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Quality products for Mechanical
& Fluid Power

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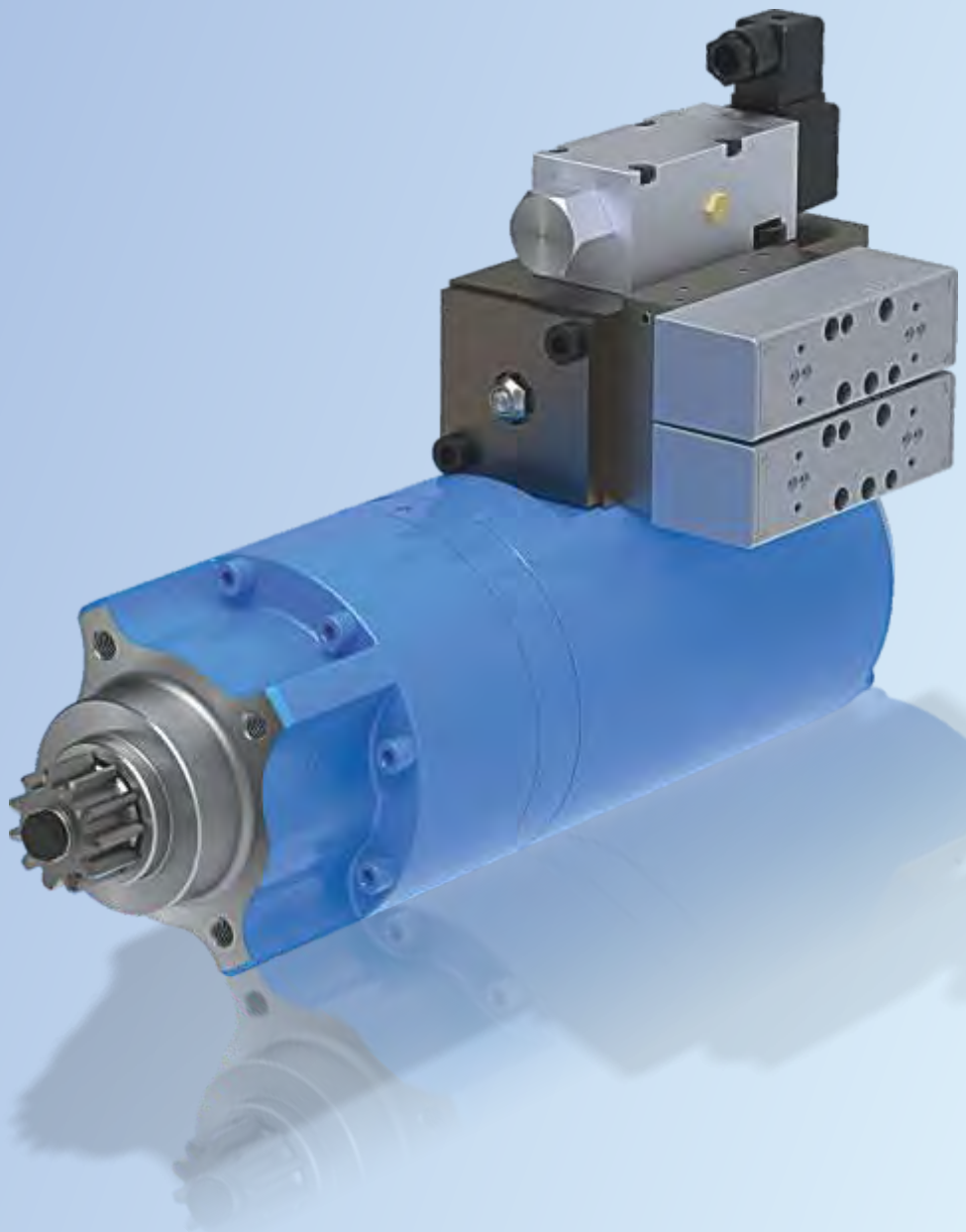
PNEUMATIC STARTERS



JBJ
TECHNIQUES
LIMITED

Pneumatic starter HY PS61 20HY FZRel

Pneumatic starter series PS HY

With this series, a start impulse is sufficient (by hand, pneumatically remote-controlled, electrically or in an emergency). The start-up process is then carried out automatically. A specially designed cycle system causes the pinion to be pulled back, rotated further and meshed again in a "tooth in front of tooth position" in a manner that is gentle on the sprocket. After meshing, the starting process takes place automatically, which must be completed when the ignition speed is reached. This can be achieved manually or automatically via a speed monitor. The pinion is then pulled out of the ring gear by spring force. The power transmission from the motor drive to the pinion takes place via a freewheel, which also protects the starter from possible damage when overtaking by the diesel. Due to the functional principle, the starters of this series do not require any beveling on the front of the pinion and ring gear.

Applications of pneumatic starters Marine & Offshore / Diesel Engines Düsterloh pneumatic starters are used to start diesel engines and turbines. The pneumatic starter develops its highest torque when it breaks away, which is why it is particularly suitable for starting diesel engines. Düsterloh pneumatic starters can be operated with air or gas. They are independent of electrical energy storage, maintenance-free and explosion-proof. Torques, measured at the starter pinion, of up to 510 Nm are achieved at a working pressure of 15 bar. Two starters can be operated in parallel for higher starting power.

» Gentle on the gear ring.
» No beveling on the face of the pinion and ring gear.
» High starter performance with low air consumption.
» Slow turn facility.
» Great lifespan.
» No oilers required (for air operation).
» Steel and bronze sprockets.
» Suitability for manual and remote control (automatic start).
» Operation even under extreme climatic conditions.
» Explosion proof.

The details contained within this catalogue are reproduced in accordance with the latest information at going to press .....

Advantages of these Pneumatic Starters

- Extremely high breakaway torques.
- High starter powers with low air consumption.
- Suitable for remote and manual operation.
- Long service life, no maintenance required.
- Explosion protection.
- Operation even under extreme climatic conditions.
- Interchangeable with electric starters.
- Air and gas operation.
- Independence from electrical energy storage devices.
- Slow-turning device.
- No oilers required.
- No maintenance unit (oil lubrication) required.
- Connection dimensions as per SAE J 542 C.
- Steel and bronze pinions.
- Starter with integrated free-wheel.

Düsterloh pneumatic starters are used to start up diesel engines and turbines.The DÜSTERLOH pneumatic starter mainly comprises a gear motor, a reduction gear unit, a free-wheel and a valve combination. As the gear motor produces its highest torque at breakaway, it is particularly suitable for starting diesel engines. The available series is able to start diesel engines up to 3300 kW with an operating pressure of 10 bar. For higher starting powers, 2 starters can be operated in parallel. A safety circuit is available which only allows the diesel engine to be started when the pinions of both starters are fully meshed with the gear ring of the diesel engine. The dependable operating behaviour of the drive motor ensures that the diesel engine starts reliably, even under extreme ambient conditions. It is used in the Arctic, off-shore and in desert regions.

Starting procedure

PS series

The starting procedure is performed by gradually opening a self-closing valve or main valve, which is usually mounted directly on the starter. The pressure acting on the engaging piston causes axial displacement of the pinion towards the flywheel gear ring while at the same time rotating it slowly. After engagement of the pinion, the actual starting procedure begins, which has to be stopped by closing the self-closing/main valve after the ignition speed has been reached. To ensure that the starter does not rotate at excessively high speeds when overtaken by the diesel engine, it is protected by an integrated multi-plate clutch.

PS.....HY series

Addition of the HY-tact system to the standard starter ensures soft engagement of the pinion with the engine gear rim. This system ensures long life and reliability of the meshing gears. The start pinion is gently pushed out to meet the engine gear rim, if the pinion does not hit a tooth gap, it retracts and is rotated slightly ready for the next cycle. The cycle repeats until the pinion finds a gap and can move into full mesh, at this point, air is switched onto the starter to crank the engine.
After the engagement, the starting procedure is performed automatically and must be stopped as soon as the ignition speed is reached. This can take place manually or automatically by means of a speed monitor. The pinion is then withdrawn from the gear ring by spring force. Power is transmitted from the motor drive to the pinion via a free-wheel, which at the same time protects the starter from potential damage when overtaken by the diesel engine. Owing to the patented operating principle, the starters of this series do not need bevelling on the front of the pinion and gear ring.

