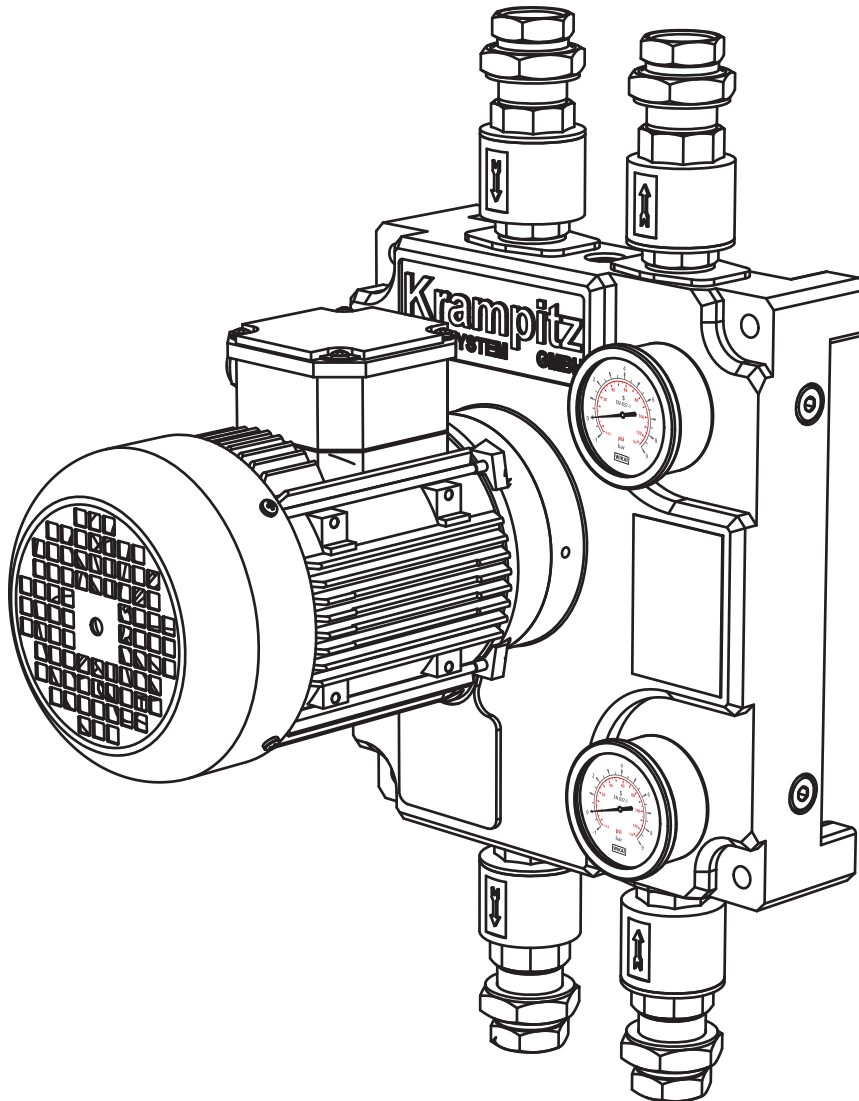


# Operating and assembly instructions (OAI) Z-PG block pump unit

# Krampitz®



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1.1 Purpose

The Z-PG block pump unit is suitable for supplying lubricating oils, fuel oils and other lubricating fluids. The liquids supplied must not contain any abrasive components and must not chemically attack the pump's materials. The liquids supplied must not contain any abrasive components and must not chemically attack the pump's materials. Its area of application extends from oil hydraulics through lubrication systems to pure supply systems. Its area of application extends from oil hydraulics through lubrication systems to pure supply systems. A prerequisite for good functioning, high operational reliability and long service life is, above all, a consistently clean and lubricating supply medium. The design is primarily to perform oil changes or oil supply to industrial combustion engines in a compact and cost-effective way, by being able to provide two supply directions by changing the direction of rotation.

1.2 Information about the product

1.2.1 Type designation and serial number

The complete type designation can be found in the technical data sheet or the order confirmation. The serial number is entered on the name plate or directly onto the pump.

1.2.2 Technical data sheet

The technical data sheet is a part of our order confirmation and should contain all important technical details which have been agreed between the purchaser and the manufacturer. These include:

- Name, type, size
- Item no.
- Related operating instructions
- Suction and pressure connection
- Materials
- Direction of rotation
- Accessories
- Hydraulic parameters like supply pressure, operating pressure, speed, viscosity and temperature range, for example.

If required, also:

- Pressure limit valve / safety devices
- Special installation location
- Suction behaviour
- Usage or working area / intended or permitted use
- Energy requirements
- Weight
- Date of issue

For pumping units also:

- drive type/motor/gears
- Accessories/safety devices

1.2.3 Permitted use

The Z-PG block pump unit is only designed for the area of application detailed in the technical data sheet of our order confirmation. Deviating operating conditions require new contractual agreements. Impermissible usage is when, for example, aggressive media are used or it is used in explosive risk zones.

1.3 User information

These operating instructions make it easier to get to know the Z-PG block pump unit and to fully utilise it in all possible uses. These operating instructions contain important information to operate the Z-PG block pump unit safely, properly and cost-effectively. Following them helps to reduce risk, minimise repair costs and outages, and to increase the reliability and service life of the Z-PG block pump unit. The operating instructions do not consider location-based regulations. The operating company is responsible for compliance with them. The pump's name plate contains the type series, the size, most important operating data and the serial number. We request that you always provide these details along with any queries, re-orders and in particular when ordering spare parts.

1.4 Intended use

The Z-PG block pump unit is only to be used in accordance with the original pump specification. It may only be used/operated with the supply fluid, supply flow, speed, density, pressure and temperature as well as the motor power or other data as specified in the technical documentation. Any other use is unauthorized. The manufacturer is not liable for any damage resulting from unauthorized use. If the Z-PG block pump unit is to be used for another purpose than laid down in the specification, the manufacturer must be consulted. We are more than happy to determine which adjustments may be required for the new purpose of use. Observing the operating instructions is also a part of proper and intended usage.

1.5 Residual risk

The Z-PG block pump unit is constructed using the latest state of the art technology, in compliance with generally accepted technical and safety standards. However, when operating the facility, the possibility still exists for damage to the machine and surrounding objects, as well as for danger to life and limb of the operator or third parties. The operating company / operator must therefore take care that the safety instructions in these operating instructions are observed. These operating instructions contain basic instructions which must be observed when setting up, operating or maintaining the device. Therefore, these operating instructions must be read by the installer or the responsible specialist member of staff/operator before assembly and commissioning and they must always be available at the machine/system's place of use. Not only are the general safety notes found in this main item on safety to be observed; other special safety notes in other main items, such as regarding private use, for example, must be observed.

## 2. SAFETY

### 2.1 General

- Before commissioning, make sure that the operators have read and understood the operating manual.

The operating company – not the operator – is responsible for safety!

- Operate the Z-PG block pump unit only in flawless condition, as intended, with safety and danger awareness, and under consideration of all notes in the operating manual!

- Immediately remedy any malfunction that might compromise safety.

- In every operating condition, observe:

### 2.2 Personnel qualifications and training

The operating, maintenance, inspection and assembly personnel must possess the relevant qualifications for this work. Areas of responsibility, competence and supervision of staff must be precisely defined by the operating company. If the personnel do not have the necessary knowledge, they must be trained and instructed. In addition, the operating company must ensure that the contents of these operating instructions is fully understood by the personnel.

### 2.3 Risks from not observing safety instructions

Ignoring the safety instructions can lead to a danger to persons and also to the environment and for the machine. Ignoring the safety instructions can lead to the loss of liability for any claims for compensation. The following are examples of hazards caused by non-observance:

- Failure of important machine/system functions
- Failure of prescribed methods for maintenance and repair
- Hazard to persons from electrical, mechanical and chemical effects
- Hazard to the environment from leaks of dangerous substances

### 2.4 Safety-aware working

The safety instructions contained in these operating instructions, the existing national regulations for accident prevention as well as any internal working, operating and safety instructions from the operating company must be observed.

### 2.6 Safety instructions for maintenance, inspection and assembly work

The operating company must ensure that all maintenance, inspection and assembly work is carried out by authorised and qualified specialist personnel, who should have sufficiently informed themselves by studying the operating instructions. All work on the machine must be done when it is shut-down. The procedures described in the operating instructions to shut-down the machine must be strictly observed. Pumps or pump units which carry substances hazardous to health, must be decontaminated. Immediately after completing work, all safety and protective equipment must be re-installed or made operational.



#### CAUTION! Risk of death!

From hot and poisonous transported media! Exceeding the pipeline strength can, for example, lead to leaks in the pump itself or from the flange connectors, which can result in a violent release of the media being transported. Deal with leaks so that there is no danger created to persons or the environment. Legal regulations must be observed.

### 2.5 Safety instructions for the operating company/operator

- If hot or cold machine parts present a hazard, these parts must be protected against contact on site.
- Protection against touching moving parts (e.g. coupling) must not be removed from a machine which is in use.
- Leaks (e.g., from the shaft seal) of dangerous substances being transported (e.g., explosive, poisonous or hot), must be contained so that they prevent no danger to persons and the environment. Legal regulations must be observed.
- Dangers from electrical energy must be excluded (for details, see the VDE regulations and the power supply company, for example).
- The operating company / operator must therefore carefully observe:
  - That the operating instructions are always available to the operating personnel.
  - That the safety instructions in these operating instructions are observed.
  - Ensure that the safety regulations and laws regarding the operation of pumps are complied with in the operating company and/or operating country.



**IMPORTANT:** Immediately shut-down the Z-PG block pump unit in the event of abnormal electrical voltages, vibrations, temperatures, noises, leaks or other malfunctions.

Before re-commissioning the machine, the items in the "Initial commissioning" section must be observed.

- The connected pipelines must be depressurised
- Allow the pump to cool
- Before starting repairs on the pump, it must be electrically isolated and secured to prevent unauthorised reconnection.
- For safety reasons, properly rinse, clean or wash surfaces of the pump contaminated with transported fluids hazardous to health before starting any work.

2.7 Safety instructions for installation, connection and commissioning

For the installation

Secure the Z-PG block pump unit using a suitable hoist until it is in its final location. The Z-PG block pump unit is designed to be installed in a total machine or system. The Z-PG block pump unit is delivered without touch-safe protection. Any required touch protection (e.g. when supplying hot liquids over 60°C) must be provided by the system manufacturer when the Z-PG block pump unit is integrated into the system.

For the commissioning

Before turning on / commissioning the pump ensure that no-one is endangered by the running pump!

2.8 Unauthorized modifications and spare-parts production

Modification or changes to the machine are only permitted after consulting with the manufacturer. Original spare parts and authorised accessories from the manufacturer ensure safety. The use of other parts can invalidate any claims for the consequences arising from their use.

