



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

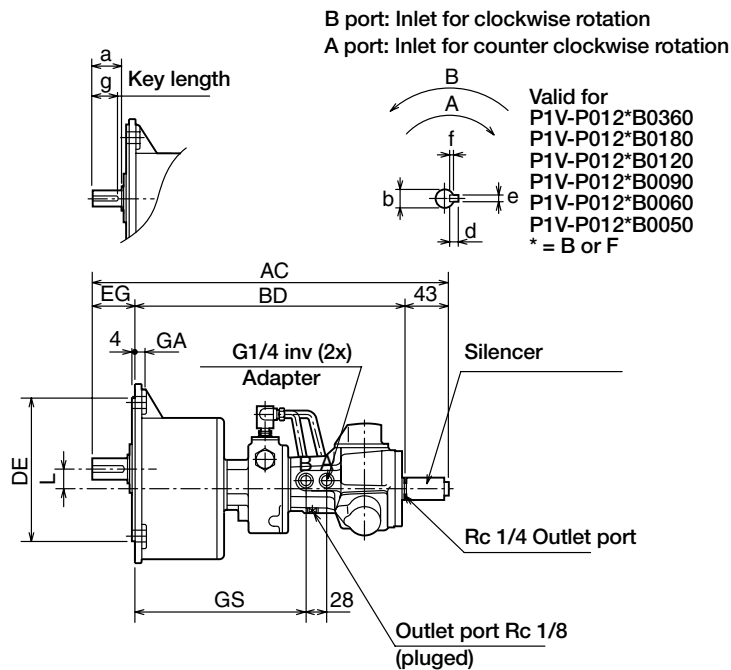
Dimensions (mm)

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

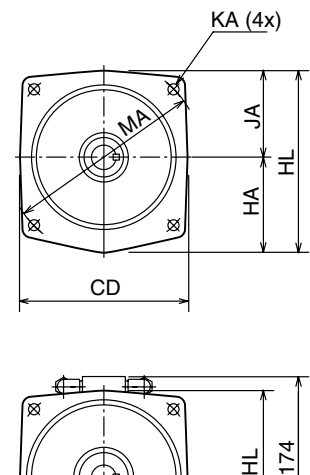
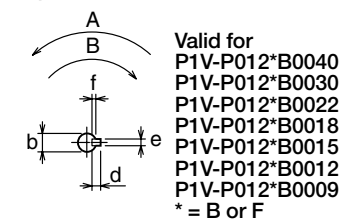
Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end	a	b	d	e	f	g
P1V-P023*00300 P1V-P023*00150																
P1V-P023*00100 P1V-P023*00075	93,0	180,0	Ø11	Ø11	23,5	Ø215	65	15	Ø152	45	Ø28h6	7	8	4	40	
P1V-P023*00050 P1V-P023*00038																
P1V-P023*00030 P1V-P023*00025																
P1V-P023*00018	107,5	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	

P1V-P - Radial Piston Air Motors**Reversible motor with gearbox, brake and flange**

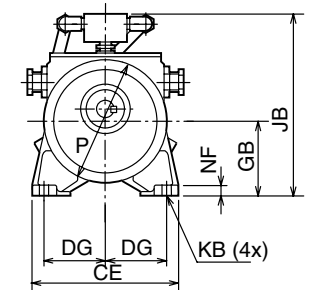
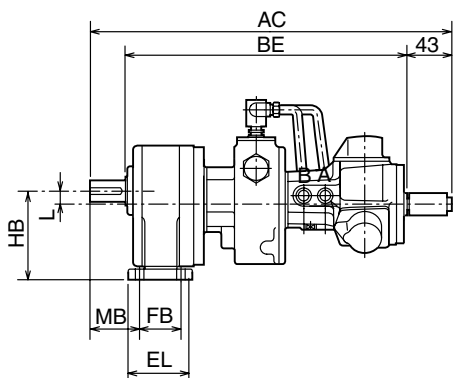
P1V-P012BB0360
P1V-P012BB0180
P1V-P012BB0120
P1V-P012BB0090
P1V-P012BB0060
P1V-P012BB0050
P1V-P012BB0040
P1V-P012BB0030
P1V-P012BB0022
P1V-P012BB0018
P1V-P012BB0015
P1V-P012BB0012
P1V-P012BB0009