Slow-turning

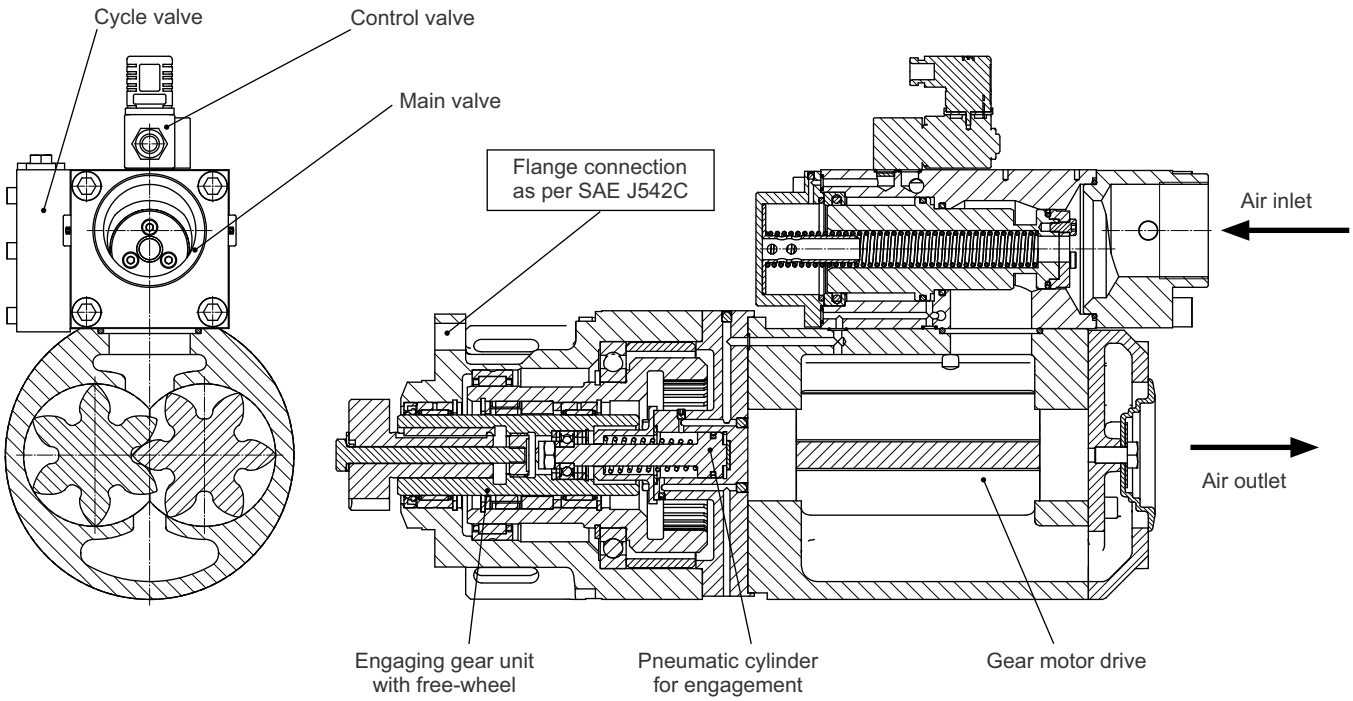
A turning valve installed in the control block me-ans that the starter can also be used for ‚slow-turning', i.e. for removing water from the pistons (prevents vapour shock). On large diesel engines, the piston position required during repair work can be approached precisely with the help of the turning device.

Advantages of these starters

- Extremely high breakaway torques.
- High starter powers with low air consumption.
- Suitable for remote and manual operation.
- Long service life, no maintenance required.
- Explosion protection.
- Operation even under extreme climatic conditions.
- Interchangeable with electric starters.
- Air and gas operation.
- Independence from electrical energy storage devices.
- Slow-turning device.
- No oilers required.
- No maintenance unit (oil lubrication) required.
- Connection dimensions as per SAE J 542 C.
- Steel and bronze pinions.
- Starter with integrated free-wheel.

Technical layout of pneumatic starter

The starters have a modular design and comprise the following components: motor drive, engaging drive and control peripherals, which consist of the main valve and cycle valve. They can be actuated either electrically, pneumatically or manually.The maintenance-free operation of the system is achieved by lifetime lubrication of the motor rotors and bearings,



making an oiler in the air feed unnecessary.If the starter pinion is retracted too late (overspeed), the free-wheel lifts off the engaging spindle and the pinions together with the engaging spindle run free without suffering any damage.

Installing the pneumatic starter

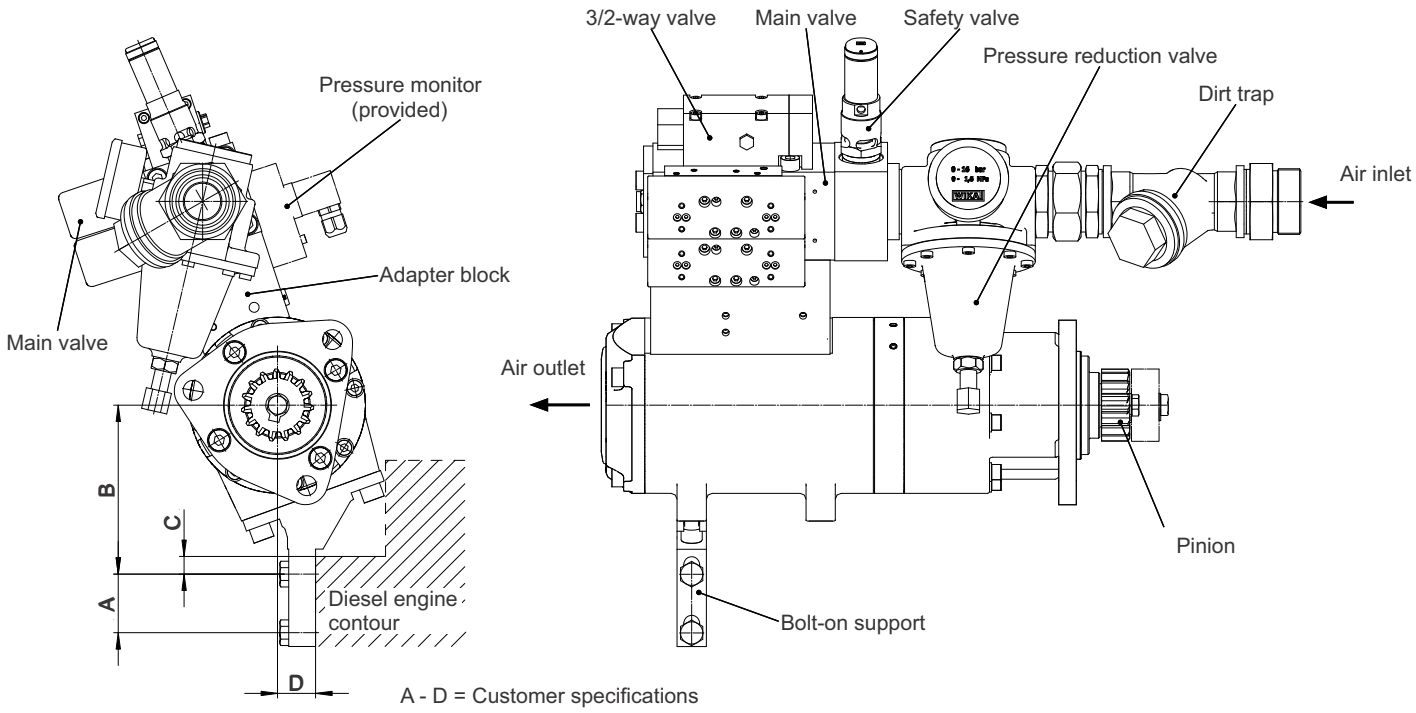
When a starter is attached to a diesel engine, it is essential to ensure that the dimensions for centre distance and spacing between the pinion and gear ring as specified in the brochures as well as the parallel alignment of the gearing are observed. Similarly, the cable cross-sections must not be below those prescribed, otherwise the specified performance values will not be achieved.

In order to prevent damage to the gearing following an unsuccessful start, the starting procedure may only be repeated when the starter and combustion engine have come to a standstill.

The PS starter is maintenance-free, i.e. it does not require an upstream oiler or relubrication of the bearings.

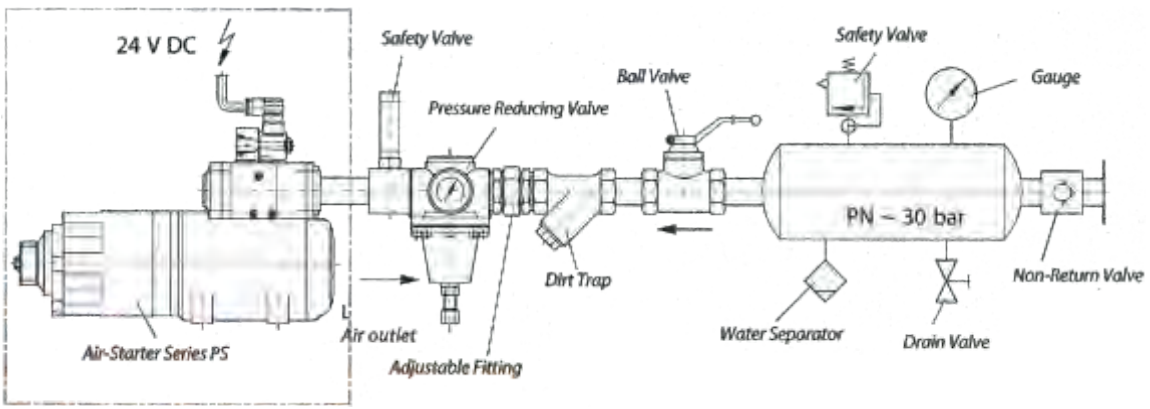
Use of a sound absorber reduces the noise level by approximately 12 dBA. Furthermore, noise can be decreased significantly by attaching a 2 metre exhaust hose. Fully automatic starting is achieved by installing a speed control unit, i.e. the starting procedure is stopped automatically when the ignition speed is reached.

