Product name

Centrifugal pump

Product range: PSR...

Original assembly manual and corresponding operating manual

in accordance with EC Machinery Directive 2006/42/EC

Version 03

Spandau pumpen

Imprint

This original assembly manual and corresponding operating manual comply with EC Machinery Directive 2006/42/EC and are an integral part of the described product. They must be kept for future use.
This original assembly manual and corresponding operating manual were created in accordance with the valid standards and regulations on technical documentation, VDI 4500 and EN 292.

Service

If you have technical queries, please contact the following:

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Operating assembly manual in accordance with EC Machinery Directive 2006/42/EC

Information on the EC Declaration of Conformity and the EC Declaration of Incorporation

For the following product:

Centrifugal pump

Belonging to the following series:
PSR...

We hereby confirm that this product complies with the relevant safety requirements specified in the applicable directives of the Council concerning the approximation of the laws of the Member States, viz.:

- **Machinery Directive 2006/42/EC**
- **Low Voltage Equipment 2006/95/EC**
- **Electromagnetic Tolerance 2004/108/EC**

...

Information:
(a) This declaration certifies compliance with the named regulations but does not guarantee characteristics.
(b) The safety instructions in the documentation enclosed with the product must be observed.
(c) The commissioning of the certified products is prohibited until it has been ensured that the machine, vehicle, or similar unit into which the product has been installed complies with the conditions and requirements of the applicable directives.
(d) The operation of the products on a non-standard mains voltage as well as non-compliance with installation instructions can affect EMC characteristics and electrical safety.

Furthermore:

- The aforementioned product is intended, in accordance with **EC Machinery Directive 2006/42/EC, Appendix II, Part B**, to be installed in a machine/assembled with other machines to form a superordinate machine. It may not be commissioned for applications within the scope of this EC directive until it has been determined that the machine in which this product is installed complies with the conditions of the aforementioned directive.

- The product may only be used as intended and in accordance with the instructions in the documentation with due observance of **EC Directive 97/23/EC regarding pressure equipment**. Please closely observe the following:

The product is neither designed nor approved for use in conjunction with fluids belonging to Group 1 (hazardous fluids) as defined in Article 2, Paragraph 2 of Directive 67/548/EC of 27 June 1967. MFEx model
The product is neither designed nor approved for use in conjunction with gases, liquefied gases, gases dissolved under pressure, vapours, or fluids with a vapour pressure of more than 0.5 bar above normal atmospheric pressure (1013 mbar) at the maximum permitted temperature.

Products supplied by SKF Lubrication Systems Germany GmbH do not reach the limit values listed in Article 3, Paragraph 1, Points 1.1 to 1.3 and Paragraph 2 of Directive 97/23/EC. This means that they are not subject to the requirements of Appendix I of this Directive. They therefore do not have a CE mark as per Directive 97/23/EC. SKF Lubrication Systems Germany GmbH classifies products in accordance with Article 3, Paragraph 3 of the directive.

The Declaration of Conformity and Incorporation forms an integral part of the documentation and is delivered with the product.

EN

General information

Meaning of symbols and corresponding information

In these assembly instructions, these symbols are used to highlight safety information that communicates a particular risk to persons, material assets, or the environment.
Pay attention to this information and be especially careful in situations where a risk is indicated. Pass on all safety instructions to other people as appropriate.

	DIN 4844-2 W000	General risk
	DIN 4844-2 W008	Voltage
	DIN 4844-2 W026	Hot surface
	DIN 4844-2 W028	Risk of slipping

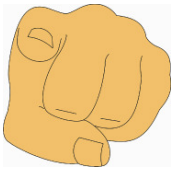
Information which is attached directly to the product - such as the examples below - must be observed.

- Rotational direction arrow
- Fluid connection label

Such signs must be kept in a legible state.

Keywords in safety information and their meanings

Keyword	Use
Danger!	Indicates a danger of injury to persons
Caution!	Indicates a danger of damage to property or the environment
Note!	Indicates additional information



The responsibility is yours!

Please read this assembly manual thoroughly and refer to the safety information.

Info symbols

	Note
⇒	Prompts you to take action
•	Used for bulleted lists
>	Indicates other issues, causes, or consequences
*	Provides additional information

Product name

Centrifugal pump

Product range: PSR...

Original assembly instructions

in accordance with EC Machinery Directive 2006/42/EC

1. Safety information

Please observe the following safety information in order to ensure the trouble-free operation of the pump and to prevent damage.

The operator of the described product must ensure that the assembly instructions are read and understood by all persons who are involved with the assembly, operation, maintenance, and repair of the product. This assembly manual must be kept close at hand.

Note that this assembly manual is an integral part of the product. It must be handed over to the new operator of the product if the product is sold.

The described product was manufactured in accordance with all generally acknowledged regulations pertaining to technology, occupational safety, and accident prevention. However, dangers that can cause physical injury to persons or damage to other material assets might still occur during the use of the product. This product should therefore only be used if it is in a technically perfect state and with full observance of the information provided in this assembly manual.

In particular, malfunctions that might affect the safety of the product must be rectified immediately.

Appropriate safety measures must be implemented in accordance with the characteristics of the conveyed media.