For the connection




Work on the electrical equipment on the pump must only be carried out by a trained electrician or by persons under instruction and supervision of a trained electrician in accordance with the electrical regulations. Hazards from electrical energy are to be excluded (for details, see the country-specific regulations and/or the local electrical supply company). The information on the ratings plate and the electrical connection specifications must correspond.

2.9 Unauthorized operating modes

The operational reliability of the supplied machine is only guaranteed if it is used as intended in accordance with section 1 (General) of the operating instructions. The limit values contained in the data sheet must not be exceeded under any circumstances.

2.10 Signs and symbols

In these operating instructions you will be given relevant notices to warn you about sources of danger. Your attention should be drawn to these notices by the use of symbols!

Symbol			
Description	<p><b>Caution! Risk of injury! / Risk of damage!</b></p> <p>This sign warns you of risks resulting from mechanical action.</p>	<p><b>Caution! Risk of death!</b></p> <p>This sign warns you of risks from electrical current.</p>	<p><b>Notice:</b></p> <p>This sign points out economical use of the pump.</p>

Notices which are directly affixed to the pump, e.g. rotational direction arrow and labels for fluid connections, must always be observed and maintained in completely legible condition.

3. TRANSPORTATION AND TEMPORARY STORAGE

3.1. Transportation


The Z-PG block pump unit is shipped in an assembled condition. Fittings and accessories may, however, be packed and delivered separately.

3.2 Temporary storage


The Z-PG block pump unit must be stored in a secure place, in its operating position on a wooden base. It should be covered.

The Z-PG block pump unit has no internal preservation. It is possible that there is a film of the test medium still on the internal surfaces from the test run. Unless otherwise specially agreed, the test medium is a mineral oil.

The condition of the pump and its preservation must be checked at least once a year! If stored outside, the Z-PG block pump unit must be particularly carefully covered and it must be ensured that neither moisture nor foreign material can collect on it.



When transporting, jerky movements, impacts or strong vibrations must be strictly avoided when lifting and lowering!



Stacking the heavy Z-PG block pump units is not permitted.

3.3 Cleaning

To protect against damage during transportation or corrosion, various measures have been taken. Check your pump yourself to see which are present:

- 1. End cover over the connecting adapters
- 2. Corrosion protection coating

Before setting up or assembling the pump, the protective equipment should be removed. No contamination may be left inside the pump.



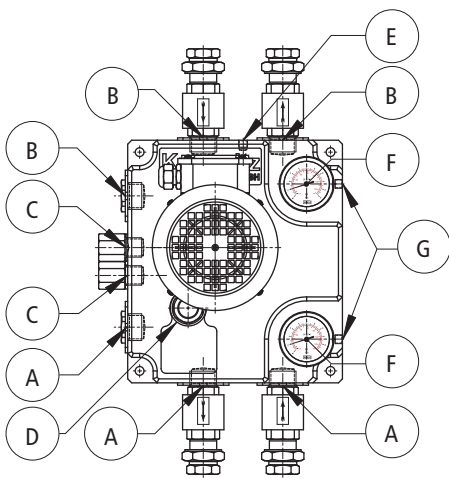
**Important!**

Depending on the pumped medium, the inside of the pump must be cleaned of oil residue. To do this, use a cleaning agent which does not damage the slide ring seal and the pump material. Ensure that the pump is carefully rinsed and dried after it has been cleaned. As suitable cleaning agents, e.g. methylated spirits, the pumped medium itself, neutral cleaning agent or Ritzol 155 as well as strong alkaline soaps. If steam cleaning is used, allow the solvent to work in first. If possible, do not use a steam jet cleaner. If this has to be used, ensure that the electric motor and the bearings are not damaged whilst doing so.

4. TECHNICAL DESCRIPTION

4.1 Description of the Z-PG block pump unit/spare parts

The Z-PG block pump unit allows and oil change or the oil supply for industrial combustion engines. The compact design of this pump contains all the required functions and fittings within the pump housing. The sturdy housing of the block pump is made of cast iron. This guarantees a long service life, and a perfect fit if there is a requirement to replace the unit. The pump's simple method of operation means that the two required supply paths can be switched by simply switching the phase direction of the electric motor. Each direction of rotation is secured by a non-return valve. The advantages of this unit are its easy piping connections and therefore large savings in terms of both time and space. The optimum alignment of the fittings makes installation simple both vertically and also horizontally. The pump is fitted with two pressure gauges and an additional sight glass for visual inspection for pressure control.

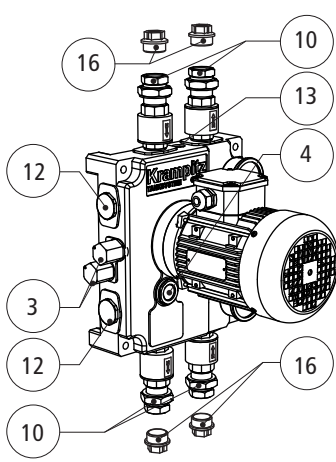
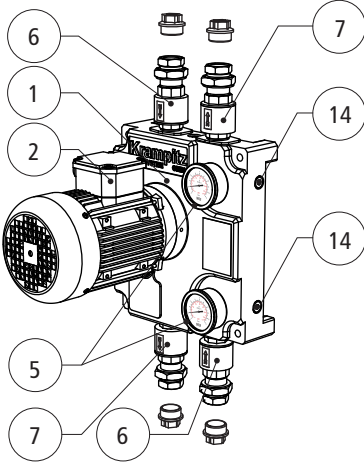


Principle construction

Pos.	Description	Connection
A	collectors with 3 piece connection	3x G1" (F)
B	collectors with 3 piece connection	3x G1" (F)
C	connections for pressure limiting valve	2x M20 (F)
D	connections for flow sight glass	1x G1" (F)
E	connections for filling hole	1x G1/4" (F)
F	connections for pressure gauge / drain	2x G1/4" (F)
G	connections for pressure gauge / drain	2x G1/4" (F)

**Benefits:**

- simple, sturdy construction
- no solenoid valves or stop cocks needed directly on the pump
- space and time-saving installation
- minimal pipework system needed
- suitable for vertical or horizontal mounting
- integrated fittings like, e.g. flow sight glass, manometers, non-return valves
- Suction and filling possible with just one pump
- Continuous use possible without restrictions thanks to the pressure relief valve



Individual parts / spare parts

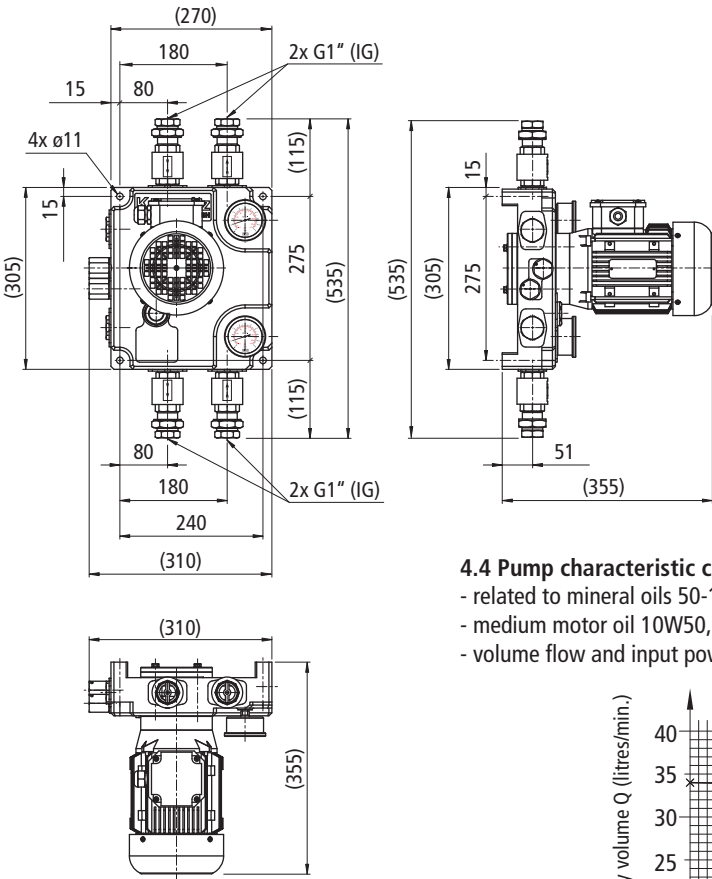
Pos.		Description	Connection
	1	pump set, consists of:	
1.	1	gerotor pump	
3.	1	three phase motor	Δ 230 / Y 400 V, 50 Hz, 0,55 kW Δ 265 / Y 460 V, 60 Hz, 0,63 kW
3.	2	bypass valve (pressure relief valve)	M20 x 1,5 (M)
4.	1	flow sight glass	G1" (M)
5.	2	pressure gauge	G1/4" (M)
6.	2	check valves type F-M	G1" (F) x G1"(M)
7.	2	check valves type M-F	G1" (M) x G1"(F)
10.	4	screw connection straight	G1" (F) x G1"(M)
12.	2	dummy plug, hexagonal head	G1" (M)
13.	1	filling hole, sealing screw	G1/4" (M)
14.	2	drain hole, sealing screw	G1/4" (M)
16.	4	treaded sealing plug	G1 (M)

4.2 Technical data

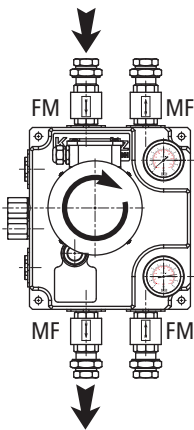
Typ	supply volume	pressure	suction height	voltage	current	frequenz	RPM	motor power	Gewicht
	Liter/Min.	bar	m	V	A	Hz	U/min	kW	kg
Z-PG-13	13,0	≤ 7,0	6,0	Δ 230 / Y 400	3,46 / 2,0	50 / 60	1.435 / 1.680	0,75 / 0,86	32
Z-PG-26-01	26,0	≤ 7,0	6,0	Δ 230 / Y 400	3,46 / 2,0	50 / 60	1.435 / 1.680	0,75 / 0,86	32



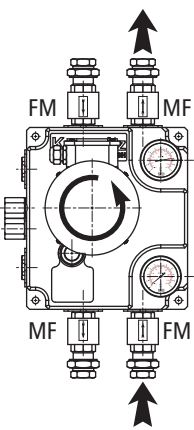
4.3 Dimensions - Z-PG pump unit with integrated non-return valves



