Single-piston pump of the ACP/MCP series

Pneumatically/manually operated piston pump for single-line systems

Creation date:	25.05.2022
Document no.:	951-170-237-EN
Version:	03

Read this manual before installing or commissioning the product and keep it at hand for later reference!

Original EC Declaration of Incorporation in accordance with Directive 2006/42/EC, Appendix II Part 1 B

The manufacturer hereby declares at its sole responsibility that the partly completed machinery conforms to the essential health and safety requirements of the Machinery Directive 2006/42/EC, Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is the manufacturer.

Designation:	Air-operated piston pump to supply lubricant within a centralized lubrication system
Types:	Piston pump ACP with reservoir
Part number:	ACP15-XXXXXXX-XXX
	ACP-9XXXXXXX
Year of construction:	See type identification plate

Furthermore, the following directives and standards were applied in the respective applicable areas:
2011/65/EU: RoHS II
2014/30/EU: Electromagnetic Compatibility

EN ISO 12100:2010	EN 809:1998+A1:2009/AC:2010	EN 349:1993+A1:2008	EN 60529:1991+A1:2000;+A2:2013
EN ISO 4413:2010	EN ISO 4414:2010	EN ISO 13857:2008	
EN IEC 63000:2018			

The partly completed machinery must not be put into service until it has been established that the machinery into which it is to be incorporated is in compliance with the provisions of the Machinery Directive 2006/42/EC and all other applicable Directives.

Berlin, 25.05.2022
Jürgen Kreutzkämper
Manager, R&D
Germany

Holger Schmidt
Manager Modularization
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Manufacturer: SKF Lubrication Systems Germany GmbH, Motzener Strasse 35/37, 12277 Berlin, Germany

Original UK Declaration of incorporation according to the Supply of Machinery (Safety) Regulations 2008 No. 1597 Annex II

The manufacturer hereby declares under sole responsibility that the partly completed machinery complies with the essential health and safety requirements of UK legislation Supply of Machinery (Safety) Regulations 2008 No. 1597 Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Designation:	Air-operated piston pump to supply lubricant within a centralized lubrication system
Types:	Piston pump ACP with reservoir
Part number:	ACP15-XXXXXXX-XXX
	ACP-9XXXXXXX
Year of construction:	See type identification plate

Furthermore, the following regulations and standards were applied in the respective applicable areas:

- Electromagnetic Compatibility Ordinance 2016 No. 1091
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032

EN ISO 12100:2010	EN 809:1998+A1:2009/AC:2010	EN 349:1993+A1:2008	EN 60529:1991+A1:2000;+A2:2013
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Note regarding manually operated MCP piston pumps:
The **manually operated MCP piston pumps** are outside the scope of application of the Machinery Directive (2006/42/EC) and the UK regulation "Supply of Machinery (Safety) Regulations 2008 No. 1597." Notwithstanding the above, the manually operated MCP piston pump has been designed, manufactured, and tested with due regard to all relevant factors affecting its safety. If the manually operated MCP piston pump is used as described in this manual, safety is ensured throughout its service life.

Models of the manually operated MCP piston pump **with monitoring (proximity sensors)** are subject to the EMC Directive (2014/30/EU) and UK "Electromagnetic Compatibility Regulations 2016 No. 1091," as well as the RoHS Directive (2011/65/EU) and the UK "Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032." For this reason, these models bear the CE and UKCA marks.

Annex to the declaration of incorporation of the ACP pump following 2006/42/EC, annex II, no 1 B

Description of the essential health and safety requirements according to 2006/42/EC, Annex I, which have been applied and complied with:

Table 1

Annex to the declaration of incorporation

No.:	Basic safety and health requirements	Applicable:	Complied with:
1.1.1	Definitions	No	
1.1.2	Principles of safety integration	Yes	Yes
1.1.3	Materials and products	Yes	Partly[1)]
1.1.4	Lighting	No	
1.1.5	Design of machinery to facilitate its handling	Yes	Yes
1.1.6	Ergonomics	Yes	Partly[2)]
1.1.7	Operating positions	No	
1.1.8	Seating	No	
1.2	Control systems		
1.2.1	Safety and reliability of control systems	No	
1.2.2	Control devices	No	
1.2.3	Starting	Yes	Yes
1.2.4	Stopping	Yes	Yes
1.2.4.1	Normal stop	No	
1.2.4.2	Operational stop	Yes	Yes
1.2.4.3	Emergency stop	No	
1.2.4.4	Assembly of machinery	No	
1.2.5	Selection of control or operating modes	Yes	Yes
1.2.6	Failure of the power supply	Yes	Yes
1.3	Protection against mechanical hazards		
1.3.1	Risk of loss of stability	Yes	Yes
1.3.2	Risk of break-up during operation	Yes	Yes
1.3.3	Risks due to falling or ejected objects	No	
1.3.4	Risks due to surfaces, edges or angles	Yes	Yes
1.3.5	Risks related to combined machines	No	
1.3.6	Risks related to variations in operating conditions	No	
1.3.7	Risks related to moving parts	No	
1.3.8	Choice of protection against risks arising from moving parts	No	
1.3.8.1	Moving transmission parts	No	
1.3.8.2	Moving parts involved in the process	No	
1.3.9	Risks of uncontrolled movements	No	
1.4	Required characteristics of guards and protective devices		
1.4.1	General requirements	Yes	Yes
1.4.2	Special requirements for guards	No	
1.4.2.1	Fixed guards	No	
1.4.2.2	Interlocking movable guards	No	
1.4.2.3	Adjustable guards restricting access	No	

Table 1

Annex to the declaration of incorporation

No.:	Basic safety and health requirements	Applicable:	Complied with:
1.4.3	Special requirements for protective devices	No	
1.5	Risks due to other hazards		
1.5.1	Electricity supply	Yes	Yes
1.5.2	Static electricity	Yes	Yes
1.5.3	Energy supply other than electricity	Yes	Yes
1.5.4	Errors of fitting	Yes	Yes
1.5.5	Extreme temperatures	Yes	Yes
1.5.6	Fire	Yes	Yes
1.5.7	Explosion	No	
1.5.8	Noise	Yes	Yes
1.5.9	Vibrations	Yes	Yes
1.5.10	Radiation	Yes	Yes
1.5.11	External radiation	Yes	Yes
1.5.12	Laser radiation	No	
1.5.13	Emission of hazardous materials and substances	Yes	Yes
1.5.14	Risk of being trapped in a machine	No	
1.5.15	Risk of slipping, tripping and falling	Yes	Yes[3)]
1.5.16	Lightning	Yes	Yes
1.6	Maintenance		
1.6.1	Machinery maintenance	Yes	Yes
1.6.2	Access to operating positions and servicing points	Yes	Partly[4)]
1.6.3	Isolation of energy sources	Yes	Yes
1.6.4	Operator interventions	Yes	Yes
1.6.5	Cleaning of internal parts	Yes	Yes
1.7	Information		
1.7.1	Information and warnings on the machinery	No	
1.7.1.1	Information and information devices	Yes	Yes
1.7.1.2	Warning devices	Yes	Yes
1.7.2	Warning of residual risks	Yes	Yes
1.7.3	Marking of machinery	Yes	Yes
1.7.4	Instructions	Yes	Yes
1.7.4.1	General principles for the drafting of instructions	Yes	Yes
1.7.4.2	Contents of the instructions	Yes	Yes
1.7.4.3	Sales literature	Yes	Yes

[1)] The product is basically designed for the use of harmless media. The operator must check whether the lubricant used has certain hazardous effects (e.g. sensitization). If necessary, a retention tray may be required. Pressure control valves must also be used.
[2)] The integrator has to ensure that the pump is integrated into the machine in such way that operation and filling of the pump are ergonomically possible.
[3)] Not relevant inside the incomplete machine (pump), only outside the incomplete machine. Here the machine integrator/operator is responsible.
[4)] The integrator has to ensure that the pump is integrated into the machine in such way that operation of the pump is possible without risk.

