Lubricant feed pump ZPU 08, ZPU 14, and ZPU 24

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Read these instructions before installation or start-up of the product and keep them readily available for consultation.

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: Electrically operated pump for the supply of lubricants within a centralized lubrication system
Type: ZPU 08, 14, 24
Item number: 605-xxxxx-x / 6050-xxxxxxxx

Furthermore, the following directives and standards were applied in the respective applicable areas:
2006/42/EC: Machinery Directive
2011/65/EU: RoHS II
2014/30/EU: Electromagnetic Compatibility
EN ISO 12100:2010 EN 809:1998+A1:2009/AC:2010 EN 60204-1:2018
EN 60947-5-1:2004/A1:2009 EN IEC 60947-5-2:2020
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.

Walldorf, 06.05.2021
Jürgen Kreutzkämper
Manager, R&D
Germany

Stefan Schürmann
Manager, PD
Germany South

Manufacturer: SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, 69190 Walldorf, 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: Electrically operated pump for the supply of lubricants within a centralized lubrication system
Type: ZPU 08, 14, 24
Item number: 605-xxxxx-x / 6050-xxxxxxxx

Furthermore, the following regulations and standards were applied in the respective applicable areas:
Supply of Machinery (Safety) Regulations 2008 No. 1597
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 60204-1:2018
EN 60947-5-1:2004/A1:2009 EN IEC 60947-5-2:2020
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 UK legislation Supply of Machinery (Safety) Regulations 2008 No. 1597 and all other applicable Directives.

Walldorf, 06.05.2021
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Manufacturer: SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, 69190 Walldorf, Germany

NOTE

The **product variants without electrical components** do **not** fall within the scope of application of the EMC Directive (2014/30/EU) or the "Electromagnetic Compatibility Regulations 2016 No. 1091," nor the scope of the RoHS Directive (2011/65/EU) or the "Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032."

Appendix to Declaration of Incorporation in accordance with 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 fulfilled:

Table 1

Appendix to Declaration of Incorporation
Piston pumps with reservoir, with/without external motor, without control unit
Types: P205, P208, P212, P215, P230, ZPUxx, JM, FF, FB, FK, RA, TA, TB

No.:	Essential health and safety requirement	Applicable:	Fulfilled:
1.1	Principles		
1.1.2	Principles of safety integration	Yes	Yes
1.1.3	Materials and products	Yes	Not completely fulfilled [1)]
1.1.5	Design of machinery to facilitate its handling	Yes	Yes
1.1.6	Ergonomics	Yes	Not completely fulfilled [2)]
1.2	Control systems		
1.2.1	Safety and reliability of control systems	Yes	Yes
1.2.3	Starting	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	Not completely fulfilled [3)]
1.3.4	Risks due to surfaces, edges or angles	Yes	Yes
1.3.7	Risks related to moving parts	Yes	Yes
1.3.9	Risks of uncontrolled movements	Yes	Yes
1.5	Risks due to other hazards		
1.5.1	Electricity supply	Yes	Yes
1.5.6	Fire	Yes	Yes
1.5.8	Noise	Yes	Yes
1.5.13	Emissions of hazardous materials and substances	Yes	Yes
1.5.15	Risk of slipping, tripping, or falling	Yes	Not completely fulfilled [4)]
1.6	Servicing		
1.6.1	Machinery maintenance	Yes	Yes
1.6.2	Access to operating positions and servicing points	Yes	Not completely fulfilled [5)]
1.6.4	Operator interventions	Yes	Yes
1.7	Information		
1.7.1	Information and warnings on the machinery	Yes	Yes
1.7.1.1	Information and information devices	Yes	Yes
1.7.2	Warning of residual risks	Yes	Yes
1.7.3	Marking of machinery	Yes	Yes
1.7.4	Operating instructions/assembly instructions	Yes	Yes
1.7.4.1	General principles for the drafting of operating instructions/assembly instructions	Yes	Yes
1.7.4.2	Contents of the operating instructions/assembly instructions	Yes	Yes
1.7.4.3	Sales literature	Yes	Yes

[1)] The product is designed for operation with non-hazardous media. The owner-operator must check whether the lubricant used has certain hazardous effects (such as sensitization). The installation of a drip pan could be required. Pressure-relief valves must also be used.

[2)] The operator must ensure that the pump is integrated into the higher-level machine in such a way that the pump can be operated and filled ergonomically.

[3)] The operator must protect the lubrication system against excessive pressure. This should be done by fitting every pump element with a pressure limiting valve with suitable opening pressure (see the "Technical data" for the pump in question).

[4)] Not relevant inside the incomplete machine (pump), only outside the partially completed machine. The machine's owner or operator is responsible here.

[5)] The owner-operator must ensure that the pump is integrated into the main machine in such a way that it can be operated without danger.

Masthead

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Authorized local distributors
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- North America -
SKF Lubrication Business Unit
Lincoln Industrial
5148 North Hanley Road, St. Louis,
MO. 63134 USA

- South America -
SKF Argentina Pte. Roca 4145,
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 electrical safety instructions

- Electrical devices must be kept in proper condition. This must be ensured by periodic inspections in accordance with the relevant applicable standards and technical rules. The type, frequency, and scope of the inspections must be determined in accordance with the risk assessment to be carried out by the operator. Work on electrical components may be performed only by qualified electricians. Connect the electrical power only in accordance with the valid terminal diagram and in observance of the relevant regulations and the local electrical supply conditions.
- Work on electrical components may be performed only in a voltage-free state and using tools suitable for electrical work. Do not touch cables or electrical components with wet or moist hands.
- Fuses must not be bridged. Always replace defective fuses with fuses of the same type.
- Ensure proper connection of the protective conductor for products with protection class I. Observe the specified enclosure rating.
- The operator must implement appropriate measures to protect vulnerable electrical devices from the effects of lightning during use. The electrical device is not furnished with a grounding system for the dissipation of the respective electric charge and does not have the voltage strength necessary to withstand the effects of lightning.

1.3 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.

1.4 Intended use

Supply of lubricants.
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.

1.5 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.

1.6 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.

1.7 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.

1.8 Prohibition of certain activities

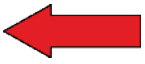
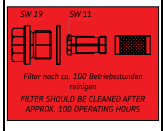
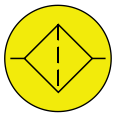
- Replacement of or modifications to the pistons of the pump elements
- Repairs or modifications to the drive

1.9 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.

1.10 Safety markings on the product

Fig. 1

	Risk of dangerous electrical voltage (on the motor terminal box)
	Risk of wrapping, pinching, crushing, or shearing when the reservoir lid is open (only for reservoirs with filling from above)
	Risk of injury from spring tension (only for pumps with a follower plate)
	Direction of rotation of the pump (stirring paddle)
	Information label for filter cleaning "Clean the filter after approx. 100 hours of operation"
	Sticker position on filter (on the plug screw of the filter)
	Sticker position on check valve (on the plug screw of the check valve)

Possible safety markings on the product

1.11 Note on the type plate

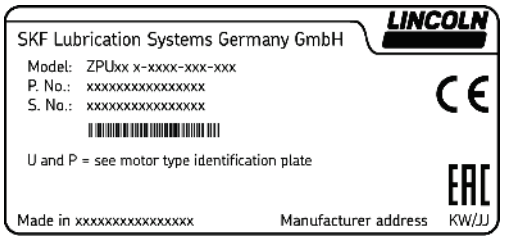
The type plate provides important data such as the type designation, order number, and sometimes regulatory characteristics. To avoid loss of this data in case the type plate becomes illegible, it should be entered in the manual.

Table 2

Table for copying out the type plate

Model:	
P-No. :	
S-No. :	

Fig. 2



Type plate (example)

1.12 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)

NOTE

For **product variants with electrical components** (e.g., filling level sensors), the following directives and regulations apply (see also the original declarations of incorporation on page 2):

- EMC Directive (2014/30/EU) and "Electromagnetic Compatibility Regulations 2016 No. 1091"
- RoHS Directive (2011/65/EU) and "Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032."

For this reason, these product variants bear CE, UKCA, and China RoHS marks.

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 3

Residual risks

Residual risk	Possible in lifecycle	Avoidance / Remedy
Personal injury / property damage due to falling of hoisted parts	A B C G H K	• Unauthorized persons must be kept away. Nobody is allowed to be present below hoisted parts. Lift parts using suitable and tested lifting gear.
Personal injury/property damage due to tilting or falling product due to non-compliance with specified torques	B C D E F G	• Adhere to the specified torques • Mount the product only on components with a sufficient load-carrying capacity. • If no torques are specified, use those specified for the screw size for screws of strength class 8.8.
Personal injury / property damage due to electric shock	B C D E F G H	• Inspect power cables for damage prior to initial use and then at regular intervals. • Before connecting the pump unit, de-energize all relevant electrical components. Observe any discharge times. • Do not install the cable on moving parts or wearing spots. If this cannot be avoided, use anti-kink coils and/or conduits.
Personal injury / property damage due to spilled, leaked lubricant	B C D E F G H K	• Be careful when filling the reservoir and then connecting or disconnecting the lubricant lines. • Use only hydraulic screw unions and lubrication lines suitable for the specified pressure. • Do not install lubrication lines on moving parts or chafe points. If this cannot be avoided, use flexible hose lines or anti-kink coils and/or conduits. • Promptly apply suitable binding agents and then remove the spilled or leaked lubricant. • Follow operational instructions for handling the lubricants and contaminated parts.
Injury from contact with the stirring paddle when filling the pump	C D F	• Preferably fill via the fill connection. Fill from the top, only when the paddle is motionless, and with the pump de-energized. Do not reach into the reservoir while filling.
Injury from hot/faulty motor	E F G	• Switch off the pump. Let parts cool off; remedy the cause.
Injury due to spring tension in reservoirs with a follower plate	F G H	• Wait until tension has been relieved on the spring as much as possible (i.e., the reservoir is empty) before removing a reservoir with a follower plate. Provide a suitable protective measures when loosening the reservoir, e.g., a retaining strap. Do not work with your head directly above the reservoir.

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 relevant application. The manufacturer or operator of the machine should ideally make the selection in consultation with the supplier of the lubricant. If you have no or little experience in selecting lubricants for lubrication systems, please contact us. We would be happy to assist you in selecting suitable lubricants and components to build a lubrication system optimized for your particular application. Consider the following points when selecting/using lubricants. This will spare you potential downtime and damage to the machine or lubrication system.

2.2 Material compatibility

The lubricants must generally be compatible with the following materials:

- Plastics: ABS, CR, FPM, NBR, NR, PA, PET, PMMA, POM, PP, PS, PTFE, PU, PUR
- Metals: steel, gray cast iron, brass, copper, aluminum

2.3 Temperature properties

The lubricant used must be suitable for the specific ambient temperature of the product. The viscosity approved for proper functioning must neither be exceeded at low temperatures nor fall too low at high temperatures. For the approved viscosity, see the “Technical data” chapter.

2.4 Aging of lubricants

Based on past experience with the lubricant used, checks should be conducted at regular intervals defined by the operator, to determine whether the lubricant needs to be replaced due to aging processes (oil separation). In case of doubt regarding the continued suitability of the lubricant, it must be replaced before the system is started up again. If you do not yet have any experience with the lubricant used, we recommend conducting a check after just one week.

2.5 Avoidance of faults and hazards

To avoid faults and hazards, please observe the following:

- When handling lubricants, observe the relevant safety data sheet (SDS) and any hazard labeling on the packaging.
- Due to the large number of additives, some lubricants that meet the pumpability requirements specified in the manual are not suitable for use in centralized lubrication systems.
- Whenever possible, always use SKF lubrication greases. They are ideal for use in lubrication systems.
- Do not mix lubricants. This can have unpredictable effects on the properties and usability of the lubricant.
- Use lubricants containing solid lubricants only after technical consultation with SKF.
- The lubricant’s ignition temperature has to be at least 50 kelvin above the maximum surface temperature of the components.