Location of pressure/suction connection with standard phase direction

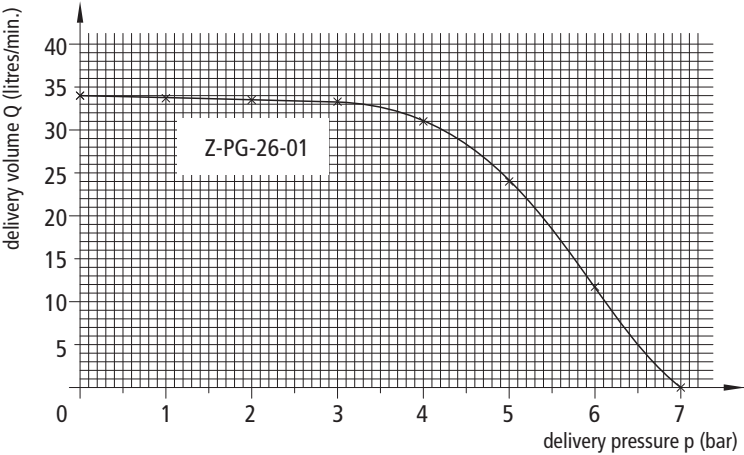


Location of pressure/suction connection with switched phase direction



4.4 Pump characteristic curve

- related to mineral oils 50-150 mm<sup>2</sup> /s (cSt), RPM of 1.435 1/min, input power 0,75 kW
- medium motor oil 10W50, temperature 19°C
- volume flow and input power change with other viscosities



4.5 How the pump unit works

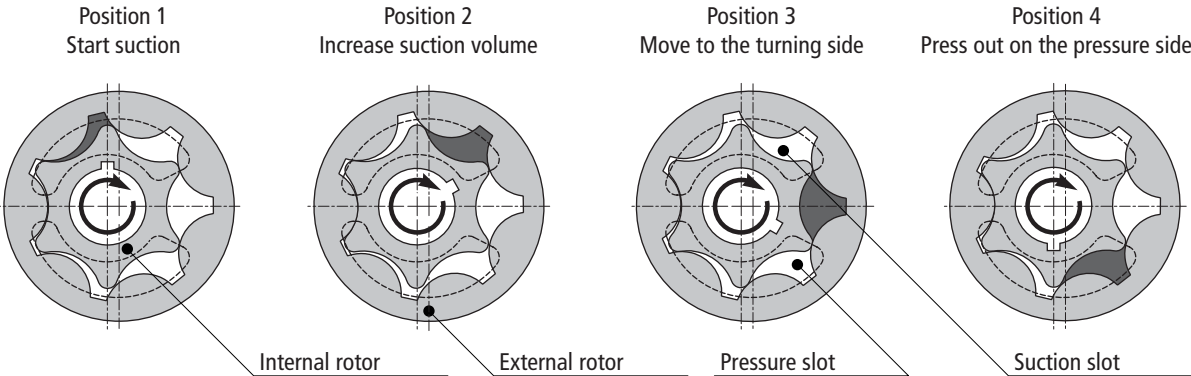
The pump is, in principle, a rotary piston pump or a rotary displacement pump consisting of an inner and outer rotor which are meshed in a trochoid. The number of teeth of the inner rotor is always one less than the outer rotor. In each rotational position, all the teeth of the inner rotor are in contact with the outer rotor. By turning the gerotor, there are displacement chambers formed between the contact points of the inner and outer rotors, their volume changes affect the supply flow. Supply flow and speed are proportional. The operation is represented here as a pump stroke where a chamber (dark area) is viewed in different positions.

How the gerotor pump works

The power required rises with increasing supply pressure.



The pump must never work with closed suction or pressure lines!



Pos.1+2: The pumping chamber is over the suction slot. The chamber volume increases with the turning movement, and it is filled with the medium.

Pos. 3: The pumping chamber is at top dead centre. The suction process is complete, the chamber has reached its maximum volume.

Pos. 4: The medium is now pressed out through the pressure slot due to the decreasing chamber volume. On the way to the next suction process, the chamber passes "bottom dead centre". The shaft has rotated through 360° during a pump stroke. The characteristic curve for the changes in the chamber volume is mainly sinusoidal.



4.6 Structural design

Pump housing

The pump housing encloses the pump wheels and is, in most cases, fitted with a suction and pressure connection for the pipe work. In addition, it has a pressure-limiting valve, a sight glass and various outlet and control openings.



The pump must always get liquid, it must never run dry! The running clearances of the sliding surfaces must be dimensioned so that there is always sufficient lubricating film.

Shafts, bearings and lubrication

The pump shafts are mounted in bearing bushings. The bearings must be sufficiently lubricated by the medium!  
The lower the viscosity of the supplied medium, the closer the running clearances must be maintained to achieve a low volumetric efficiency of the pump. However, this also needs a clean supplied medium to achieve high operational reliability and as long a service life of the pump as possible.

4.7 Pressure-limiting valve (standard)

To prevent the pump being overloaded for occasional, short-term and not operationally conditional demands, the pump is fitted with a built-in pressure-limiting or circulation valve. This returns the fluid from the pressure side to the suction side. If, however, this continues for a long period of time, the medium will be quickly heated up. This can lead to unwanted changes and, amongst others, it disrupts the problem-free running of the pump. For high pressures and longer response times, it is recommended to fit over-flow valves in a by-pass with a return to the reservoir.



Changes to the valve setting of the pressure-limit valve may only be done with the prior agreement of the pump manufacturer! The final pressure of the valve lies 20-30% over the opening pressure.

5. CONSTRUCTION AND ASSEMBLY

5.1. Assembly

The pump is supplied completely assembled and is therefore ready for installation. Other external accessories, like filters, dirt traps or similar, which are not pre-fitted onto the pump at the factory should be attached after the assembly of the pump into the system or onto the pump foundations.



**IMPORTANT:**  
Check that the pump runs easily and its clearance before beginning assembly.

5.2. Pipelines

The pipelines should be laid so that they do not cause undue stresses on the Z-PG's connections, even during operation. The pipelines should be adapted to the connections. Before connecting the pipelines to the Z-PG, the pipes should be freed of all impurities so that no foreign bodies end up in the pump combination. The closure caps on the connections should be removed only when fitting the pipelines to the pump combination. Working on the pipelines for water hazardous material must only be carried out by suitable, approved personnel.



**CAUTION!**  
The pipelines must also meet the legal requirements for environmental protection (WHG, water pollution prevention, flammable liquids, flammable substances) as well as the requirements of the system.



**CAUTION!**  
Work on pipelines may only be performed by qualified staff from approved specialist companies.

5.2.1 Connecting pipelines

The pump must not be used under any circumstances as a fixed point for longer pipelines. Long pipelines must be directly fixed before the pump and connected without any tension or stresses. Their weight must not load the pump.  
Stresses from the pipeline caused by thermal expansion must be compensated for using appropriate measures.



**CAUTION!**  
Under no circumstances may the pump be used as a fixing point for the pipework. The piping system must not pass any forces or torques (e.g. due to distortion, thermal expansion) onto the pump.



The pipes should be fixed directly before the pup and connected without any tension or stresses. Their weight must not load the pump. The alignment must be done with great care, as this is a pre-requisite for the trouble-free operation of the unit. Failure to follow these instructions will result in a loss of all warranty claims.

**CAUTION! Risk of death!**

Sudden (shock-like) closing valves in the pipework must be avoided. The pressure surges that these cause could exceed the maximum permissible housing pressure on the pump by several times! To avoid excessive pressure shocks, shock absorbers or other suitable measures must be taken.

**NOTICE:**

At the end of installation or before commissioning the system, the container, pipelines and connections must be thoroughly cleaned, rinsed and blown out. Welding splatter, scale and other impurities often loosen after some time. The free cross-section of the sieve should be three times the cross-section of the pipeline, so that no large resistance is created by trapped foreign bodies.

Sieves in the shape of a hat with inlaid wire mesh of 2.0 mm mesh width and 0.5 mm wire diameter made of corrosion-resistant material have been proven to work. To implement such a sieve, it is recommended to use the suction side of the pump for the dirt trap to protect the pump from pollution and seizure.

### 5.3 Rinsing

Suction and pressure connections of the pump are closed with plastic caps. The inside of the pump contains residual amounts of the test oil or, possibly, a preservative. If contractually agreed, the pumps are also cleaned by us after the test run. They are then fully free of such residues.

If the pump should be rinsed before initial commissioning, we recommend using the supplied medium or a neutral agent.

Water, or fluids containing water, should not be used due to the risk of corrosion.

Welding splatter, scale and other impurities often loosen after some time. To avoid this, appropriate measures like sand blasting, for example, are required before the installation.



Before installing the pump into a new system, the containers, pipelines and connections must be thoroughly cleaned, rinsed and blown out.



Foreign bodies endanger operational safety of the pump and can lead to blockages or total failure.

### 5.4 Suction line

The suction line must be protected to prevent any air ingress and laid so that the formation of air pockets is avoided. They must rise away from the Z-PG. Cross-sectional constrictions and sharp bends should be avoided. The nominal diameter of the suction line must at least be designed in accordance with the connection nominal width of the Z-PG (DN25). Local conditions can require greater diameters. A non-return or foot valve prevents flow back of the supplied medium when the pump is shut down and the associated possible reverse running of the pump. The foot valve should be installed so that neither debris from the container bottom or air (if the fluid level is low) can be sucked in.

The pump must be protected against dry running using suitable measures. A shut-off valve (e.g. ball valve) must be provided at each suction port on the Z-PG. The shut-off valve of the required suction connection must be completely opened during operation. It is not to be used to control the flow rate. If the suction line is short, the nominal width should be at least that of the pump connection. For longer pipelines, the most economical nominal width should be determined on a case-by-case basis. Transition pieces to larger nominal widths should be done using the most slender possible expansion angle, so avoid excessive pressure losses. Fundamentally, the suction line should be as short and straight as possible. The total suction-side resistance must not exceed 0.4 bar in operation. In the start-up condition for a time period of up to approx. 30 minutes (until operating temperature has been reached), a maximum of 0.65 bar. The total resistance is made up of the geodetic suction height and the pipeline resistance including any add-ons.

It is measured directly using a vacuum gauge immediately on the pump suction connection as negative pressure. As a further characteristic value for the suction line, the flow rate speed should be considered; for oils this is always a value of 1 to 1.5 m/s. If the underpressure is higher than 0.4 bar, the filling degree of the pump will be affected which will reduce the supply power and can lead to cavitation. Cavitation causes increased noise production and increased wear in the long term. The installation of a vacuum gauge on the pump suction connection is particularly used to control the underpressure in the suction line and to evaluate the degree of contamination of any suction filters which have been installed.



The suction line must be absolutely leak-free!

**IMPORTANT:**

Foreign bodies and contamination must be filtered out before they enter the pump in the suction sieve or the dirt trap!

### 5.5 Pressure line

Cross-sectional constrictions and sharp bends should be avoided. The nominal diameter of the pressure line must at least be designed in accordance with the connection nominal width of pressure-side connection of the Z-PG (DN20). Local conditions can require greater diameters for the pressure lines. A shut-off valve (e.g. ball valve) must be provided at the pressure ports on the Z-PG. The shut-off fitting must be completely opened during operation. It is not to be used to control the flow rate. The shut-off fitting of the not used suction port is to be closed tightly for technical reasons.