Masthead

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- South America -
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CP 2001 Rosario, Santa Fe

Warranty
The instructions contain no statements regarding the warranty or liability for defects. That information can be found in our General Terms of Payment and Delivery.

Training
We conduct detailed training in order to enable maximum safety and efficiency. We recommend taking advantage of this training. For further information, contact your authorized SKF dealer or the manufacturer.

Table of contents

Safety alerts, visual presentation, and layout

While reading these instructions, you will encounter various symbols, illustrations, and text layouts intended to help you navigate and understand the instructions. Their meaning is explained below.

Safety alerts:
Activities that present specific hazards (to life and limb or possible damage to property) are indicated by safety alerts. Always be sure to follow the instructions given in the safety alerts.

⚠ DANGER
These safety alerts indicate an imminent danger. Ignoring them will result in death or serious injury

⚠ WARNING
These safety alerts indicate potentially imminent danger. Ignoring them could result in death or serious injury

⚠ CAUTION
These safety alerts indicate potentially imminent danger. Ignoring them could result in minor injury

NOTICE
These safety alerts indicate a potentially harmful situation. Ignoring them could result in damage to property or malfunctions

Illustrations:
The illustrations used depict a specific product. For other products, they may have the function of a diagram only. This does not alter the basic workings and operation of the product.

Text layout:
- **First-order bulleted lists:** Items on a bulleted list start with a solid black dot and an indent.
  - **Second-order bulleted lists:** If there is a further listing of subitems, the second-order bulleted list is used.

1 **Legend:** A legend explains the numbered contents of an illustration, presented as a numbered list. Items in a legend start with a number (with no dot) and an indent.
  - **Second-order legend:** In some cases, the numbered contents of an image represent more than just one object. A second-order legend is then used.

1. **Instruction steps:** These indicate a chronological sequence of instruction steps. The numbers of the steps are in bold and are followed by a period. If a new activity follows, the numbering starts again at "**1.**"
  - **Second-order instruction steps:** In some cases, it is necessary to divide up a step into a few substeps. A sequence of second-order instruction steps is then used.

1. Safety instructions

1.1 General safety instructions

- Putting the products into operation or operating them without having read the instructions is prohibited. The operator must ensure that the instructions are read and understood by all persons tasked with working on the product or who supervise or instruct such persons. Retain the instructions for further use.
- The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.
- Any faults that could affect safety must be remedied according to responsibility. The supervisor must be notified immediately in case of malfunctions outside one's individual scope of responsibility.
- Unauthorized modifications and changes can have an unpredictable effect on safety and operation. Unauthorized modifications and changes are therefore prohibited. Only original SKF spare parts and SKF accessories may be used.
- Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- The components used must be suitable for the intended use and the applicable operating conditions, e.g. max. operating pressure and ambient temperature range, and must not be subjected to torsion, shear, or bending.

1.2 General behaviour when handling the product

- Familiarize yourself with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Keep unauthorized persons away.
- Wear personal protective equipment always.
- Precautionary operational measures and instructions for the respective work must be observed.
- In addition to these Instructions, general statutory regulations for accident prevention and environmental protection must be observed.
- Precautionary operational measures and instructions for the respective work must be observed. Uncertainty seriously endangers safety.
- Safety-related protective and safety equipment must not be removed, modified or affected otherwise in its function and is to be checked at regular intervals for completeness and function.
- If protective and safety equipment has to be dismantled, it must be reassembled immediately after finishing the work, and then checked for correct function.
- Remedy occurring faults in the frame of responsibilities. Immediately inform your superior in the case of faults beyond your competence.
- Never use parts of the centralized lubrication system or of the machine as standing or climbing aids.

1.3 Intended use

Supply of lubricants.
Supply of lubricant to lubrication points.
The product is intended solely for installation in another machine.
Use is only permitted within the scope of commercial or economic activity by professional users, in compliance with the specifications, technical data, and limits specified in this manual.

1.4 Persons authorized to use the product

Operator
A person who is qualified by training, knowledge and experience to carry out the functions and activities related to normal operation. This includes avoiding possible hazards that may arise during operation.

Specialist in electrics
Person with appropriate professional education, knowledge and experience to detect and avoid the hazards that may arise from electricity.

Specialist in mechanics
Person with appropriate professional education, knowledge and experience to detect and avoid the hazards that may arise during transport, installation, start-up, operation, maintenance, repair and disassembly.

1.5 Foreseeable misuse

Any usage of the product other than as specified in this manual is strictly prohibited. Particularly prohibited are:

- Use of non-specified consumables, contaminated lubricants, or lubricants with air inclusions.
- Use of C3 versions in areas with aggressive, corrosive substances (e.g., high salt load).
- Use of plastic parts in areas with high exposure to ozone, UV light, or ionizing radiation.
- Use to supply, convey, or store hazardous substances and mixtures as defined in the CLP Regulation (EC 1272/2008) or GHS with acute oral, dermal, or inhalation toxicity or substances and mixtures that are marked with hazard pictograms GHS01-GHS06 and GHS08.
- Use to supply, convey, or store Group 1 fluids classified as hazards as defined in the Pressure Equipment Directive (2014/68/EU) Article 13 (1) a).
- Use to supply, convey, or store gases, liquefied gases, dissolved gases, vapors, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature.
- Use in an explosion protection zone.
- Use without proper securing against excessively high pressures, in the case of pressurized products.
- Use outside of the technical data and limits specified in this manual.

1.6 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:

- Company instructions and approval rules

If applicable:

- Safety data sheet of the lubricant used
- Project planning documents
- Supplementary information regarding special designs of the pump. This you will find in the special system documentation.
- Instructions for other components for setting up the centralized lubrication system.

1.7 Prohibition of certain activities

NOTE

The following activities are prohibited during cleaning, maintenance or repair:

- Pump ACP/MCP has a piston with seals. This must not be modified.
- Generally the pump must not be opened.
- Adjustment of the pressure control valve must not be altered.
- Changes and repairs to the manual (MCP) or pneumatic drive (ACP) are not allowed.

1.8 Painting plastic components and seals

The painting of any plastic components and seals of the products described is prohibited. Completely mask or remove plastic components before painting the main machine.

1.9 Safety markings on the product

No safety markings on the product

NOTE

In accordance with the results of the workstation risk assessment, additional labels (e.g., warnings, safety signs, prohibition signs, or labels in accordance with CLP/GHS) are to be attached by the operator if necessary.

1.10 Note on the type plate

The type plate provides important data such as the type designation, order number, and sometimes regulatory characteristics. To avoid loss of this data in case the type plate becomes illegible, it should be entered in the manual.

Fig. 1

Type identification plates ACP and MCP with filling level switch

Fig. 2

Type identification plates ACP and MCP w/o filling level switch

1.11 Notes on CE marking

CE marking is effected following the requirements of the applied directives requiring a CE marking:

- 2014/30/EC Electromagnetic Compatibility
- 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II)

1.12 Note on Pressure Equipment Directive

Due to its performance characteristics, the product does not reach the limit values defined in Article 4, Paragraph 1, Subparagraph (a) (ii) and is excluded from the scope of Pressure Equipment Directive 2014/68/EU in accordance with Article 1, Paragraph 2 Subparagraph (f).

1.13 Note on UKCA marking

The UKCA conformity marking confirms the product's conformity with the applicable legal provisions of Great Britain.

1.14 Note on EAC marking

The EAC conformity marking confirms the product's conformity with the applicable legal provisions of the Eurasian customs union.

1.15 Note on China RoHS mark

The China RoHS mark confirms that there is no danger to persons or the environment from the regulated substances contained within for the intended period of use (year number shown in the circle).

1.16 Emergency shutdown

This is done by a course of action to be defined by the operator.