The provided safety functions must not be damaged, taken out of services, made useless, or replaced by any parts other than those expressly approved by SKF Lubrication Systems Germany GmbH.

In addition to the information provided in this assembly manual, all generally valid regulations on accident prevention and the environment must be observed.

1.1 Intended use

All products manufactured by SKF Lubrication Systems Germany GmbH may only be used as intended and in accordance with the specifications in the assembly manual for the product in question.

Spandau Pumps immersion pumps are multi-stage centrifugal pumps for conveying oils, mineral emulsions, and emulsions with synthetic lubricating coolants without abrasive or long-stranded components.

They are designed to be installed in a vertical position.

Any other use of this product constitutes improper use.

Only media approved for this pump type may be conveyed. The use of unsuitable media can cause the pump to fail and may result in serious damage to property or injury to persons.

You must not carry out alterations to the product or use non-original spare parts or resources. Doing so invalidates the statutory guarantee.

Worn-out units must be placed in a state that prevents them from being used and must then be disposed of in the appropriate manner.

In particular, note that this product is neither designed nor approved for use with fluids belonging to Group I (hazardous fluids) as defined in Article 2, Paragraph 2 of Directive 67/548/EC of 27 June 1967.

The described product is neither designed nor approved for use in conjunction with gases, liquefied gases, gases dissolved under pressure, vapours, or fluids with a vapour pressure of more than 0.5 bar above normal atmospheric pressure (1013 mbar) at the maximum permitted temperature.

Unless explicitly stated otherwise, SKF Lubrication Systems Germany GmbH products are not approved for use in potentially explosive atmospheres as per ATEX Directive 94/9/EC.

1.2 Authorized personnel

The products described in the assembly manual may only be installed, operated, maintained, and repaired by qualified experts. Qualified experts are persons who have been trained, instructed, and familiarized with the end product into which the described product is installed.

These persons are considered capable of such tasks due to their education, training, and experience with valid standards, conditions, accident prevention regulations, and assembly measures. They are entitled to carry out the required tasks and to recognize - and thus avoid - any dangers that might otherwise occur.

A definition of what constitutes a qualified person and information on the prohibition on allowing work to be carried out by unqualified personnel are stipulated in DIN VDE 0105 and IEC 364.

1.3 Danger relating to electric current

The electrical connection for the described product may only be established by qualified, instructed persons who have been authorized to carry out the task at hand by the operator. All local electrical operating conditions and regulations such as DIN and VDE must be observed. Improperly connected products can result in considerable damage to property and injury to persons.

Working on products which have not been disconnected from the power supply can cause injury to persons. Assembly, maintenance, and repair work may only be carried out by qualified experts on products that have been disconnected from the power supply. The supply voltage must be turned off before any product components are opened.

1.4 Danger relating to hydraulic pressure

The described product is under pressure when it is being operated. It must therefore be depressurized before assembly, maintenance, or repair work begins and before any changes to the system are made.

2. Conveyed media

- Emulsions
- Cooling and cutting oils
- Cleaning liquids
- Water
- Mild acids

The following **limit values** must be observed if using contaminated or high-viscosity fluids:

Grain size: Max. ø of 2 mm for PSR 02/04

Dirt content: Max. 50 g/m^3 for PSR 02/04

Kinematic viscosity: Max. 20 mm^2/s
In the case of densities or viscosities that differ from those of water, the motor power must be checked.

Temperature range: -10°C to +80°C

3. Assemblies and type designation

PSR immersion pumps are available in various sizes. The different models vary in their dimensions and delivery rate. They work in the same way regardless of the size.

For the size and designation of your pump along with other important characteristics, see the rating plate.

Series	PSR	To 25 bar
Size	02 04 06	2 m³/h 4 m³/h 6 m³/h
No. of stages	02 - 30	No. of active stages
Material type	G C T	Cast iron (standard) GG with chemical surface sealing GG coated with paint
Seal type	B G	Sealing bushing Face seal
Pump type	S V C	Standard design Prepared for extension pipe Intake strainer
Immersion depth	137 to 739	Pump immersion depth in mm

Table 1. Type legend

Example designation	PSR	04	02	G	B	S	185	D	01	BA

Series
Size
No. of stages
Material
Seal type
Pump type
Immersion depth
Motor size index[1)]
Power supply[1)]
Motor type[1)]

[1)] For the motor data, see the motor rating plate.

