

Single-piston pump with reservoir for use in centralized lubrication systems

Product series:

POE..., POEP...,
PFE..., PFEP..

Owner's Manual - Containing Installation,
Operation and Maintenance Instructions
(Original installation instructions in accordance with EC-
Machinery Directive 2006/42/EC)

Version 07



WARNING:

Read this owner's manual before installing, operating or maintaining the product. Failure to follow the instructions and safety precautions in this owner's manual could result in serious injury, death, or property damage. Keep for future reference.



Masthead

This owner's manual - containing installation, operation and maintenance instructions complies with EC-Machinery Directive 2006/42/EC and is an integral part of the described product. It must be kept for future use.

This owner's manual - containing installation, operation and maintenance instructions was created in accordance with the valid standards and regulations on documentation, VDI 4500 and EN 292.

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Table of contents

Owner's Manual - Containing Installation, Operation and Maintenance Instructions

(Original installation instructions in accordance with EC-Machinery Directive 2006/42/EC)

Masthead	2	3.3.2. Connected load.....	11	7. Operation	23
Service	2	3.3.3. Fill level monitoring.....	13	7.1. General notes.....	23
Table of contents	3	4. Assembly instructions	14	8. Shutdown	24
Information concerning EC Declaration of Incorporation	4	4.1. General information.....	14	8.1. Temporary shutdown.....	24
General information	5	4.2. Setup and attachment.....	14	8.2. Permanent shutdown.....	24
Explanation of safety and informational symbols and safety signal words.....	5	4.3. Connection dimensions.....	15	9. Maintenance	25
1. Safety instructions	6	4.4. Electrical connection (single-piston pumps with fill level monitoring).....	15	10. Faults	26
1.1. Intended use.....	6	4.4.1. Inductive loads.....	15	11. Technical data	27
1.2. Authorized personnel.....	6	4.4.2. Float switch (single-piston pump for oil supply).....	15		
1.3. Electric shock hazard.....	7	4.4.3. Capacitive fill level switch (single-piston pump for fluid grease supply).....	16		
1.4. System pressure hazard.....	7	4.5. Compressed air connection (pneumatically operated single-piston pumps).....	17		
1.5. Compressed air hazard.....	7	4.6. Lubrication line connection.....	17		
1.6. Spring-loaded component hazard.....	7	4.7. Lubrication line arrangement.....	18		
1.7. Warranty and liability.....	7	5. Transport, delivery, and storage	19		
2. Lubricants	8	5.1. Transport.....	19		
2.1. General information.....	8	5.2. Delivery.....	19		
2.2. Selection of lubricants.....	8	5.3. Storage.....	19		
2.3. Approved lubricants.....	9	5.3.1. Storage of lubrication units.....	19		
2.4. Lubricants and the environment.....	9	5.3.2. Storage of electronic and electrical devices.....	19		
2.5. Lubricant hazards.....	9	5.3.3. Storage - general information.....	19		
3. Design and function	10	6. Commissioning	20		
3.1. Model designs.....	10	6.1.1. Lubricant filling.....	20		
3.2. Design.....	11	6.1.2. Calibrating the capacitive fill level switch (single-piston pumps for fluid grease supply with fill level monitoring).....	20		
3.3. Function.....	11	6.1.3. Venting the centralized lubrication system.....	22		
3.3.1. Mode of operation.....	11				

Information concerning EC Declaration of Incorporation

The product

Single-piston pump with reservoir

Product line:

POE..., POEP..

PFE..., PFEP..

is hereby confirmed to comply with the essential protection requirements stipulated by the following Directive(s) of the Council on the approximation of laws of the Member States:

- **Machinery Directive 2006/42/EC**
- **Electromagnetic compatibility 2014/30/EU**
- **RoHS Directive 2011/65/EU**

SKF further declares that the above mentioned product is meant for integration into a machinery / for connection to other machinery according to the **EC-Machinery Directive 2006/42/EC, Appendix II Part B**. Starting up the product is not permissible until it is assured that the machinery, vehicle or the like in which the product was installed meets the provisions and requirements of the regulations set forth in the EC Directive 2006/42/EC.

Notes:

- (a) This declaration certifies conformity with the aforementioned directive(s), but does not contain any assurance of properties.
- (b) The safety instructions in the owner's manual must be observed.
- (c) The certified product must not be started up until it is confirmed that the equipment, machinery, vehicle or the like in which the product was installed meets the provisions and requirements of the national directives to be applied. This is in particular important for the implementation of the Use of Work Directive.
- (d) Operation of the products on non-standard main voltage as well as nonobservance of installation instructions can affect the EMC properties and electrical safety.

Notes on the Low Voltage Directive 2014/35/EU

The protective regulations of the Low Voltage Directive 2014/35/EU are fulfilled according to annex I (1.5.1) of Machinery Directive 2006/42/EC.

Notes on the Pressure Equipment Directive 2014/68/EU

Due to its performance characteristics, the product does not reach the limit values defined in Article 4, Paragraph 1, Subparagraph (a) item (i) and is, pursuant to Article 4, Paragraph 3, excluded from the scope of Pressure Equipment Directive 2014/68/EU.

The EC Declaration of Incorporation is part of the product documentation. This document is delivered with the product.

General information

Explanation of safety and informational symbols and safety signal words

You will find these symbols, which warn of specific dangers to persons, material assets, or the environment, next to all safety instructions in this owner's manual.

Please heed these instructions and proceed with special care in such cases. Please pass all safety instructions to other users.

Instructions attached directly to the equipment, such as rotational direction arrows and fluid connection labels, must be followed. Replace such signs if they become illegible.

- Rotational direction arrow
- Fluid connection label



You are responsible!

Please read the owner's manual thoroughly and follow the safety instructions.

Note

Not every symbol and corresponding information described in the Safety Information is necessarily used in these instructions.