1.17 Assembly, maintenance, fault, repair

Prior to the start of this work, all relevant persons must be notified of it. At a minimum, the following safety measures must be taken before any work is done:

- Unauthorized persons must be kept away
- Mark and secure the work area
- Cover adjacent live parts
- Dry any wet, slippery surfaces or cover them appropriately
- Cover hot or cold surfaces appropriately

Where applicable:

- Depressurize
- Isolate, lock and tag out
- Check to ensure live voltage is no longer present
- Ground and short-circuit

The product should be protected as much as possible from humidity, dust, and vibration, and should be installed so that it is easily accessible. Ensure an adequate distance from sources of heat or cold. Any visual monitoring devices present, such as pressure gauges, min./max. markings, or oil level gauges must be clearly visible. Observe the mounting position requirements.

Drill required holes only on non-critical, non-load-bearing parts of the operator's infrastructure. Use existing holes where possible. Avoid chafe points. Immobilize any moving or detached parts during the work. Adhere to the specified torques.

If guards or safety devices need to be removed, they must be reinstalled immediately following conclusion of work and then checked for proper function.

Check new parts for compliance with the intended use before using them.

Avoid mixing up or incorrectly assembling disassembled parts. Label parts. Clean any dirty parts.

1.18 First start-up, daily start-up

Ensure that:

- All safety devices are fully present and functional
- All connections are properly connected
- All parts are correctly installed
- All warning labels on the product are fully present, visible, and undamaged
- Illegible or missing warning labels are immediately replaced

1.19 Residual risks

Table 2

Residual risks

Residual risk	Possible in lifecycle	Avoidance / Remedy
Personnel slipping due to floor contamination with spilled or leaked lubricants.	B C E G H K	• Exercise caution when connecting hydraulic connections on the product • Promptly apply suitable binding agents and then remove the spilled or leaked lubricant • Follow operational instructions for handling the lubricants and contaminated parts
Tearing or damage to lines when installed on moving machine components.	B	• Installing the pump on moving machine components should be avoided whenever possible. In cases where mounting the pump in this way cannot be avoided, flexible hose lines must be used.
Excessive system air pressure resulting in destruction of lubrication system components	B C	• Install a pressure reducer on the compressed air feed and set regulator to maximum pressure of 6 bar
Lubricant spraying out due to faulty component fitting, or incorrect connection of lines.	B C	• Tighten all components securely or using the specified torques • Use hydraulic screw unions and lines suitable for the indicated pressures, and check them for proper connection and for damage prior to first start-up
Only for MCP (manually operated model): Crushing is possible when using the hand lever.	B C D E F G H	The presence of an operating/hand lever inevitably causes the possibility of a slight, reversible crushing. Avoid crushing when using the operating/hand lever

Lifecycle phases: A = Transport, B = Assembly, C = First start-up, D = Operation, E = Cleaning, F = Maintenance, G = Malfunction, repair, H = Shutdown, K = Disposal

2. Lubricants

2.1 General information

Lubricants are selected specifically for the respective application. The selection is made by the manufacturer or operator of the machine, preferably together with the lubricant supplier. Should you have little or no experience with the selection of lubricants for lubrication systems, please contact us. We will be pleased to support you in the selection of suitable lubricants and components for the construction of a lubrication system optimized for the respective application. Please observe the following points when selecting/using lubricants. You will avoid possible downtimes and damages to your machine or the lubrication system.

2.2 Material compatibility

Lubricants must generally be compatible with the following materials:

- Plastics: ABS, CR, FPM, NBR, NR, PA, PET, PMMA, POM, PP, PS, PTFE, PU, PUR

Metal steel, grey iron, brass, copper, aluminium

2.3 Temperature characteristics

The lubricant used must be suitable for the specific ambient temperature of the product. The viscosity required for proper operation of the product must not be exceeded in case of low temperatures nor fall below specification in case of high temperatures. Specified viscosity, see chapter Technical data.

2.4 Ageing of lubricants

Depending on the experience with the lubricant used, it should be checked at regular intervals to be determined by the operator whether the lubricant needs to be replaced due to ageing processes (bleeding). If there is any doubt as to the further suitability of the lubricant, it must be replaced before recommissioning. If you have no experience with the lubricant used, we recommend testing after only one week.

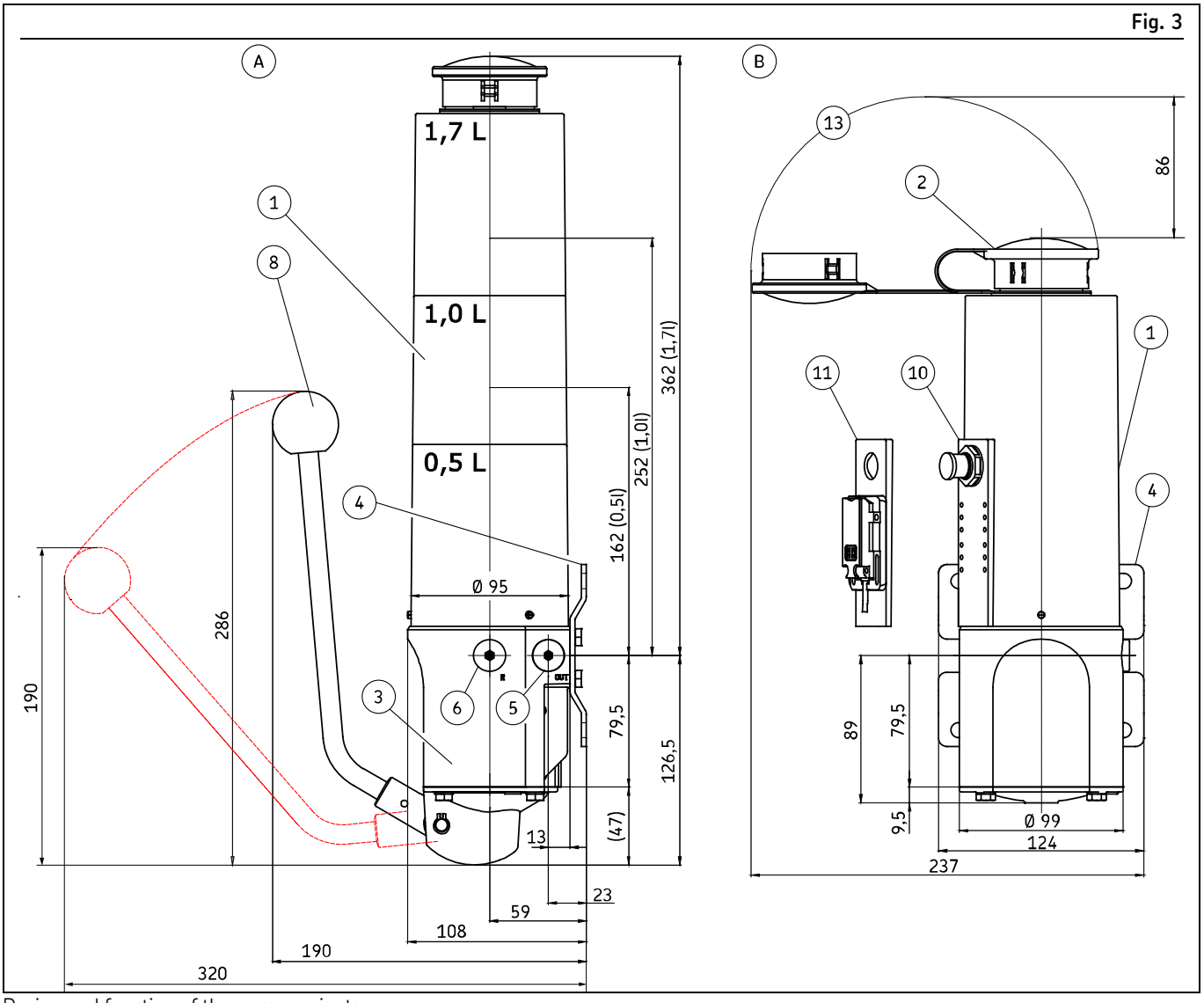
2.5 Avoidance of malfunctions and hazards

To avoid malfunctions or hazards, please observe the following:

- When handling lubricants, observe the relevant safety data sheets (SDS) and hazard designations on the packaging, if any.
- Due to the large number of additives, individual lubricants which meet the requirements for pumpability specified in the instructions may not be suitable for use in centralized lubrication systems.
- Always use SKF lubrication greases, if possible. These are optimally suited for use in lubrication systems.
- Do not mix lubricants. This may have unforeseeable effects on the characteristics and on the usability of the lubricant.
- The ignition temperature of the lubricant must lie at least 50 K over the maximum surface temperature of the components.