4. Composition and function

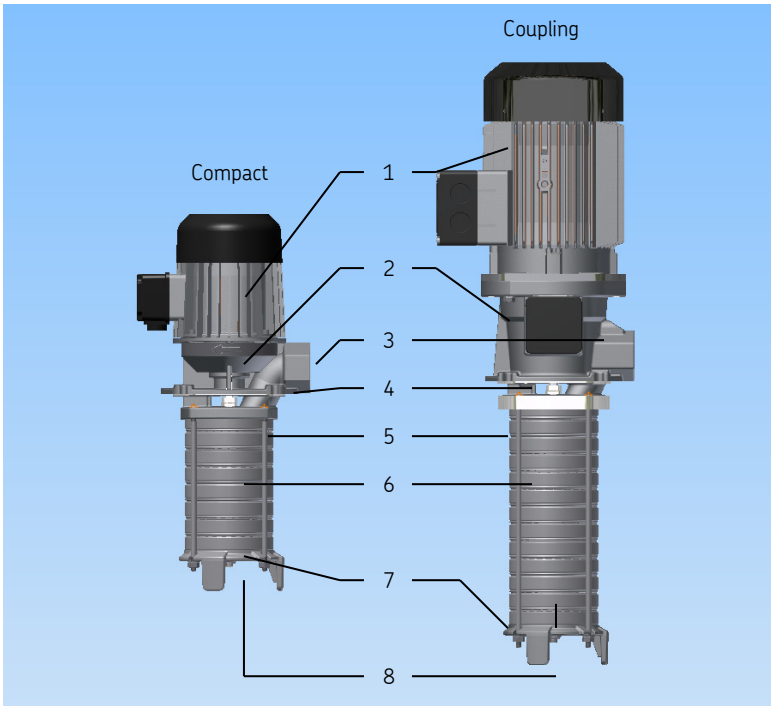


Fig. 1. Composition of PSR pump
1 Drive
2 Pump port
3 Pressure port
4 Connecting flange
5 Tie rod
6 Pump stage
7 Pump bottom
8 Suction opening

Fig. 1 shows the principles of the composition of the PSR pump.

These pumps are used in suction mode. They are designed to be installed in a vertical position.

The electric drive (1) sits on the pump port (3) to which the individual pump stages (6) are attached using tie rods (5).

The pump port contains the bearing for the pump shaft and seal. The pressure port (4) and connecting flange (3) for assembly on a tank are also located on the pump port.

A variable number of pump stages conveys the medium in the vicinity of the bottom of the pump (7) through the suction opening (8).

5. Assembly instructions

The products described in the assembly manual may only be installed, operated, maintained, and repaired by qualified experts. Qualified experts are persons who have been trained, instructed, and familiarized with the end product into which the described product is installed. These persons are considered capable of such tasks due to their education, training, and experience with valid standards, conditions, accident prevention regulations, and operating conditions. They are entitled to carry out the required tasks and to recognize - and thus avoid - any dangers that might otherwise occur.

A definition of what constitutes a qualified person and information on the prohibition on allowing work to be carried out by unqualified personnel are stipulated in DIN VDE 0105 and IEC 364.

Before assembling/positioning the product, remove the packaging material and any transportation safety devices (e.g. sealing plugs on suction/pressure connections). Keep the packaging material until you are sure that there are no delivery discrepancies that need to be clarified.

The product must not be tipped up or dropped.

Regional accident prevention regulations and the operating and maintenance instructions of the operator must be observed when carrying out all assembly work on machines.

5.1 Positioning

PSR immersion pumps are designed to be installed in a vertical position in a tank. If you need a pump with a different position, please contact your pump supplier.

Before installing the pump, remove the packaging material and transportation devices (e.g. sealing plugs on suction/pressure connections).

The pump must only be transported in the proper manner using the transport lugs.

If an intake pipe is included in the scope of delivery, it will be delivered loose. Prior to the mounting of the pump, it must be screwed into the suction housing in a leak-tight manner by means of a conical thread.

The sealing material must be selected in accordance with the usage conditions and temperatures. When the intake pipe is inserted, the sealing material may not be allowed to reach the inside of the pump or pipe.

The pump has a 4-hole connecting flange with standard connection dimensions (see the technical data) so that it can be mounted to the tank housing.

When choosing the installation location, make sure that there is sufficient space to carry out installation, cabling, and inspection work and for ventilation. The distance between the air inlet on the motor and the walls, components, and so on must be at least $\frac{1}{4}$ of the diameter of the air inlet opening. The direction of air flow is from the air inlet opening to the pump.

Design:
With empty intermediate chambers With extension pipe

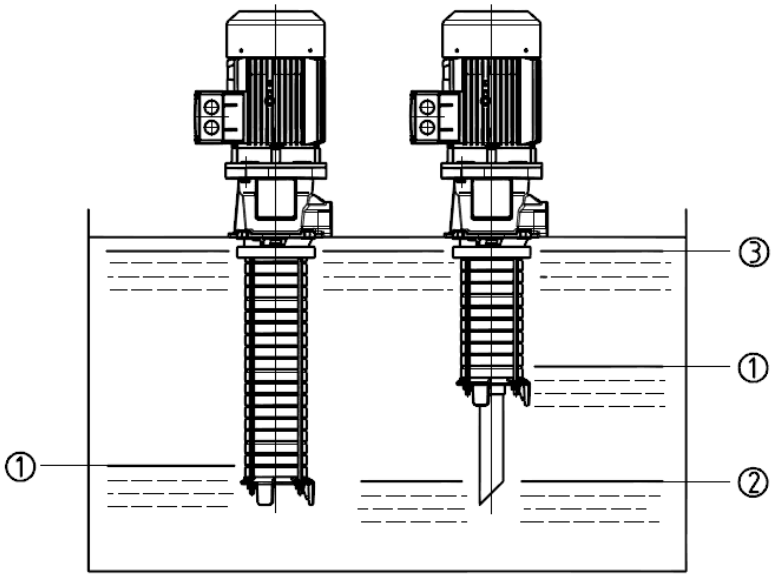


Fig. 2 - Maximum and minimum permitted fluid levels

The maximum and minimum permitted fluid levels (see Fig. 2) must be taken into account when the pump is installed.