2.6 Solid lubricants

Solid lubricants may only be used after prior consultation with SKF. When solid lubricants are used in lubrication systems, the following rules generally apply:

Graphite:

- Maximum graphite content 8%
- Maximum grain size 25 µm (preferably in lamellar form)

MoS2:

- Maximum MoS2 content 5%
- Maximum grain size 15 µm

Copper:

- Lubricants containing copper are known to lead to coatings forming on pistons, bore holes, and mating surfaces. This can result in blockages in the centralized lubrication system.

Calcium carbonate:

- Lubricants containing calcium carbonate are known to lead to very heavy wear on pistons, bore holes, and mating surfaces.

Calcium hydroxide:

- Lubricants containing calcium hydroxide are known to harden considerably over time, which can lead to failure of the centralized lubrication system.

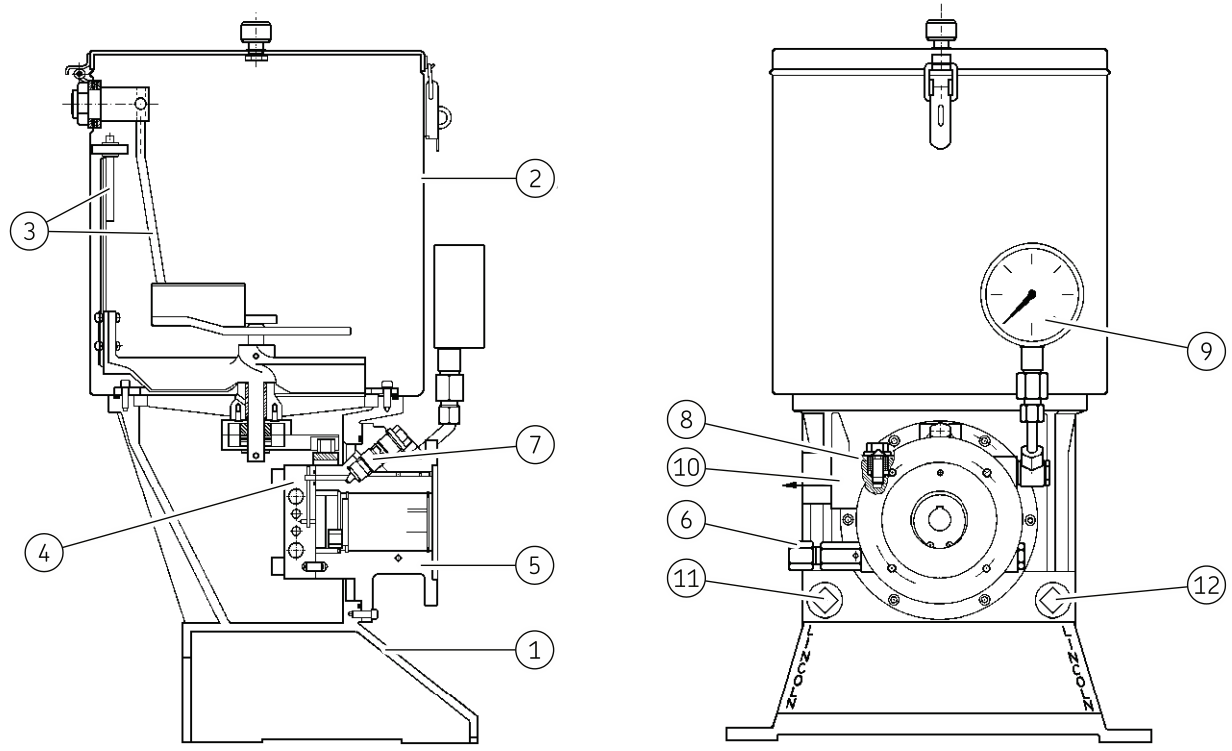
PTFE, zinc, and aluminum:

- For these solid lubricants, it is not yet possible to define any limit values for use in lubrication systems on the basis of existing knowledge and practical experience.

3. Overview, functional description

3.1 Overview

Fig. 3



Structure of the pumps ZPU 08/14/24

1 Pump housing
2 Lubricant reservoir
3 Stirring paddle with scraper blade and fixed paddle
4 High-pressure pump element
5 Bearing flange with drive
6 Pressure limiting valve
7 Check valve
8 Lubricant filter
9 Pressure gauge
10 Pressure line connection
11 Relief line connection
12 Fill connection

NOTE

The exact structure and features of the pump are indicated by the type identification code (see section Pump type identification code ZPU 08...24, Page 26).

Reservoir
The reservoir stores the lubricant. Different reservoir designs and reservoir sizes exist in accordance with the pump variant.

Reservoir cover
The reservoir lid is used to fill the reservoir with clean and suitable lubricant, and also to protect the lubricant from contamination.

Fill connection
Used for filling the pump.

Pressure limiting valve
The pressure limiting valve protects the pump from excessively high back pressure. The pressure limiting valve is set to a pressure of 410 bar [5946 psi] and sealed.

Stirring paddle
The stirring paddle homogenizes and smooths the lubricant while the pump is running.
In addition, the lower vertical part of the stirring paddle presses the lubricant in the direction of the pump elements and improves the suction characteristics of the pump as a result.

Pressure gauge
Used to monitor the working pressure of the pump.

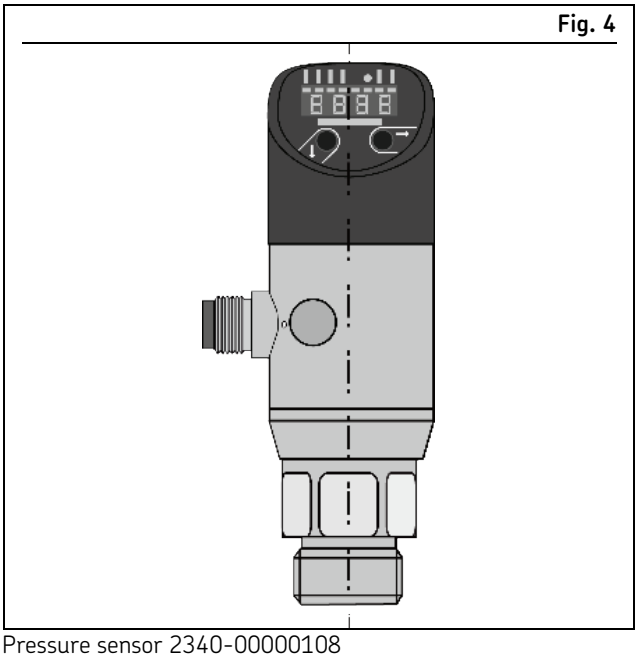
Lubricant filter
Used for cleaning of the lubricant, in case foreign substances have gotten into the pump reservoir.

3.2 Accessories

Electrohydraulic pressure monitor
The electrohydraulic pressure monitor switches off the drive motor of the pump at a set pressure (160 to 400 bar).

Electronic pressure sensor

Fig. 4



Pressure sensor 2340-00000108

The pressure sensor monitors the delivery pressure of the pump. The pressure sensor has digital and analog outputs, and also an IO-Link interface for connection to the system control. The switching points can be set to anywhere in the range from 0 to 400 bar.

Low-level signal – 40 liters [10.6 gal.] Reservoir
The low-level signal is triggered using the swivel-mounted fixed paddle and a reed switch.

NOTE
Do not use with lubricants of NLGI Grade 3.

Full signal – 40 liters [10.6 gal.] Reservoir
The full signal is triggered using a diaphragm and a reed switch.

Cover switch (overfill release valve) – 40 liters [10.6 gal.] Reservoir
The cover switch is activated when the reservoir cover is opened and when the reservoir is overfilled.

Low-level and full signals – 100 liters [26.4 gal.] Reservoir
The low-level and full signals are triggered using a follower plate and two position switches.

Low-level and full signals using a digital ultrasonic sensor – 40 liters [10.6 gal.] and 100 liters [26.4 gal.] Reservoir
Ultrasonic sensor for monitoring the fill level in the reservoir. Two LEDs are used to display the respective fill level. (See the "Technical data" of the ultrasonic sensor). The switching points are set at the factory according to the reservoir size.

Level measurement using an analog ultrasonic sensor – 40 liters [10.6 gal.] and 100 liters [26.4 gal.] Reservoir
Ultrasonic sensor for measuring the fill level in the reservoir. The fill level of the reservoir is transmitted as an analog current value via the 4 to 20 mA interface or 0 to 10 V interface.

3.3 Functional description

The lubricant is filled into the lubricant reservoir (Fig. 3/12) from above, either through the opened cover or through a filling pump.

The lubricant reservoir contains a stirring paddle with a scraper blade, and a fixed paddle (Fig. 3/3). The rotary motion of the stirring paddle homogenizes the lubricant and removes air from it. The fixed paddle prevents the lubricant from flowing in the the direction in which the stirring paddle is rotating. If an electric low-level signal is installed, then the fixed paddle is swivel-mounted.

The high-pressure pump element supplies the lubricant to the pressure line connection (Fig. 3/10) via a check valve (Fig. 3/7) and a lubricant filter (Fig. 3/8). The following are also connected to the pressure line connection: pressure limiting valve (Fig. 3/6) and pressure gauge (Fig. 3/9).

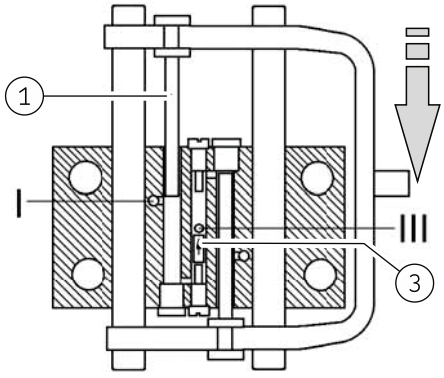
Functional description of high-pressure pump element for pumps ZPU08, ZPU14, ZPU24

The pump element (Fig. 3/4) works as a piston pump with two pistons acting in opposite directions, which alternately draw in lubricant and dispense it to the pressure line through the outlet hole. The outlet ducts of the high-pressure pistons are controlled by a floating valve piston.

The pump element is driven by a hollow shaft with an eccentric pin and a roller. The rotary movement of the drive shaft is converted into a back-and-forth movement of the pump pistons.

This type of drive allows the direction of rotation on the pump shaft to be selected or changed as desired.

Fig. 5

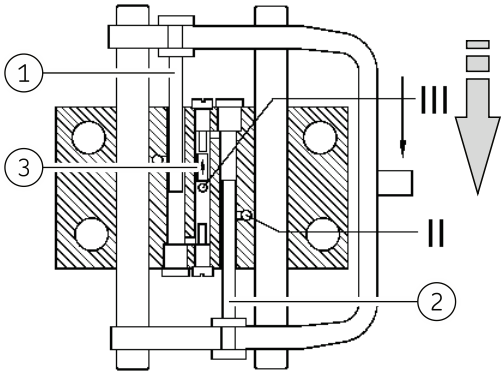


Upper end position

1 Delivery piston 1
2 Delivery piston 2
3 Control piston (floating)
I Suction bore for delivery piston 1
II Suction bore for delivery piston 2
III Outlet hole (pressure port)

- Start of the downward piston movement.

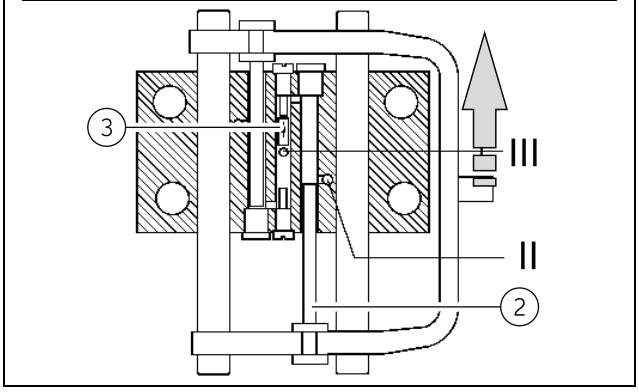
Fig. 6



Downward working stroke

- Delivery piston 1 shifts the floating control piston 3 up with the lubricant in front of it (from the preceding suction stroke).
- Lubricant is fed into the pressure line through the outlet hole that is now open. Delivery piston 2 creates a vacuum that draws in lubricant after the opening of bore II.