3. Overview, functional description

Fig. 3



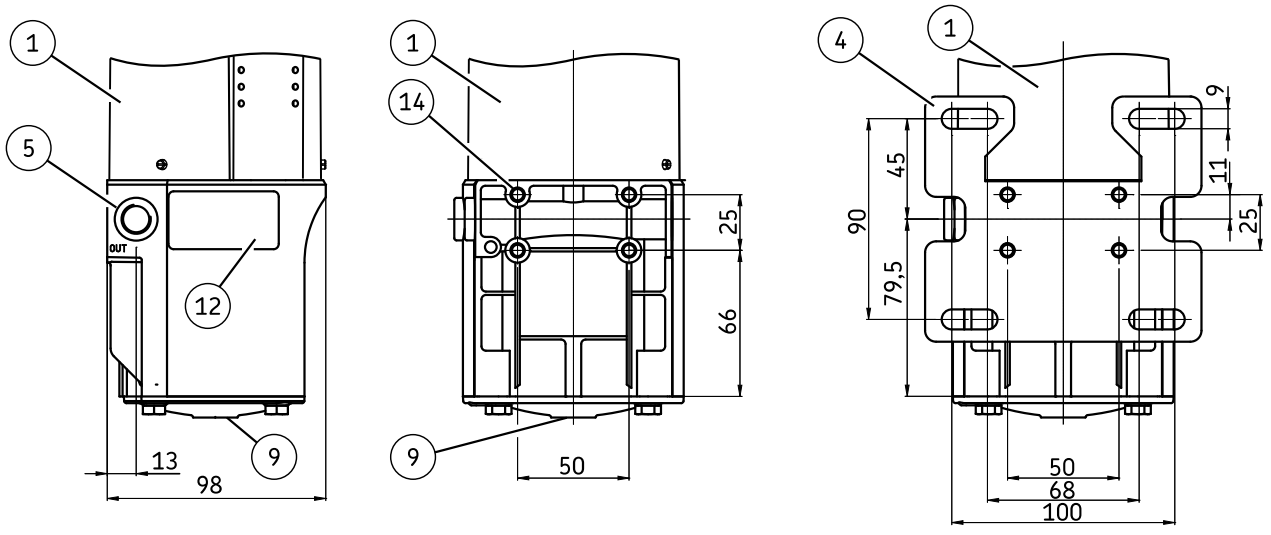
Design and function of the pump variants

Table 3

Legend Illustrations 3 and 4

No.	Explanation:	No.	Explanation:
A	Version for fluid grease (without oil filter), manually operated	7	Oil filter (only in the version for oil supply)
B	Version for oil, pneumatic drive	8	Hand lever
1	Lubricant reservoir	9	Compressed air connection G ¼ x 12 mm
2	Filling aperture with cap	10	Float switch (only in the version for oil supply)
3	Pump housing	11	Capacitive filling level switch (only in the version for fluid grease supply)
4	Connecting flange	12	Type identification plate (Fig. 4)
5	Outlet with cap screw	13	Free space for opening the cap of the filling aperture (86 mm upwards; 237 mm from the right edge of the device to the left)
6	Filling connection/return	14	4 x mounting hole with internal thread M6 x 13 mm (Fig. 4)

Fig. 4



Design and function of the pump variants and the connecting flange

3.1 Construction designs

Single-piston pumps of the ACP/MCP type series with reservoir are offered in two construction designs for the supply of either oil or fluid grease and with lubricant reservoirs in three different sizes. Depending on the design, the actuation can be manual (MCP) or pneumatic (ACP). A filling level monitoring can be supplied as an option.

In case of single-piston pumps for the supply of fluid grease and oil, the filling level switch can be connected via a 4-pin quarter-turn type plug M8x1 (fluid grease / capacitive filling level switch) or M12x1 (oil / float switch). A corresponding cable is offered as an accessory.

The equipment of a single-piston pump with reservoir can be taken from the type identification plate and these instructions. For the type identification code of the ACP/MCP see chapter Type identification code.

NOTE
Should the documentation not be available, you may request it from SKF Lubrication Systems Germany GmbH directly.

3.2 Design

Figure 3 shows the basic design of the single-piston pump ACP respectively MCP. On the pump housing (Fig. 3/3) there is the lubricant reservoir (Fig. 3/1). On the top side of the lubricant reservoir there is a filling aperture (Fig. 3/2), which is equipped on the inside with an oil filter (Fig. 3/7). The oil filter is used for the oil version only. The items (Fig. 3/10) and (Fig. 3/11) designate the filling level switches for the respective construction design.

On the side of the pump housing there are two opposite outlets (Fig. 3/5) for connection of the tubing of the centralized lubrication system and an additional filling connection (Fig. 3/6) for the filling with a filler pump. When delivered, the right outlet is closed with a cap screw.

Depending on the construction design, for activation the single-piston pump either has a hand lever (Fig. 3/8) or a compressed air connection (Fig. 3/9). For further notes regarding the individual connections, see chapter Installation.

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

3.3 Operating principle

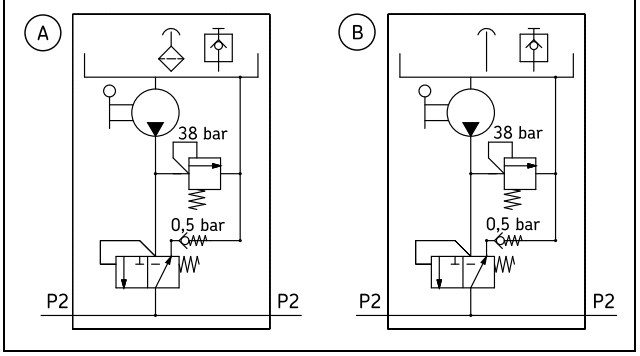
When actuating the single-piston pump the lubricant is conveyed by the actuating piston from the suction chamber into the main line towards the single-line metering devices of the centralized lubrication system. Due to the system pressure built up, the lubricant metered separately for each lubrication point in the single-line metering devices is conveyed to the lubrication points; in the case of pre-lubrication metering devices together with the working stroke of the single-piston pump; in the case of re-lubrication metering devices only after the relief process.

After the working stroke the actuating piston of the single-piston pump moves back into its initial position and thereby takes in lubricant into the suction chamber. At the same time the main line of the centralized lubrication system is relieved from pressure via the relief valve. This allows the lubricant in the metering chambers of the single-line metering devices to be displaced to the respective supply chambers. Then the metering devices are ready for operation again.

The pressure control valve opens as soon as the pressure in the main line of the centralized lubrication system exceeds the maximum admissible value (see chapter „Technical data“). The lubricant is then returned to the lubricant reservoir.

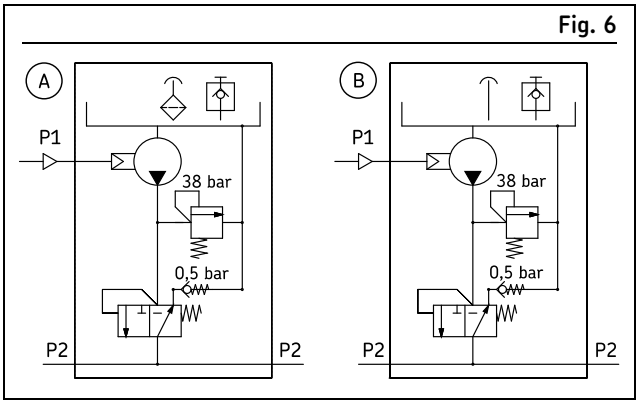
The figures 5 and 6 show the hydraulic circuits of the single-piston pump depending on the type of actuation.