Layout of a complete pneumatic starting system



If required and in consultation with the user, a complete starting system, like the one shown above, can be delivered instead of the starter.
The pneumatic starting system additionally features a compressed-air reservoir (not included in the items) and a ball valve to prevent pressure loss caused by leakage.
The dirt trap should always be installed between the compressed-air reservoir and pressure reduction valve in order to protect the electro-pneumatic valves against dirt penetration.
The dirt trap therefore increases operational dependability and the reliability of the overall system.

Type	Permissible operating pressure	Starting torque at	p_{max} and n = 2000 rpm		Connection width nominal width	Weight
	p_{max}	p_{max}	Power	Air consumption		
	bar	Nm	kW	Nm^3/min	inch	kg
PS 24/20	12	145	22	25	G 1 1/2“	35
PS 32/20	12	220	28	30	G 1 1/2“	38
PS 61/20 HY	12	415	52,5	52	G 2“	52
PS 2360 HY	15	510	70	62	G 2“	52

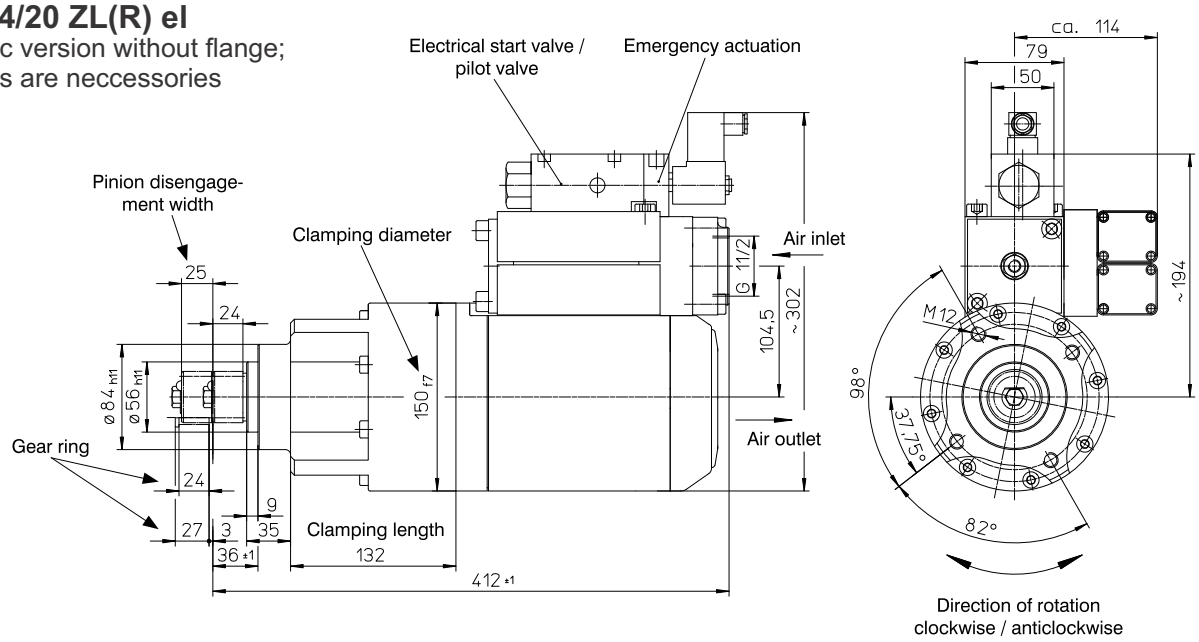


Pneumatic characteristics

Max. starting pressure:	10 bar
Max. starting torque:	145 Nm
Max. power: (where n = 2500 rpm)	22 kW
Max. starting speed:	3000 rpm
Direction of rotation: (specify when ordering)	Clockwise or anticlockwise
Weight:	35 kg