The operating or supply pressure is to be checked using a pressure gauge fitted directly next to the pump pressure connection. The supply pressure or total resistance is composed of the individual resistances of the consumers, the geodetic height and the pipework resistances.



Pipe and consumer resistances are dependent on the viscosity. To avoid overloading the pump with non-permissible pressure, it is recommended that an external pressure limiting valve is installed.

5.6 Malfunctions in the pipelines

If oils are used, the flow rate in the discharge line should not exceed 3 m/s. If there is air in the suction line, suction problems may occur when the pump is started up, for example, if:

- the pump should be operated against a closed system (weight-loaded non-return valve)
- two parallel pumps are secured against each other by non-return valves.

This can be remedied by venting the pressure line or through a small bypass line (NW 4-6) placed upstream of the non-return valve. The bypass is returned to the tank.

In circulating lubrication systems – common in gear manufacturing, for example – cleaning filters are used in the pressure line. The quantity of the lubricating oil which is being circulated must not be set too small to ensure that it is not overheated due to excessive pumping and inadequate cooling. A cooler or heat exchanger should be installed if necessary.

5.7 Pressure test and leak test

These tests are performed statically, prior to the pump installation. It is best to use special boiler pumps and pipe tester pumps, rather than feed pump.



Test pressures that substantially exceed the pump design pressure can damage the pump.

5.8 Assemble and connect



The pump must not be used in potentially explosive environments. Only approved components should be used.

5.9 Check before starting installation

- Make sure the machine / system / vessel sockets have been prepared in accordance with the dimensional / installation drawings?
- Make sure the fixing points are sufficiently strong.
- Make sure the surface is horizontal and level.



**CAUTION! Risk of injury! Make sure the machine is stable.**  
Pumps that are mounted vertically are top-heavy. They should be secured with ropes to prevent tipping during assembly or disassembly.

5.10 Additional connections

Any additional connections that need to be made for the pump, such as flushing- or leak-liquid lines, should be mounted in accordance with the installation drawing and / or piping plan.

5.11 Protection against foreign objects and contamination

There are two types of soiling:

1. Primary soiling

- Filling and feeding pumps are exposed to foreign matter, particles of dirt, or mineral-based pigments found in the medium to be pumped.
- The pipework components, especially those installed upstream of the pump, may be covered with fine dirt particles, such as metal shavings, weld spatter or solder beads, abrasives, etc. resulting from the production or installation operations.

2. Secondary soiling

The circulation pumps used in the oil supply systems are exposed to soiling which continually builds up on the sliding surfaces of the transmission components as fine metallic wear or abrasion particles absorbed by the lubricating oil. The size of the foreign objects trapped by the suction filters depends on the filter fineness.



The filters may gradually get clogged due to soiling and accumulation of mud, which will impede the intake of the flow rate through the pump. This will be immediately noticeable due to increased noise emission.

It is good practice to use filters with a fineness of 0.05 to 0.20 mm, depending on the pump design. The larger the filter surface, the longer the maintenance intervals.

Primary soiling is prevented by suction filters or strainers in the suction line. Secondary soiling of displacement pumps is best prevented by means of duplex filters installed in the pressure line and designed for continuous filtration. While one chamber of the filter is on duty, the other clean half is on standby. The filters can be equipped with differential pressure indicators or electrical contacts for remote monitoring of the increasing filter soiling. Make sure you consider the viscosity range of the lubricating oil when defining the fineness and size of the filter. Contact the filter manufacturer, if necessary.

The filter fineness of 25-60 µm is commonly used for lubricating oils.



Foreign bodies endanger operational safety of the pump and can lead to blockages or total failure.

Large amounts of the finest contamination cause abrasive wear on the sliding surfaces and shorten the service life of the pump.

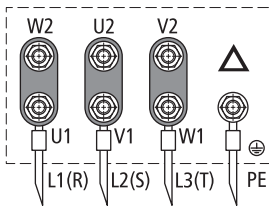
## 5.12 Electrical connection

Have the electrical connection of the pump performed by qualified electricians approved by the local electricity supply company in accordance with the technical connection requirements. The connections must be performed by a qualified installation electrician. The relevant DIN VDE regulations must be observed. Compare the mains voltage with the data on the motor rating plate and choose a suitable circuit.

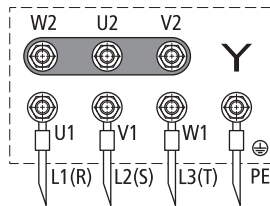
We recommend using a motor protection device. Connect the motor in accordance with the wiring diagram and / or delta-connection or star-connection diagram.

### Wiring diagram 400 V / AC - three-phase current

Delta connection



Star connection



## Motor Rotation Direction Test

The motor rotation direction should correspond to the direction arrow on the volute casing of the pump.

Check if the motor rotation direction is correct by quickly switching the plant on and off. If the direction is incorrect, swap any two supply phases (L1, L2 or L3) and check again.



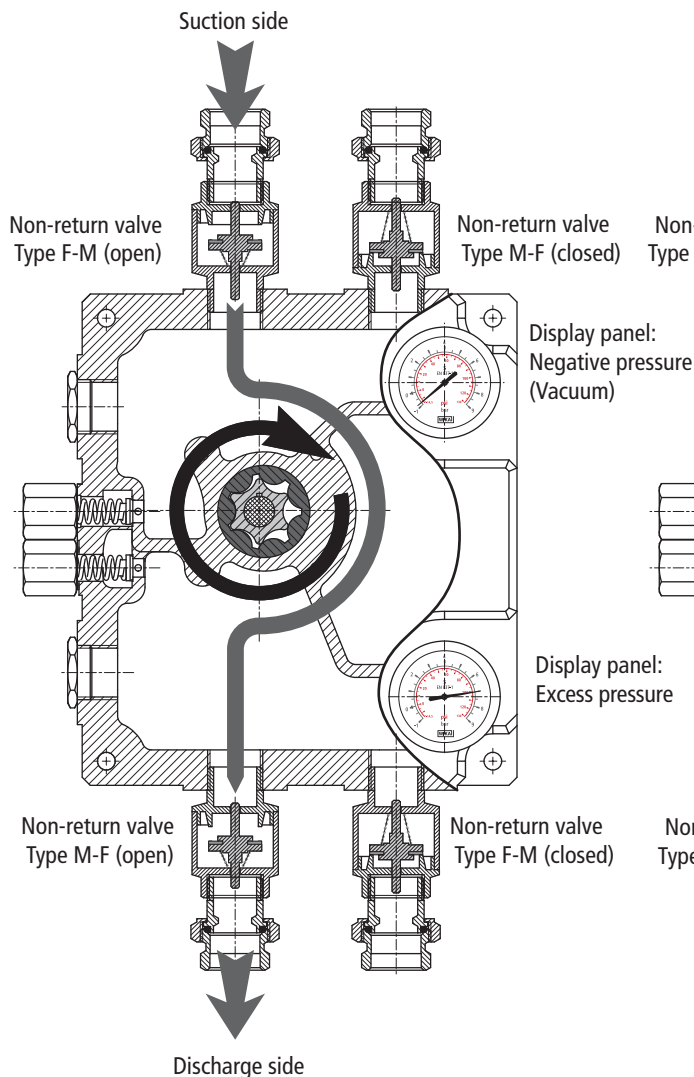
### CAUTION!

- Work on the electrical systems may only be carried out by qualified electricians.
- Disconnect the system from the mains before beginning work on electrical components.

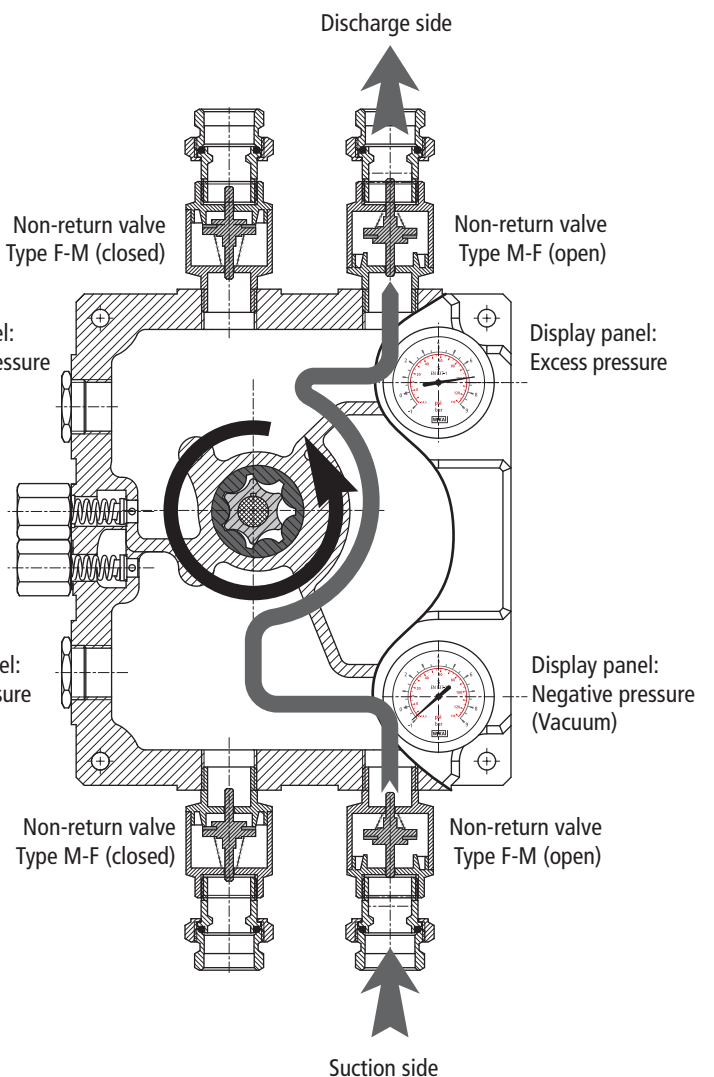
## 5.13 Pressure gauge to optically detect the pump discharge direction of the Z-PG pump unit

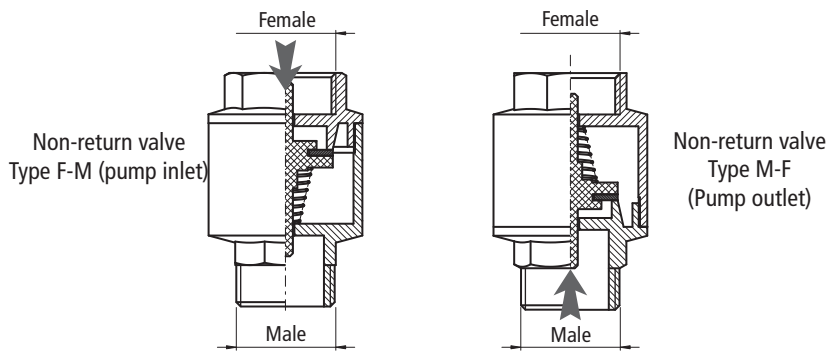
When the direction of the pump motor rotation changes, the pump discharge direction is reversed. The suction and discharge directions are reversed too.