Fig. 7

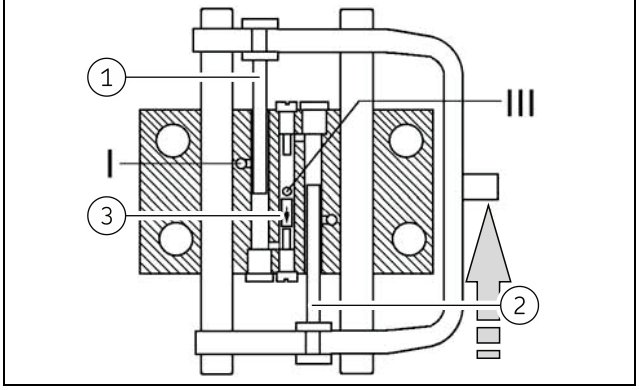


Lower end position

1 Delivery piston 1
2 Delivery piston 2
3 Control piston (floating)
I Suction bore for delivery piston 1
II Suction bore for delivery piston 2
III Outlet hole (pressure port)

- Start of the upward piston movement

Fig. 8



Upward working stroke

- Delivery piston 2 shifts the floating control piston down with the lubricant from the preceding suction stroke.
- The lubricant is pumped into the pressure line.
- Delivery piston 1 draws in lubricant.

4. Technical data

4.1 Pump ZPU 08 ... 24

Table 4

Technical data of the pump

Parameter	ZPU 08	ZPU 14	ZPU 24
Delivery rate	8000 cm³/h [488 in³/h]	14000 cm³/h [855 in³/h]	24000 cm³/h [1465 in³/h]
Operating pressure	max. 400 bar [5800 psi]	max. 400 bar [5800 psi]	max. 400 bar [5800 psi]
Operating temperature	-20 to +80 °C [-4 to +176 °F]		
Pressure limiting valve	Permanently set and sealed at 410 bar [5946 psi]		
Drive speed	61.4 rpm, (1535 rpm with reduction gear)	97.1 rpm	184 rpm
Direction of drive rotation	any	any	any
Pipe thread for pressure, relief, and filling lines	G 3/4"	G 3/4"	G 3/4"
Lubricant filter			
– Filter surface:	5.1 cm²	5.1 cm²	5.1 cm²
– Filter fineness	280 µm	280 µm	280 µm
Lubricant	Grease: up to NLGI 2; NLGI 3 on request Oil: with min. viscosity of 20 mm²/s		
Reservoir capacity	40 or 100 liters [10.6 or 26.4 gal.]		
Drive motor	See section Drive motors, Page 17		
Sound pressure level	< 70 db(A)		
Mounting position	Vertical		

NOTE

In the case of drive motors with a power supply frequency of 60 Hz, the speed and thus also the delivery rate are 20% higher.
In the case of lubricating greases of Grade NLGI 2 or NLGI 3 and very low temperatures, the actual delivery rate can be below the calculated theoretical rate.

4.2 Drive motors

4.2.1 Multi-voltage motors

Table 5

Technical data for multi-voltage motors

Parameter		ZPU 08		ZPU 14		ZPU 24	
Manufacturer		ABM		ABM		ABM	
Motor type		G80F/4D71C-4		G80F/4D80E-4		G90F/4D90LD-4	
Item number		245-13575-1		245-13575-2		2450-00000026	
Operating mode		S1		S1		S1	
Switching type		D/S		D/S		D/S	
Frequency f	[Hz]	50	60	50	60	50	60
Rated capacity P	[kW]	0.37	0.37	0.55	0.55	1.1	1.1
Rated speed n/n_2	[rpm]	1420 / 61.4	1720 / 74.4	1400 / 97.1	1730 / 120	1440 / 184	1750 / 223
Rated torque M	[Nm]	54.7		51.4		54.2	
Rated current I_N							
230/400 V ± 5%	[A]	1.94 / 1.12		2.34 / 1.35		4.2 / 2.45	
277/480 V ±5%			1.87 / 1.08		2.08 / 1.2		3.8 / 2.2
Power factor cos φ		0.67		0.77	0.71	0.73	
Application factor		0.9		0.64		2.0	
Efficiency η	[%]	75 / 77		79 / 90		84 / 86	
Type		B5		B5		B5	
Flange		B5-160		B5-160		B5-160	
Direction of rotation		CW		CW		CW	
Enclosure rating		IP 55		IP 55		IP 55	
Insulation class		F		F		F	
Weight	[kg / lb]	approx. 11 [24.3]		approx. 12 [26.5]		approx. 17 [37.5]	
Flange	[mm / in]	∅ 160 [6.3]		∅ 160 [6.3]		∅ 160 [6.3]	
Shaft extension	[mm / in]	∅ 20×50 [0.8×2]		∅ 20×50 [0.8×2]		∅ 20×50 [0.8×2]	

4.2.2 Motors 290 / 500 V (50Hz)

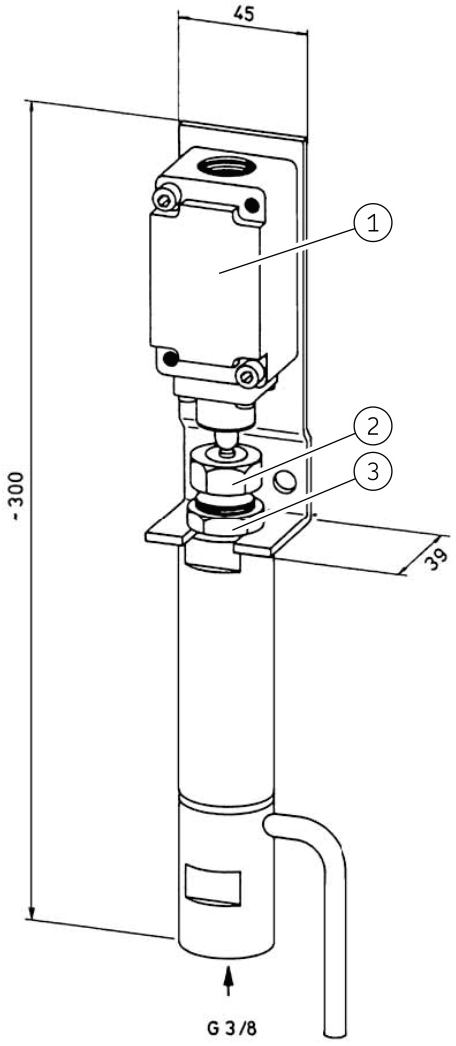
Table 6

Technical data for motors with 290/500 V (50 Hz)

Parameter		ZPU 08	ZPU 14	ZPU 24
Manufacturer		ABM	ABM	ABM
Motor type		G80F/D71B-4	G80F/3D71C-4	G90F/3D71C-4
Item number		245-13564-1	245-13564-2	2450-00000046
Frequency f	[Hz]	50	50	50
Rated capacity P	[kW]	0.37	0.55	1.1
Rated speed n/n_2	[rpm]	1370 / 60	1400 / 100	1440 / 184
Rated torque M	[Nm]	59	53	57
Rated current I_N				
290 V ±10 %	[A]	1.45	2.0	3.65
500 V ±10 %		0.85	1.15	2.1
Starting current / rated current I_A/I_N	[A]	3.9	4.1	4.2
Power factor	cosφ	0.73	0.8	0.81
Efficiency η	[%]	0.72	0.69	0.73
Frame size		71	80	90 S
Type		B5 A1/160	B5 A1/160	B5 A1/160
Enclosure rating		IP 55	IP 55	IP 55
Insulation class		F	F	F
Weight	[kg / lb]	approx. 11 [24.3]	approx. 12 [26.5]	approx. 17 [37.5]
Flange	[mm / in]	∅ 160 [6.3]	∅ 160 [6.3]	∅ 160 [6.3]
Shaft extension	[mm / in]	∅ 20×50 [0.8×2]	∅ 20×50 [0.8×2]	∅ 20×50 [0.8×2]

4.3 Pressure monitor

Fig. 9



Pressure monitor

1 Position switch
2 Setting screw, SW 24 mm
3 Locknut, SW 27 mm

Table 7

Technical data for pressure monitors

Parameter	Pressure range 160 to 400 bar [1)]	Pressure range 75 to 170 bar [2)]
Piston and cylinder diameter	7 mm	10 mm
Pressure spring	4 mm	4 mm
Item no.	623-25461-2	623-25456-2

[1)] Included in pressure monitor set 40l, item no. 623-37243-1 and pressure monitor set 100l, item no. 623-37242-1

[2)] With supply pump for COBRA, pipe thread G3/8, position switch, 1 NC contact, 1 NO contact; technical specifications: see data sheet 93G-10001-B06

Setting the pressure monitor

Before setting the pressure monitor, the power supply to the lubrication pump must be switched off.
The spring tension can be adjusted after releasing the locknut (spanner width 27 mm).
Screwing in the setting screw (spanner width 24 mm) tensions the pressure spring and increases the switching pressure.
Unscrewing the screw reduces the pressure.

Contents:

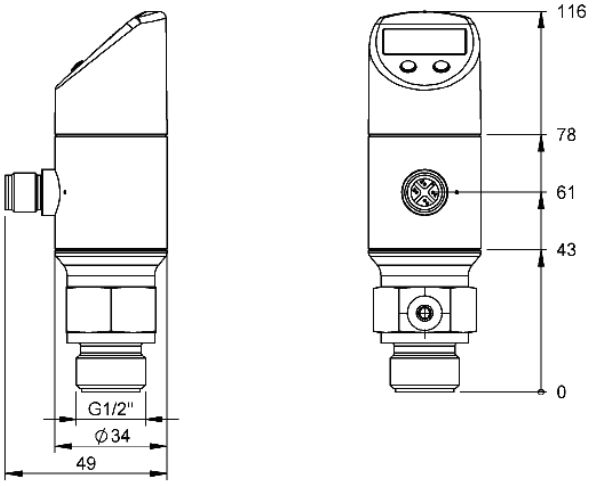
With all components as shown. Specify the piston diameter when ordering.

To be provided by the customer:

Wiring of the position switch to the control cabinet, Ölflex 3 x 1.5 mm².