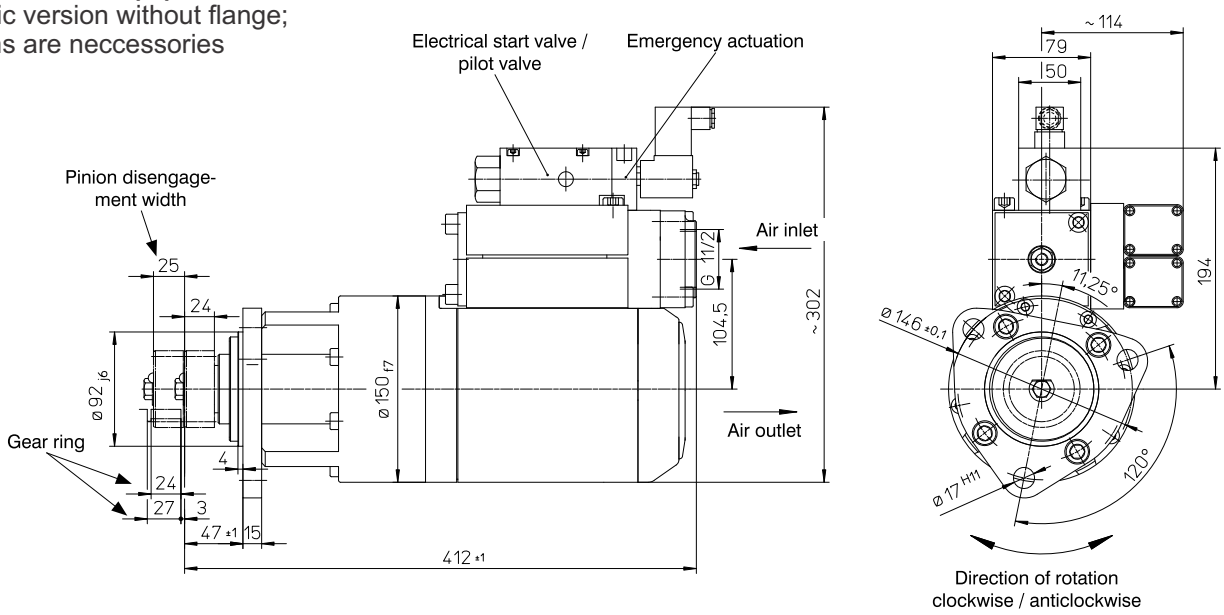
PS 24/20 ZL(R) el

Centric version without flange;
pinions are neccessories



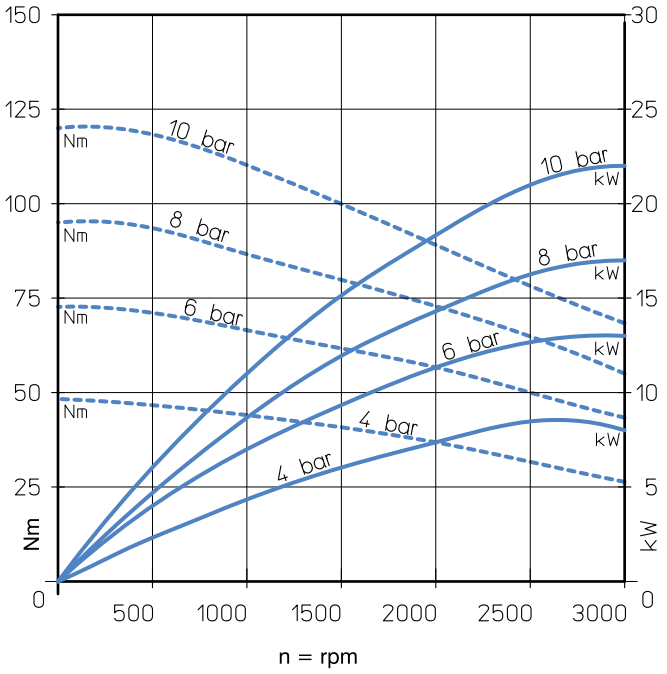
PS 24/20 FZL(R) el

Centric version without flange;
pinions are neccessories

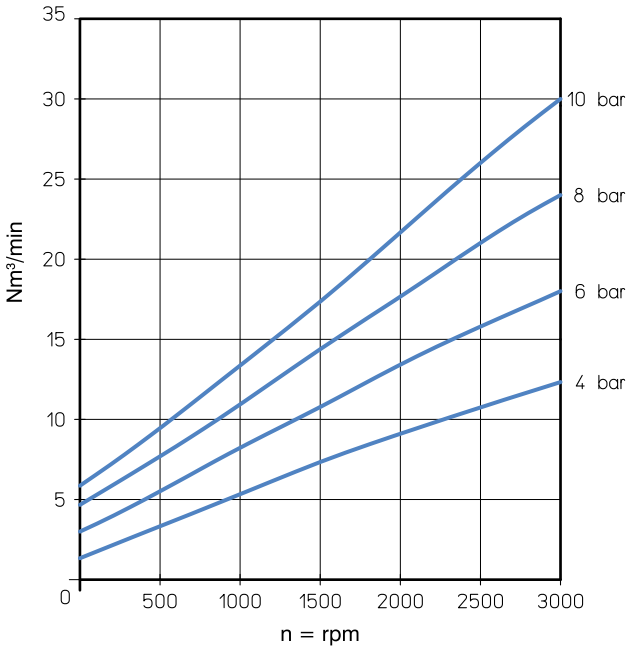


PS 24/20 Characteristic curves, calculation of air consumption

Torque Power



Air consumption Operating pressure



Approximate calculation of air consumption for a starting operation

Duration of starting procedure:	3 sec.
Starter pinion speed:	1500 rpm, at ignition speed of motor
Operating pressure at starter p_e:	6 bar
Air consumption of starter at 1500 rpm and p_e 6 bar:	10.3 m^3/min, (diagram)
Air consumption per start:	$\Delta V = \frac{10.3 * 3}{60} = 0{,}52\ m^3$

*Since a constant speed of 1500 rpm over 3 sec. was expected, savings in compressed air for the run-up phase from 0 to 1500 rpm is not taken into consideration.

Approximate determination of size of air reservoir

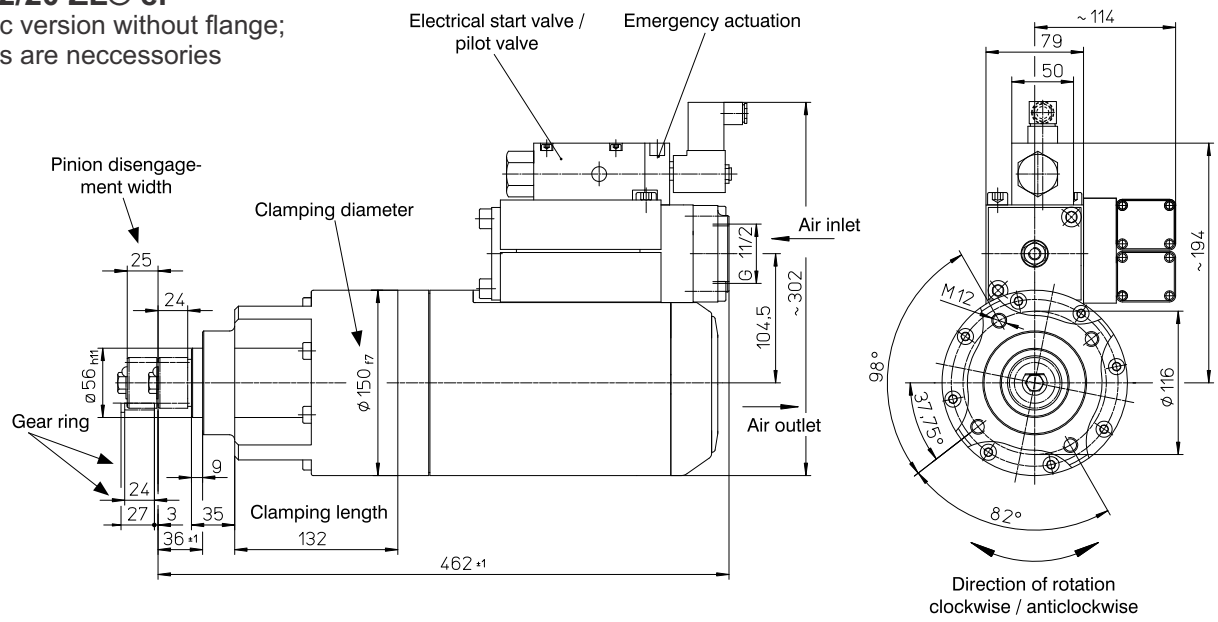
Number of starting procedures:	3
Pressure in reservoir (assumed):	30 bar
Usable pressure drop:	24 bar
Total air consumption:	1.56 Nm^3
Size of air reservoir:	0.065 m^3

Pneumatic characteristics

Max. starting pressure:	10 bar
Max. starting torque:	220 Nm
Max. power: (where n = 2500 rpm)	28 kW
Max. starting speed:	3000 rpm
Direction of rotation: (specify when ordering)	Clockwise or anticlockwise
Weight:	38 kg