Standard direction of rotation



Switched phase direction





## 6. COMMISSIONING / DECOMMISSIONING

### 6.1 Preparation for commissioning

Check the pumping plant for compliance with the accompanying technical documentation prior to commissioning. When you use a pump with an electric motor, the electrical connection may be carried out by a qualified electrician only.

### 6.2 Initial Commissioning

Basically, pumps are self-priming units.

Make sure that a sufficient amount of liquid is provided (added) in the pump prior to the initial start-up.

Normally, you should also suck off the air left in the suction line and pump it into the pressure line. It is good practice, especially in extremely adverse suction conditions, to fill the suction line with the medium before initial start-up in order to avoid dry running of the pump.

Any shut-off valves located in the suction or discharge lines must be fully open. Open the additional connections (e.g. for flushing liquid supply, etc.) and monitor the flow rate. Use the drain and level plugs to fill or vent the pump.

There is a rotational direction arrow notice affixed to the pump. Once the pump has been filled up and the shut-off valves have been opened, check if the motor rotation direction is correct by quickly switching the plant on and off.

### 6.3 Recommissioning

Basically, you should observe the points described in section 5.3.2 "Commissioning".

Check if there is enough liquid in the pump to ensure safe re-intake after longer downtimes.

### 6.4 Decommissioning

Depending on the version, the pump should have a run-on cycle that is long enough to ensure that the liquid temperature is reduced to avoid heat accumulation in the pump with the heat source switched off. Close the shut-off valve in the intake line for longer downtimes. Also, shut off any additional connections. In pumps where the pumping medium flows in under a vacuum the shaft seal must be supplied with sealing liquid, even at standstill. Hardening fluids must be drained from the piping system. The pump can be used to clean the piping system at low flushing pressure for short time only.

If poorly lubricating flushing or cleaning liquids are used, high flushing pressure and longer running times should be avoided to prevent fretting or jamming of the sliding surfaces of the pump.



Personal protective equipment should be provided.



The pump and suction line should be filled up with liquid and vented. Dry run must be avoided.



Check the direction of rotation.



Pumps are positive displacement units. If the pump is operated with a closed / blocked discharge line, it will get overloaded and damaged.

Pressure relief valves are used to protect the pump against damage and overloads. Use pressure gauge and sound level meter to determine the proper function of the pump. Once the pump has been switched on, the period of time needed to start pumping the liquid should not exceed 30 seconds.



Check the mobility of the internal pump parts (e.g. by turning the drive shaft) if hardening fluids are used.



Never run a cold pump suddenly with a hot fluid. Run the pump and allow it to slowly heat up to the required temperature in order to avoid jamming due to a thermal shock.



The rating plate should indicate if the pump can be used as a flushing unit to avoid incompatibility of the materials used.

Each pump shall be delivered in a carefully assembled condition. If the pump unit is to be stored for a prolonged period of time before commissioning, we recommend that you should proceed as follows.

**Storage of New Pumps**

New pumps, when required, are protected by an anti-corrosion coating for a storage period specified by the customer. If this period is significantly exceeded, the condition of the pump should be checked and the anti-corrosion coating should be refreshed, if necessary.

**Decommissioning for periods longer than 3 months**

**1. Do not remove the pump.**

To ensure that your system is always in an operational state and to prevent deposits in the pump and immediate intake area, run a monthly or quarterly functional check of the pumping plant (approx. 10 min.) after long downtimes. The pump should be supplied with a sufficient amount of liquid.

**2. The pump is removed and stored in a safe place.**

Clean the pump thoroughly and apply anti-corrosion agents before you place it in storage.

Anti-corrosion agents should be applied on the interior and exterior of the pump.

**6.5 Disposal**

If you choose to finally shut down and decommission the pump, please observe the local regulations regarding the disposal of industrial waste.

**6.6 Pump-drive documentation**


It is accompanied by the following documents:

- Operation manual
- dimension drawing

In case of complaints with regard to the pump motor operation, feel free to contact us or the motor manufacturer.

**6.7 Dimension sheet**

The provided dimension sheet corresponds with the supplied pump. You are not authorized to make dimensional modifications to the pump.



**IMPORTANT:**  
Subsequent modifications of the delivered pump shall void your warranty.

**6.8 Density of pumped liquid**


The power consumption of the pump changes proportionally to the density of the pumped liquid. To avoid overloading the motor, the liquid density should comply with the specification data.

**6.9 Important notes**

When returning the pump for repairs, please follow the instructions below.

1. If you send the pump to the manufacturer for repairs or retrofitting, please make sure you enclose exact information on the pumped medium!

**2. CAUTION!**



If the pumped medium is toxic, corrosive, etc., we request you enclose a copy of the medium's safety data sheet!

3. Only thoroughly emptied and cleaned pumps are accepted for repairs.

**Recommissioning after storage**

**Removal of anti-corrosion agents:**

The anti-corrosion agents applied and / or filled in must be removed before re-installing the pump.


**Recommissioning:**

Immediately after completing work, all safety and protective equipment must be re-installed or made operational. Make sure you observe the points listed in Section 5.3.2 "Initial commissioning" when recommissioning the pump unit.


**Special feature of the slide ring seal:**

The shafts and bearings strongly adhere to each other due to adhesive forces. The spring traction is no longer strong enough to break loose the shaft. In this case, the motor does not start or starts with difficulty, which can damage the unit. Remove the fan cover and turn the fan wheel (after disconnecting the pump from the mains) in the direction of the rotation direction arrow. If the resistance automatically adjusts itself and the fan wheel springs back, the pump must be removed and the shaft carefully separated.

Never use excessive force to spin the shaft.



**CAUTION!**  
Check the dimensional stability and proper elasticity of the elastomers (O-rings, shaft seals, etc.) after prolonged storage in conserving conditions. Replace brittle elastomers. EPDM-based elastomers must always be replaced.



**CAUTION! Risk of fatal injury / poisoning**  
The pumps which were used to convey toxic, corrosive or other chemicals that pose a hazard to human health or to the environment, must be thoroughly cleaned and / or decontaminated prior to disposal. The cleanser and pumped liquid residues should be properly disposed of in accordance with the applicable statutory provisions. The pump should be disassembled and separated into individual materials to facilitate disposal, unless otherwise specified by the relevant statutory provisions applicable in the area where the pump is operated.

**6.10 Indication of incorrect operation**

**General**

Incorrect operation is largely excluded if the plant is operated via a central system control unit. In manual mode, as well as control unit mode, make sure that:

- The pump always running quietly and there is no vibration
- The pump is not running dry
- The pump is not running against a closed shut-off valve in order to prevent heating of the pumped medium.
- The maximum permissible ambient temperature does not exceed +40°C
- The storage temperature is max. +50°C above the ambient temperature. However, it should not exceed +80°C (measured outside of the motor housing).
- The shut-off valve in the supply line is not closed during pump operation.



## 7. USAGE POSSIBILITIES FOR THE Z-PG BLOCK PUMP UNIT

### 7.1 Pump unit for oil supply combined operation with one pump (MINIMAL oil supply system)

When changing oil, you normally extract waste oil from the motor oil sump and fill in fresh oil into the motor oil sump. Not infrequently, fresh oil needs to be poured into the tank from a canister, and waste oil needs to be disposed of from the tank into a canister as there is no other way to deliver and / or dispose of it.

#### Combined operation with one pump

The waste oil is sucked through the first conveying path from the oil sump of the combustion engine and conveyed into the waste oil tank. After switching the rotating direction the fresh oil is sucked through the second conveying path from the fresh oil tank and conveyed in the engine oil sump.

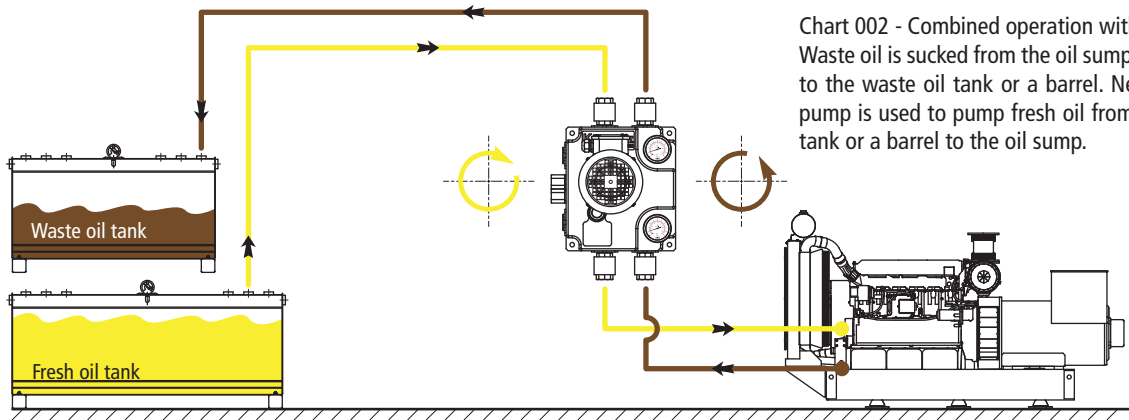
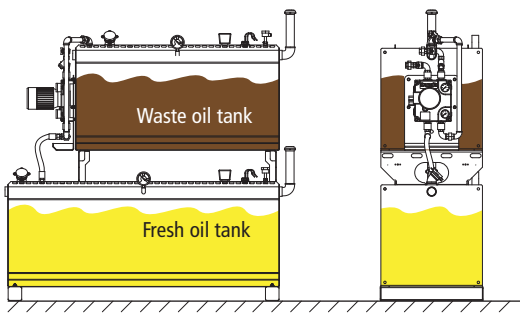


Chart 002 - Combined operation with one pump  
Waste oil is sucked from the oil sump and pumped to the waste oil tank or a barrel. Next, the same pump is used to pump fresh oil from the fresh-oil tank or a barrel to the oil sump.

#### MINIMAL Oil Supply System - Complete System



#### MINIMAL functions:

- Oil change: Suck waste oil from and pump fresh oil to the oil sump.
- Refilling fresh oil automatically when the oil level in the sump drops
- Third-party fueling of the system with fresh oil by means of a tank car.
- Third-party disposal of the waste oil from waste oil tank by means of a tank car.

### 7.2 Pump unit for oil supply separate operation with two pumps (IDEAL oil supply system)

Two Z-PG pump units are required for the separate operation.  
The advantage: Fresh oil and waste oil is not mixed.  
Waste-oil pump: Through the first conveying path the waste oil is sucked from the motor oil sump into the corresponding tank. Through the second conveying path the waste oil is sucked from this tank into the motor oil barrel after switching the rotating direction.