Table 1. Hazard symbols







Symbol	Standard	Meaning
	DIN 4844-2 W000	General hazard
	DIN 4844-2 W008	Voltage
	DIN 4844-2 W026	Hot surface
	DIN 4844-2 W028	Slip hazard

Table 2. Safety signal words and their meaning

Signal word	Meaning
Danger!	Danger of bodily injury
Warning!	Danger of damage to property or the environment
Note	Additional information

Table 3. Informational symbols

Symbol	Meaning
	Note
•	Prompts an action
○	Used for itemizing
➔	Refers to other facts, causes or consequences
	Provides additional information

1. Safety instructions



The operator of the described product must ensure that the owner's manual is read and understood by all persons tasked with the assembly, operation, maintenance, and repair of the product. The owner's manual must be kept readily available.



Note that the owner's manual form part of the product and must accompany the product if sold to a new owner.

The described product is manufactured in accordance with the generally accepted rules and standards of industry practice and with occupational safety and accident prevention regulations. Risks may, however, arise from its usage and may result in physical harm to persons or damage to other material assets. Therefore the product may only be used in proper technical condition and in observance of the owner's manual. In particular, any malfunctions which may affect safety must be remedied immediately.



In addition to the owner's manual, statutory regulations and other general regulations for accident prevention and environmental protection must be observed and applied.

1.1. Intended use



All products from SKF Lubrication Systems Germany GmbH may be used only for their intended purpose and in accordance with the information in the product's owner's manual.

The described product is for supplying centralized lubrication systems with lubricant and is intended for use in centralized lubrication systems. Any other use of this product constitutes improper use.

Hazardous materials of any kind, especially the materials classified as hazardous by CLP Regulation EC 1272/2008 may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

None of the products manufactured by SKF Lubrication Systems Germany GmbH can be used with gases, liquefied gases, gases dissolved under pressure, steams or fluids that will reach a steam pressure of more than 0.5 bar above the normal atmospheric pressure (1013 mbar) in the permissible application temperature range.

Unless specially indicated otherwise, products from SKF Lubrication Systems Germany GmbH are not approved for use in potentially explosive areas as defined in the ATEX Directive 94/9/EC.

1.2. Authorized personnel

The products described in the installation instructions 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 installation measures. They should be able 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 who are unqualified persons are stipulated in DIN VDE 0105 and IEC 364.

1.3. Electric shock hazard

Electrical connections for the described product may only be established by qualified and trained personnel authorized to do so by the operator, and in observance of the local conditions for connections and local regulations (e.g., DIN, VDE). Serious injury or death and property damage may result from improperly connected products.



Danger!

Performing work on an energized pump or product may result in serious injury or death.

Assembly, maintenance, and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.

1.4. System pressure hazard



Danger!

Centralized lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

1.5. Compressed air hazard



Danger!

The described product is pressurized during operation. The product must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

Depending on the model design, the product may be able to be operated with compressed air.

1.6. Spring-loaded component hazard



Danger!

In the model design for manual operation, the described product contains an operating lever that is under spring preload. It is important to note that the operating lever is returned by spring force to its normal position after actuation. This presents a crushing hazard for the operator.

Depending on the model design, the product may be able to be operated manually.

1.7. Warranty and liability

SKF Lubrication Systems Germany GmbH assumes no warranty or liability for the following:

- Non-compliant usage
- Improper assembly/disassembly or improper operation
- Use of unsuitable or contaminated lubricants
- Maintenance and repair work performed improperly or not performed at all
- Use of non-original SKF spare parts
- Alterations or modifications performed without written approval from SKF Lubrication Systems Germany GmbH
- Non-compliance with the instructions for transport and storage

2. Lubricants

2.1. General information



All products from SKF Lubrication Systems Germany GmbH may be used only for their intended purpose and in accordance with the information in the product's owner's manual.

Intended use is the use of the products for the purpose of providing centralized lubrication/ lubrication of bearings and friction points using lubricants within the physical usage limits which can be found in the documentation for the device, e.g. owner's manual/operating instructions and the product descriptions, e.g. technical drawings and catalogs.

Particular attention is called to the fact that hazardous materials of any kind, especially those materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Para. 2, may only be filled into centralized lubrication systems and components and delivered and/or distributed with such systems and components after consulting with and obtaining written approval from SKF Lubrication Systems Germany GmbH.

No products manufactured by SKF Lubrication Systems Germany GmbH are approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure

(1013 mbar) by more than 0.5 bar at their maximum permissible temperature.

Other media which are neither lubricant nor hazardous substance may only be fed after consulting with and obtaining written approval from SKF Lubrication Systems Germany GmbH.

SKF Lubrication Systems Germany GmbH considers lubricants to be a component of the system design and must be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critically important in making these selections.

2.2. Selection of lubricants



Observe the instructions from the machine manufacturer regarding the lubricants that are to be used.



Warning!

The amount of lubricant required at a lubrication point is specified by the bearing or machine manufacturer. It must be ensured that the required quantity of lubricant is provided to the lubrication point. The lubrication point may otherwise not receive adequate lubrication, which can lead to damage and failure of the bearing.

The selection of a lubricant suitable for the lubrication task is made by the machine/system manufacturer and/or the operator of the

machine/system in cooperation with the lubricant supplier. When selecting a lubricant, the type of bearing/friction point, the expected load during operation, and the anticipated ambient conditions must be taken into account. All economic and environmental aspects must also be considered.



If required, SKF Lubrication Systems Germany GmbH can help customers to select suitable components for the conveyance of the selected lubricant and to plan and design their centralized lubrication system.

Please contact SKF Lubrication Systems Germany GmbH if you have further questions regarding lubricants. Lubricants can be tested in the company's laboratory for their suitability for pumping in centralized lubrication systems (e.g., "bleeding").

You can request an overview of the lubricant tests offered by SKF Lubrication Systems Germany GmbH from the company's Service department.

2.3. Approved lubricants

**Warning!**

Only lubricants approved for the product may be used. Unsuitable lubricants can lead to failure of the product and damage to property.