When the pump is switched on, the fluid level must be above the bottom pump chamber①. The pump then conveys the fluid to the suction opening in the chamber or pipe ②. The maximum permitted fluid level is 30 mm below the reservoir lid ③.

The product should be mounted in a way that protects it from humidity and vibrations. It should also be easily accessible so that all other installation work can be carried out without problems. Make sure that there is a sufficient amount of circulating air to prevent the excessive heating of the product. For information on the maximum permitted ambient temperature, see the technical data.

The product must be installed vertically in accordance with the specifications of the customer documentation.

If no customer documentation is available, a customer drawing can be requested directly from SKF Lubrication Systems Germany GmbH.

5.2 Connection dimensions

The flange and connection dimensions comply with DIN EN 12157 (for further information, see the technical data).

5.3 Laying the pipes

When laying the pipes, note the following information in order to ensure that the conveying circuit works without problems:

- All piping parts such as pipes, shut-off devices, valves and so on which come into contact with the medium must be cleaned carefully. No seals may protrude inwards into the pipes. Otherwise, impurities might reach the pump and damage or destroy it.
- Only use pipes or hoses which are suitable for the operating pressure of the pump, the prevailing temperatures, and the media to be conveyed.
- The lines must be connected up so that no forces can be transmitted to the pump (no-tension connection).
- The flow of the medium in the lines should not be impeded through the incorporation of sharp bends, corner valves, or check valves. Unavoidable cross section changes in conveying lines must have smooth transitions. Sudden changes of direction are to be avoided.
- The lines must be leak-tight and laid in a way that prevents the formation of air pockets in any place.
- The pipelines must always be laid with an upwards gradient. Pressure lines should enable deaeration at the highest point.
- The cross section of the pressure line should be at least as large as the cross section of the pressure connection port.

5.4 Connection of pipelines

The pipelines are connected to the provided connection port on the pressure housing of the pump. Make sure that no forces are transmitted to the pump.

The pipeline is to be connected up by means of a cylindrical thread, sealed flat to the end face. If tapered threads are used, a suitable sealing material must be selected.

The screw-in torque must not exceed 70 Nm, since otherwise there is a danger that the pump port might be forced off or snap.

5.5 Screwing the pump onto the reservoir

Once the pressure line has been installed, the pump can be screwed onto the reservoir with a maximum torque of 15 Nm.

5.6 Electrical connection

The pump may only be electrically connected up by an appropriately qualified and instructed expert. The information in this operating manual must be observed.

The pump motor must be connected up in accordance with the specifications on the rating plate and the available mains voltage.

The connection itself must comply with all valid VDE directives (such as VDE 0100, VDE 0101, and VDE 0165) and with the connection requirements of the responsible power supply company.

The cables and lines must be secured in the junction box by means of a cable gland with strain relief.

The circuit must comply with the circuit diagram in the motor junction box.

In the case of a pump which has been left stored without being used for a relatively long period of time in a damp room, we recommend that you measure the insulation resistance of the winding to the housing prior to commissioning.

The minimum value for a winding temperature of around 20°C is 1 kΩ per volt of rated voltage for low-voltage motors. If the resistance is lower than this, the motor must be dried out in a warm room or using a heating device until the required insulation value is reached.

5.7 Rotational direction

The rotational direction of the motor must match the direction of the arrow on the pump. To check the rotational direction, open the valves in the pressure and suction lines and switch the motor on for around 1 second.

An incorrect rotational direction can cause damage to the pump.

Product name

Centrifugal pump

Product range: PSR...

Operating manual

6. Transport, delivery, and storage

Products from SKF Lubrication Systems Germany GmbH are packaged as is usual in the trade in accordance with the conditions of the recipient country and in accordance with DIN ISO 9001. Our products must be transported with care. Products must be protected against mechanical influences such as impacts. Transport packaging must be labelled with the information 'Do not drop!'.

The product must not be tipped up or dropped.

There are no restrictions relating to land, air, or sea transportation.

Following receipt of the shipment, the product or products must be checked for damage and the shipping documents should be used to make sure that the delivery is complete. Keep the packaging material until you are sure that there are no delivery discrepancies that need to be clarified.

The following conditions apply to the storage of products from SKF Lubrication Systems Germany GmbH:

6.1 Pump units

- The pump must only be transported in the proper manner using the transport lugs.
- It must be stored in a dry, dust-free, low-vibration ($v_{eff} \leq 0.2$ mm/s) environment.
- In the case of a relatively long period of storage, the bearing grease service life decreases.
- In the case of storage lasting more than 12 months, the state of the grease must be checked prior to recommissioning. In addition, the insulation resistance of the motor winding to the housing must be measured. In the case of values of ≤ 1 kΩ per volt of rated voltage, the motor winding must be dried out.

6.2 Electronic and electrical devices

- Ambient conditions: Dry, dust-free environment; storage in well-ventilated, dry area
- Storage time: 24 months max.
- Permitted air humidity: < 65%
- Warehouse temperature: 10 - 40°C
- Light: Direct sunlight/UV radiation must be avoided; nearby sources of heat must be screened.