Fresh oil pump: Through the first conveying path the fresh oil is sucked from the barrels into the corresponding tank. Through the second conveying path the oil is sucked from the tank into the motor oil sump.

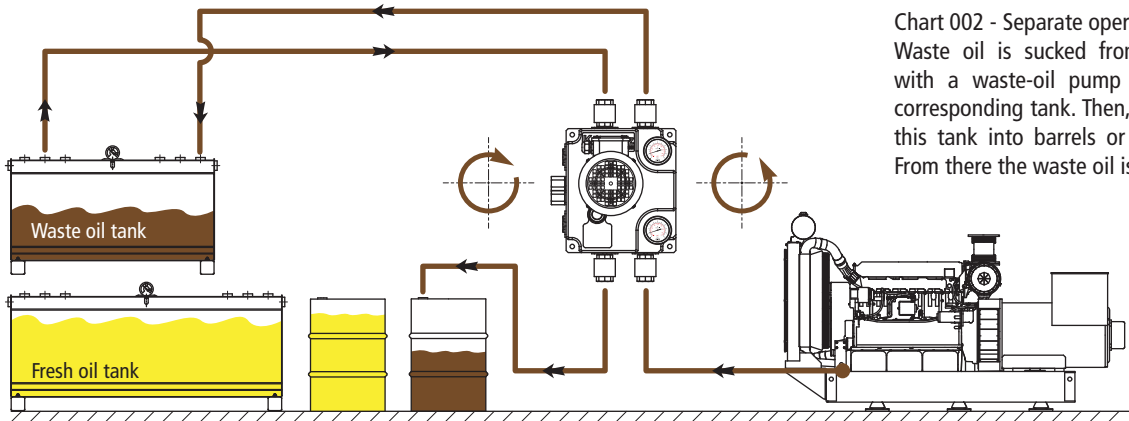


Chart 002 - Separate operation - Waste oil pump  
Waste oil is sucked from the motor oil sump with a waste-oil pump and pumped into the corresponding tank. Then, the oil is pumped from this tank into barrels or storage/disposal tanks. From there the waste oil is then disposed of.



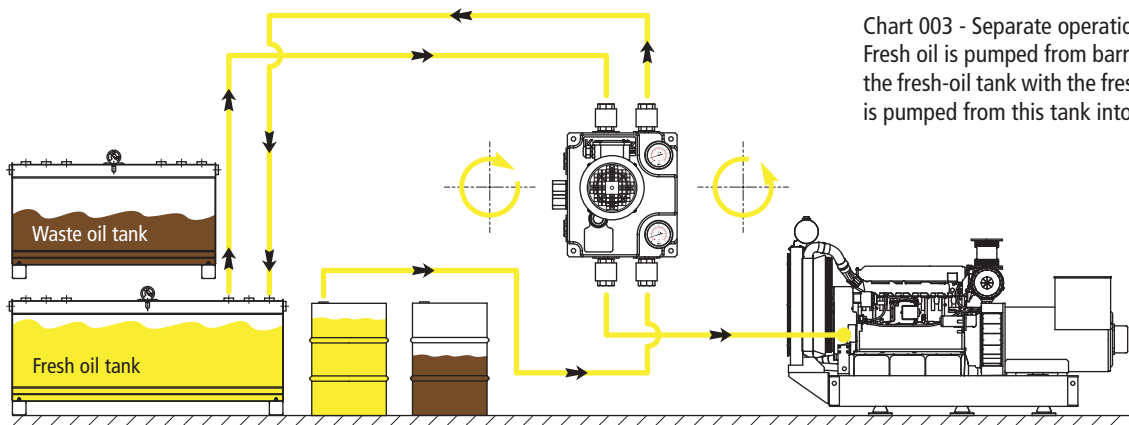
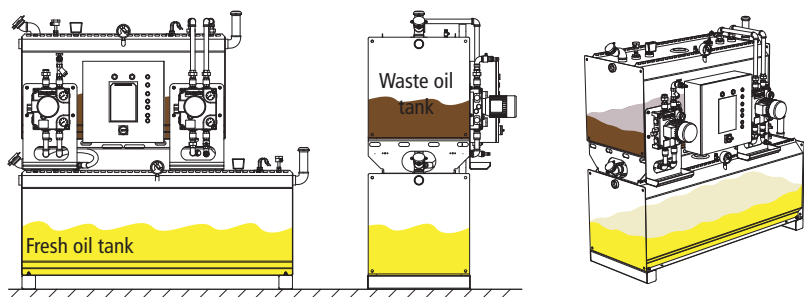


Chart 003 - Separate operation - Fresh oil pump  
Fresh oil is pumped from barrels or storage tanks into the fresh-oil tank with the fresh-oil pump. Then, the oil is pumped from this tank into motor-oil sump.

### IDEAL Oil Supply System - Complete System



IDEAL functions:

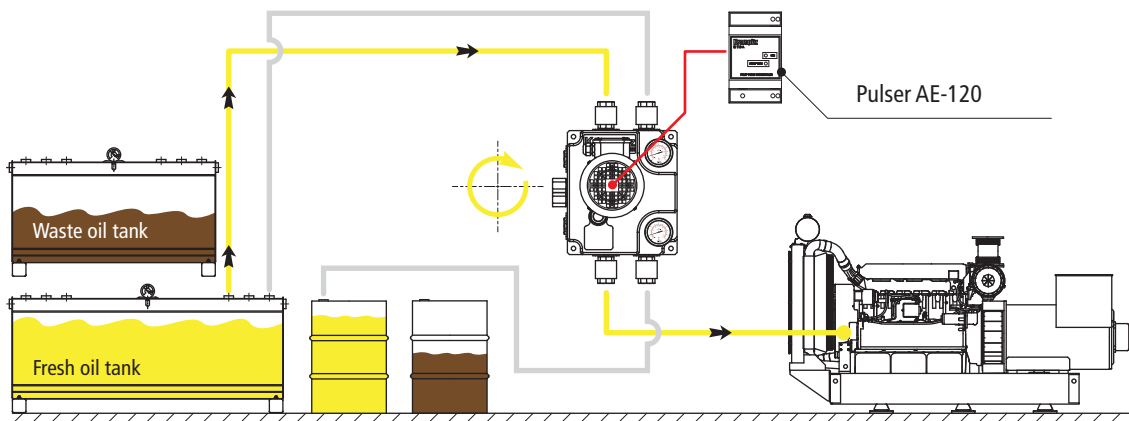
- Oil change: Suck waste oil from and pump fresh oil to the oil sump.
- Refilling fresh oil automatically when the oil level in the sump drops
- fueling the fresh oil tank from a barrel / storage tank possible
- disposal of the waste oil from waste oil tank into a barrel/storage tank possible
- third-party fueling the system with fresh oil by means of a tank car
- third-party disposal of the waste oil from the waste oil tank by means of a tank car

### 7.3 Automatic operation of the fresh oil pump (MAXIMAL Oil Supply System)

In addition to the supply and disposal of motors as in the IDEAL Oil Supply System, it also has a feature of an automated oil level regulation during operation of the combustion engine. After filling the engine oil sump with fresh oil, press the button to switch to the automatic operation. The pump unit operates under pulse and level control.

Chart 004 - Automatic operation - Fresh oil pump unit - Pulse-controlled

A controlled break during running period at second-interval reduces the flow rate to approx. 15%. If additional fresh oil is required in the motor oil sump, the inlet magnet valve on the motor oil sump will open, and the fresh- oil-pump unit will convey fresh oil in small amounts as required.



Pulser AE-120

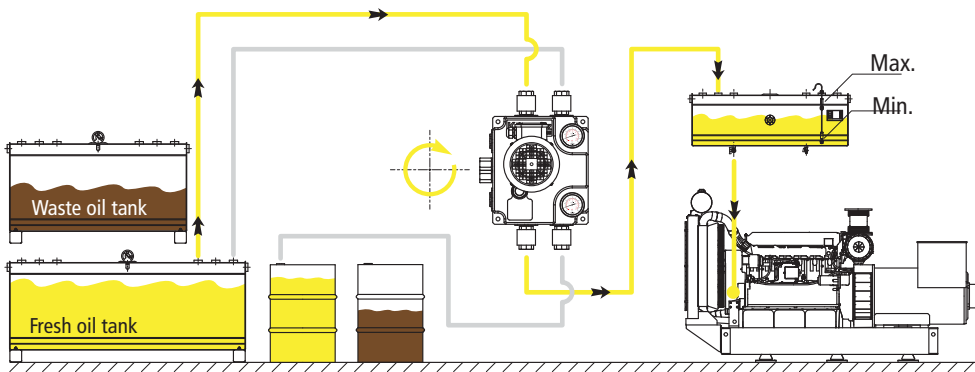
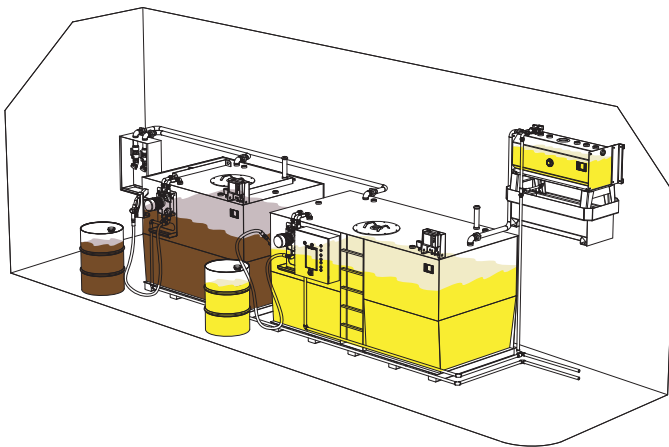


Chart 005 - Automatic operation -  
Fresh oil pump unit  
Level-controlled

In a day fuel tank, a level sensor is installed for each maximum and minimum filling level. The pump receives electrical signal from the level sensor. If the signal "minimum filling level" arrives, the pump will request fresh oil as long as it receives the signal "maximum filling level", and then it turns off.

Due to the raised arrangement of the day fuel tank above the motor, static supply of the motor oil sump with fresh oil can take place.

### MAXIMAL Oil Supply System - Complete System



#### MAXIMAL functions:

- continuous oil supply to the motors from the reservoir that is filled automatically
- Oil change: Suck waste oil from and pump fresh oil to the oil sump.
- Refilling fresh oil automatically when the oil level in the sump drops
- fuelling the fresh oil tank from the barrel possible
- disposal of the waste oil from waste oil tank into barrel possible
- third-party fueling the system with fresh oil by means of a tank car
- third-party disposal of the waste oil from waste oil tank by means of a tank car.

## 8. MAINTENANCE AND REPAIR

### 8.1 General Instructions

The Z-PG pumps are practically maintenance-free. However, certain instructions should be observed to ensure the maximum uptime and service life possible.