**Warning!**

Different lubricants must not be mixed together. Doing so can cause damage and require extensive cleaning of the product/centralized lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The described product can be operated using lubricants that meet the specifications in the technical data.

Note that in rare cases, there may be lubricants whose properties are within the permissible limits values but whose other characteristics render them unsuitable for use in centralized lubrication systems. For example, synthetic lubricants may be incompatible with elastomers.

2.4. Lubricants and the environment

**Warning!**

Lubricants can contaminate soil and bodies of water. Lubricants must be used and disposed of properly. Observe the local regulations and laws regarding the disposal of lubricants.

It is important to note that lubricants are environmentally hazardous, flammable substances that require special precautionary measures during transport, storage, and processing. Consult the → safety data sheet from the lubricant manufacturer for information regarding transport, storage, processing, and environmental hazards of the lubricant that will be used. The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

2.5. Lubricant hazards

**Danger!**

Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed without delay.

Lubricant leaking from centralized lubrication systems is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.



Follow the safety instructions on the → lubricant's safety data sheet.

Lubricants are hazardous substances. The safety instructions on the lubricant's → safety data sheet must be strictly followed. The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

3. Design and function

3.1. Model designs

Single-piston pumps with reservoir are offered in two model designs for supplying either oil or fluid grease and in three different lubricant reservoir capacities. The pumps can be operated manually or pneumatically depending on the model design, and can optionally be equipped with fill level monitoring.

On single-piston pumps for fluid grease supply, the fill level switch can be connected either via a cable (W1) or a 4-pin M8x1 circular connector (W2). On single-piston pumps for oil supply, the electrical connection of the fill level switch is established via an M12x1 circular connector (W).

Consult the → rating plate or the → technical documentation for the configuration of the single-piston pump with reservoir. The type code is explained in the adjacent → table.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

Table 4. Type code

Designation	P	O	E	P	-	15	-	1.0	W2
Piston pump									
Lubricant									
Relief after each stroke									
Drive (type of actuation)									
Delivery rate/stroke in cm ³									
Lubricant reservoir capacity in l									
Fill level monitoring (optional)									

Lubricant: O: Oil Drive: No designation: manual operation
F: Fluid grease P: Pneumatic drive

Lubricant reservoir capacities: 0.5; 1.0 and 1.7 l

Fill level monitoring: W1: With 2m cable connection (only for PFE(P) >> fluid grease supply)
W2: With 4-pin M8x1 circular connector (only for PFE(P) >> fluid grease supply)
W: With 4-pin M12x1 circular connector (only for POE(P) >> oil supply (fill level monitoring only for lubricant reservoir capacities of 1.0 and 1.7 l))

3.2. Design

➔ Fig. 1 shows the basic structure of a POE/PFE or POEP/PFEP single-piston pump. The lubricant reservoir (1) is located on the pump housing (3). The filling hole (2) is on top of the lubricant reservoir. The filling hole is equipped internally with a strainer (7). Items (10) and (11) indicate the fill level switches for the respective model design.

There are two laterally opposed outlets (5) on the pump housing for connecting the pipe of the centralized lubrication system and an additional filler socket (6) for filling using a filling pump. On delivery, the right outlet is closed with a screw plug.

The single-piston pump contains either a hand lever (8) or a compressed air connection (9) for operation, depending on the model design. ➔ Chapter 4, "Assembly instructions" contains further information about the individual connections.

The single-piston pump is equipped with a pressure relief valve and a pressure regulating valve.

3.3. Function

3.3.1. Mode of operation

When the single-piston pump is actuated, the actuating piston feeds the lubricant from the suction chamber into the main line and to the piston distributors on the centralized lubrication system. Using the built-up system pressure, the lubricant is metered separately in the piston distributors for each lubrication point and conveyed to the

lubrication points. In prelubrication distributors, this occurs simultaneously with the working stroke of the single-piston pump; in relubrication distributors, this occurs following the relief procedure.

After the working stroke, the actuating piston of the single-piston pump is returned to its normal position. In the process, it draws lubricant into the suction chamber. At the same time, the main line of the centralized lubrication system is relieved via the pressure relief valve. This allows the lubricant in the piston distributor's metering chambers to be shifted to the respective delivery chambers. The distributors are then ready to operate again.

The pressure regulating valve opens as soon as the pressure in the main line of the centralized lubrication system exceeds the maximum permissible value (see ➔ technical documentation). The lubricant is then returned to the lubricant reservoir.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

➔ Fig. 2 and ➔ Fig. 3 show the hydraulic diagram of the single-piston pump for the respective types of actuation.

3.3.2. Connected load

Since every working stroke of the single-piston pump triggers a new lubrication procedure, be sure that the connected load of the centralized lubrication

system is a maximum of 2/3 of the delivery volume of the single-piston pump in order to ensure the necessary reserves for pressure build-up in the centralized lubrication system.