Fig. 5



Hydraulic circuit diagram of the manually operated single-piston pump MCP (A: Oil; B: Fluid grease)

Fig. 6



Hydraulic circuit diagram of the pneumatically operated single-piston pump ACP (A: Oil; B: Fluid grease)

3.4 Connected load

Since each working stroke of the single-piston pump initiates a new lubrication procedure, it must be observed that the connected load of the centralized lubrication system does not exceed 2/3 of the supply volume of the single-piston pump in order to ensure the necessary reserve for the pressure build-up in the centralized lubrication system.

The connected load can be roughly calculated as follows:
Connected load =
Total of all metering devices' metering units of the system
+ 25% of this value (safety surcharge)
+ 1 cm³ per meter main line (ventilation loss, for hose lines only)
+ compressibility loss following table 4 (for grease supply systems only)

Table 4

Compressibility loss in tube lines for grease in cm³/m

Tube 6x0.7	Tube 8x0.7	Tube 10x0.7
0.17	0.34	0.58

3.5 Filling level monitoring

Single-piston pump for oil supply
The filling level monitoring is realized by means of a float switch. The electrical connection of the float switch is made via a 4-pin quarter-turn type plug M12x1.

In filled condition the electrical contact of the float switch is closed while it is open when empty.

Regarding the low-level signal the electrical contact is designed as a normally closed contact. This means, in filled condition, in addition to the filling level monitoring, the electrical cable is monitored with regard to wire breakage.

Single-piston pump for fluid grease supply
The filling level monitoring is realized by means of a capacitive filling-level switch. The capacitive filling-level switch is connected via a 4-pin quarter-turn type plug M8x1. The capacitive filling-level switch can be operated as a normally closed contact or as a normally open contact.
For more details regarding the electrical connection see chapters „Electrical connection (single-piston pumps with filling level monitoring)“ and „Technical data“.

4. Technical data

Table 5

Technical data:

Designation	Values:
Pump:	
Drive	Manual (MCP...) or pneumatic (ACP...)
Capacity of lubricant reservoir	0.5 l; 1.0 l or 1.7 l
Reservoir material	Plastic (PP), transparent
Outputs	G1/4 right- or left-hand side (delivery state: right-hand side closed)
Output volume	up to 15 cm³/stroke
Operating pressure	up to approx. 38 bar (see diagram of inlet pressure/operating pressure for pneumatics)
Lubricant	Mineral oils, synthetic or environmentally friendly oil with an operating viscosity of 20 to 1500 mm²/s or fluid greases of NLGI 000 and 00
Operating temperature	0°C - +60 °C
Filling level monitoring (optional)	• Float switch (only for single-piston pumps for oil supply) or • Capacitive filling level switch (only for single-piston pumps for fluid grease supply)
Degree of protection of the pump following EN60529	IP 54
Purity of the compressed air	At least to grade 5 following ISO 8573-1: Max. particle size/ particle density 40 µm/10 mg/m³ Pressure dew point ≤ 7 °C; Max. water content 7.800 mg/m³; Max. residual oil content 25 mg/m³;
Residual pressure of the residual pressure valve	About 0.5 bar
Empty weight	1660 g (APC15-10A11XX-U10)
Filling:	
Filling aperture on the lubricant reservoir	Ø approx. 60 mm
Filling connection on the side of the pump housing	Flat lubrication fitting following DIN 3404 Form A For nozzle couplers of Form C2 following DIN 1283

Table 5

Technical data:

Designation	Values:
Compressed air connection (pneumatically operated single-piston pumps)	
Connection	G ¼ x 12 mm in the bottom of the housing
Max. primary pressure	10 bar
Min. primary pressure	3.5 bar
Electrical connection (single-piston pumps with filling level monitoring)	
Float switch:	
• Circuit	Normally closed contact (contact open when minimum)
• Max. operating voltage	10-36 V AC/DC
• Max. switching capacity	50 W
• Connection	4-pole push-in type connector M12x1
Capacitive filling level switch:	
• Output function	PNP/NC | NPN/NO
• Operating voltage	10... 36 V DC
• Current carrying capacity	100 mA
• Connection	4-pole push-in type connector M8x1

4.1 Type identification code

A C P 1 5 - 1 W A 1 1 X X - U 1 0

Type designation/type of actuation:
ACP: Pneumatically driven
MCP: Manually driven (hand operated)

Type designation / output:
15: 15 cm³/stroke

Version index:
1: Version

Warning switch for pre-warning:
0: No warning switch
W: Warning switch (pre-warning)

Wall bracket:
0: No wall bracket
A: With wall bracket

Supply port (inlet):
0: Hand operated (for MCP)
1: Connection thread G ¼ (for ACP)

Main line port (outlet):
1: Connection thread G 1/4
X: Closed

Left side (Fig. 7/L)
Right side (Fig. 7/R)

Return (to reservoir)
2: Lubrication fitting (for fluid grease)
X: Closed (for oil)

Type of lubricant:
U: Oil (with filling strainer)
F: Fluid grease (without filling strainer)

Reservoir specification:
05: Refilling reservoir, 0.5 l (without filling strainer, without warning switch)
10: Refilling reservoir, 1.0 l
17: Refilling reservoir, 1.7 l

Fig. 7

Definition

5. Delivery, returns, storage

5.1 Delivery

After receipt of the shipment, it must be inspected for any shipping damage and for completeness according to the shipping documents. Immediately inform the transport carrier of any shipping damage. The packaging material must be preserved until any discrepancies are resolved.

5.2 Return shipment

Before return shipment, all contaminated parts must be cleaned. If this is not possible or practical, e.g. if it would impede fault detection in the case of complaints, the medium used must always be specified. In the case of products contaminated with hazardous substances as defined by GHS or CLP regulations, the safety data sheet (SDS) must be sent with the product and the packaging must be labelled in accordance with GHS/CLP. There are no restrictions for land, air, or sea transport. The choice of packaging should be based on the specific product and the stresses to be expected during transport (e.g., necessary anti-corrosion measures in the case of shipment by sea). In the case of wooden packaging, the applicable import regulations and the IPPC standards must be observed. Required certificates must be included in the shipping documents. The following information, as a minimum, must be marked on the packaging of return shipments.

Fig. 8

Marking of return shipments

5.3 Storage

The following conditions apply to storage:

- Dry, low-dust, vibration-free, in closed rooms
- No corrosive, aggressive substances at the storage location (e.g., UV rays, ozone)
- Protected against animals (insects, rodents)
- If possible, keep in the original product packaging
- Protected from nearby sources of heat or cold
- In the case of large temperature fluctuations or high humidity, take appropriate measures (e.g., heating) to prevent the condensation of water
- Before usage, check products for damage that may have occurred during storage. This applies in particular to parts made of plastic (due to embrittlement).

5.4 Storage temperature range

For parts not filled with lubricant, the permitted storage temperature is the same as the permitted ambient temperature range (see “Technical data”).

5.5 Storage conditions for products filled with lubricant

For products filled with lubricant, the permitted storage temperature range is:

minimum	+ 5 °C	[+41 °F]
maximum	+ 35 °C	[+95 °F]

If the storage temperature range is not maintained, the following steps for replacing the lubricant may not lead to the desired result under certain circumstances.

5.5.1 Storage period up to 6 months

Filled products can be used without implementing additional measures.

5.5.2 Storage period between 6 and 18 months

Pump:

- Connect the pump to a power source
- Switch on the pump and run it until lubricant comes out of every outlet without air bubbles
- Disconnect the pump from the power source
- Remove and dispose of the lubricant that came out

Lines:

- Remove pre-installed lines
- Ensure that both ends of the line are open
- Fill the lines completely with fresh lubricant

Metering devices:

NOTE

Due to the large number of different metering devices, no universally valid statement can be made regarding the removal of the old lubricant and correct bleeding after filling with new lubricant. The instructions can be found in the technical documentation of the specific metering device used.

5.5.3 Storage period more than 18 months

To prevent faults, the manufacturer should be consulted before start-up. The basic procedure for removal of the old lubrication filling corresponds to that for storage periods between 6 and 18 months.

6. Assembly

6.1 General information

Before the assembly/installation of the product, the packaging material as well as possible transport locking devices (e.g. closure plugs etc.) must be removed.