4.4 Pressure sensor

Fig. 10



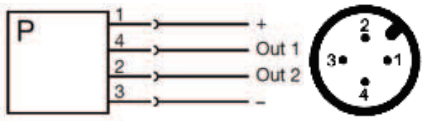


Table 8

Pin assignment of M12 port

Pin	Signal
1	Power +
2	Out 2 PNP/NPN 4...20 mA/0...10 V (selectable)
3	Power -
4	Out 1 PNP/NPN/IO-Link (selectable)

Pressure sensor 2340-00000108: dimensions and connection diagram

NOTE

For detailed information on installing and operating the pressure sensor, see the corresponding operating instructions 951-181-028

Table 9

Technical data for pressure sensor 2340-00000108

Electrical data		**Mechanical data**	
Operating voltage U_B	18...30 V DC	Quick coupling connection	M12 connector, 4-pin, A-coded
Output voltage	≤ 150 mA	Housing material	PE, stainless steel (1.4301)
Interface	IO-Link V1.1	Process connection	G1/4"
No-load current Io	≤ 50 mA	Process connection material	Stainless steel (1.4301)
Protected against polarity reversal	Yes	Measuring cell material	Ceramic with FKM seal (internal), welded stainless steel
Short-circuit-proof	Yes		
Switching frequency	≤170 Hz		
Accuracy acc. to IEC 60770	≤ ±0.5 % FSO BFSL	Packing ring material	FKM
Temperature error	≤ ±0.3 % FSO/10 K	Enclosure rating	IP 67
Display		**Ambient conditions**	
Function indicators	LED	Ambient temperature	-40 to 85 °C
Display	7-segment display	Media temperature	-40 to 125 °C
Pressure data		Torque	
Nominal pressure	0 to 600 bar	Process connection G1/4"	5 Nm
Overpressure	1,000 bar		
Burst pressure	1,570 bar		
Permissible negative pressure	Vacuum-proof		

4.5 Ultrasonic sensor 664-853xx-x

Table 10

Technical data

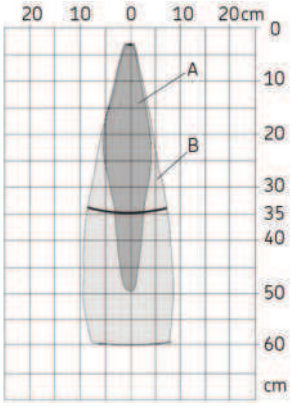
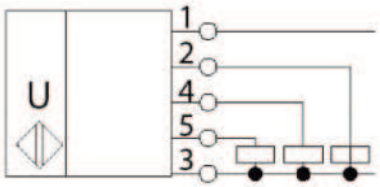
Parameter	Value
Blind zone	0-65 mm
Sensing range	600 mm
Ultrasonic frequency	approx. 400 kHz
Sonic frequency	3.7 Hz
Resolution	0.18 mm
Accuracy	± 1 %
Reproducibility	± 15 %
Sensing range in centimeters	 The dark gray areas (A) indicate the range in which the normal reflector (conduit) is reliably detected. The light gray areas (B) represent the range in which a large reflector (such as the lubricant surface) is still detected provided that it is optimally aligned to the sensor. No evaluation is possible outside the light gray area.
Operating voltage U_B	9-30 VDC (reverse polarity resistant)
Residual ripple	± 10%
No-load power consumption	≤ 60mA
Connection type	M12 connector, 5-pin
Response delay	272 ms
Readiness delay	< 300 ms
Enclosure rating per EN 60529	IP65 / IP67 (depending on the cable box used)
Operating temperature range	- 40 °C to + 70 °C
Switching points	Full signal D1; low-level signal D2 according to the reservoir size; pre-empty signal D3 programmable upon customer request, preset to 10 mm above the low-level signal (use is optional)
Conformity with standards	DIN EN 60947-5-2
Display elements	LED green/LED orange Switching output set/not set
Housing material	PBT, polyester, ultrasonic transducer: PUR, epoxy resin with glass contents
Switching output	3x pnp; UB-2V; Imax = 3 x 200 mA; NO contact, short-circuit proof

Table 11

Electrical connection



		Color (IEC 60757)
1	+ U_B	Brown (BN)
3	- U_B	Blue (BU)
4	D2	Black (BK)
2	D1	White (WH)
5	D3 / Com	Gray (GY)

Table 12

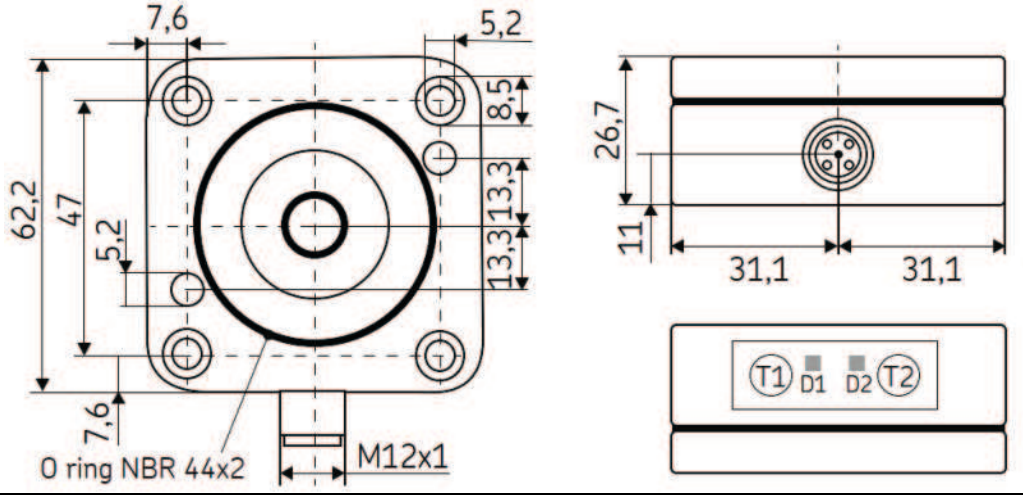
Display of the circuit states

Parameter	Switching points D1	D2	D3	D1 (up to 10/21)	Display of the LEDs D1 (from 10/21)	D2 (up to 10/21)	D2 (from 10/21)	--
Full signal (high level)	A	A	B	Orange	green	Orange	green	C
Between full signal and pre-empty signal	B	A	B	green	Orange	Orange	green	C
Pre-empty signal	B	A	A	green	Orange	Orange	green	D
Low-level signal	B	B	B	green	Orange	green	Orange	C

A = switched, B = not switched, C = steady, D = flashing

Dimensions:

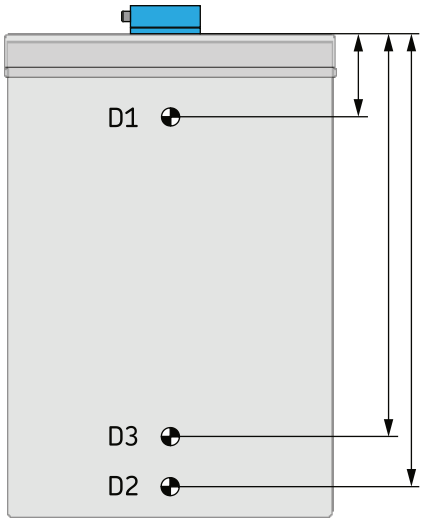
Fig. 11



Dimensions

4.5.1 Switching points of ultrasonic sensor for reservoir design XYBU

Fig. 12



Switching points of ultrasonic sensor

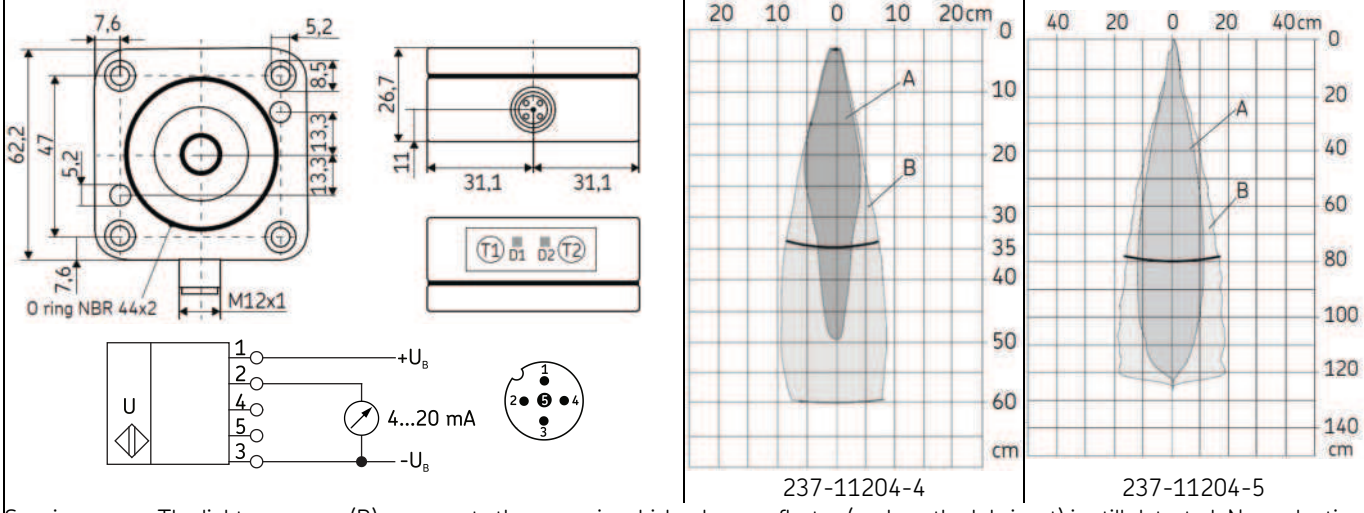
Table 13

Switching points

Reservoir size liters [gal.]		D1 Full mm	D2 Low-level mm	D3 Pre-empty signal mm
40	[10.6]	65	305	295
100	[26.4]	80	530	480

4.6 Analog ultrasonic sensor

Fig. 13



Sensing range: The light gray area (B) represents the range in which a large reflector (such as the lubricant) is still detected. No evaluation is possible outside the light gray area.

Dimensions, connection diagram, and sensing ranges

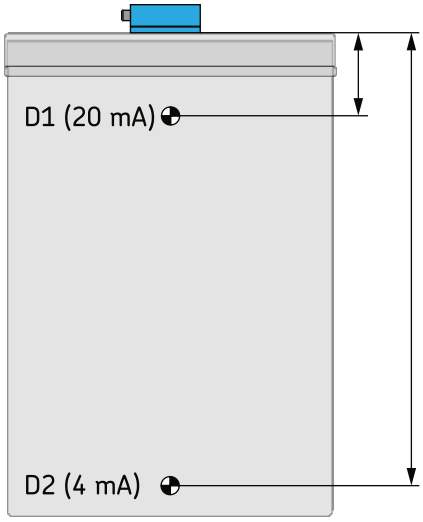
Table 14

Technical data

Order number	237-11204-4	237-11204-5
Blind zone	0 to 65 mm	0 to 115 mm
Sensing range	500 mm	1000 mm
Opening angle of sound cone	See the sensing range in Fig. 13	
Ultrasonic frequency	approx. 400 kHz	approx. 200 kHz
Resolution	0.18 mm	0.18 mm
Reproducibility	± 0.15 %	± 0.15 %
Accuracy	± 1 %	± 1 %
Operating voltage UB	9 bis 30 V DC reverse polarity resistant	
Residual ripple	± 10 %	± 10 %
Current consumption while running empty	≤ 60 mA	≤ 60 mA
Housing material	PBT, polyester, ultrasonic transducer: PUR, epoxy resin with glass contents	
Connection type	5-pin M12 circular connector	
Enclosure rating per EN 60529	IP 67	IP 67
Display elements	LED D1 (green / orange) LED D2 (green)	
Operating/storage temperature range	-40 °C to 70 °C	-40 °C to 70 °C
Weight	120 g	120 g
Response delay	272 ms	340 ms
Readiness delay	< 300 ms	< 300 ms
Conformity with standards	DIN EN 60947-5-2	
Current output 4 bis 20 mA	RL ≤ 100 Ω bei 9 V ≤ UB ≤ 15 V / RL ≤ 500 Ω bei UB ≥ 15 V Rising/falling characteristics	
Power consumption 0 to 10 V	RL ≥ 100 Ω bei UB ≥ 15 V short-circuit proof Rising/falling characteristics	
Factory settings	Falling characteristic curve, analog output to current 4-20 mA, 4 mA (empty), 20 mA (full), pushbuttons deactivated	