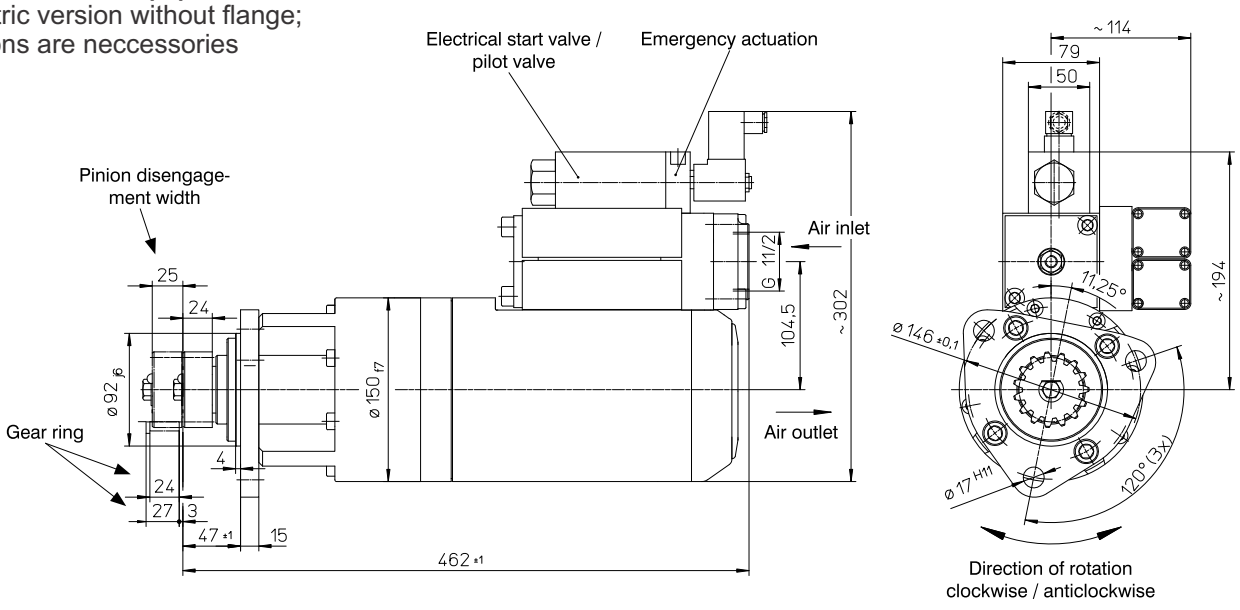
PS 32/20 ZL® el

Centric version without flange;
pinions are neccessories

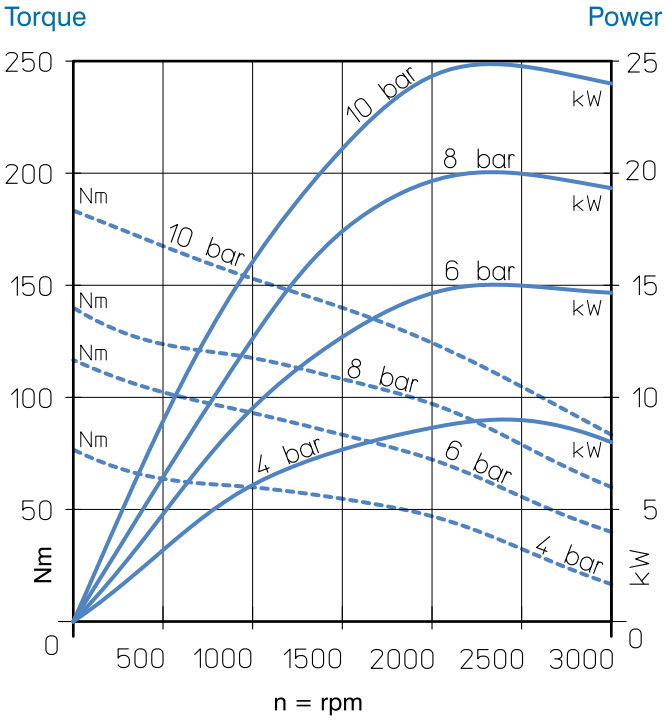


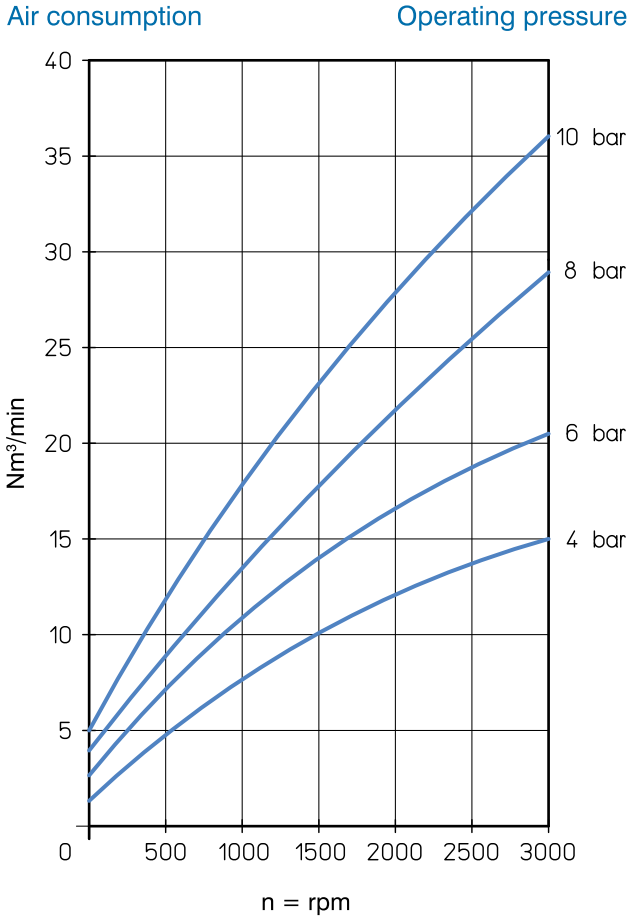
PS 32/20 FZL(R) el

Centric version without flange;
pinions are neccessories



PS 32/20 Characteristic curves, calculation of air consumption





Approximate calculation of air consumption for a starting operation

Duration of starting procedure:	3 sec.
Starter pinion speed:	1500 rpm, at ignition speed of motor
Operating pressure at starter p_e:	6 bar
Air consumption of starter at 1500 rpm and p_e 6 bar:	14 m^3/min, (diagram)
Air consumption per start:	$\Delta V = \frac{14 * 3}{60} = 0{,}7\ m^3$

*Since a constant speed of 1500 rpm over 3 sec. was expected, savings in compressed air for the run-up phase from 0 to 1500 rpm is not taken into consideration.

Approximate determination of size of air reservoir

Number of starting procedures:	3
Pressure in reservoir (assumed):	30 bar
Usable pressure drop:	24 bar
Total air consumption:	2.1 Nm^3
Size of air reservoir:	0.088 m^3

Pneumatic characteristics

Max. starting pressure: 10 bar

Max. starting torque: 415 Nm

Max. power: 52.5 kW
(where n = 2500 rpm)

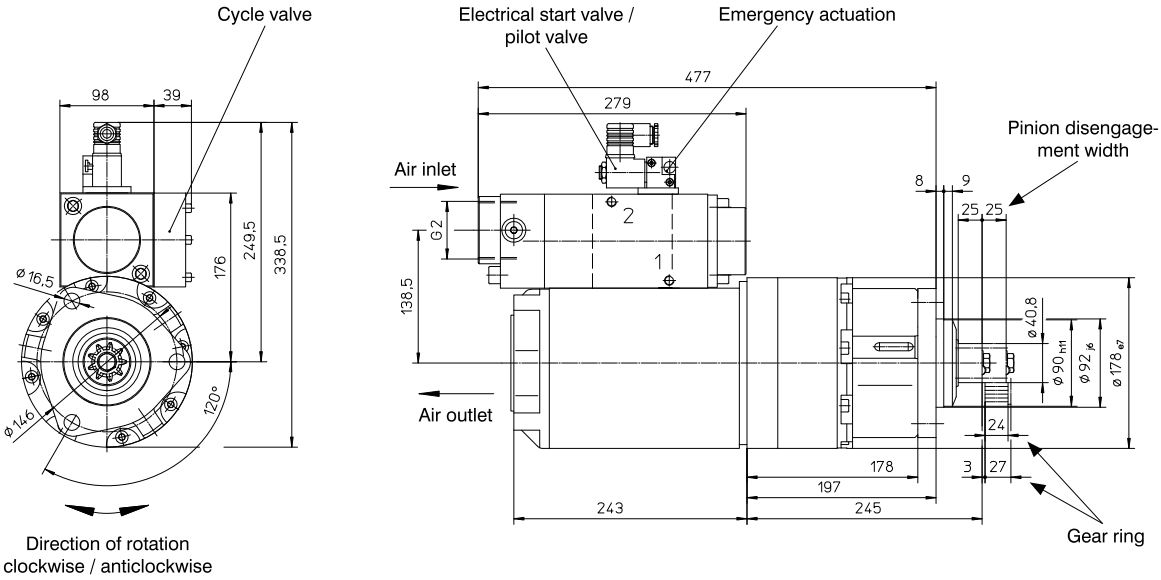
Max. starting speed: 3000 rpm

Direction of rotation: Clockwise or anticlockwise
(specify when ordering)

Weight: 52 kg

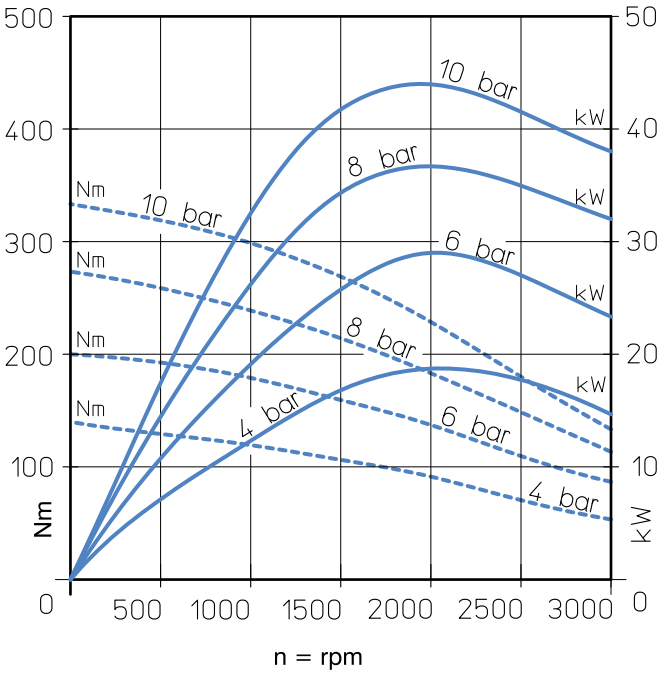
PS 61/20HY FZL(R) el

Centric version without flange;
pinions are neccessories

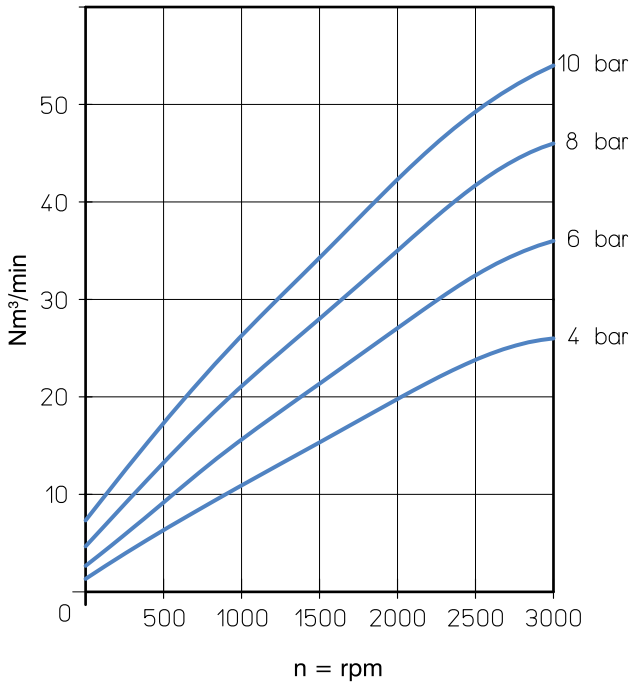


PS 61/20HY Characteristic curves, calculation of air consumption

Torque Power



Air consumption Operating pressure



Approximate calculation of air consumption for a starting operation

Duration of starting procedure:	3 sec.
Starter pinion speed:	1500 rpm, at ignition speed of motor
Operating pressure at starter p_e:	6 bar
Air consumption of starter at 1500 rpm and p_e 6 bar:	21.5 m^3/min, (diagram)
Air consumption per start:	$\Delta V = \frac{121.5}{60} * 3 = 1.08\ m^3$

*Since a constant speed of 1500 rpm over 3 sec. was expected, savings in compressed air for the run-up phase from 0 to 1500 rpm is not taken into consideration.