For any installation works observe the owner's respective operation and maintenance regulations as well as the regional accident prevention regulations.

6.2 Set-up and attachment

- The single-piston pumps are delivered in an oil-conserved condition. If necessary, clean the pump with a commercial, non-aggressive cleaning agent before installation.
- Protect the product against humidity and vibration and install it in an easily accessible position to ensure all other installations as well as the pump filling can be carried out without any problem later**.**
- Ensure sufficient air circulation to avoid inadmissible heating up of the single-piston pump. For indications on the maximum admissible ambient temperature see the technical data.
- The single-piston pump's installation position is vertical corresponding to the indications made in this documentation.
- The filling level in the lubricant reservoir and all visual control devices must be clearly visible.
- In case of manually operated single-piston pumps ensure sufficient free space for moving the hand lever.
- Mounting holes for wall mounting of the single-piston pump must be drilled according to the specifications in chapter Connection dimensions.

NOTICE

Damages to the product due to incorrect assembly

During assembly and particularly during any drilling work always pay attention to the following:

- Existing supply lines must not be damaged by the assembly.
- Other units must not be damaged by the assembly.
- The product must not be installed within the range of moving parts.
- The product must be installed at an adequate distance from sources of heat.
- Adhere to safety distances and regional prescriptions on assembly and prevention of accidents.

6.3 Connection dimensions

A single-piston pump with reservoir is mounted on the connecting flange with four fixing bores. The installation dimensions can be taken from Fig. 3 or from this technical documentation. Dimensions and positions of the fixing bores on the connecting flange can be taken also by measurement.

The single-piston pump is fixed to the intended installation place by means of suitable fastening material (e.g. screws, washers, nuts).

6.4 Electrical connection (single-piston pumps with filling level monitoring)

6.4.1 Inductive consumers

When designing circuits with inductive consumers, care must be taken to ensure a low-inductive design in order to keep the wear of the contact faces low. Otherwise, the contact faces of the switch elements might be destroyed. Use adequate measures to protect the contacts of the switch elements.

Connect electrical devices like filling-level switches, pressure switches, way valves, thermometers, etc. according to the indications given in these instructions respectively in the technical documentation of the single-piston pump.

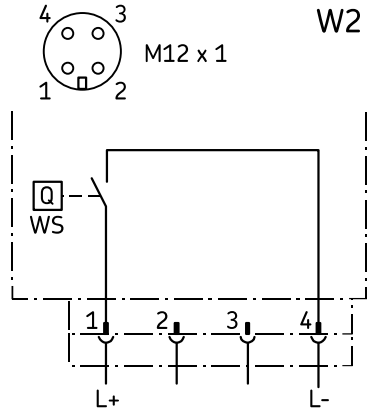
6.4.2 Float switch (single-piston pump for oil supply)

The electrical contact of the float switch for the filling level monitoring of a single-piston pump for oil supply is closed when the lubricant reservoir is full and open when it is empty.

Regarding the low-level signal the electrical contact is designed as a normally closed contact. This means, in filled condition, in addition to the filling level monitoring, the electrical cable is monitored with regard to wire breakage.

Fig. 9 shows the electrical connection and the pin assignment of the quarter-turn type plug for the float switch.

Fig. 9



Quarter-turn type plug for the float switch (illustration: Float switch in case of empty reservoir)

6.4.3 Capacitive filling-level switch (single-piston pump for fluid grease supply)

The capacitive filling-level switch for the filling level monitoring of a single-piston pump for fluid grease supply can be operated as a normally closed contact or as a normally open contact.

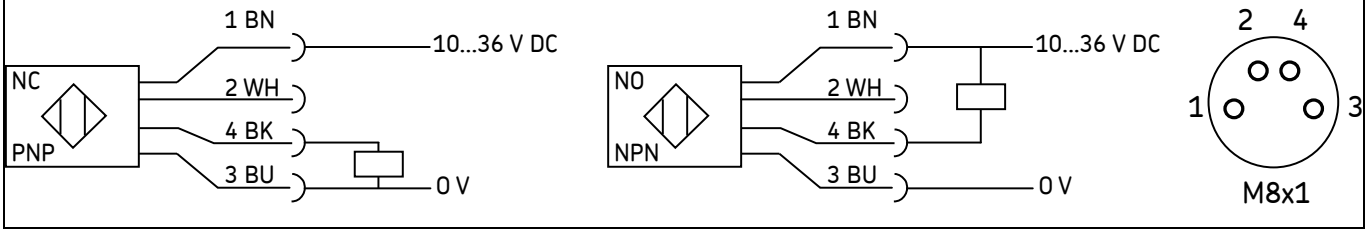
Fig. 10shows the electrical connection and the assignment of the cable cores respectively of the pins of the quarter-turn type plug for the capacitive filling level switch.

Table 6

Colour marking of the cable cores

Abbreviation	Colour
BN	brown
WH	white
BU	blue
BK	black

Fig. 10



Electrical connection of the capacitive filling level switch

PIN 1: Operating voltage 10...36 V DC
PIN 2: not connected
PIN 4: Output (current carrying capacity 100 mA)
PIN 3: 0 V
With regard to the low-level indication the electrical contact has been designed as a normally closed contact (NC).
Reservoir full: PIN 4 = High
Reservoir empty or wire breakage: PIN 4 = Low

PIN 1: Operating voltage 10...36 V DC
PIN 2: not connected
PIN 4: Output (current carrying capacity 100 mA)
PIN 3: 0 V
With regard to the low-level indication the electrical contact has been designed as a normally open contact (NO).
Reservoir full: PIN 4 = Low
Reservoir empty: PIN 4 = High

6.5 Compressed air connection (pneumatically operated single-piston pumps)

Always connect lubrication lines to the single-piston pump in such way that no forces are transferred to the mounted single-piston pump (tension-free connection).

⚠ WARNING

Risk of personal injury by leaking compressed air

Before connection of the single-piston pump to the compressed air supply ensure that the main air valve is closed.

NOTICE

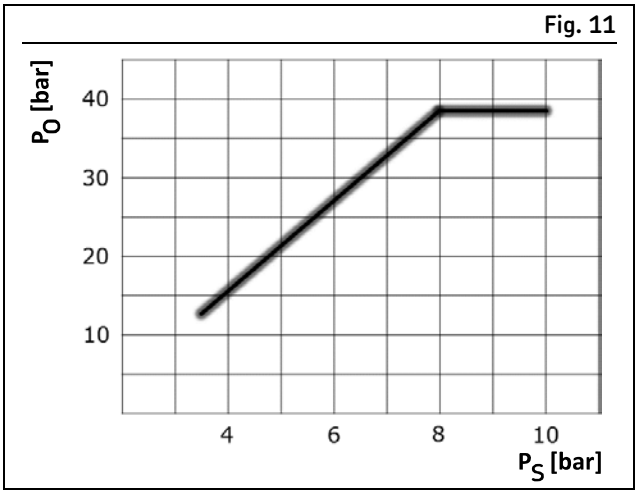
Too high primary air pressure
Damaging of the product

Do not exceed the specified maximum primary air pressure when operating the pneumatically operated single-piston pump.

The compressed air to be used must correspond at least to grade 5 following ISO 8573-1 (see chapter „Technical data“).

At the bottom of the pump housing of the single-piston pump there is located a compressed air connection. For further details regarding the compressed air connection see Fig. 11.

Fig. 11



Pressure diagram

Legend of Fig. 11:
P_O: Operating pressure [bar]
P_S: Inlet / supply pressure [bar]

It must be possible to switch the compressed air on and off via way valves either mechanically, by hand or electromagnetically. Ensure proper and complete pressure relief of the compressed air line after each activation to allow the actuating piston to return to its initial position.

6.6 Lubrication line connection

Always connect the lubrication line to the single-piston pump in such way that no forces are transferred to the mounted single-piston pump (tension-free connection).