4.6.1 Measuring range of analog ultrasonic sensor for reservoir design XYBU

Fig. 14



Measuring range of ultrasonic sensor

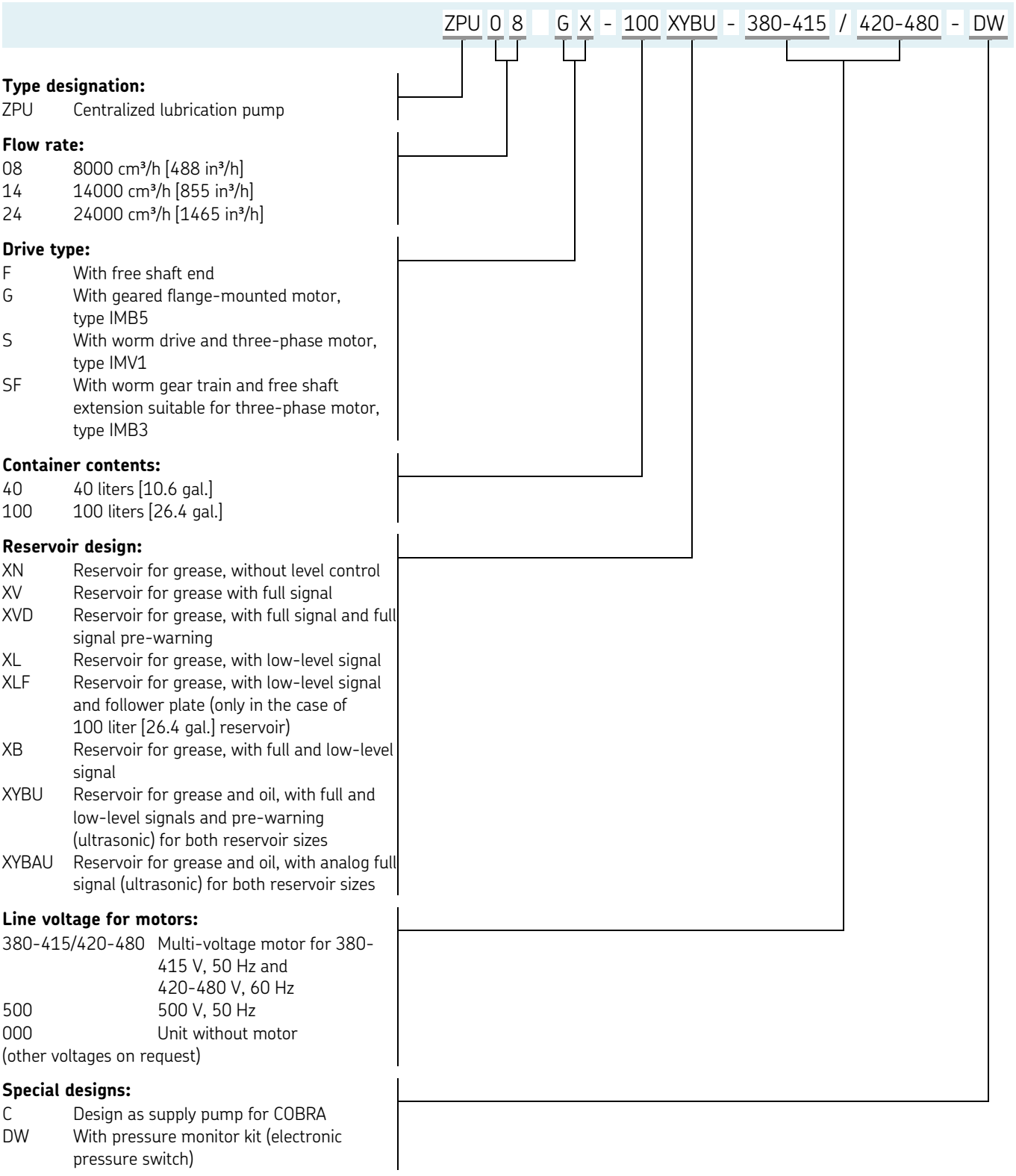
Table 15

Measuring range

Reservoir size liters [gal.]		D1 Full (20 mA) mm	D2 Low-level (4 mA) mm
40	[10.6]	65	305
100	[26.4]	115	535

4.7 Pump type identification code ZPU 08...24

4.7.1 Basic parameters and reservoir version



Type designation:
ZPU Centralized lubrication pump

Flow rate:
08 8000 cm³/h [488 in³/h]
14 14000 cm³/h [855 in³/h]
24 24000 cm³/h [1465 in³/h]

Drive type:
F With free shaft end
G With geared flange-mounted motor, type IMB5
S With worm drive and three-phase motor, type IMV1
SF With worm gear train and free shaft extension suitable for three-phase motor, type IMB3

Container contents:
40 40 liters [10.6 gal.]
100 100 liters [26.4 gal.]

Reservoir design:
XN Reservoir for grease, without level control
XV Reservoir for grease with full signal
XVD Reservoir for grease, with full signal and full signal pre-warning
XL Reservoir for grease, with low-level signal
XLF Reservoir for grease, with low-level signal and follower plate (only in the case of 100 liter [26.4 gal.] reservoir)
XB Reservoir for grease, with full and low-level signal
XYBU Reservoir for grease and oil, with full and low-level signals and pre-warning (ultrasonic) for both reservoir sizes
XYBAU Reservoir for grease and oil, with analog full signal (ultrasonic) for both reservoir sizes

Line voltage for motors:
380-415/420-480 Multi-voltage motor for 380-415 V, 50 Hz and 420-480 V, 60 Hz
500 500 V, 50 Hz
000 Unit without motor
(other voltages on request)

Special designs:
C Design as supply pump for COBRA
DW With pressure monitor kit (electronic pressure switch)

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. 15

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.

5.6 Declaration of decontamination

If the product came in contact with harmful substances, make sure to thoroughly clean the product before returning it to us. Due to statutory provisions and for the safety of our employees and operation facilities we further need a fully completed and signed “Declaration of decontamination”.

6. Assembly

6.1 General safety instructions

Observe the safety instructions and the technical data in this manual. Additionally, during assembly pay attention to the following:

- Only qualified and authorized technical personnel may install the products described in this manual.
- Adhere to safety distances and legal prescriptions on assembly and prevention of accidents.
- Possibly existing visual monitoring devices, e.g. pressure gauges, MIN/MAX markings, oil inspection glasses must be clearly visible.
- Protect the product against humidity, dust and vibrations.
- Install the product in an easily accessible position. This facilitates other installations, control and maintenance work.

6.2 Internal transportation

⚠ WARNING

Risk of injury due to heavy weight

Improper handling of heavy components can result in severe crushing, broken bones, or even fatal injuries.

- Use suitable equipment to lift and transport heavy loads.
- Always secure loads to prevent unintended movement.
- Wear safety shoes.
- Keep an adequate safe distance away from suspended loads.
- Never walk under a suspended load.

⚠ WARNING

Risk of injury due to transportation devices

Improper use of transportation devices can lead to injuries and damage.

- Transportation devices, such as forklifts and cranes, may only be used by authorized personnel.

Observe the following points for internal transportation of the pump:

- SKF recommends that the customer use a height-adjustable pallet jack or a forklift for transport to the installation or storage location.
- During transportation, use at least two ratchet straps to secure the pump against the tipping over.
- The lifting equipment provided by the customer, such as forklifts, pallet jacks, ratchet straps, transport nets, etc. must be designed for the total weight of the pump plus a safety margin.

6.3 Mechanical connection

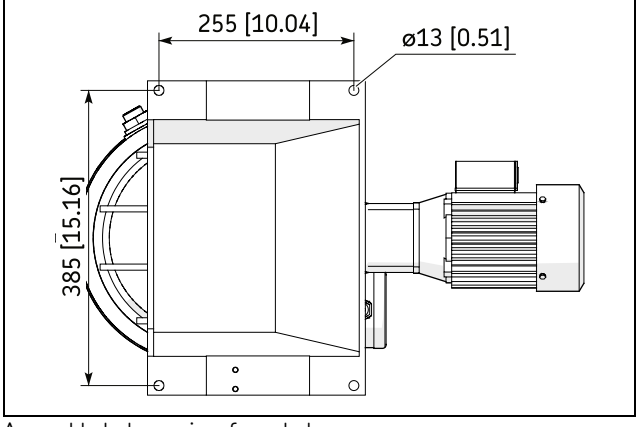
6.3.1 Assembly holes

NOTICE

Possible damage to the main machine and the pump

The assembly holes should be created only on non-load-bearing parts of the main machine. Do not fasten on two parts which move in opposite directions to one another (e.g., machine base and machine assembly).

Fig. 16



Assembly holes – view from below

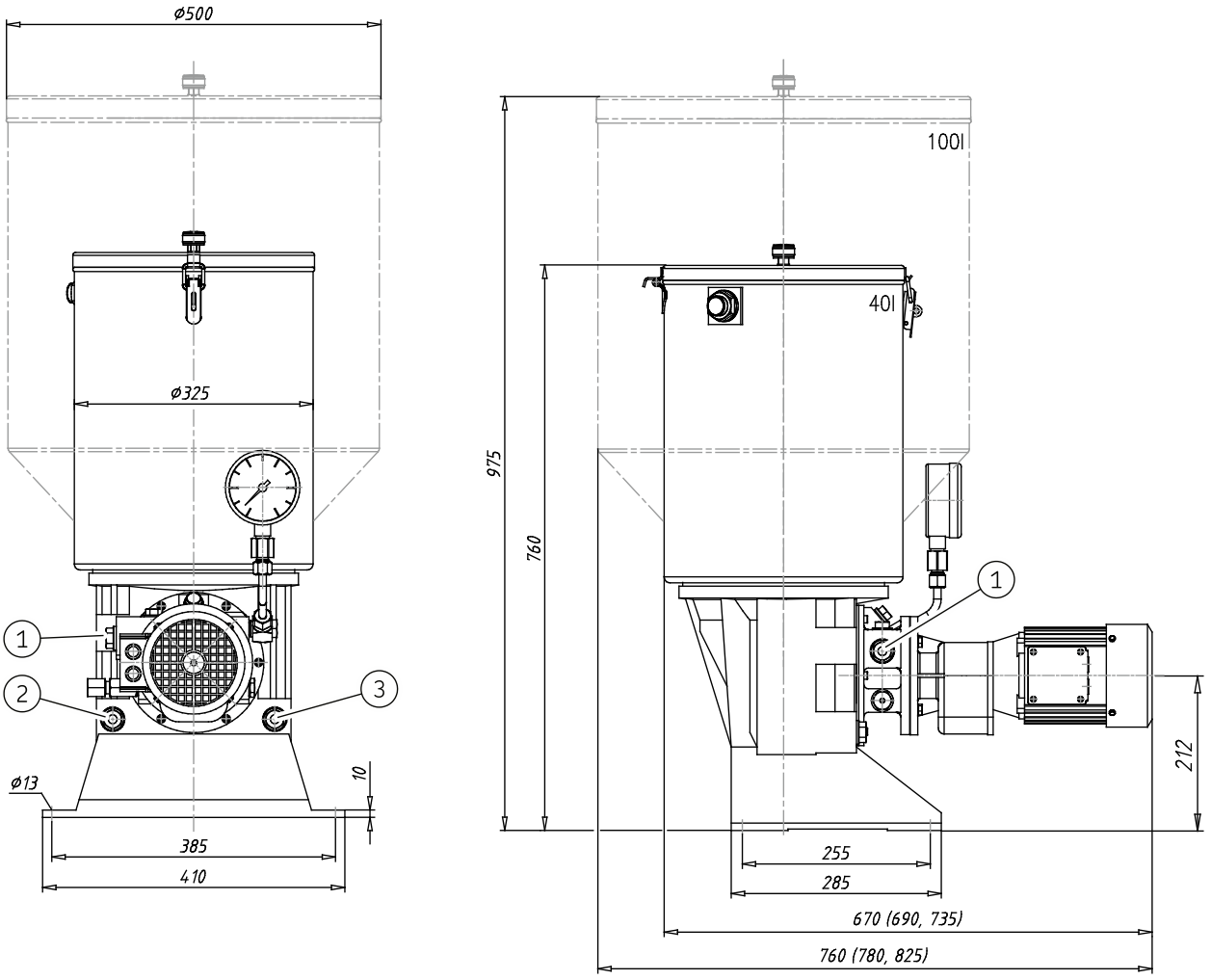
The product is fastened to a flat surface using the 4 assembly holes (∅ 13 mm) on the pump housing.
It is secured using 4 M10 screws (strength class 8.8).
Tightening torque: 25 Nm, ±2,5 Nm

6.4 Dimensions

In order to have sufficient space for maintenance work or for the attachment of additional components for the construction of a centralized lubrication system on the pump, sufficient clearance should be provided for in every direction in addition to the specified dimensions.
In particular, the additional clearance required for complete opening of the reservoir cover and for the air inlet of the drive motor (+ 40 mm) must be observed.