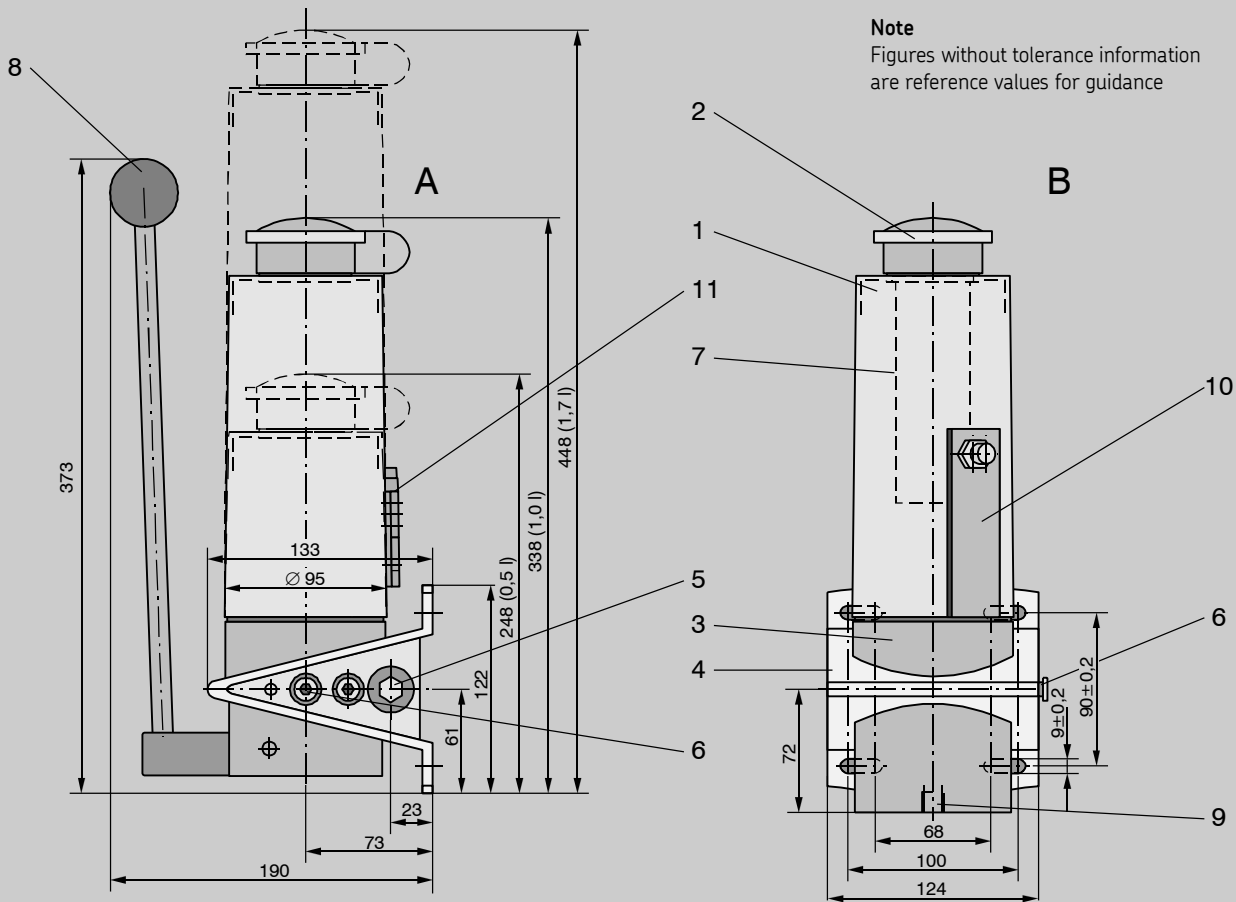
The connected load can be roughly calculated as follows:

Connected load

Sum of all volumes metered by system distributors
 + 25% of this value (safety margin)
 + 1 cm³ per meter of main line
 (expansion loss, only for hose lines)
 + Compressibility loss acc. to ➔ Table 5
 (only for grease supply systems)

Table 5. Compressibility loss in pipes conducting grease, in cm³/m

Line 6 x 0.7	Line 8 x 0.7	Line 10 x 0.7
0.17	0.34	0.58



3.3.3. Fill level monitoring

Single-piston pump for oil supply

The fill level is monitored by a float switch. The electrical connection of the float switch is established via a 4-pin M12x1 circular connector.

The float switch is designed as an NC contact, i.e., the electrical output of the float switch conducts voltage when the lubricant reservoir is full. In addition to monitoring the fill level, this also serves to monitor the electrical cable for wire breakage.

Fig. 1. Structure of single-piston pump (schematic diagram, subject to changes)

A - Design for fluid grease, manual operation
B - Design for oil, pneumatic operation

- 1 Lubricant reservoir
- 2 Filling hole with cap
- 3 Pump housing
- 4 Connecting flange
- 5 Outlet with screw plug
- 6 Filler socket
- 7 Strainer (in design for oil supply)
- 8 Hand lever
- 9 Compressed air connection
- 10 Float switch
- 11 Capacitive fill level switch

Single-piston pump for fluid grease supply

The fill level is monitored by a capacitive fill level switch. The capacitive fill level switch is connected via a 4-pin M8x1 circular connector or directly via a connection cable. The capacitive fill level switch can be operated as an NC contact or NO-contact.

→ Chapter 4.4, "Electrical connection (single-piston pumps with fill level monitoring)" and the → technical documentation contain further information about the electrical connection.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

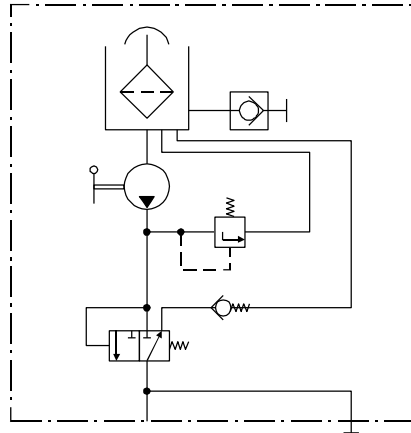


Fig. 2. Hydraulic diagram of manually operated single-piston pump

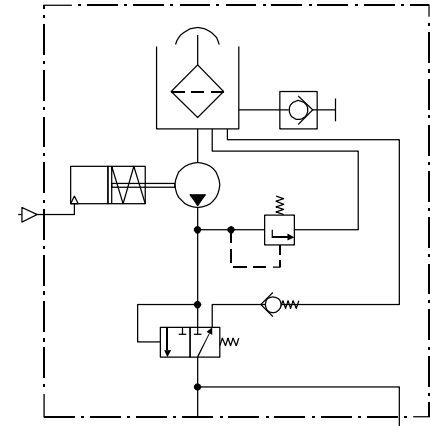


Fig. 3. Hydraulic diagram of pneumatically operated single-piston pump

4. Assembly instructions

4.1. General information

Only qualified technical personnel may install, operate, maintain, and repair the products described in the assembly instructions. Qualified technical personnel are persons who have been trained, assigned and instructed by the operator of the final product into which the described product is incorporated. Such persons are familiar with the relevant standards, rules, accident prevention regulations, and operating conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid potential hazards.