- Ensure that the system and pumped fluids are clean.
- Check the sealing of the pump and the connections

Major deviations of the achieved flow rates from the technical specifications are rarely associated with the pump itself. In cases of doubt, it is appropriate to contact the manufacturing plant, specifying the serial number and year of manufacture of the pump.

Prior to maintenance or repair work on the Z-PG pump unit and the connected pipework, disconnect the system from the mains. Work on the electrical components may only be carried out by qualified electricians. The shut-off valves in the suction and pressure lines of the Z-PG pump unit should be closed. Loosen the drain screw to empty the Z-PG pump. Please note that residues of the pumped medium may remain in the pump body. If the pipework or the pump combination is dismantled, all openings must be sealed with suitable plugs. Only in this way can the penetration of foreign bodies into the Z-PG and pipelines be prevented reliably. Work on pipelines may only be performed by qualified personnel from approved specialist companies. Do not operate the Z-PG pump unit longer than 3 min. without pumped medium (dry run).

Under normal operating conditions (when well lubricating liquids are used), pumps are practically maintenance-free. It is good practice to check the performance of the pump on a regular basis. The corresponding control instrumentation, such as operating hours counter, pressure gauge, temperature monitor, etc. should be integrated in accordance with the relevant requirements, standards and regulations.

The following points have to be observed when carrying out maintenance work on the pump:

- Check the fastening screws and bolts for tightness, tighten if needed.
- Check the entire pump for tightness, particularly the shaft seals

The operator shall ensure that all inspection, maintenance and repair work on the pump is carried out by authorised and specially trained personnel only. The operator shall make sure that the personnel have thoroughly read and understood the operating instructions. We recommend that you create and adhere to a maintenance plan. This will help you avoid costly repairs and ensure a trouble-free, reliable operation of the pump. For repairs use only original spare parts offered by the manufacturer. If work has to be carried out on the motor, the instructions specified in the manual provided by the relevant motor manufacturer must be observed.

Checks

Regular inspections:

- Output specifications of the pump (pressure, flow rate)
- Current consumption
- Check that the screws are tight

Weekly inspections:

- Make sure the pump is running quietly and vibration-free
- Storage temperature


8.2 Maintenance / Repairs

General

Basically, it is recommended that you have the pump repaired by a specialist company, as a great number of leak checks for leaks and checks for compliance with technical / electrical parameters have to be carried out on a test bench. Always carry out repair work on the removed in an appropriate workshop. Make sure you observe the general instructions. The following instructions will enable you to dismantle the pump and to re-assemble it properly with the requisite spare parts in place. Special instructions must be observed when a new shaft seal is fitted. The repairs can be carried out using the usual workshop tools. No special tools are needed. After dismantling, all individual components of the pump should be thoroughly cleaned. Check the individual components for wear and damage. Defective components have to be reworked or replaced.

8.2.1 Disassembly preparation

Prior to disassembly, the pump must be secured against being accidentally switched on (or disconnected from the mains). When used in a facility, make sure you inform the shift supervisor / manager.




**CAUTION! Risk of death!**  
Affix a warning sign on the switch cabinet.


8.2.2 Disassembly / removing the pump

The pump should be operated at ambient temperature.


- Disconnect the power supply
- Close the valves in the suction and pressure lines.
- Depressurise the pump by loosening the drain screws.
- Disconnect electrical connections on the motor.
- Disassemble any additional connections.
- Loosen the pressure and suction ports.
- Remove the pump fittings
- Remove the pump unit (from the container, etc.).



**IMPORTANT:**  
Make sure you observe the local regulations and conditions when carrying out the work described below.



**CAUTION! Risk of death!**  
In order to prevent electric shocks, work on the terminal box and the machine controller unit must never be carried out until the electrical connections have been isolated or disconnected.



**CAUTION! Risk of injury or death!**  
The pump must be secured against being accidentally switched on (or disconnected from the mains) when inspections or maintenance work are carried out.

8.2.3 Disassembly / disassembling the pump

Only begin the work when you have checked that:

- The required spare parts are available which fit the relevant type of the pump. The faulty parts, if any, can be procured at short notice. Make sure that the pump serial number is stated in your spare parts order.
- You have all the tools and accessories required for the work.

8.2.4 Shaft Seal / Bearing

Check the motor shaft / housing joint for dripping and replace the shaft seal, if necessary. To replace the shaft seal, unscrew the motor from the pump housing. When replacing the shaft seal, check the shaft bearings for play. Replace the sliding bearing, if necessary. Invariably make sure that the pump is not damaged or soiled during repairs and / or replacement of components. This affects the functioning of the pump and can lead to subsequent hazards.

8.2.5 Pressure-limiting valve

To adjust / change the opening pressure of the pressure limiting valve, proceed as follows:

- Screw off the sealing cap and remove the lock nut.
- Adjust the opening pressure by rotating the stem nut / adjusting screw:
  - Turn to the right to increase the opening pressure.
  - Turn to the left to decrease the opening pressure.Reference values for pressure setting: approx. 10% above the operating pressure / working pressure of the system
- Screw the sealing cap back on (remember to install the sealing ring and / or sealant).

### 8.3 Spare parts

Keeping the most important spare parts and wear parts in stock at the place of installation of the pump unit is an essential precondition for its operation. On the other hand, we recommend to keep a spare (stand-by) pump in stock so that you can return the faulty pump to our factory for repairs, if necessary.

We assume warranty only for original spare parts supplied by us. We particularly emphasize that parts and accessories not supplied as genuine KRAMPITZ parts have not been verified for suitability by KRAMPITZ and thus are not authorised for use. The installation and / or use of such products can therefore, under certain circumstances, negatively affect the constructive specified characteristics of the pump and impair active and / or passive safety. The manufacturer accepts no liability whatsoever for damage caused by the use of non-original parts and accessories. When ordering spare parts, make sure you state the following information:

- Order / serial number
- Part no. / designation
- Number of units

## 9. MALFUNCTIONS, CAUSES AND REMEDIES

### 9.1 Malfunctions

In the event of faults which do not result from the system control or other operational errors, proceed as follows:

1. Localise the error / malfunction.
2. Determine the cause
3. Eliminate the error.

### 9.2 Shutdown

1. Close the shut-off valve in the pressure (and suction) pipes.  
If back-flow prevention is fitted to the pressure pipe, the shut-off valve can remain open, provided that there is back pressure.
2. Switch off the motor. Allow it to come to rest. Depending system type, give the pump sufficient idle run time – with the heat source, if any, switched off – to allow the pumped fluid temperature to go down and to prevent an accumulation of heat in the pump.
3. Close the shut-off valve in the suction pipe.



**CAUTION! Risk of damage!**  
If there is a danger that the pump may freeze during longer shutdown periods, the pump must be emptied or protected against freezing up (by auxiliary heating).

Malfunctions								Cause	Remedy	
Pump does not prime.	Pumping capacity is too low.	Uneven feed	Pump overheating	Excessive sound pressure level	Valve pin "flutters"	Motor overheating	Pump jammed			
a	b	c	d	e	f	g	h			
✓								Rotating in the wrong direction	Check the pump rotating direction indicated by the arrow on the pump, if incorrect reverse the polarity of the motor.	1
✓	✓			✓			✓	Pump is not filled, fluid level is too low.	Fill the pump and, if necessary, the suction line and vent.	2
✓	✓			✓				<ul style="list-style-type: none"> <li>- Suction line is not tight</li> <li>- Shaft seal is not tight</li> <li>- Sealing plug on the pump is not tight</li> <li>- Sealing cap on the PLV is missing or not tight.</li> </ul>	<ul style="list-style-type: none"> <li>- Reseal the suction line</li> <li>- Replace the shaft seal</li> <li>- Tighten or reseal the sealing plugs (ring screw, if necessary).</li> <li>- Screw the sealing cap back on and tighten</li> </ul>	3
✓	✓			✓				<ul style="list-style-type: none"> <li>- Suction lift is too high / infeed is too low.</li> <li>- Suction filter is clogged or too small.</li> <li>- Wear of the internal components</li> </ul>	<ul style="list-style-type: none"> <li>- Check the suction lift / resistance. If necessary, increase pipe cross-section or reduce the pipe length. If necessary, clean suction filters or install larger ones.</li> <li>- Replace worn parts</li> </ul>	4
✓								No bleeding is possible in the suction line against non-return valve.	Do not install bypass line (DN 4) upstream of the non-return valve with recirculation in the oil tank. Alternative: install a bleed cock.	5
✓	✓	✓						<ul style="list-style-type: none"> <li>- Partial flow via PLV, valve pin is stuck</li> <li>- Suction and pressure line clogged</li> </ul>	<ul style="list-style-type: none"> <li>- Remove and fix or replace the valve pin.</li> <li>- Clear away blockages or deposits.</li> </ul>	6
				✓	✓			<ul style="list-style-type: none"> <li>- Valve spring operates within the response range.</li> <li>- Valve pin rattles in its seat</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the valve pin.</li> <li>- Adjust the opening pressure.</li> </ul>	7
	✓	✓						Pressure limiting valve opens too early.	Adjust the PLV (10% above the operating pressure). Replace the valve spring if it is loose.	8
				✓				<ul style="list-style-type: none"> <li>- Pump does not operate stably.</li> <li>- The pump construction is not noise-proof.</li> </ul>	<ul style="list-style-type: none"> <li>- If low-viscosity media are pumped without pressure, apply 1 or 2 bar to the pump.</li> <li>- Mechanical noise reduced by means of vibration dampers, provide for noise insulation covers</li> </ul>	9
	✓	✓		✓				Air trapped in the pipes, insufficient bleeding, the medium is foaming	Return flow lines must be channelled to the tank below the oil level, the suction and return flow ports should be placed further apart, ventilation / oil level area should be increased.	10
	✓	✓		✓				Pump filling level is too low / fluid viscosity is too high.	Reduction of RPM when pumping high-viscosity media	11
			✓					<ul style="list-style-type: none"> <li>- Pumping pressure is too high.</li> <li>- Too many RPM</li> <li>- Bearing damaged</li> <li>- Sliding bearing overload for lack of lubrication</li> <li>- Viscosity of the pumped medium is too low.</li> <li>- Pump is badly aligned.</li> </ul>	<ul style="list-style-type: none"> <li>- Reduce pressure / increase the discharge line / reduce resistance</li> <li>- Reduce RPM.</li> <li>- Inspect the bearings and replace if necessary.</li> <li>- Improve bearing lubrication.</li> <li>- Reduce the temperature.</li> <li>- Align the pump.</li> </ul>	12
	✓			✓		✓		<ul style="list-style-type: none"> <li>- Current consumption too high</li> <li>- Two-phases running</li> <li>- Insufficient cooling</li> <li>- Viscosity of the pumped medium is too high.</li> <li>- Motor bearings defective</li> </ul>	<ul style="list-style-type: none"> <li>- Compare voltage and frequency with those specified on the motor rating plate</li> <li>- install a more powerful motor, reduce RPM</li> <li>- Repair the motor or replace defective fuse.</li> <li>- Improve cooling air supply.</li> <li>- Heat up the pumped media / install additional heating system.</li> <li>- Repair the bearings.</li> </ul>	13
							✓	Foreign body in the pump	Disassemble the pump and remove the foreign body from the pump housing; smooth the damaged spots using an whetstone / install a filter.	14
							✓	bearing jammed	Make sure that the pumped media has not lost its lubricity because of high temperatures. Disassemble and fix the pump. Return to the manufacturer, if necessary.	15