6.4.1 ZPU xx G – with geared flange-mounted motor

Fig. 17

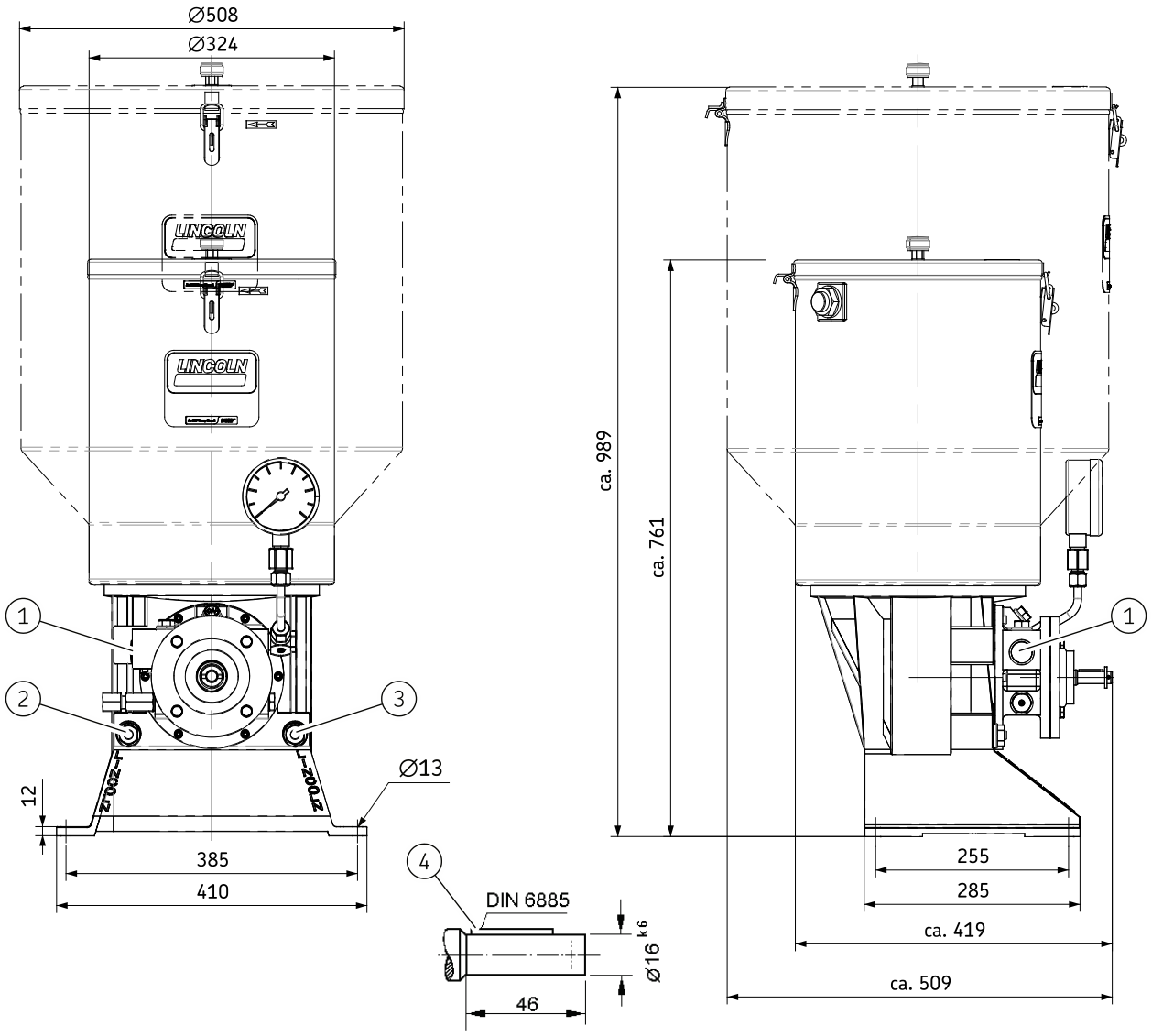


Dimensions (mm) of ZPU 08/14/24 with geared flange-mounted motor

1 Connection of pressure line, G 3/4“
2 Connection of return line, G 3/4“
3 Connection of filling line, G 3/4“

6.4.2 ZPU xx F – with free shaft extension

Fig. 18

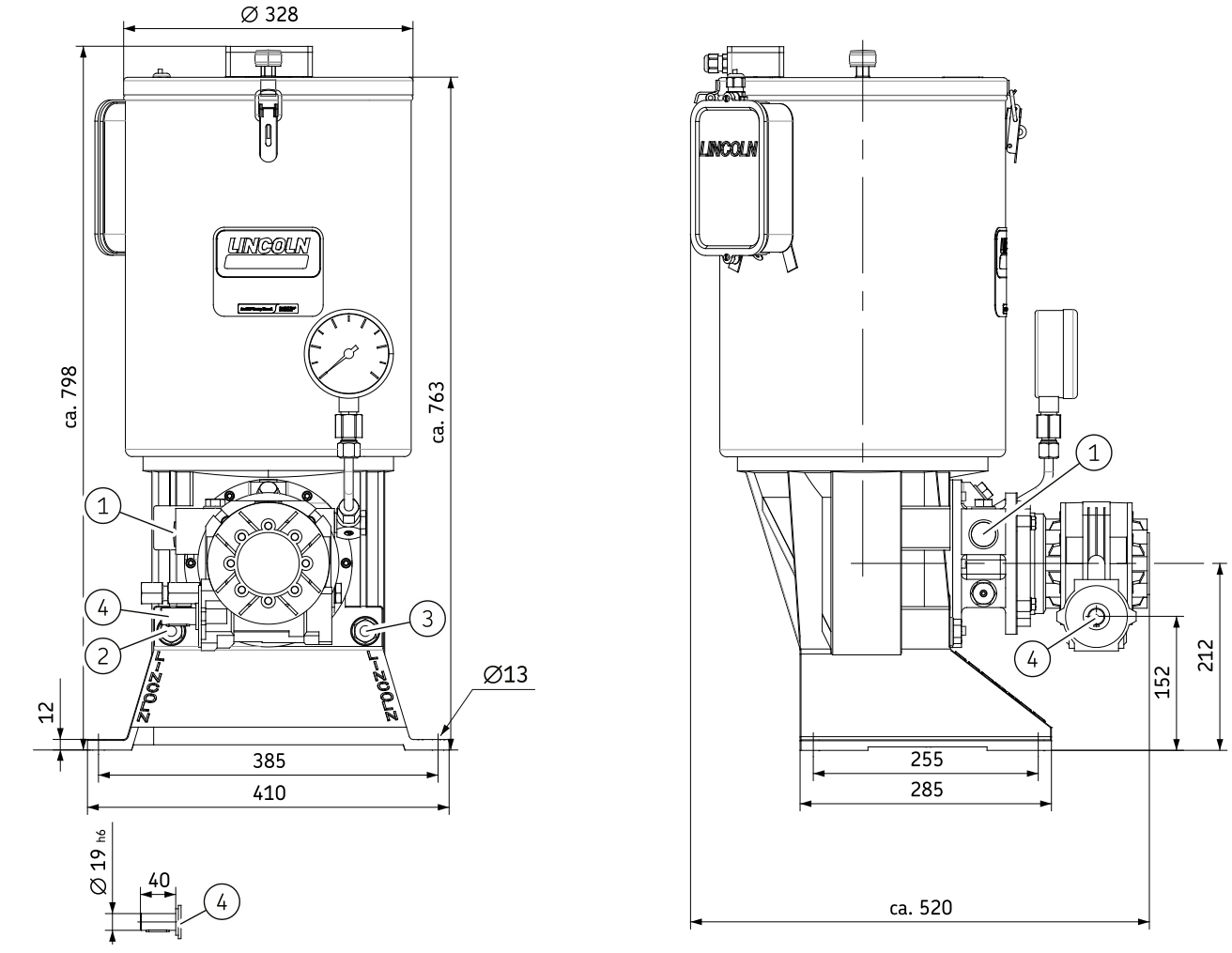


Dimensions (mm) of ZPU 08/14/24 with free shaft extension

1 Connection of pressure line, G 3/4“
2 Connection of return line, G 3/4“
3 Connection of filling line, G 3/4“
4 Detail for connection dimensions

6.4.3 ZPU 08 S F – with flanged worm drive i=20:1 and free shaft extension

Fig. 19

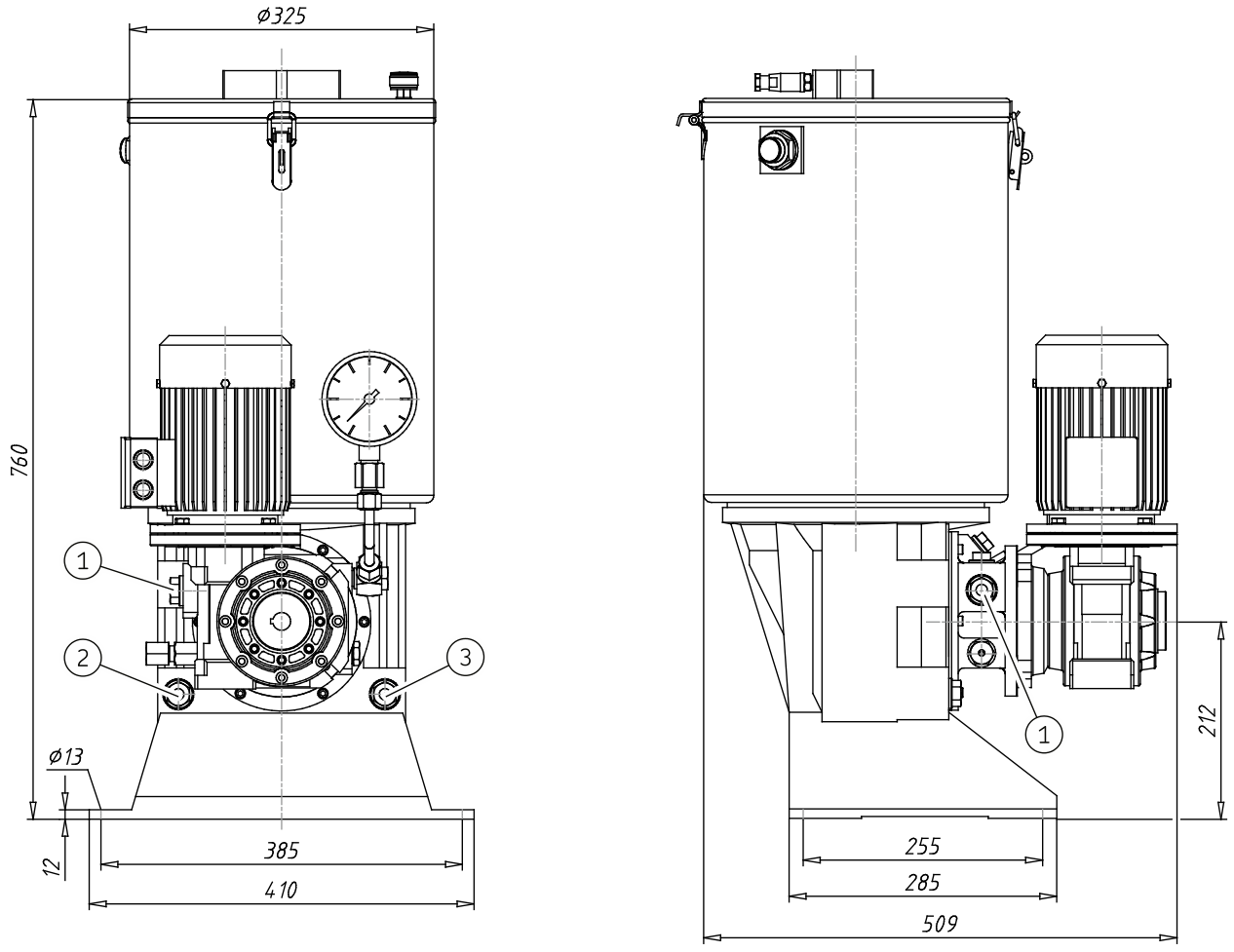


Dimensions (mm) ZPU 08 S with flanged worm drive

1 Connection of pressure line, G 3/4“
2 Connection of return line, G 3/4“
3 Connection of filling line, G 3/4“
4 Detail for connection dimensions