The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in → DIN VDE 0105 and IEC 364.

Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed. Keep the packaging material until any discrepancies have been resolved.



Warning!

The product must not be tilted or dropped.

During all assembly work on machinery, observe the local accident prevention regulations as well as the applicable operating and maintenance specifications.

4.2. Setup and attachment

The single-piston pumps are delivered in an oil-preserved condition. It may be necessary to clean the pump using a standard, mild cleaning agent before setup.

The single-piston pump should be protected from humidity and vibration, and should be mounted so that it is easily accessible, allowing all further installation work to be done without difficulty and allowing the pump to be filled easily later.

Ensure that there is sufficient air circulation to prevent excessive heating of the single-piston pump. For the maximum permissible ambient temperature, see → "Technical data."



For product-specific technical data, see the relevant → documentation. If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

The mounting position of the product is vertical according to the specifications in the → technical documentation.

The fill level in the lubricant reservoir and all other visual indicators must be clearly visible.

Ensure sufficient clearance for movement of the hand lever on manually operated single-piston pumps.

Drill the assembly holes for wall-mounting the single-piston pump as specified in → Chapter 4.3, "Connection dimensions."



Warning!

During assembly and especially when drilling, always pay attention to the following:

- Existing supply lines must not be damaged by assembly work.
- Other units must not be damaged by assembly work.
- The product must not be installed within range of moving parts.
- The product must be installed at an adequate distance from sources of heat.
- Maintain safety clearances and comply with local regulations for assembly and accident prevention.

4.3. Connection dimensions

The single-piston pump with reservoir is mounted on a connecting flange with four fastening holes. The mounting dimensions are given in → Fig. 1 and the → technical documentation. If no documentation is available, the dimensions and location of the fastening holes on the connecting flange can be determined by taking measurements.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

Attach the single-piston pump to the intended mounting location using appropriate fastening materials (e.g., bolts, washers, and nuts).

4.4. Electrical connection (single-piston pumps with fill level monitoring)



Danger!

Electrical connections for the fill level monitoring of single-piston pumps may only be established by qualified and trained personnel authorized to do so by the operator and in observance of the local conditions for connections and local regulations (e.g., DIN, VDE). Serious injury or death and property damage may result from an electrical connection that is established improperly.

4.4.1. Inductive loads

In the case of switches with inductive loads, their inductivity must be low in order to keep wear on contact surfaces to a minimum. Otherwise, there is a risk of damaging the contact surfaces on the switch elements. Appropriate measures must be taken to protect the contacts of the switch elements.

Connect electrical switching devices such as the fill level switch, pressure switch, directional control valves, thermometer, etc. according to the specifications in these instructions or the → technical documentation for the single-piston pump.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

4.4.2. Float switch (single-piston pump for oil supply)

The float switch for fill level monitoring of a single-piston pump is designed as an NC contact, i.e., the electrical output of the float switch conducts voltage when the lubricant reservoir is full. In addition to monitoring the fill level, this also serves to monitor the electrical cable for wire breakage.

→ Fig. 4 shows the electrical connection and the pin assignment of the circular connector for the float switch.

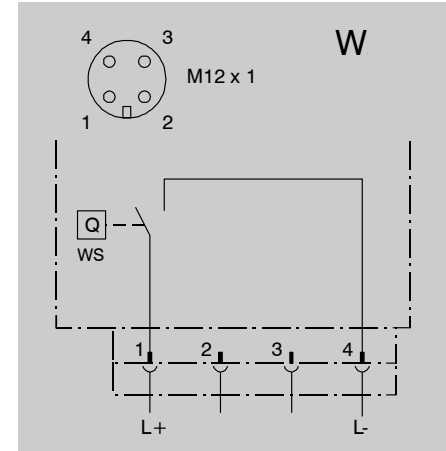


Fig. 4. Electrical connection for float switch (NC contact)

4.4.3. Capacitive fill level switch (single-piston pump for fluid grease supply)

The capacitive fill level switch for the fill level monitoring of a single-piston pump for fluid grease supply can be operated as an NC contact or NO-contact.

→ Fig. 5 shows the electrical connection and the wiring assignment of the circular connector for the float switch.

Table 6. Wire color coding

Color abbreviation	Color
BN	Brown
WH	White
BU	Blue
BK	Black

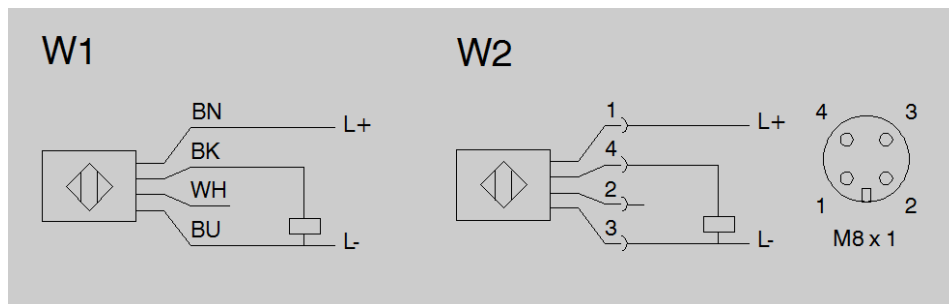


Fig. 5. Electrical connection of capacitive fill level switch

4.5. Compressed air connection (pneumatically operated single-piston pumps)

The compressed air line must be connected to the single-piston pump in such a way that no forces can be transferred to the assembled single-piston pump (stress-free connection).



Danger!

Ensure that the main air valve is closed before connecting the single-piston pump to the compressed air supply.



Warning!

The maximum primary air pressure indicated for operation of the pneumatically operated single-piston pump may not be exceeded.