Approximate determination of size of air reservoir

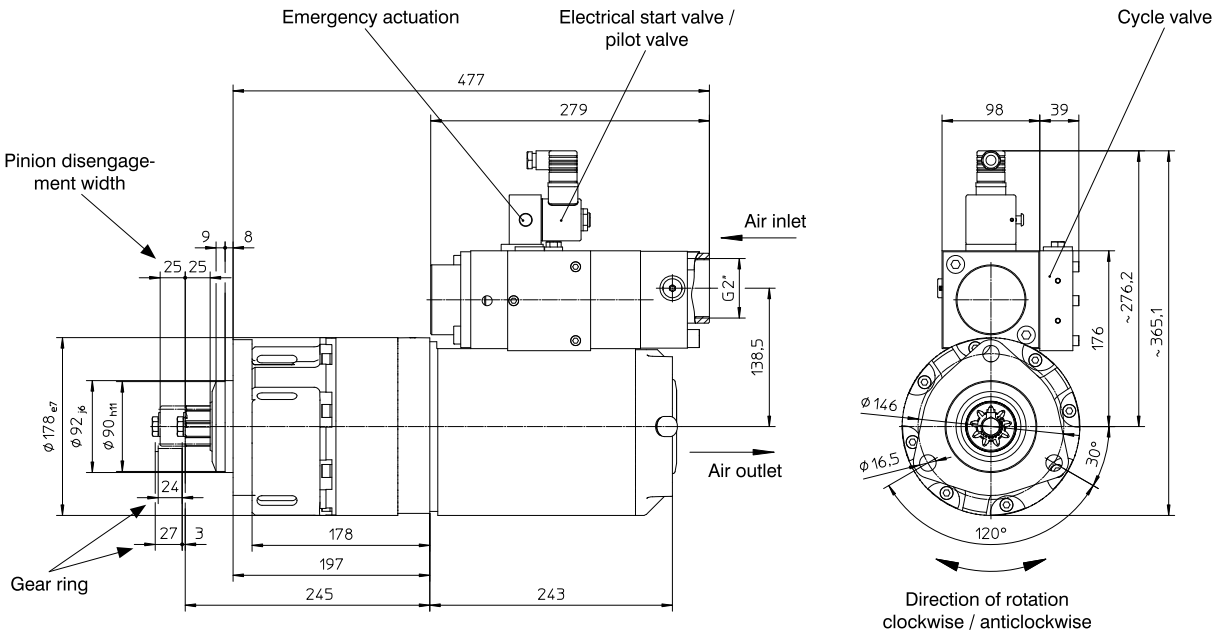
Number of starting procedures:	3
Pressure in reservoir (assumed):	30 bar
Usable pressure drop:	24 bar
Total air consumption:	3.24 Nm^3
Size of air reservoir:	0.135 m^3

Pneumatic characteristics

Max. starting pressure:	10 bar
Max. starting torque:	510 Nm
Max. power: (where n = 2500 rpm)	70 kW
Max. starting speed:	3000 rpm
Direction of rotation: (specify when ordering)	Clockwise or anticlockwise
Weight:	52 kg

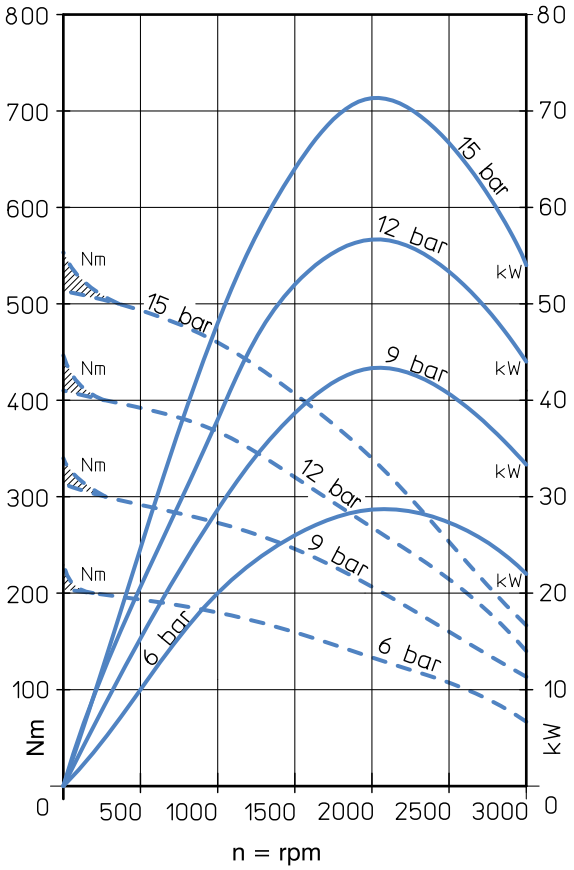
PS 2360HY) el

Centric version without flange;
pinions are neccessories

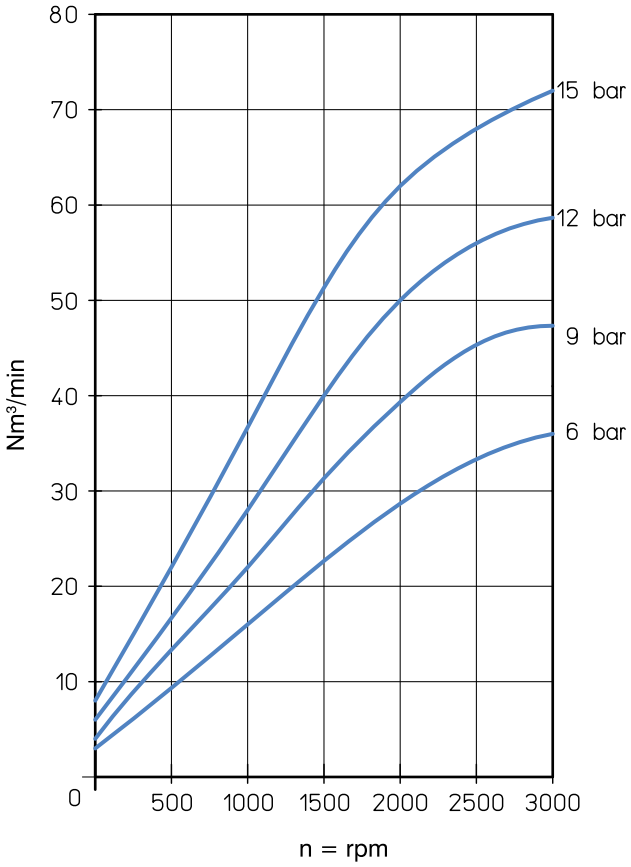


PS 2360HY Characteristic curves, calculation of air consumption

Torque / Power



Air consumption / Operating pressure



Approximate calculation of air consumption for a starting operation

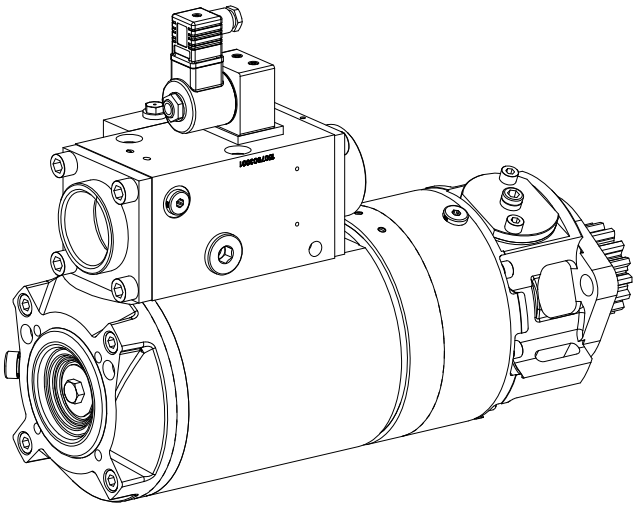
Duration of starting procedure:	3 sec.
Starter pinion speed:	1500 rpm, at ignition speed of motor
Operating pressure at starter p_e:	6 bar
Air consumption of starter at 1500 rpm and p_e 6 bar:	22.7 m^3/min, (diagram)
Air consumption per start:	$\Delta V = \frac{22.7 * 3}{60} = 1.15\ m^3$

*Since a constant speed of 1500 rpm over 3 sec. was expected, savings in compressed air for the run-up phase from 0 to 1500 rpm is not taken into consideration.