6.4.4 ZPU 08 S – with flanged worm drive i=20:1 and three-phase flange-mounted motor

Fig. 20



Dimensions (mm) ZPU 08 S with flanged worm drive

1 Connection of pressure line, G 3/4“
2 Connection of return line, G 3/4“
3 Connection of filling line, G 3/4“

NOTICE

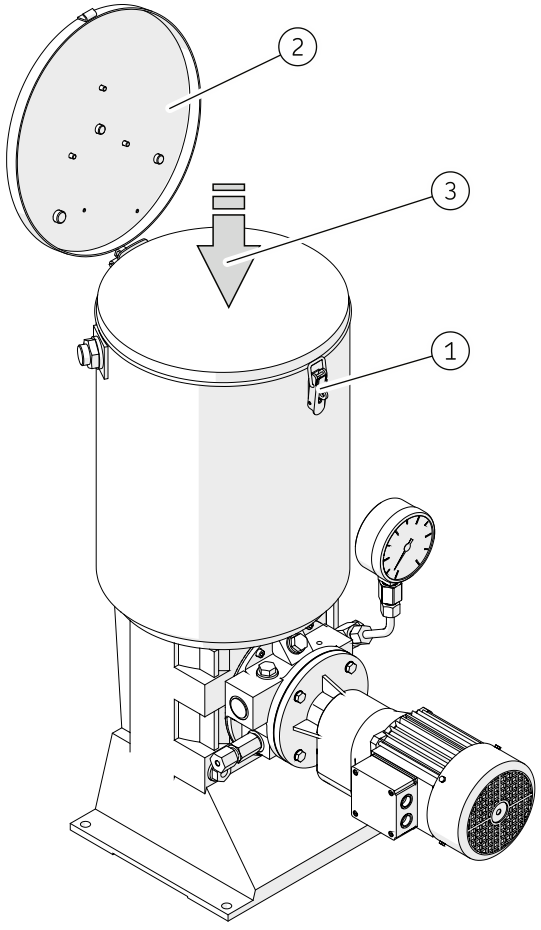
Damage to the motor fan from foreign substances

Motors with the motor fan pointing up should be protected from foreign substances by installing a suitable fan cowl

6.5 Filling with lubricant

6.5.1 Filling via the reservoir cover

Fig. 21



Filling via the reservoir cover

1 Cover latch
2 Reservoir cover
3 Reservoir

⚠ WARNING

Crushing hazard

Crushing hazard on the rotating stirring paddle. Filling through the opening of the reservoir cover is permitted only if the pump has first been disconnected from the power supply. Never reach into the reservoir when the pump is running.

NOTICE

Contamination of the centralized lubrication system

When filling, carefully make sure that no dirt particles or other foreign substances get into the reservoir.

1. Switch off the pump.
2. Open the cover latch.
3. Open the reservoir cover.
4. Remove any contamination on the reservoir cover and (if present) on the ultrasonic sensor.
5. Fill the reservoir from the top up to the "MAX" marking. Take care to ensure while doing so that the lubricant is filled in without air inclusions if at all possible.

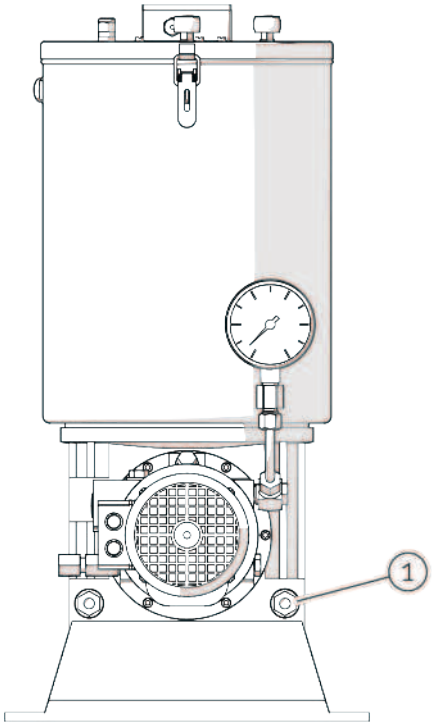
NOTE

For reservoirs with an ultrasonic sensor:
The ultrasonic sensor must not come into contact with the lubricant. The clearance between the lubricant and the ultrasonic sensor must be at least 60 mm.

6. Close the reservoir cover.
7. Close the cover latch.
8. Switch the pump back on.

6.5.2 Filling via the fill connection

Fig. 22



Filling via the fill connection

Alternatively, the pump can be filled via the fill connection. In this case, the filling is controlled automatically via the pump's low-level signal and full signal.

6.6 Electrical connection

⚠ WARNING

Electric shock

Work on electrical components may be performed only by qualified electricians.

At a minimum, the following safety measures must be taken before any work on electrical components is done:

- Isolate, lock and tag out
- Check to ensure the absence of voltage
- Ground and short-circuit the product
- Cover any live parts in the surrounding area

Observe the following instructions for a safe connection:

- The electrical connection must be implemented in accordance with the specifications of the standards of the DIN VDE 0100 series or of the standards of the IEC 60364 series, respectively

Connect the electrical lines in such a way that no mechanical forces are transferred to the product

- The pump must be secured with a suitable external fuse (see terminal diagram)

Electrical connection of the drive motor:

The pump is connected electrically in accordance with the specifications of the motor manufacturer. For the technical data of the drive motors, see section Drive motors, Page 17.
For the terminal diagram, see the terminal box of the motor.

Electrical connection of the pressure monitor and the level signals:

Connect these components in accordance with the terminal diagrams in the appendix and/or the circuit diagram.

6.7 Bleeding the pump

Before connecting the lubricant line, the pump must be bled. To do this, switch on the pump (the direction of rotation of the drive shaft is not important) and allow it to run until the lubricant comes out of the pressure line connection without bubbles.

6.8 Connection of the lubrication line

⚠ CAUTION

Risk of slipping
Exercise caution when handling lubricants. Immediately remove and bind any leaked lubricants.

NOTICE

Damage to the higher-level machine caused by faulty planning of the centralized lubrication system
All parts for the construction of the centralized lubrication system must be designed for the maximum operating pressure that occurs, the permissible ambient temperature range, the required delivery volume, and the lubricant to be supplied.

Observe the following assembly information for safe and trouble-free operation:

- Generally valid regulations and company regulations regarding the laying of pressurized pipe and hose lines must be observed.
- Use only clean, pre-filled components and lubrication piping.
- Secure every lubricant line on the pump against excessive pressure through the use of a suitable pressure relief valve (only in the case of pumps without an internal pressure relief valve).
- The main lubricant line should be arranged ascending and be able to be bled at the highest point. Lubrication lines should always be arranged so that air inclusions cannot form anywhere.
- Install lubricant metering devices at the end of the main lubricant line such that the outlets of the lubricant metering devices point upwards wherever possible.
- If the system configuration requires that the lubricant metering devices be arranged below the main lubricant line, they should not be placed at the end of the main lubricant line.
- The flow of lubricant should not be impeded by the presence of sharp bends, angle valves, flap valves, seals protruding inward, or changes in cross-section (large to small). Unavoidable changes in the cross-section in lubrication lines must have smooth transitions.
- Connect the lubricant lines in such a way that no mechanical forces are transferred to the product (stress-free connection).
- Lubrication piping is to be positioned in such a way that they cannot become kinked, pinched or frayed.

7. First start-up

In order to warrant safety and function, a person assigned by the operator must carry out the following inspections. Immediately eliminate detected deficiencies. Deficiencies may be remedied by an authorized and qualified specialist only.

7.1 Inspections before first start-up

Table 16

Checklist: Inspections before first start-up

Inspections to be performed	YES	NO
Electrical connection established correctly.	☐	☐
Mechanical connection established correctly.	☐	☐
The performance characteristics for the aforementioned connections match the specifications in the "Technical data".	☐	☐
All components, e.g. lubrication lines, are pre-filled with the correct lubricant and correctly installed.	☐	☐
No apparent damage, contamination, or corrosion.	☐	☐
Product is protected by a suitable pressure limiting valve.	☐	☐
Any dismantled protective and monitoring equipment is fully reinstalled and functional.	☐	☐
All warning labels on the product are present and in proper condition.	☐	☐
The lubricant used matches the permissible specifications of the pump and the intended use.	☐	☐

7.2 Inspections during first start-up

Table 17

Checklist: Inspections during first start-up

Inspections to be performed	YES	NO
No unusual noises, vibrations, moisture accumulation, or odors present.	☐	☐
No undesired discharge of lubricant at connections (leakage).	☐	☐
Lubricant is fed without bubbles.	☐	☐
The bearings and friction points requiring lubrication receive the planned lubricant volume.	☐	☐

7.3 Activating the pump

Activate the pump by:

- Switching on the machine contact
- Using your own control unit (supplied by customer, not by SKF)

8. Operation

SKF products operate largely automatically.
The activities required during normal operation are limited primarily to inspection of the fill level, timely refilling of lubricant, and cleaning the exterior of the product if contaminated.

8.1 Operating the pump

The pump is operated via the control of the centralized lubrication system. For information on pump operation, see the system documentation for the centralized lubrication system.

8.2 Top up lubricant

See section Filling with lubricant, Page 33.

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.

Table 18

Checklist: Maintenance activities

Activity to be performed	YES	NO
Mechanical and electrical system connections established correctly	☐	☐
The performance characteristics for the aforementioned connections match the specifications in the “Technical data”	☐	☐
All components such as lubrication lines and metering devices are correctly installed	☐	☐
Product is protected by a suitable pressure limiting valve	☐	☐
No apparent damage, contamination, or corrosion	☐	☐
Any dismantled protective and monitoring equipment is fully reinstalled and functional	☐	☐
All warning labels on the product are present and in proper condition	☐	☐
No unusual noises, vibrations, moisture accumulation, or odors present	☐	☐
No undesired discharge of lubricant (leakages) at connections	☐	☐
Lubricant is fed without bubbles	☐	☐
The bearings and friction points requiring lubrication receive the planned lubricant volume	☐	☐

9.1 Maintenance of the pump

⚠ WARNING

Risk of electric shock/injury

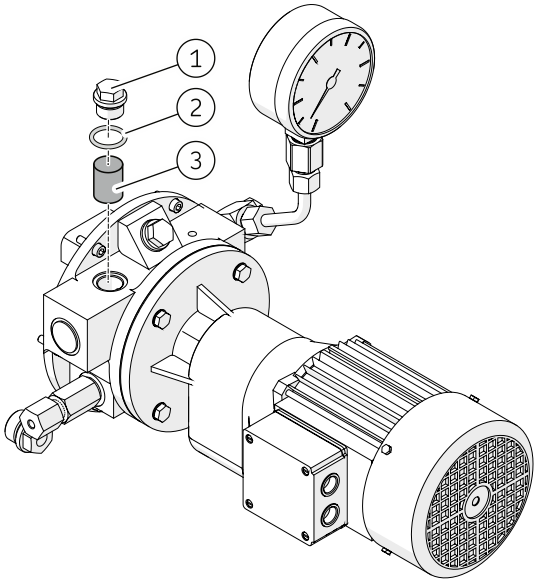
At a minimum, the following safety measures must be taken before any work on the pump is done:

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

- Electrically isolate the product and prevent it from being switched back on
- Check to ensure the absence of voltage
- Ground and short-circuit the product
- Cover any live parts in the surrounding area

9.1.1 Cleaning the lubricant filter

Fig. 23

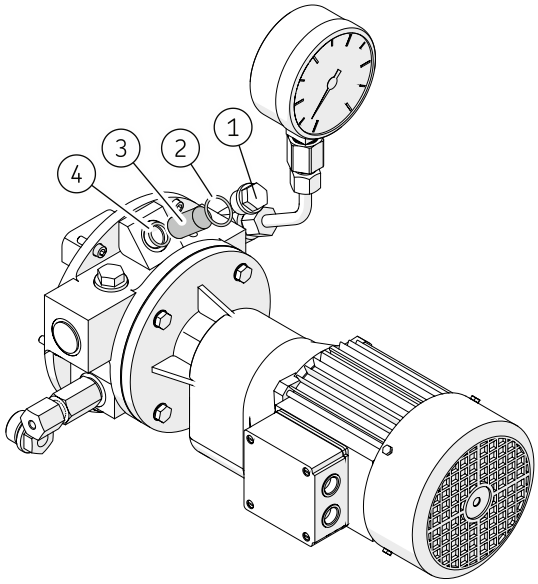


Cleaning the lubricant filter

Maintenance interval: 100 hours of operation
Clean the lubricant filter:
1.Remove the plug screw (1).
2.Remove the filter insert by unscrewing it (3) and clean it. If it is heavily clogged, replace it completely.
3.Check the O-ring (2) for damage and replace it if necessary.
4.Screw in the filter insert.
5.Screw in the plug screw.