6.3 General information

- Ensure that no dust gets into stored products by wrapping them in plastic film.
- Store products on racks or pallets to protect them from rising damp.
- Before placing products into storage, protect uncoated metal surfaces - and drive parts and mount surfaces in particular - from corrosion using long-term corrosion protection.
- At 6-monthly intervals: Check products for corrosion. If signs of corrosion are found, improve the corrosion protection measures.
- Drives must be protected against mechanical damage.

7. Commissioning and operations

All connections must be checked before the pump is placed into operation. You must make sure that the suction and pressure side of the pump is open.

The pump must run easily and smoothly. To inspect it, remove the fan guard and turn the pump shaft a few turns by hand on the fan wheel. Then mount the fan guard again.

When you start the pump up, check the rotational direction. It must match the direction of the arrow on the pressure housing.

The reservoir must be filled with fluid up to the level specified in "Positioning".

The pump must not be allowed to run dry. The pump can be damaged if the rotational direction is incorrect or if the pump is allowed to run dry.

You must also make sure that there is no dirt in the reservoir or pipeline system and that the upstream filters are working properly.

PSR

Place the pump into operation as follows:

- If there is a shut-off valve on the pressure side, open it completely. Otherwise, make sure that the pressure-side connection is clear.
- Switch the pump on and check the rotational direction. It must match the direction of the arrow on the motor fan guard.
- Let the pump run until a stable delivery state is achieved, i.e. when there are no more air bubbles in the conveyed medium.
- You can now set the required delivery rate using the shut-off valve on the pressure side.

These pumps should be used in continuous operation wherever possible. If this is not possible for technical reasons relating to the process at hand, the constant delivery rate of the pump can be controlled by means of a control valve, for example.

If the pump is operated in intermittent mode with short intervals, please ask your supplier for advice.

8. Shutdown

The pump may only be used within the prescribed delivery range. See the pump's rating plate for the relevant key data.

The fluid level can drop down to the suction opening if the pump is operated without interruption. You must ensure that the fluid level does not drop further whilst the pump is being operated. Otherwise, it could run dry.

Whilst the pump is at a standstill, the fluid level must not be allowed to drop below the minimum level specified in the "Positioning" section of the "Assembly instructions" chapter. If the fluid level is lower than the permitted minimum when the pump is started up, there is a risk of it running dry.

The pump must not be allowed to run dry, since this could damage it.

8.1 Temporary shutdown

You temporarily shut down the described product by disconnecting the electrical and hydraulic supply connections. For more information, see "General information" in this assembly manual.

If you wish to shut down the product for a longer period of time, refer also to the instructions in the section "Transport, delivery, and storage" of this assembly manual.

When placing the product back into operation, pay attention to the information in "Assembly instructions" and "Commissioning and operations" in this assembly manual.

8.2 Definitive shutdown

All regional legal guidelines and legislation on the disposal of contaminated equipment must be observed when shutting down the product for the final time.

Lubricants can contaminate the ground and watercourses. Lubricants must be used and disposed of properly. Regional regulations and laws on the disposal of lubricants must be observed.

In exchange for the incurred costs, SKF Lubrication Systems Germany can take back the product and arrange for its disposal.

9. Maintenance

9.1 General information

Working on products which have not been disconnected from the power supply can result in injuries. Assembly, maintenance, and repair work may only be carried out by qualified experts on a product which has been disconnected from the power supply. The supply voltage must be disconnected before any product components are opened.

The described product is under pressure when it is being operated. It must therefore be depressurized before assembly, maintenance, or repair work begins and before any changes to the system are made.

PSR immersion pumps are mostly maintenance-free. To ensure that your pump works properly, you should check it regularly for external damage and leaks.

Conveyed media, preliminary filters, and screen baskets should be regularly checked for dirt and cleaned/replaced as necessary.

Make sure that there are no foreign bodies, dust, or similar in the housing of the pump motor in order to ensure good heat exchange between the motor and ambient air and to make sure that surface cooling is not restricted.

The cables and lines must be checked for damage and to make sure that the electrical connections are secure on a regular basis.

Any defects must be rectified professionally before the pump is placed back into operation.

You must not dismantle the product or parts thereof during the statutory guarantee period. Doing so invalidates all guarantee claims.

Only original parts from SKF Lubrication Systems Germany GmbH may be used. You must not carry out alterations to the product or use non-original spare parts or resources. Doing so invalidates the statutory guarantee.

SKF Lubrication Systems Germany GmbH is not liable for damage caused by improper assembly, maintenance, or repair work.

9.2 Dismantling and reassembling the PSR

You may need to replace the shaft sealing of the pump. If so, you need to dismantle and then reassemble it.

When dismantling and reassembling the pump, handle all parts with the utmost care. Do not bang or jolt the parts.

All parts must be cleaned thoroughly. If necessary, they must be renovated or replaced with spare parts.

You must not carry out alterations to the product or use non-original spare parts or resources. Doing so invalidates the statutory guarantee.

Work should always take place in accordance with Fig. 3. All PSR immersion pumps share a structure which is more or less the same, so Fig. 3 can be used for all types.

9.2.1 Dismantling the pump

First, shut off the pressure line of the pump and disconnect it from the pump.

Then unscrew the pump from the reservoir lid and pull it upwards out of the reservoir along with the pump port and motor.