The compressed air to be used here must comply with at least quality class 5 as defined by → DIN ISO 8573-1:

- Max. particle size 40 µm
- Max. particle density 10 mg/m³
- Pressure dew point 7°C
- Water content max. 7800 mg/m³
- Residual oil content max. 25 mg/m³

Through the use of the appropriate compressed air quality class, compressed air preparation can be optimized and machine downtime and higher maintenance costs avoided.

The single-piston pump has a compressed air connection in the base of the pump housing.

See → Fig. 6 and the → technical documentation for more information about the compressed air connection.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

It must be possible to switch the compressed air on and off via directional control valves that are operated mechanically, manually or electromagnetically. Ensure that the compressed air line is completely relieved of pressure after each actuation so that the actuating piston on the single-piston pump can return to its normal position.

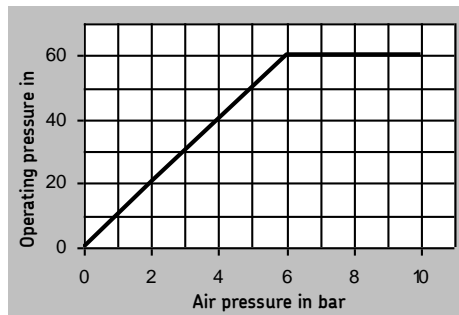


Fig. 6. Pressure diagram

4.6. Lubrication line connection

The lubrication line must be connected to the single-piston pump in such a way that no forces can be transferred to the assembled single-piston pump (stress-free connection).



Warning!

The fittings used to connect the lubrication line should be designed for the maximum operating pressure of the single-piston pump. If they are not, the lubrication line system needs to be protected from excessive pressure by means of a pressure-limiting valve.

For operating pressures up to 45 bar as can occur especially in single-line piston distributor systems, SKF fittings for solderless lubrication line screw unions can be used (double tapered sleeves or tapered sleeves).

4.7. Lubrication line arrangement

When arranging the main lubricant lines and lubrication point lines, observe the following instructions in order to ensure that the entire lubrication system functions smoothly.

The main lubricant line must be dimensioned in accordance with the maximum operating pressure occurring in the lubrication unit used and the delivery volume of that lubrication unit. If possible, the main lubricant line should rise upward from the lubrication unit and be ventable at the highest point on the lubrication line system.

Lubricant distributors at the end of the main lubricant line must be installed such that the outlets of the lubricant distributors point upwards. If the system configuration requires that the lubricant distributors be arranged below the main lubricant line, they should not be placed at the end of the main lubricant line.

The pipes, hoses, shutoff valves and directional control valves, fittings, etc. that will be used must be designed for the maximum operating pressure of the lubrication unit, the permissible temperatures and the lubricants that will be delivered. The lubrication line system also needs to be protected from excessive pressure by means of a pressure-limiting valve.

All components of the lubrication line system such as pipes, hoses, shutoff valves and directional control valves, fittings, etc. must be carefully cleaned before assembly. No seals in the lubrication line system should protrude inwards in a way that disrupts the flow of the lubricant and could allow contaminants to enter the lubrication line system.

Lubrication lines should always be arranged so that air pockets cannot form anywhere. Avoid changes in the cross-section of the lubrication line from small to large cross-sections in the direction of flow of the lubricant. When the cross-section does change, the transition should be gentle.

The flow of lubricant in the lubrication lines should not be impeded by the incorporation of sharp bends, angle valves, or flap valves. Unavoidable changes in the cross-section in lubrication lines must have smooth transitions. Sudden changes of direction should be avoided if possible.



Warning!

Lubrication lines must always be free of leaks. Lubricants can contaminate soil and bodies of water. Lubricants must be used and disposed of properly. Observe the local regulations and laws regarding the disposal of lubricants.



Danger!

Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and

injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed without delay.

Lubricant leaking from centralized lubrication systems is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.



Follow the safety instructions on the → lubricant's safety data sheet.

The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

5. Transport, delivery, and storage

5.1. Transport

SKF Lubrication Systems Germany GmbH products are packaged in accordance with standard commercial practice according to the regulations of the recipient's country and → DIN ISO 9001. Safe handling must be ensured during transport. The product must be protected from mechanical effects such as impacts. The transport packaging must be marked "Do not drop!".



Warning!

The product must not be tilted or dropped.

There are no restrictions for land, air or sea transport.

5.2. Delivery

Upon receiving the shipment, please check the product(s) for possible damage, and ensure that the shipment is complete according to the shipping documents. Keep the packaging material until any discrepancies have been resolved.

5.3. Storage

SKF Lubrication Systems Germany GmbH products are subject to the following storage conditions:

5.3.1. Storage of lubrication units

- Ambient conditions: dry and dust-free surroundings, storage in well ventilated dry area
- Storage time: max. 24 months
- Permissible humidity: < 65%
- Storage temperature: 10 - 40°C
- Light: avoid direct sun or UV exposure and shield nearby sources of heat

5.3.2. Storage of electronic and electrical devices

- Ambient conditions: dry and dust-free surroundings, storage in well ventilated dry area
- Storage time: max. 24 months
- Permissible humidity: < 65%
- Storage temperature: 10 - 40°C
- Light: avoid direct sun or UV exposure and shield nearby sources of heat

5.3.3. Storage - general information

- The product(s) can be enveloped in plastic film to provide low-dust storage.
- Protect against ground moisture by storing on a shelf or wooden pallet.
- Bright-finished metallic surfaces, especially wearing parts and assembly surfaces, must be protected using long-term anti-corrosive agents before storage.
- At approx. 6-month intervals: Check for corrosion. If there are signs of corrosion, remove them then reapply anti-corrosive agents.
- Drives must be protected from mechanical damage.

6. Commissioning



Inspect all pneumatic and electrical (if present) connections before commissioning the single-piston pump.

After assembling the single-piston pump and arranging the lubrication lines, commission the centralized lubrication system by following these steps:

- Fill the lubricant reservoir.
- Calibrate the capacitive fill level switch (single-piston pumps for fluid grease supply with fill level monitoring).
- Vent the centralized lubrication system.