NOTICE

Too high operating pressure
Damage to the fittings and lubrication lines
The fittings used for the lubrication line connection have to be designed for the maximum operating pressure of the single-piston pump. Otherwise the lubrication line system must be protected against inadmissible high pressure by means of an overpressure safety valve.

For operating pressures of up to 45 bar, such as those occurring particularly in single-line piston metering device systems, there may be used SKF solderless lubrication line fittings (double or single cone rings).

6.7 Laying of the lubrication lines

When laying the main lubrication lines and the lubricant feed lines, observe the following information in order to ensure a trouble-free function of the entire centralized lubrication system.

- Dimension the lubrication line according to the maximum arising pressure and the output volume of the lubrication unit used. Starting from the lubrication unit, the main lubrication line should be laid preferably rising with a possibility to vent it at the highest point of the lubrication line system.
- Mount the lubricant metering devices at the end of the main lubrication line in such way that the outlets of the lubricant metering devices show upwards. If lubricant metering devices have to be mounted below the main lubrication line, then this should not be done at the end of the main lubrication line.
- The tube lines, hoses, shut-off and way valves, fittings, etc. have to be designed for the maximum operating pressure of the lubrication unit, the admissible temperatures and the lubricants to be supplied. Furthermore, the lubrication line system must be protected against inadmissible high pressure by means of a pressure control valve.
- Before the assembly thoroughly clean all components of the lubricant feed line system like tube lines, hoses, shut-off and way valves, fittings, etc. In the lubrication line system no seals should protrude towards the inside, as the lubricant flow could be impeded and contaminations could enter the lubrication line system.
- Lubrication lines shall generally be laid in such way that there can never be created air pockets at any point. Avoid changing the cross sections of the lubrication line from smaller to larger cross sections in the lubricant flow direction. Design cross section transitions as smooth as possible.
- The lubricant flow in the lubrication lines should not be impeded by the installation of sharp elbows, angle valves and check valves. Provide unavoidable changes of the cross sections in the lubrication lines with as smooth transitions as possible. Avoid sudden changes of direction, if possible.

NOTICE

Lubricants leaking from leaky lubrication lines
Lubricants may pollute ground and waters.
Lubrication lines must be absolutely leakproof. Lubricants may pollute ground and waters. Lubricants have to be handled and disposed of properly. Observe the regional laws and prescriptions regarding disposal of the lubricants.

⚠ CAUTION

Lubricants leaking from leaky lubrication lines

Risk of slipping and injury

Centralized lubrication systems must be absolutely leakproof. Leaking lubricant is hazardous due to the risk of slipping and injury. During assembly, operation, maintenance and repair of centralized lubrication systems watch out for leaking lubricant. Leaks must be sealed immediately.

Lubricant leaking from centralized lubrication systems constitutes a considerable potential risk. Leaking lubricant may result in harm to persons or damage to material assets.

Adhere to the respective safety instructions in the lubricant safety data sheet. The safety data sheet of a lubricant may be requested from the lubricant manufacturer.

7. First start-up

NOTE
Before commissioning the single-piston pump check all pneumatic and, if existing, electrical connections.

After assembly of the single-piston pump and laying the lubrication lines, the start-up of the centralized lubrication system is done as follows:
- Filling the lubricant reservoir
- Adjustment of the capacitive filling-level switch (single-piston pumps for fluid grease supply with filling level monitoring)
- Venting the centralized lubrication system

7.1 Lubricant filling

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

NOTICE
System failure due to contaminated lubricant or use of unsuitable filling device
Use a suitable filling device to fill in clean lubricant only. Contaminated lubricants may result in serious system failures. Ensure bubble-free filling of the lubricant reservoir.

NOTICE
Damages when using different lubricants

Different lubricants must not be mixed. Doing so may cause damage and require costly and complicated cleaning of the pump unit or 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.

Lubricant may be supplied free from air bubbles only. To ensure this, fill the lubricant reservoir with clean lubricant and free from bubbles.

Procedure in case of single-piston pump for oil supply:
1. Remove lid from lubricant reservoir
2. Fill in lubricant through the strainer
3. Adhere to dwell time to ensure lubricant inside the reservoir is free from bubbles
4. Close filling aperture again

Procedure in case of single-piston pump for fluid grease supply:
1. Fill in lubricant via the filling connection on the pump housing
2. Lubricant filling via filler lid is also possible with adequate equipment (e.g. barrel pump or similar)
3. Then vent the single-piston pump and the centralized lubrication system

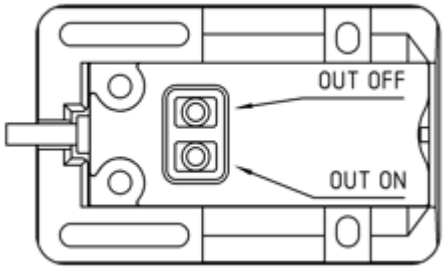
7.2 Adjustment of the capacitive filling level switch (single-piston pumps for fluid grease supply with filling level monitoring)

In case of single-piston pumps for fluid grease supply with capacitive filling level switch, adjust the switch before commissioning the single-piston pump to ensure reliable functioning of the switch in its installation environment.

The adjustment (see table 7) comprises the following steps:
- Empty adjustment
- Full adjustment
- Locking

NOTE
Make sure to carry out the empty adjustment before proceeding to the full adjustment. If during commissioning a proper empty adjustment is not possible, as the lubricant reservoir is filled and emptying the reservoir is not possible, carry out an empty adjustment by simulating an empty condition (by detaching the switch; empty adjustment at a higher position). For optimal functioning, a modified empty adjustment should be carried out after emptying the reservoir.

Fig. 12



Sensor

NOTE
Lubricant residuals at the reservoir wall may impact the signal. For an optimal empty adjustment we recommend to first fill the lubricant reservoir, then empty it and then carry out a modified empty adjustment.
Repeating a modified empty adjustment is possible at any time. An already performed full adjustment is not affected.

Table 7

Functions of the electronic filling level switch

Designation:	Explanation:	Version:	Display:
Empty adjustment	The empty adjustment readjusts the switch. The switch is readjusted to the empty lubricant reservoir. An adjustment already performed is deleted.	Empty the reservoir up to about 20 mm below the sensor. • Device as normally open contact: Keep OUT OFF pressed for minimum 2 s up to maximum 6 s. • Device as normally closed contact: Keep OUT ON pressed for minimum 2 s up to maximum 6 s.	LED flashes slowly. • Normally open contact: After releasing the key, the LED goes out. • Normally closed contact: After releasing the key, the LED lights up constantly.
Full adjustment	In addition to the empty adjustment, the switch can also be adjusted to the full lubricant reservoir.	Fill reservoir until the active face is fully covered. • Device as normally open contact: Keep OUT ON pressed for at least 6 s. Device as normally closed contact: Keep OUT OFF pressed for at least 6 s.	LED first flashes slowly, after 6 s it flashes more quickly. • Normally open contact: After releasing the key, the LED lights up constantly. • Normally closed contact: After releasing the key, the LED goes out.
Modified empty adjustment	Recommended in case of deposits inside the reservoir. But also if an empty adjustment is not possible with a full reservoir during commissioning of the sensor.	Empty reservoir until the filling level undergoes the active face. • Device as normally open contact: Keep OUT OFF pressed for at least 6 s. • Device as normally closed contact: Keep OUT ON pressed for at least 6 s.	LED first flashes slowly, after 6 s it flashes more quickly. • Normally open contact: After releasing the key, the LED goes out. • Normally closed contact: After releasing the key, the LED lights up constantly.
Locking/unlocking	The switch is locked or unlocked.	Locking: • Keep OUT OFF and OUT ON pressed simultaneously for a minimum of 10 s. Unlocking: • Repeat procedure.	LED status changes. • Lighting LED will go out shortly. • Non-lighting LED lights up shortly.

7.3 Vent centralized lubrication system

NOTICE

Functional failure due to air pockets in the lubricant

Lubricant may only be supplied free from air bubbles. Air inclusions in the lubricant impair the function of the centralized lubrication system and affect safe lubricant supply, which can cause damage to the bearing points to be lubricated.