9.1.2 Replacing the check valve

Fig. 24



Replacing the check valve

If the lubricant filter is heavily clogged, the check valve should be replaced.
1.Remove the plug screw (1).
2.Remove the check valve (3) and replace it.
3.Check the O-rings (3) for damage and replace it if necessary.
4.Install a new check valve (3).
5.Screw in the plug screw.

9.1.3 Setting the pressure monitor

The cut-out pressure on the electrohydraulic pressure monitor is factory-set to 350 bar.
If necessary, it can be set to a higher or lower pressure, but not more than the pump's permissible pressure of 400 bar.
To set the pressure monitor, see Pressure monitor, Page 19.

9.2 Maintenance of the gearbox

The gearboxes are largely maintenance-free and come filled with synthetic oil. To prevent damage, the following tasks should be carried out at the intervals specified.

Every 500 hours of operation:
Visual inspection for leakage (radial shaft seal)

Every 5 years:
Change the synthetic oil with new synthetic oil of the same specification.

9.2.1 Required oil quality

Synthetic oil according to ISO VG320 specification, suitable for the operating temperature range.

9.3 Maintenance of the motor

⚠ WARNING

Risk of electric shock/injury
At a minimum, the following safety measures must be taken before any work on the motor is done:

- Unauthorized persons must be kept away
- Mark and secure the work area
- Depressurize the product
- Electrically isolate the product and prevent it from being switched back on
- Check to ensure the absence of voltage
- Ground and short-circuit the product
- Cover any live parts in the surrounding area

9.3.1 Checking the bearings

Before a long period of downtime/storage, check the bearing grease of the motor before starting it up again, and replace it with new bearing grease if necessary.

9.3.2 Required grease quality

Lithium-based rolling bearing grease, suitable for the operating temperature range.

9.3.3 Replacing the bearing grease

Under normal loading (operation at rated speed, under normal environmental conditions), the bearing grease should be changed as follows.

- 2-pole motor: After 10,000 hours of operation
- Multi-pole motor: After 20,000 hours of operation

Under different conditions, such as operation with a frequency converter, the replacement interval is shorter, in proportion to the percentage deviation of the actual speed from the rated speed of the motor.

To replace the bearing grease, proceed as follows:

1. Switch off the pump and secure it to prevent it being switched back on (lock it out).
2. Access the bearing and remove the old grease from the bearing.
3. Clean the bearing with a suitable solvent.
4. Apply new grease to the bearing.

NOTICE

Damage to the bearing by overfilling with grease

Fill the bearing only two thirds with grease.
Filling the bearing and the bearing cap completely will increase the bearing temperature and result in increased wear.

5. Reinstall the bearing cap and other removed parts properly.

10. Cleaning

10.1 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.

10.2 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.

10.3 Exterior cleaning

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

⚠ WARNING

Risk of fatal electric shock

Cleaning work may only be performed on products that have been de-energized first. When cleaning electrical components, be mindful of the IP enclosure rating.

⚠ 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.

If products have ultrasonic sensors, the active sensor surface must be cleaned with a cloth when it becomes contaminated.

11. Faults, causes, and remedies

Table 19

Fault table

Fault	Possible cause	Remedy
Pump does not deliver medium	• Reservoir empty	• Fill the reservoir with clean lubricant. • Then run the pump until lubricant comes out of the pressure line connection without bubbles.
	• Lubricant filter is clogged **Note** This is usually indicated by brief, sharp deflections (flickering) of the pointer on the pump's pressure gauge, and lubricant coming out at the pressure limiting valve.	• Check and clean the filter. If damaged, replace completely. • See section Cleaning the lubricant filter, Page 38.
Pump runs, but supplies either no lubricant at all or not enough	• Check valve is dirty or defective	• Replace the check valve. • See section Replacing the check valve, Page 38.
	• Pump element is damaged or worn	• Replace the pump element. • The pump element cannot be repaired because the piston is fitted at the factory with extremely small tolerances.
	• Error in the changeover or in the downstream system.	• Check the system control.

NOTE

Please contact our Customer Service if you cannot determine or resolve the error.

12. Shutdown, disposal

12.1 Temporary shutdown

Temporary shutdowns should be done by a course of action to be defined by the operator.

12.2 Permanent shutdown, disassembly

Permanent shutdown and disassembly of the product must be planned properly by the operator and conducted in compliance with all applicable laws and regulations.

12.3 Disposal

The waste producer/operator must dispose of the various types of waste in accordance with the applicable laws and regulations of the country in question.

13. Spare parts

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

13.1 Pump

Table 20

Spare parts ZPU08 ... 24

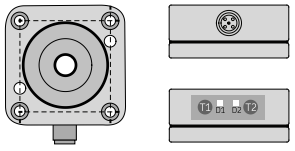
Designation	Pcs.	Item number
Repair kit for pump element	1	505-30922-1
Check valve with seals	1	505-36089-1
Filter with packing ring	1	528-30822-1
Pressure gauge 0 to 600 bar, assembly group	1	505-30852-1
Pressure limiting valve SV-410-R 3/4 A Z	1	624-27092-1
Repair kit for agitator		505-30813-1

13.2 Ultrasonic sensors

13.2.1 Ultrasonic sensors, digital

Table 21

Ultrasonic sensors, digital

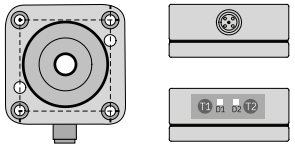
Description	Pcs.	Item number	Figure
Ultrasonic sensor BU for 40 liters (10.57 gal.) Reservoir XYBU Switching points LS = 305; VS = 65; VLO = 295; H = 10	1	664-85314-9	
Ultrasonic sensor BU for 100 liters (26.42 gal.) Reservoir XYBU Switching points LS = 530; VS = 80; VLO = 480; H = 10	1	664-85315-8	

LS = low-level signal; VS = full signal; VLO = pre-empty warning NC contact; H = hysteresis

13.2.2 Ultrasonic sensors, analog

Table 22

Ultrasonic sensors, analog

Description	Pcs.	Item number	Figure
Ultrasonic sensor BAU for 40 liters (10.57 gal.) Reservoir XYBAU Set measuring range: 4 mA = 305 mm, 20 mA = 65 mm	1	664-85058-3	
Ultrasonic sensor BAU for 100 liters (26.42 gal.) Reservoir XYBAU Set measuring range: 4 mA = 535 mm, 20 mA = 115 mm	1	664-85058-4	

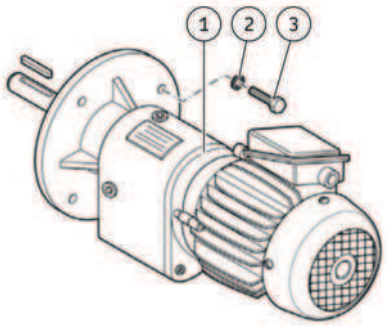
13.3 Assembly groups for the drive of the pump

13.3.1 Drive with geared motor

Table 23

Geared motors

No.	Description	Pcs.	Item number	Figure (example)
1	**Geared flange-mounted motor ZPU 08**			
	• 0.37 kW, 380-415V/50Hz, 60 rpm, 420-480V/60Hz, 72 rpm	1	245-13575-1	
	• 0.37 kW, 500V/50Hz, 60 rpm	1	245-13564-1	
	Geared flange-mounted motor ZPU 14			
	• 0.55 kW, 380-415V/50Hz, 97 rpm	1	245-13575-2	
	• 0.55 kW, 500V/50Hz, 100 rpm	1	245-13564-2	
	Geared flange-mounted motor ZPU 24			
	• 1.1 kW, 380-415V/50Hz, 184 rpm, 420-480V/60Hz, 223 rpm	1	2450-00000026	
	• 1.1 kW, 500V/50Hz, 180 rpm	1	2450-00000046	
2	Toothed lock washer J8, 4Z	4	210-12161-8	
3	Hexagon head screw M8 x 25 CF	4	200-12007-5	

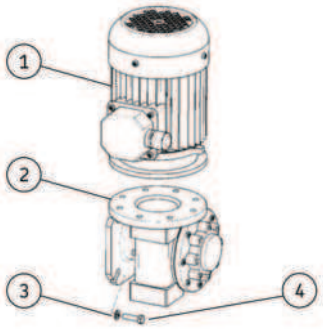


13.3.2 Drive with three-phase motor and worm drive

Table 24

Three-phase motor and worm drive

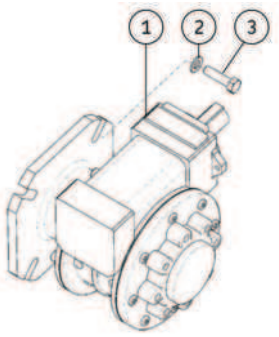
No.	Description	Pcs.	Item number	Figure
1	Three-phase motor AC, 0.55 kW, 1500 rpm, 220/380V, 50 Hz	1	245-13955-1	
2	Worm drive 20 : 1	1	246-14422-1	
3	Washer ST 8 CF	4	209-13077-1	
4	Hexagon head screw M8 x 30 CF	4	200-12007-6	



13.3.3 Drive with worm drive and free shaft extension

Table 25

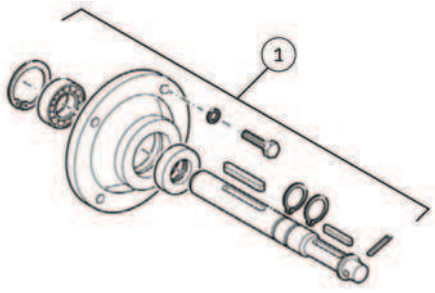
Worm drive with free shaft extension

No.	Description	Pcs.	Item number	Figure
1	Worm drive 20 : 1	1	246-14422-2	
2	Washer ST 8 CF	4	209-13077-1	
3	Hexagon head screw M8 x 30 CF	4	200-12007-6	

13.3.4 Rotary drive with free shaft extension

Table 26

Assembly group of rotary drive with free shaft extension

No.	Description	Pcs.	Item number	Figure
1	Drive, compl., with free shaft extension	1	505-30411-1	

13.4 Pressure monitor

Table 27

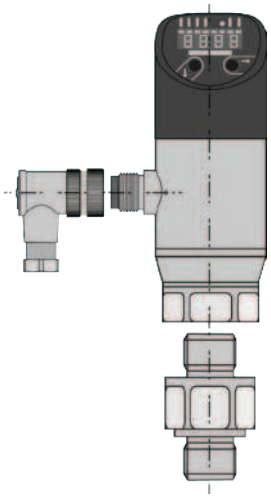
Pressure monitor

Designation	Pcs.	Item number
Pressure monitor (pressure range 75 to 170 bar)	1	623-25456-2
Pressure monitor (pressure range 160 to 400 bar)	1	623-25461-2

NOTE

See also section 4.3 .

13.5 Pressure sensor assy

Designation	Pcs.	Item number	Figure
Pressure sensor assy Including separate adapter G1/4 to EN 2852 and M12 coupling socket, 5-pin, A-coded 90°	1	2340-00000108	

14. Appendix

14.1 China RoHS Table

Table 28

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.)

0：	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.)

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