6.1.1. Lubricant filling



Observe the instructions from the machine manufacturer regarding the lubricants that are to be used.



Warning!

Only fill using clean lubricant and an appropriate device. Contaminated lubricants can result in severe system malfunction. The lubricant reservoir must be filled without introducing bubbles.



Warning!

Different lubricants must not be mixed together. Doing so can cause damage and require extensive cleaning of the pump unit/centralized lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The lubricant may only be fed without bubbles. The lubricant reservoir must be filled with clean lubricant without introducing bubbles.

Procedure for single-piston pumps for oil supply

- Remove the cap from the lubricant reservoir.
- Fill lubricant through the strainer.
- Wait until the lubricant in the lubricant reservoir is free of bubbles.
- Close the filling hole.

Procedure for single-piston pumps for fluid grease supply

- Fill lubricant via the filler socket on the pump housing (see → technical documentation for connection type).

Then vent the single-piston pump and the centralized lubrication system.

6.1.2. Calibrating the capacitive fill level switch (single-piston pumps for fluid grease supply with fill level monitoring).

On single-piston pumps for fluid grease supply with capacitive fill level switch, the switch must be calibrated before commissioning the single-piston pump in order to ensure proper function of the switch in the installation area.

Calibration includes the following steps:

- Empty calibration
- Full calibration
- Locking

An empty calibration has to be done before full calibration. Is an empty calibration not possible, because the reservoir is full and can not be emptied, the empty calibration can be set, with a simulation of an empty reservoir, by disassembling the level switch. For best use a modified empty calibration should be made after the reservoir is empty.



Note

Residual lubricant on the reservoir wall affects the signal of the capacitive fill level switch. For optimal empty calibration we recommend first filling the lubricant reservoir and then emptying it before performing a modified empty calibration. On first-time operation of the sensor a modified empty calibration is also used if the reservoir is full and an empty calibration is not possible. A modified empty calibration can be repeated at any time. A full calibration already carried out is not affected.

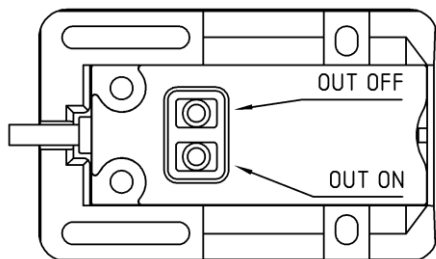


Fig. 7. Sensor

Calibrating the sensor is described in → Table 7.
 Normally open - NO: Output closes when the reservoir is full
 Normally closed – NC: Output opens when the reservoir is full

Table 7. Functions of electronic fill level switch

Function	Explanation	Execution	Display
Empty calibration	The sensor is calibrated to empty lubricant reservoir. An already carried out calibration is deleted.	Empty the reservoir below 20mm of the sensor. Sensor as NO: press OUT OFF for min. 2s and max. 6s. Sensor as NC: press OUT ON for min. 2s and max. 6s.	LED flashes slowly. NO: On release of the button the LED goes off. NC: On release of the button the LED lights continuously.
Full calibration	In addition to empty calibration, the switch can also be calibrated to a full lubricant reservoir.	Fill the reservoir until the sensor is covered. Sensor as NO: press OUT ON for min. 6s. Sensor as NC: press OUT OFF for min. 6s.	LED flashes slowly, after 6s more quickly. NO: On release of the button the LED lights continuously. NC: On release of the button the LED goes off.
Modified empty calibration	Recommend if residual lubricant is on the reservoir wall. Also, on first-time operation of the sensor if reservoir is full.	Empty the reservoir below the sensing face. Sensor as NO: press OUT OFF for min. 6s. Sensor as NC: press OUT ON for min. 6s.	LED flashes slowly, after 6s more quickly. NO: On release of the button the LED goes off. NC: On release of the button the LED lights continuously.
Locking / Unlocking	This locks or unlocks the sensor.	Locking: Press OUT ON and OUT OFF simultaneously for min. 10s. Unlocking: same procedure	The LED changes state. The lit LED goes off briefly and the not lit LED lights briefly.

6.1.3. Venting the centralized lubrication system



Warning!

The lubricant may only be fed without bubbles. Air pockets in the lubricant adversely affect the function of the centralized lubrication system and impair the reliability of lubricant delivery, which can result in damage to the lubrication points requiring lubrication.

- Disconnect lubricant branch lines from master distributor. Operate the single-piston pump until bubble-free lubricant discharges from all ports of the master distributor. Reinstall the lubricant branch lines.
- Finally, check that the entire centralized lubrication system functions properly.

Note

The second, closed outlet in the pump housing must also be vented.

The process of venting the centralized lubrication system can be facilitated by:

- Opening the ends of the main pipes until bubble-free lubricant discharges from the ends.
- Filling long lubricant line sections before connecting.

The centralized lubrication system is vented as follows:

- Disconnect the main lubricant lines from the single-piston pump. Operate the single-piston pump until the lubricant emerging from the outlet is free of bubbles. Reinstall the main lubricant lines.
- Disconnect main lubricant line from master distributor. Operate the single-piston pump until the lubricant emerging from the main line is free of bubbles. Reinstall the main lubricant line.

7. Operation

7.1. General notes

During operation, observe the following instructions to provide for trouble-free operation of the centralized lubrication system:

- Check the lubricant transport in the lubrication lines at regular intervals.
- Inspect the lubrication of the lubrication points at regular intervals.
- Perform a visual check of the lubricant fill level in the lubricant reservoir at regular intervals (including on single-piston pumps with fill level monitoring).

If the lubricant fill level is too low, top up as described in → Chapter 6.1.1, "Lubricant filling."

- Check the operation indicators of the capacitive fill level switch at regular intervals → Table 8 (single-piston pumps for fluid grease supply with fill level monitoring).