For the venting procedure of the centralized lubrication system it is helpful to:

- Open the ends of the main tube lines until lubricant emerges free from bubbles
- Fill longer lubrication line sections before connecting them

The centralized lubrication system is vented as follows:

1. Disassemble the main lubrication lines from the single-piston pump. Operate the single-piston pump until bubble-free lubricant escapes from the outlet. Then mount the main lubrication lines again.
2. Disassemble the main lubrication line from the main metering device. Operate the single-piston pump until bubble-free lubricant escapes from the main line. Then mount the main lubrication line again.
3. Disassemble the secondary lubrication lines from the main metering device. Operate the single-piston pump until bubble-free lubricant escapes from all outlets of the main metering device. Then mount the secondary lubrication lines again.
4. Finally check the entire centralized lubrication system for proper functioning.

NOTE

Make sure to vent also the second closed outlet in the pump housing.

8. Operation

8.1 General notes

During operation the following notes should be observed to ensure a trouble-free operation of the centralized lubrication system:

- Regular checks of the lubricant transport in the lubrication lines
- Regular checks of the lubrication status of the lubrication points
- Regular visual checks of the lubricant filling level in the lubricant reservoir (also in case of single-piston pumps with filling-level monitoring)

  If the lubricant filling level is too low, refill lubricant as described in chapter Lubricant filling.
- Regular checks of the operating displays of the capacitive filling-level switch (see table 8).

Table 8

Single-piston pumps for fluid grease supply with filling-level monitoring

LED display	Meaning
Yellow LED is on	Switching output conductive
Yellow LED is off	Switching output non-conductive

9. Maintenance and repair

Careful and regular maintenance is required in order to detect and remedy possible faults in time. The operator must always determine the specific intervals according to the operating conditions, review them regularly, and adjust them where necessary. If necessary, copy the table for regular maintenance activities.

⚠ WARNING

Electric shock

Carry out cleaning works only on products that have been disconnected from the power supply. Observe the IP type of protection when cleaning electrical components.

⚠ WARNING

During operation the system is pressurized. Personal injury is possible

During operation centralized lubrication systems are pressurized. Therefore, centralized lubrication systems must be depressurized before starting any assembly, maintenance, modification or repair works.

Products of SKF Lubrication Systems Germany GmbH require little maintenance. However, in order to ensure proper functioning and avoid dangers from the outset, all connections and joints should be checked for firm seating at regular intervals.

Should incorrect or contaminated lubricant have been filled accidentally, inside cleaning of the product will be required. To do so please contact the Service Department of SKF Lubrication Systems Germany GmbH.

Disassembly of the product or of single components of the product within the legal warranty period is not admissible and will result in the voiding of any warranty.

NOTE

SKF Lubrication Systems Germany GmbH accepts no liability for damages to the product resulting from improper installation, maintenance and repair works.

10. Cleaning

10.1 Special cleaning instructions for the ACP/MCP

NOTE

Check the oil filter for contamination before and after each filling procedure. If the oil filter is dirty, make sure to clean it.

10.2 Basics

Cleaning should be carried out in accordance with the operator's own company rules, and cleaning agents and devices and the personal protective equipment to be used should likewise be selected in accordance with those rules. Only cleaning agents compatible with the materials may be used for cleaning. Completely remove any cleaning agent residue left on the product and rinse with clear water. Unauthorized persons must be kept away. Use signage to indicate wet areas.

10.3 Interior cleaning

The interior normally does not need to be cleaned. The interior of the product must be cleaned if incorrect or contaminated lubricant accidentally enters the product. Please contact our Service department.

10.4 Exterior cleaning

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

⚠ WARNING

Serious injury from contact with or inhalation of hazardous substances

Wear personal protective equipment.
Observe the safety data sheet (SDS) of the hazardous substance.

Avoid contaminating other objects or the environment during cleaning.

11. Faults, causes, and remedies

The following table 9 gives an overview of possible malfunctions and their causes. If it is not possible to remedy the malfunction, please contact the Service Department of SKF Lubrication Systems Germany GmbH.

⚠ WARNING

Danger by electric shock

Assembly, maintenance, and repair works may be performed only on products previously disconnected from the power supply.

⚠ WARNING

During operation the system is pressurized
Personal injury is possible

During operation centralized lubrication systems are pressurized. Therefore, centralized lubrication systems must be depressurized before starting any assembly, maintenance, modification or repair works.

Table 9

Fault analysis and fault remedying:

Fault:	Possible causes:	Remedy:
Power transmission from operating lever to pump is interrupted	• Seals in the actuating cylinder are defective (pneumatic, hydraulic actuation) • Retaining spring is broken	Disassemble pump considering safety instructions and replace defective parts.
Pump does not supply, no pressurization	• Not enough lubricant in the reservoir	Refill lubricant
	• Wrong lubricant	Remove the wrong lubricant from the entire centralized lubrication system and refill fresh lubricant. The replaced lubricant must be disposed of properly.
	• Air in the system	Vent the system until lubricant leaks from the vent bores without bubbles.
	• Inside parts	Disassemble pump considering safety instructions and replace defective parts.

12. Repairs

⚠ WARNING

Risk of injury

At a minimum, the following safety measures must be taken before any repairs:

- Unauthorized persons must be kept away
- Mark and secure the work area
- Depressurize the product

- Isolate the product, and lock and tag it out
- Check to ensure live voltage is no longer present
- Ground and short-circuit the product
- Cover any adjacent live parts

13. Shutdown, disposal

13.1 Temporary shutdown

- A temporary shutdown of the described product is done by disconnecting the electrical, pneumatic and/or hydraulic supply connections. Note the instructions given in the chapter Safety instructions in these Assembly Instructions.
- When shutting the product down for a longer period of time, additionally observe the instructions given in chapter Delivery, returns and storage in these Assembly Instructions.
- For restarting the product observe the instructions given in the chapter Installation and commissioning in the Assembly Instructions.
- For a temporary shutdown, the operator has to determine further measures, if necessary.

13.2 Final shutdown and disassembly

The final shutdown and disassembly of the product must be planned and carried out by the operator in a professional manner and in compliance with all laws and regulations to be observed.

13.3 Disposal

The disposal of the different types of waste must be carried out by the waste producer/operator in accordance with the laws and regulations applicable in the country.

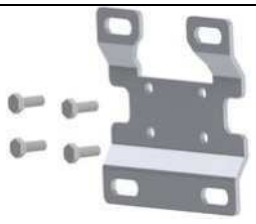
The product can also be returned for disposal to SKF Lubrication Systems Germany GmbH, in which case the customer is responsible for reimbursing the costs incurred.

14. Spare parts

Spare parts may be used exclusively for replacement of identical defective parts. Modifications with spare parts on existing products are not allowed.

Table 10

Spare parts

Designation	Part number	Fig.
Filling level switch assy.	24-2540-2955	
Filling strainer PA/NYLON	44-1874-2018	
KIT replacement reservoir 0.5 ACP/MCP (shown on the right) KIT replacement reservoir 1.0 ACP/MCP KIT replacement reservoir 1.7 ACP/MCP	5112-00000001 5112-00000002 5112-00000003	
KIT replacement filler lid ACP/MCP	5112-00000004	
KIT replacement level sensor ACP/MCP	5112-00000005	
KIT holding bracket ACP/MCP	5112-00000006	

NOTE

For further technical data see the following brochures:

- Electrical push-in type connectors (brochure no. 1-1730-EN)
- Lubricant metering device for SKF MonoFlex systems (brochure no. 1-5001-EN)
- Transport of lubricants in centralized lubrication systems (brochure no. 1-9201-EN)

15. Appendix

15.1 China RoHS Table

Table 11

部件名称 (Part Name)	有毒害物质或元素 (Hazardous substances)					
	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
用钢和黄铜加工的零件 (Components made of machining steel and brass)	X	0	0	0	0	0

本表格依据SJ/T11364的规定编制 (This table is prepared in accordance with the provisions of SJ/T 11364.)

O：表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。
(Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.)

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572标准规定的限量要求。
(Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.)

Notes

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