Undoing the clamp coupling
The clamp coupling (2) ensures a force fit between the drive (electric motor) and the hydraulics (hydraulic shaft, 4).
Remove the square plastic caps in the centre of the pump port (they are only pushed on). You can now reach the coupling (2). You should be able to turn it slightly. Undo the cylinder head screw (3) on the hydraulics side. The hydraulics are then separated from the drive.

Removing the hydraulics unit
Undo the spray ring (5). This is a hat-shaped, stainless steel ring between the base and the coupling chamber of the pump port. Before you can remove the hydraulics unit (the entire pump stage section), you must remove the tie rods (9). Make sure that you release the tension evenly. First, radially secure the tie rods with a clip. You can now remove the hydraulics unit including the shaft.

Replacing the seal
In the case of pumps with a sealing bushing (Fig. 3-A), the sealing bushing itself (7) and the O-ring (6) are replaced. When you insert the new O-ring, make sure that it sits neatly in the groove.

In the case of pumps with a face seal (Fig. 3-B), the slide ring (7.1) and counter-ring (6.1) must be replaced. It may be necessary to lever out the counter-ring with a suitable tool. When handling the parts, do not touch the sliding surfaces with your hands or get any grease on them.

9.2.2 Assembling the pump

All parts must be cleaned before you assemble the pump. Pay attention to the prescribed tightening torques (see Table 2, p. 22).

Mounting the hydraulics unit
The hydraulics unit - including the shaft - is mounted again once the seal has been replaced. The bottom of the pump is then mounted and the tie rods are attached. These are then tightened diagonally with the specified torque.

Setting the running gap

The running gap must be set correctly; otherwise, the pump can be damaged.

With your hands or visually, check that the edge of the bottom running wheel is at the same height as the edge of the bottom chamber opening. If necessary, correct the position of the shaft.

The running gap is set correctly if no difference can be felt/seen between the edge of the bottom running wheel and the edge of the bottom chamber opening.

Tightening the clamp coupling

Once the running gap has been set correctly, you can attach the shaft to the clamp coupling again. To do so, tighten the cylinder head screw.

You must make sure that the clamping surfaces on the shaft and coupling are grease-free and clean.

Mounting the pump

Following the repair work, mount the pump as described in "Assembly instructions" (page 12).

Table 2. Assembly torques

Part	Wrench/Allen key	Torque in Nm
Cylinder head screw (3)	⬡ 5	18.0
Pump shaft (4)	A/F 17	20.0
Tie rod (9)	A/F 13	12.0