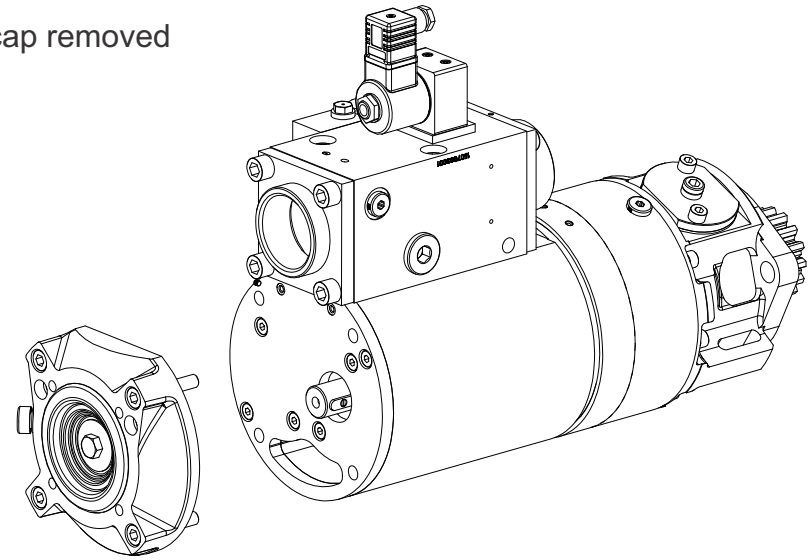
Approximate determination of size of air reservoir

Number of starting procedures:	3
Pressure in reservoir (assumed):	30 bar
Usable pressure drop:	24 bar
Total air consumption:	3.45 Nm^3
Size of air reservoir:	0.144 m^3

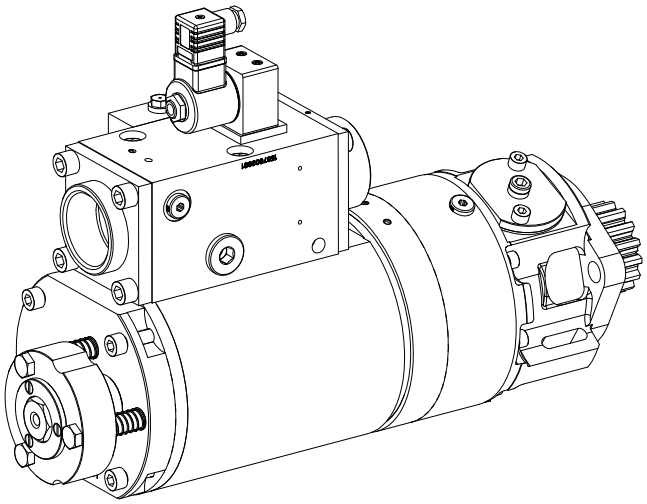
Pneumatic starter
PS 2360HY for turning



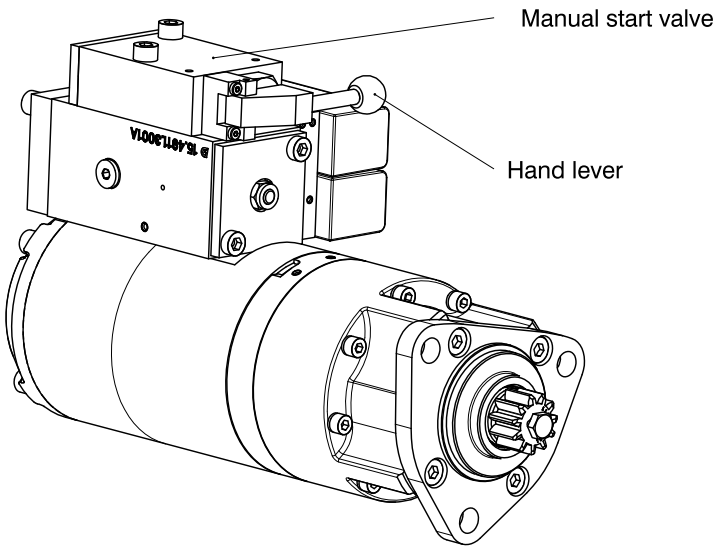
Pneumatic starter
PS 2360HY with outflow cap removed



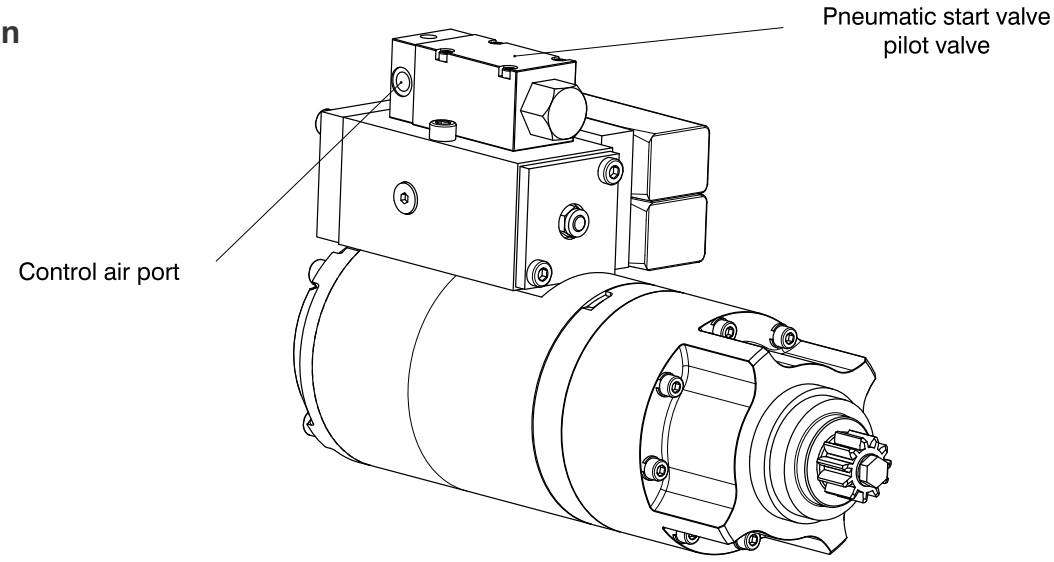
Pneumatic starter
PS 2360HY with turning cap attached



Actuation by hand lever



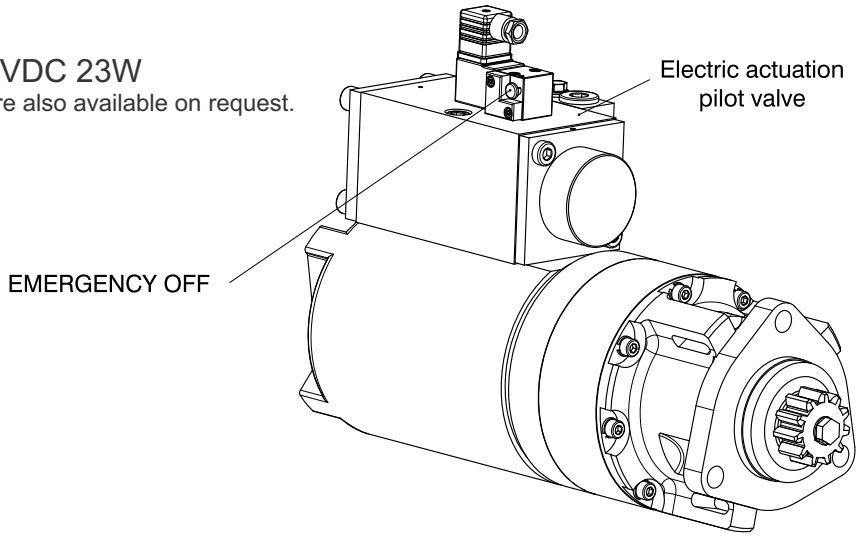
Pneumatic actuation



Electric actuation

Standard version 24VDC 23W

Other versions (12V .....) are also available on request.



an excellence in engineering

quality products for mechanical & fluid power

Getting the most out of your machinery often depends on close integration between all components. An organisation that manufactures and integrates all the diverse components of a drivetrain provides the experience to help you select the best component combination for your application. jbj Techniques' in-house design team and manufacturing facility provide tailored solutions for your applications at competitive prices with quick delivery.

The following examples are a simplistic view of how jbj Techniques assists customers.

Hydraulic Adaptors
Designed primarily to allow the close coupling of hydraulic pumps to a variety of prime movers, such as diesel / petrol engines, electric, air or hydraulic motors, they can also be used in the connection from prime mover to alternative driven parts i.e. gear boxes, generators, water or vacuum pumps etc. An additional range of engine front PTO adaptors, which provide additional connection between the engine pulley and the driven part are also available.

The kit comprises of a bellhousing and flexible drive coupling that are fully machined to suit the driving and driven components. These can be to suit either shaft to shaft, flange (flywheel) to shaft or even flange to flange connections.

Getting the most out of your equipment will demand close integration between all components. In specifying jbj Techniques as your preferred supplier, you will have selected a company with the experience to specify, manufacture and integrate all of the diverse components that will ensure the best component combination for your application.

jbj's in house design team and manufacturing facility provide tailored solutions for your applications at competitive pricing and on-time deliveries.