Malfunctions								Cause	Remedy	
i	j	k	l	m	n	o	p			
Pump is not running.	Flow rate of the pump is too low.	Motor overload	Pump does not transport the fluid, no pump pressure available.	increased motor / bearing temperature	Pump not tight, leaks	Pump is not running quietly.	Temperature of the pump is too high.			
	✓		✓				✓	Counter-pressure too high, pump working against too much pressure, plant resistance too high, performance too low	Reset operating point, clean the plant, increase the rpm, install a new impeller, clean the pipes, increase the performance, use a larger pump.	1
	✓		✓				✓	Pump / pipework not completely vented, air being sucked in due to too little covering, gas formation, air pockets in the pipes, high level of air content in the medium, infeed or impeller blocked	Increase fluid level, adjust level control, install the pump at a lower level, vent the plant, clean the pipework, change the pipework, de-gas the medium, decrease the resistance in the supply pipe, fully open valves in the suction pipe clean sieves and suction connections, install a venting valve directly upstream of the non-return valve.	2
	✓	✓	✓					Wrong rotating direction, incorrect electrical connection, rpm too low	Swap two of the power supply phases in the terminal box, increase the rpm (*) (install a new motor, if necessary).	3
	✓			✓		✓		Worn internal parts (e.g. impeller)	Remove foreign bodies from the pump housing, replace worn parts.	4
		✓		✓		✓		Pump counter-pressure is less than that stated in the specifications, incorrect electrical connection	Set operating point precisely, increase counter-pressure by throttling the pump on the pressure side for example, turn off impeller if required (*), use larger motor (*), compare electrical supply connection with that on the motor rating plate.	5
		✓		✓				Higher density or higher viscosity of the pumped medium than specified	Re-adjust the pump (*)	6
						✓		Cavitation	Throttle the pump on the pressure side, adjust the suction conditions, use larger pump (*).	7
					✓			Defective gaskets, pump badly aligned, connecting screws loose	Replace gaskets, align the pump properly, check pipework connections, tighten connecting screws.	8
					✓			Shaft seal worn	Replace shaft seal, check bypass for clear cross-section.	9
✓								Foreign body in the pump, motor bearings defective, circuit breaker tripped due to motor overload, circuit breaker too small, winding defective	Remove foreign body from pump housing, clean or replace pump housing, replace motor bearings, check electrical connection and compare with motor rating plate. If the motor is overloaded: throttle pump, smaller rotor (*), larger motor (*)	10
				✓	✓	✓		Pump wrongly adjusted, pump twisted or resonance vibrations in the pipework, several pumps on one console	Adjust the pump precisely, check pipework connections / pump holder, stand-alone installation, connect pipework via expansion joints, install vibration damper under the pump, stiffen the tank, clean pressure-relief openings in the impeller	11
				✓		✓	✓	Flow rate too low, pipework blocked, closed valve on the pressure side	Re-adjust the pump, provide a bypass for low intake volumes, clean the pressure pipe, only turn the pump on when required, open valve on the pressure side; use a smaller pump (*)	12

(\*) Please contact the manufacturer.

# EC Declaration of Conformity



We (the following) hereby declare

Krampitz Tanksystem GmbH  
Dannenberger Str. 15  
21368 Dahlenburg  
Germany

that following named product – on account of its conception and construction and in the version marketed by us – complies with the relevant basic safety and health requirements of the EC directives mentioned. This statement loses its validity with any changes made to our product without our consent. The following named product is intended to be installed or assembled with other machines. It may not be commissioned until it has been determined that the ready-for-use machine or entire system complies with the corresponding EC directives.

Name: Z-PG-13, Z-PG-26-01, (block pump) OSP-2000  
(waste oil pumping station) for pumping non-flammable liquids,  
lubricant media, for example, lubricating oil

Characteristics: pumping volume: 5 - 55 l/min.  
Voltage: 230V/400V, 50Hz/60Hz

relevant EC directive:

EC Machinery Directive 2006/42/EC  
EC Low Voltage Directive 2006/95/EC  
EC EMC Directive 2004/108/EC

applied harmonizing norms and specifications, especially:

DIN EN 292 Safety of machinery  
EN 809 general safety requirements for pumps  
DIN EN 61000-6-2 Interference resistance in the industrial sector  
DIN EN 61000-6-3 Emitted interference for living, business and industrial areas  
EN 60529 (IEC 529) Protection types through housing

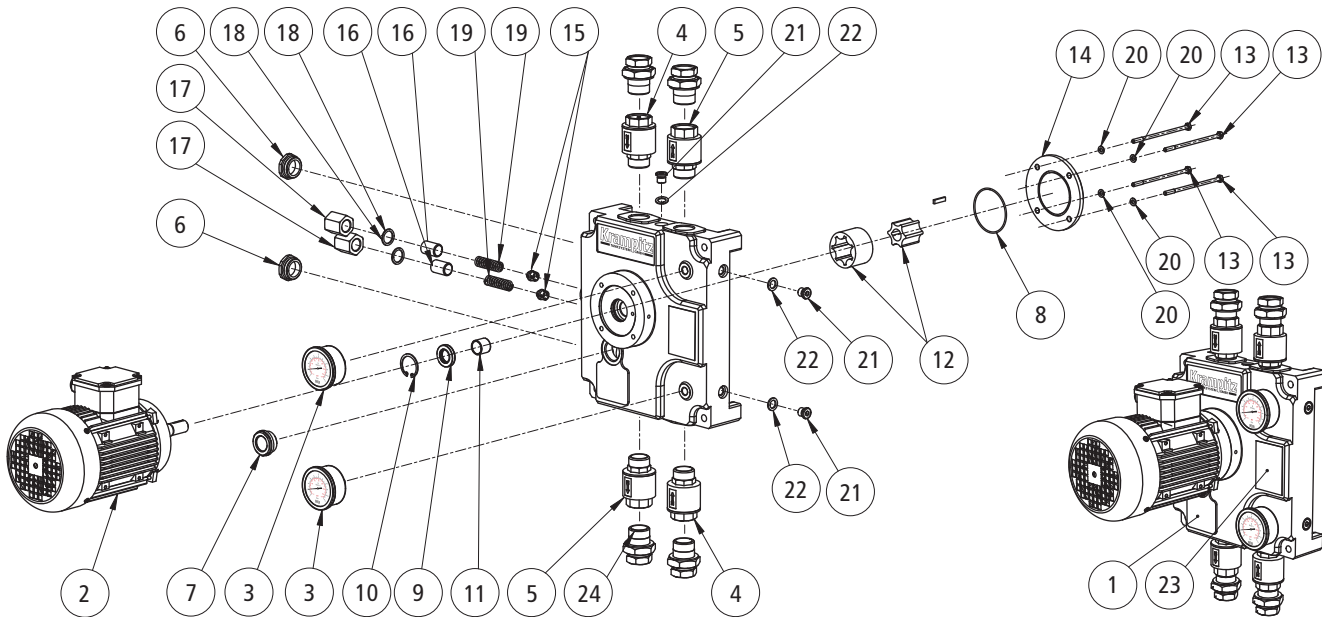
.....2012-03-01.....

Date

A stamp of the Krampitz Tanksystem GmbH logo, including the company name and address: "Dannenberger Straße 15, 21368 Dahlenburg". A handwritten signature is written over the stamp.

signed/stamped





pos.	quantity	art. no.	description	type	dimension
1	1	Z-PG-13	pump set		
	1	Z-PG-26	pump set		
	1	Z-PG-J	pump set		
	1	Z-PG-RS	pump set		
2	1	Z-PG-26-001	three phase motor	$\Delta$ 220 / Y 400 ~ V 50 Hz $\Delta$ 265 / Y 460 ~ V 60 Hz	1.400 min <sup>-1</sup> / 0,55 kW 1.680 min <sup>-1</sup> / 0,60 kW
	1	Z-PG-26-002	three phase motor	$\Delta$ 220 / Y 400 ~ V 50 Hz $\Delta$ 265 / Y 460 ~ V 60 Hz	1.435 min <sup>-1</sup> / 0,75 kW 1.690 min <sup>-1</sup> / 0,86 kW
	1	Z-PG-26-007	three phase motor	Y 600 ~ V 60 Hz	1.675 min <sup>-1</sup> / 0,55 kW
	1	Z-PG-26-008	three phase motor	Y 600 ~ V 60 Hz	1.675 min <sup>-1</sup> / 0,65 kW
3	2	AM-MS-14-001	pressure gauge	-1,0 ~ 9,0 bar	G1/4"
4	2	F-MF-1-048	check valve	AG/IG	G1" x G1"
5	2	F-MF-1-049	check valves	IG/AG	G1" x G1"
6	2	AMF-MS-1-012	dummy plug, hexagonal head	AG	G1"
7	1	AM-AL-25-001	flow sight glass	AG	G1"
8	1	AM-GU-68-001	O-Ring - Viton	ISO 3601	ø 68 x 2 mm
9	1	AM-GU-20-002	sealing ring	ISO 6194	ø 20 x ø 35 x 6 mm
10	1	N-S-35-002	ring lock	DIN 472	ø 35 x 1,5 mm
11	1	M-S-20-004	DU-bushing		20 x 23 x 20 mm
12	1	M-S-26-004	gerotor	Typ 7633	Ø57,1 x 38,1 mm
13	4	N-S-M6-010	hexagon bolt	DIN 931	M6 x 120 - 8.8
14	1	M-S-120-003	cover		ø120 x 8 mm
15	2	M-S-26-003	ventil tapered		Ø16 x 16 mm
16	2	M-S-26-002	thread bushing		M20 x 1,5
17	2	M-S-26-001	bushing nut		SW30
18	2	N-CU-20-001	sealing ring - copper	DIN 7603-A	ø 20 x ø 26 x 1,5 mm
19	2	AM-S-26-001	pressure spring		ø 2,5 / ø13 / L0: 49 mm
20	4	N-S-M6-006	washer	ISO 7090	ø 6,4
21	3	N-S-14-001	screw	DIN 908	G1/4"
22	3	N-CU-13-001	sealing ring - copper	DIN 7603-A	ø 13 x ø 20 x 2,0 mm
23	1	AM-091	manufacturing label		55 x 80 mm
24	4	F-MS-1-053	screw connection	IG/AG, straight	G1" x G1"

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