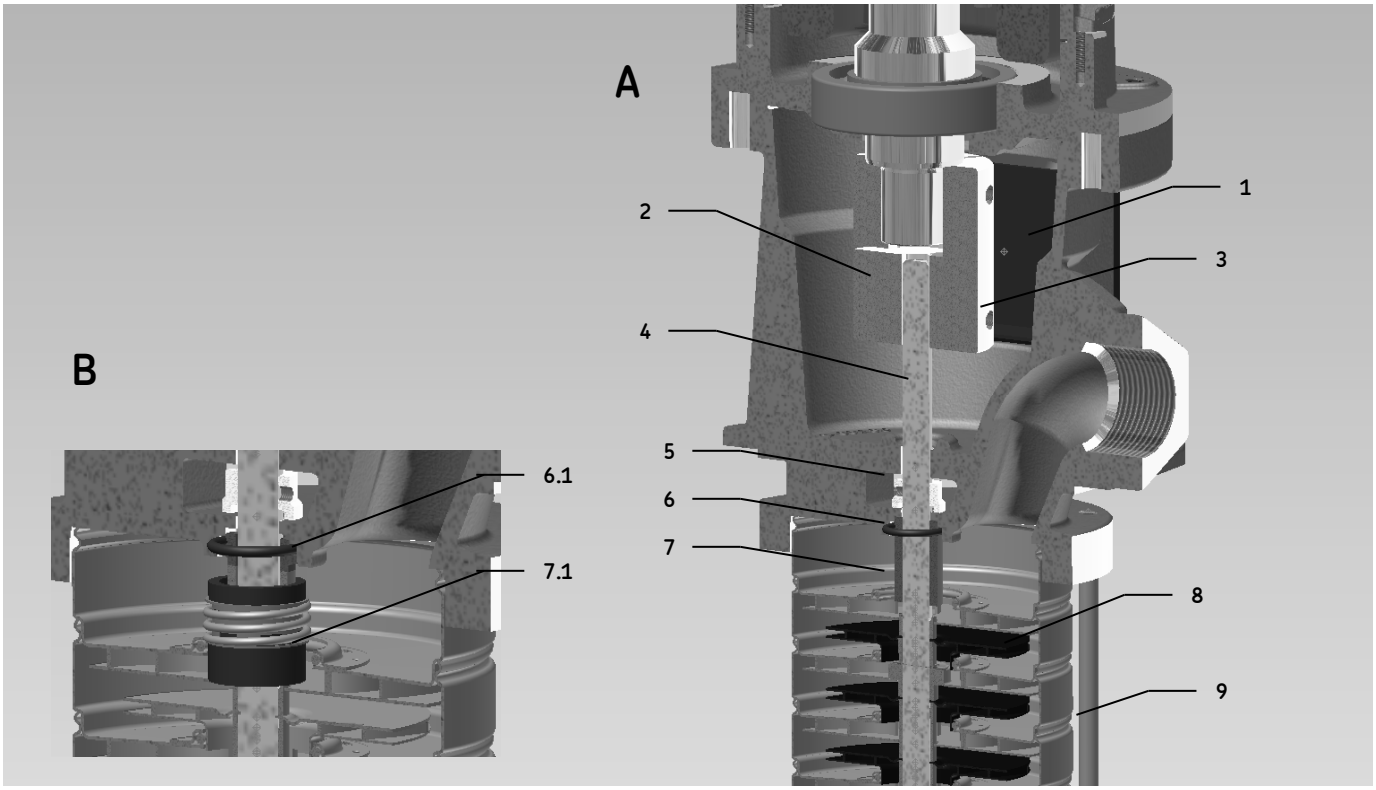


Fig. 3 - Cross section of PSR coupling pump

1	Plastic cap	4	Pump shaft	6.1	Counter-ring	8	Running wheel
2	Clamp coupling	5	Spray ring	7	Sealing bushing	9	Tie rod
3	Cylinder hear screw	6	O-ring	7.1	Slide ring		

10. Faults

You must not dismantle the motor or pump functional assemblies within the statutory guarantee period. Doing so invalidates all guarantee claims.

Only original parts from SKF Lubrication Systems Germany GmbH may be used. It is prohibited for the operator to make alterations to the product or to use non-original spare parts and resources.

All work on the system (e.g. repair work, the replacement of parts etc.) may only be carried out by qualified and trained experts.

Repair work may only be carried out by qualified experts once all assemblies have been disconnected from the power supply. Working on equipment which has not been disconnected from the power supply can cause injuries.

The conveying system may be under pressure. For this reason, you must depressurize it before starting installation, repair, or maintenance work.

Table 4 gives an overview of possible malfunctions and their causes. If you are unable to rectify the malfunction, please contact SKF Lubrication Systems Germany GmbH.

Table 3 - Fault analysis and troubleshooting

Problem	Possible cause	Rectification
Pump fails to start	Power connection malfunction	Check the power connection
	Blown fuse	Check fuse protection or the motor circuit breaker
	Motor circuit breaker triggered	Ensure that: • The pump shaft can be turned easily and smoothly • The rating plate values match the mains values • The winding resistance to the housing is at least 2 mohm Then enable the motor circuit breaker again.
	Temperature limit for the PTC thermistor exceeded	Ensure that: • Surface cooling is not impeded • The ambient temperature is below the maximum permitted value • The pump is not overloaded [1)] Then enable the motor circuit breaker again.
	Switching contact or motor coils are defective	Replace any defective parts.
Motor circuit breaker triggers immediately when you switch the system on	Fuse is blown: A phase is missing	Check the connection of the terminal board. Check the fuse and replace if required.
	Motor circuit breaker defective	Replace the motor circuit breaker.
	Cable connection is loose or defective	Secure the cable connections or replace the cable.
	Motor winding is defective	Replace the motor.
Motor circuit breaker triggers immediately when you switch the system on	Motor circuit breaker is set too low	Set the motor circuit breaker to the predefined value indicated on the rating plate and make sure that the pump is not overloaded. [1)]
	Motor shaft jammed	Remove the blockage. Make sure that the pump shaft can be turned easily and smoothly.
	Pump is overloaded [1)]	Check the pump and voltage parameters.

Table 3 cont. - Fault analysis and troubleshooting

Problem	Possible cause	Rectification
Motor circuit breaker triggers at times	Motor circuit breaker is set too low	Set the motor circuit breaker to the predefined value indicated on the rating plate and make sure that the pump is not overloaded. [1)]
	Electricity supply is not constant	Check the connection of the terminal board. Check the fuse and replace if required.
	Mains voltage is too low at times	Make sure that the values on the rating plate match the mains values. Use a mains supply with a constant voltage.
Pump output is not stable	Suction opening is partially clogged	Check the suction opening and clean if required.
	Pump is sucking in air	Check the fill level of the pump and adjust if necessary.
	Incorrect installation	See "Assembly instructions".
Pump is running but not conveying medium	Suction opening blocked	Check the suction opening and clean it if necessary. The medium may be heavily contaminated. Replace it.
	Extension pipe not leak-tight	Check the extension pipe and rectify any leaks
	Pump has no conveyed medium	Check the fill level and adjust if necessary.
	Air pocket in the pump	Bleed the pump.
	Incorrect rotational direction	Change the rotational direction in accordance with the circuit diagram.
	Shut-off valve closed	Open the shut-off valve.
Noise, vibrations, or leaks	Pump is sucking in air	Check the fill level of the pump and adjust if necessary.
	Feed height too low	Increase the fluid level or feed height.
	Shaft bearing defective	Replace the shaft bearing.

[1)] Factors which may cause pump overload include the following: The viscosity and temperature of the medium to be conveyed, flow rate, flow height, ambient temperature, and degree of contamination.