Table 8. Operation indicators of capacitive fill level switch independent of the programmed output function

LED display	Meaning
Yellow LED lights	the switching output is enabled
Yellow LED is off	the switching output is disabled

8. Shutdown

8.1. Temporary shutdown

The described product can be temporarily shut down by disconnecting the electrical, pneumatic, and/or hydraulic supply connections. The instructions in → Chapter 1, "Safety instructions" in this owner's manual must be observed when doing so.

If the product is to be shut down for an extended period of time, follow the instructions in → Chapter 5, "Transport, delivery, and storage" in this owner's manual.

To recommission the product, follow the instructions in → Chapters 4, "Assembly" and 6, "Commissioning" in this owner's manual.

8.2. Permanent shutdown

If the product will be permanently shut down, the local regulations and laws regarding the disposal of contaminated equipment must be observed.



Warning!

Lubricants can contaminate soil and bodies of water. Lubricants must be used and disposed of properly. Observe the local regulations and laws regarding the disposal of lubricants.

The product can also be returned to SKF Lubrication Systems Germany GmbH for disposal, in which case the customer is responsible for reimbursing the costs incurred.

9. Maintenance



Danger!

Performing work on an energized pump or product may result in serious injury or death. Assembly, maintenance, and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.



Danger!

Centralized lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.



Danger!

The described product is pressurized during operation. The product must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

Products from SKF Lubrication Systems Germany GmbH are low-maintenance. However, all connections and fittings must be regularly inspected for proper seating to ensure proper function and to prevent hazards from arising.

If necessary, the product can be cleaned using mild cleaning agents that are compatible with the product's materials (non-alkaline, non-soap). For safety reasons, the product should be disconnected from the power supply and the hydraulic and/or compressed air supply.

Do not allow any cleaning agent to enter the interior of the product during cleaning.

It is not necessary to clean the interior of the product if the product is operated normally and intercompatible lubricants are used.

The interior of the product must be cleaned if incorrect or contaminated lubricant is accidentally filled into the product. If this occurs, please contact the Service department of SKF Lubrication Systems Germany GmbH for assistance.



Dismantling of the product or individual parts thereof within the statutory warranty period is not permitted and voids any claims.



Only original spare parts from SKF Lubrication Systems Germany GmbH may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited and nullify the statutory warranty.

SKF Lubrication Systems Germany GmbH shall not be held liable for damages resulting from improperly performed assembly, maintenance or repair work on the product.

10. Faults

→ Table 9 provides an overview of possible malfunctions and their causes. Contact the Service department of SKF Lubrication Systems Germany GmbH if you cannot remedy the malfunction.



Danger!

Performing work on an energized pump or product may result in serious injury or death. Assembly, maintenance, and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.



Danger!

Centralized lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.



Dismantling of the product or individual parts thereof within the statutory warranty period is not permitted and voids any claims.

Table 9. Fault analysis and rectification

Malfunction	Possible cause	Rectification
Power transmission from the actuating mechanism to the pump is interrupted	Driver pin is broken	Disassemble the pump in observance of the safety instructions and replace the broken components.
	Seals in the actuating cylinder are defective (pneumatic operation)	
	Return spring is broken	
Pump does not convey lubricant; no pressure build-up	Too little lubricant in reservoir	Fill up with lubricant
	Wrong lubricant	Empty the entire centralized lubrication system of unsuitable lubricant and fill it with new lubricant. Properly dispose of the old lubricant.
	Air in the system	Vent the system until lubricant without bubbles discharges from the venting points.
	Pressure regulating valve is open	Check the pressure regulating valve for contamination and damage and, if necessary, clean or replace it.
	Pressure relief valve does not close	Check the pressure relief valve for contamination and damage and, if necessary, clean or replace it.



All assembly, maintenance and repair work beyond this scope must be performed by the Service department of SKF Lubrication Systems Germany GmbH.



Only original spare parts from SKF Lubrication Systems Germany GmbH may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are not permitted.

11. Technical data

Table 10. Technical data

Description	Unit	Values
Pump		
Drive		Manual or pneumatic
Lubricant reservoir capacity	l	0.5, 1.0 or 1.7
Reservoir material		Plastic (PP), transparent
Outlets		G1/4 left or right (as delivered: closed on right)
Delivery volume	cm ³ /stroke	15
Operating pressure	bar	30 (manually operated) 50 (pneumatically operated)
Lubricant		Mineral oils, synthetic or environmentally compatible oils with an operating viscosity between 20 and 1500 mm ² /s Fluid greases NLGI 000 and 00
Operating temperature	°C	0 ... +60
Fill level monitoring (optional)		Float switch (only single-piston pumps for oil supply) or capacitive fill level switch (only single-piston pump for fluid grease supply)
Filling		
Filling hole on the lubricant reservoir		Ø approx. 60 mm
Filler socket on the side of the pump housing		Button-head lubricating nipple according to → DIN 3404-A for nozzles of form C2 according to → DIN 1283
Compressed air connection (pneumatically operated single-piston pumps)		
Connection		G1/4 in housing base
Primary pressure, max.	bar	10
Primary pressure, min.	bar	2

Continuation of Table 10. Technical data

Description	Unit	Values
Electrical connection (single-piston pumps with fill level monitoring)		
Float switch		
Circuit		NC contact (contact open at minimum)
Operating voltage, max.		42 V AC/DC
Switching capacity, max.		50 W
Connection		M12x1 4-pin plug connector
Electronic fill level switch		
Output function		PNP / NO-contact - NC contact
Operating voltage		10 ... 30V DC
Connection		Cable or M8x1 4-pin plug connector
Protection class		IP67

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Subject to changes in contents and technical information.

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All SKF Lubrication Systems Germany GmbH products may be used only for their intended purpose as described in this owner's manual with associated operating instructions. If assembly/operating instructions are supplied together with the products, they must be read and followed.

Not all lubricants can be fed using centralized lubrication systems. SKF can, on request, inspect the suitability of the lubricants selected by the user for pumping in centralized lubrication systems. Lubrication systems and their components manufactured by SKF Lubrication Systems Germany GmbH are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by CLP Regulation EC 1272/2008 may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

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