Pump shaft alignment is key to preventing unnecessary wear and damage to the pump shaft seal and bearing. Improper alignment may lead to premature pump failure.

Also to be considered are unwanted torsional resonant frequencies in the system which can quickly cause damage to components in the drivetrain and reduce system life and performance. Improper pump installation can lead to premature failure, increased maintenance costs and reduced production levels of final product.

jbj Techniques can advise on the correct installation of hydraulic pumps into Industrial / mobile / marine / machine tool / agricultural / offshore industries and can specify complete driveline systems from their extensive range of components which are available from stock or manufactured to order, albeit simple or complex, standard or bespoke.

Electric Motor – Hydraulic Pump Adaptors (safe area)
jbj Techniques Limited offer the most comprehensive range of bellhousings in Europe. Designed to connect electric motors with frame size IEC D56 - D400 (0.06kW – 750kW) and can be compatible with electric motor 'B5' or 'B14' flange configurations. Accompanying the metric frame units above is a complete range of mountings to suit Nema and imperial frame motors with 'C' face or 'D' flange fitments.

With fully machined torsionally flexible couplings, or torsionally rigid couplings available, jbj ensure the most suitable combination is selected for the application in hand. As an example spider couplings are available in various materials including aluminium, grey cast iron, nodular iron, steel and stainless steels and can be finish machined with parallel, taper or splined bores to DIN, SAE, ANSI or ISO standards.

Bellhousings can be manufactured in aluminium or cast iron material as standard, however, units can be produced in a variety of exotic materials on request.

The aluminium product range is produced in either monoblock or composite formats giving great flexibility in design and allows for early delivery time, often with same or next day delivery possibilities.

For applications where low noise levels are a

requirement then a complete range of anti-vibration and noise reduction components add to the range.

Electric motor – Hydraulic Pump Adaptors (hazardous area)
Designed to meet the exacting safety standards of the offshore and chemical process industries, jbj Techniques produce adaptor kits certificated to Directive 2014/34/EU II2GD-IM2-TX -50 C< Service Temp < +105 C. Harmonised standards BS EN 1127:1, BS EN 13463:1, BS EN13463:5, BS EN 50303, BS EN 1834-1,BS EN 1834-3.

Generally manufactured in Cast or Nodular iron, bellhousings can be produced in steel, stainless steel or alternative exotic materials on customer request.

Couplings supplied for these applications are the jbj Techniques 'JXL' pin and bush range which provide an anti-static and flameproof drive which meet zone 1 area requirements, conforming to all of the above standards.
Also available are spider and gear couplings which are certified to zone 2 standards. (Contact jbj Techniques for details).

An important development of equipment for use within hazardous areas is the wet mount series of bellhousings. Commissioned to research and develop a product that would control the high temperature generated by a piston pump shaft seal when working within cycling applications. A little considered issue is the frictional heat generated at the shaft seal when the application requires the pump to cycle between different pressures causing the seal temperature to increase. This process will often take the seal temperature out and above the levels required by the relevant ATEX standards requirement. This specially designed assembly allows a pumped cooling flow to be passed over the seal face and through an auxiliary cooler, this in turn reduces the seal face temperature which can be maintained at an acceptable level. With a vast array of components to select from, jbj are well placed to provide all required components to support the required cooling system.

Diesel Engine – Hydraulic Pump Adaptors
A complete range of bellhousing and couplings exist for the connection of a diesel engine flywheel to a specified driven component, be it an oil hydraulic pump, water pump, generator or similar device. With the bellhousing available in various materials to suit all application areas. With a standard range to connect Diesel engines with SAE dimensions from SAE '6' to SAE '0' jbj are well placed to satisfy the majority of customer requirements. Couplings to complete the assembly are available in either torsionally flexible or torsionally rigid design ad can be supplied to suit SAE flywheel dimensions from SAE 6.5" to SAE 18".

For hydraulic pumps to be mounted to engines that do not conform to SAE dimensions, we offer a full range of assembly parts, some of which (but not all) are shown here » for diesel engines

All bellhousings within this range can be finished machined to accept any, piston, vane or gear pump interfaces requested by customer.

As with the electric motor range of product jbj offer complete solutions for ATEX environments, using our well proven 'JXL' coupling range which has standard design to connect to the engine flywheel.
Directive 2014/34/EU II2GD-IM2-TX -50°C ≤ Service Temp ≤ +105°C.
Harmonised Standards: BS EN 1127:1 BS EN 13463:1 BS EN 13463:5 BS EN 50303.

Petrol Engine – Hydraulic Pump Adaptors
Petrol engine adaptors have been developed for use with industrial petrol engines. Design exists to suit Honda, Briggs and Stratton, Kawasaki, Kubota, Hatz, Mag, Robin, Suzuki, Winsconsin, to name but a few, all adaptors can be finished to accept most hydraulic pumps. Adaptors to suit engine crankshaft drives and for vertical mounting are available on request.

Small Individual Components to Large Combinations

"ensuring a continuing high quality service in which customers can have complete confidence."

jbj Techniques is a specialist supplier of high-quality products for the mechanical power transmission and fluid power sectors. The company offers a high level of in-house expertise plus a huge selection of products to meet a very broad range of customer applications. From specification, through technical advice and manufacture to after-sales support, jbj Techniques provides a comprehensive and valued service to the power transmission and hydraulics industries. The company fields a UK-wide team of technical sales engineers to ensure that the business is close to its customers, and it enjoys excellent associations with European manufacturers, acting as sole UK distributor in many cases.

jbj's team is recognised for its expertise in the selection and configuration of hydraulic and mechanical transmission systems. Able to draw on an extensive product range that provides the building blocks for bespoke systems both large and small, the in-house design team offers a complete service, ranging from an assessment of customer requirements to full technical backup, including product specification, CAD based system design, system build and certification. Moreover customers can take advantage of jbj's own machine-shop facilities and skilled engineers to guarantee quality and control costs.

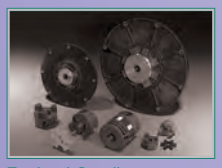
jbj Techniques provides one of the widest ranges of couplings available within the UK; mechanical power transmission couplings for a vast range of applications. Ranging from miniature couplings, all steel gear couplings, flexible spider couplings, shaft couplings, torque limiting couplings, disc and grid type couplings, ATEX compliant and shaft locking devices. Magnetic couplings for power transmission between hermetically sealed areas. However as extensive as the selection is, couplings make up a fraction of jbj's portfolio. As power transmission specialists the company stock and provide gearboxes, clutches, pumps, hydraulic motors, flow meters, fluid power accessories including: cooling & heat exchange products, reservoirs, pipe flanges, seals and level indicators, as well as a variety of bellhousings and engine adaptors, to name just a few of the product categories.

jbj Techniques Limited is proud of it's relationship and reputation with customers and suppliers. The core client base is stable and loyal, which is testament to the quality of service provided by the company. A similar relationship exists with suppliers, ensuring a continuing high quality service in which customers can have complete confidence.


Bellhousings


Torsionally Flexible Couplings


Torsionally Rigid Couplings


Torsional Couplings


Anti-static/Flameproof Couplings


Tyre Couplings


Torque Limiting Couplings


Permanent Magnetic Couplings


Hydraulic Adaptors


Engine Adaptor Kits


Dampers

from
Small
Individual Components to
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an excellence in engineering

comprehensive range of components www.jbj.co.uk

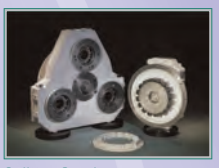

Gear Pumps/Motors

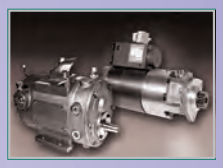

Screw Pumps

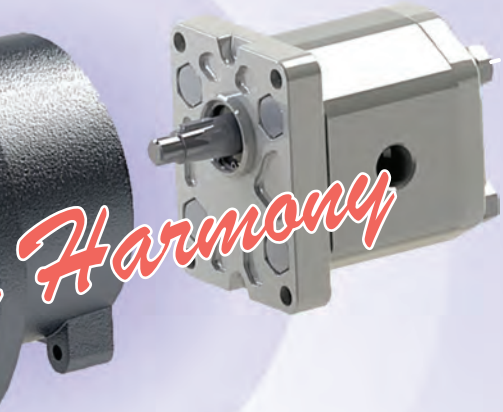

Axial & Radial Piston Motors


LSHT Motors/Geared Motors


Vane Pumps


Splitter Gearboxes


Pneumatic Motors & Starters

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BDS Clutches


Planetary Gearboxes


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Flow Dividers


Tanks/Accessories


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quality products for mechanical & fluid power

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jbj Techniques Limited is ISO certificated, committed to international coordination & unification of industrial standards.

- registered in England No: 1185469 -

A range of products ATEX certificated to directive 94/9/E requirements

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