Table 3 continued - Fault analysis and rectification

Problem	Possible cause	Rectification
Noise, vibrations, or leaks	Shaft seal defective	Replace the shaft seal.
	Axial clearance of pump misaligned	Adjust the axial clearance.
	Pump not mounted securely	Secure the connecting flange.
Pump shaft hard to turn	Pump blocked	Check the suction opening and clean if required.
	Running wheel chafing	Make sure that the running wheel is properly secured and that the pump shaft is not bent or off-centre.
	Shaft bearing defective	Replace the shaft bearing.

Working on products which have not been disconnected from the power supply can cause injury to persons. Assembly, maintenance, and repair work may only be carried out by qualified experts on a product that is not connected to a power supply. The supply voltage must be turned off before any product components are opened.

The hot surfaces of a motor can cause burns. The surfaces of motors should only be touched by persons wearing appropriate protective gloves or once the motor has been stopped for a long period time.

Conveying systems are under pressure when they are being operated. They must therefore be depressurized before assembly, maintenance or repair works begin and before any changes to the system are made.

11. Technical data

11.1 Design features:

Type and location of shaft seal

- Shaft seal to 15 bar with low-wear sealing bushing; from 16 bar with face seal
- Flange and connection dimensions as per DIN EN 12157

Connection between motor and pump shaft

PSR coupling

- Delivery heights of up to 245 m (24.5 bar)
- Separation of pump and motor shaft by means of coupling
- Use of clamp coupling
- Suspension of shaft in pump section
- Quality motors

PSR compact

- Delivery heights of up to 110m (11 bar)
- Compact motor and pump shaft connection
- Compact version with small motor dimensions

11.2 Mechanical design

Part	Material	Option
Flange	EN-GJL-200	With chemical surface sealing or coated with paint
Shaft	Stainless steel 1.4057	
Gap bush	POM	
Mechanical seal	Wo C, carbon, FKM stainless steel 1.4571	
Impeller	Stainless steel 1.4305	
Intermediate chamber	Stainless steel 1.4301	
Tension anchor	Stainless steel 1.4057	
Bushing	Stainless steel 1.4301	
Pump bottom	Stainless steel 1.4308	
Elastomers	FPM	
Accessories	**Material**	
Intake strainer	Stainless steel 1.4301	
Base for extension pipe	Stainless steel 1.4301	
Extension pipe	Steel Plastic	

11.3 Electrical design

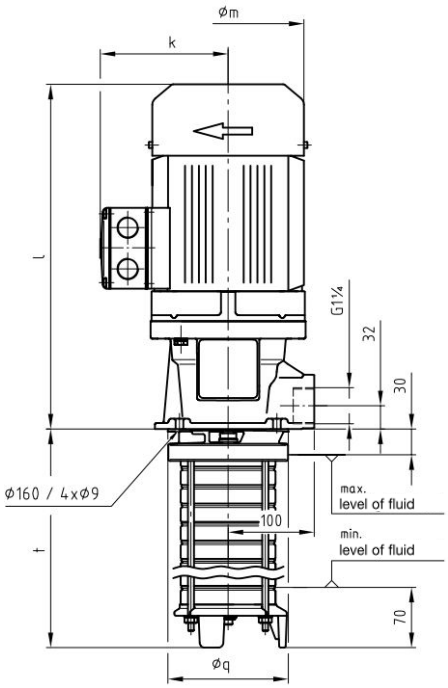
The drive motors comply with VDE directives and European motor standards (DIN EN 60034-1) as well as with the requirements of the CE mark.

Designs which comply with other regulations such as **CSA or UL** or the requirements of specific markets such as the US or Japan are also possible.

Protection class (DIN EN 60034-5)	IP55
Rotational direction	To the right (clockwise) when viewed from above on the ventilation side of the motor
Insulation class	F
Ambient temperature (DIN EN 60034-1)	Max. 40°C at max. 1000 m above sea level
Power supply (standard)	≤ 4 kW 230/400 V, 50 Hz and 265/460 V, 60 Hz >(6 kW one part) Δ 400 V, 50 Hz and Δ 460 V, 60 Hz

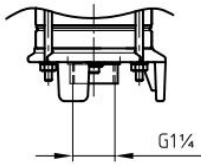
11.4 Dimensions

PSR

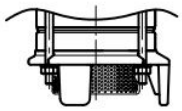


Additional equipment

For extension pipe



For intake strainer



k	114 mm to 182 mm
l	223 mm to 530 mm
øm	176 mm to 257 mm
t	137 mm to 747 mm
øq	140 mm
Weight	13.1 kg to 52.8 kg

12. Notes

Order number: 951-170-031

We reserve the right to make changes!

All SKF Lubrication Systems Germany GmbH products may only be used as intended and as described in this assembly manual and corresponding operating manual. If assembly/operating instructions are delivered with your products, read them carefully and follow them.

Pump units which are marketed by SKF Lubrication Systems Germany GmbH are not approved for use in conjunction with gases, liquefied gases, gases dissolved under pressure, vapours, and fluids with a vapour pressure of more than 0.5 bar above normal atmospheric pressure (1013 mbar) at the maximum permitted temperature.
Note that hazardous substances of any kind and - in particular - the substances that are classed as hazardous in accordance with EC Directive 67/548/EC Article 2, Paragraph 2 may only be inserted into and conveyed/distributed by central lubrication units and components following consultation with SKF Lubrication Systems Germany GmbH and with the express written permission of the company.

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