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

**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

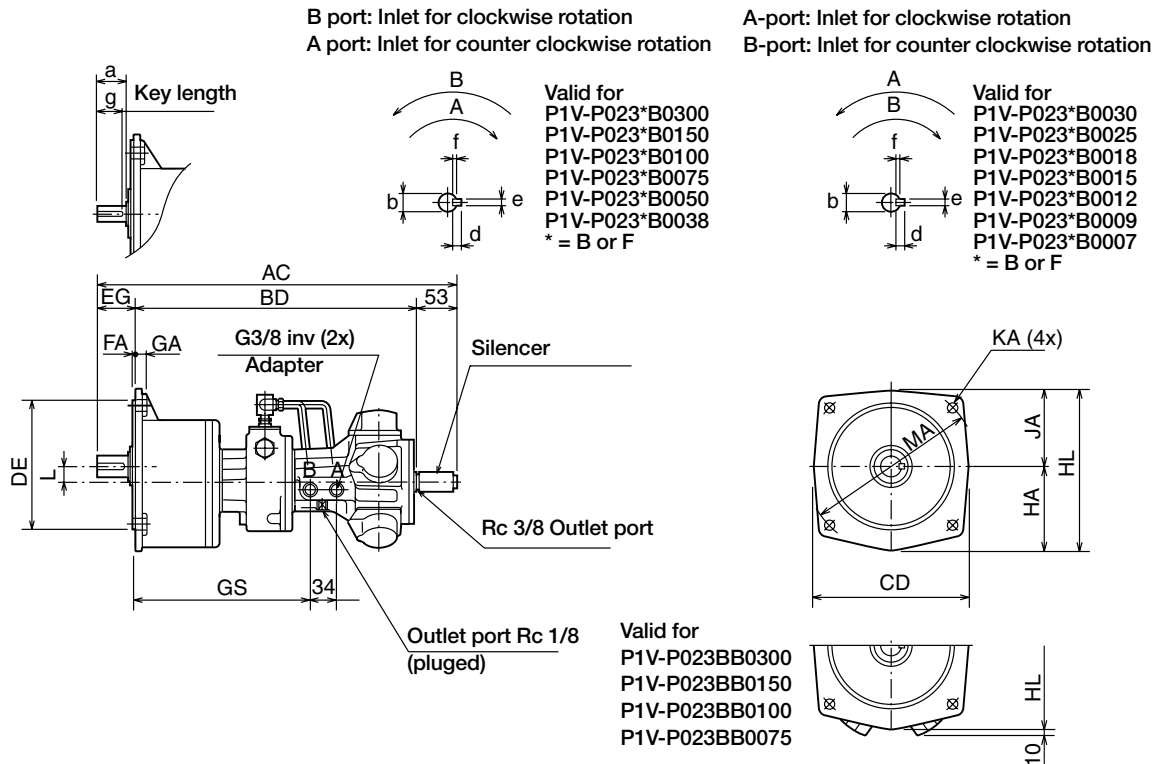
**Dimensions (mm)**

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

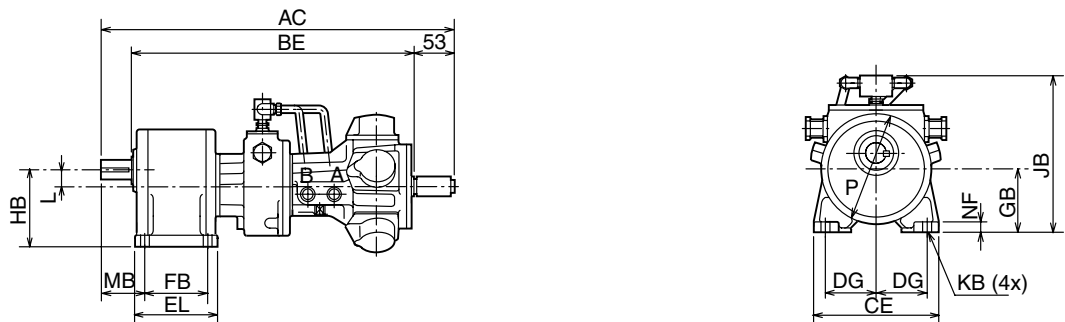
Motor	JA	JB	KA	KB	L	MA	MB	NF	P	Shaft end	a	b	d	e	f	g
P1V-P012*B0360 P1V-P012*B0180																
P1V-P012*B0120 P1V-P012*B0090	82,5	175	Ø11	Ø11	19,0	Ø185	55	12	Ø125	40	Ø22H6	45	Ø28h6	7	8	
P1V-P012*B0060 P1V-P012*B0050																
P1V-P012*B0040 P1V-P012*B0030																
P1V-P012*B0022	93,0	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	

P1V-P - Radial Piston Air Motors**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

**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	

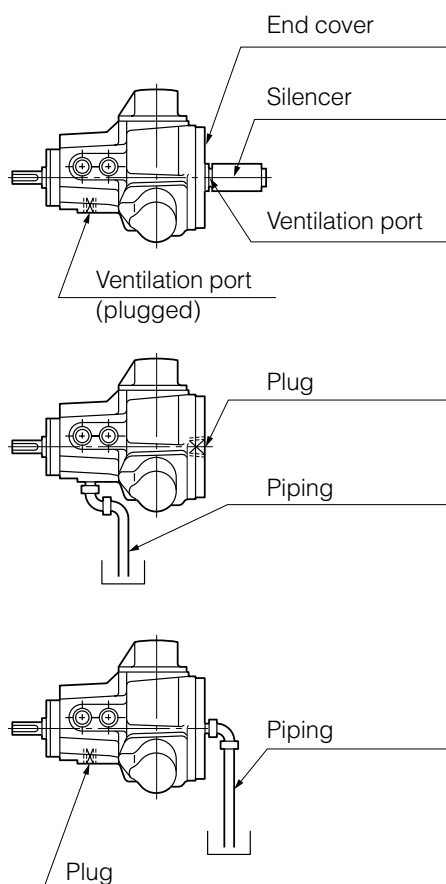
Installation instructions

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 close 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 has 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 filter 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 has to work with a speed of 20 – 50% of the free speed. A lower speed will not give a stable 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

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

Air motor range	
P1V-P	Radial piston motor

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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