GROENEVELD-BEKA
LUBRICATION SYSTEMS BY TIMKEN

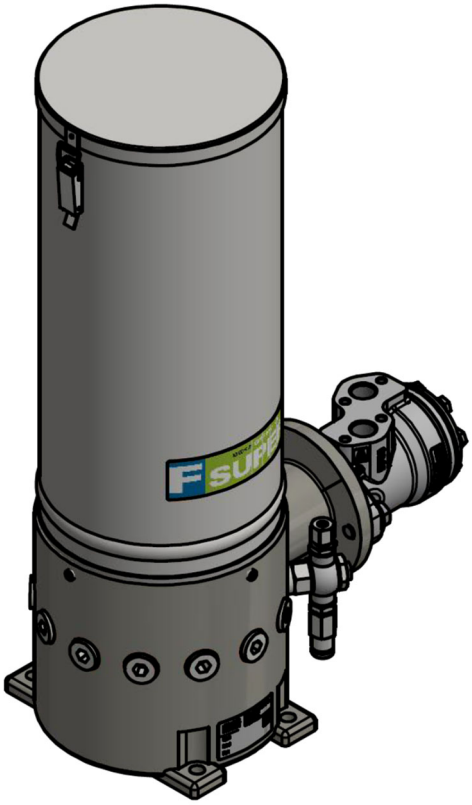
Grease lubrication pump

F Super

Code 2049 ….

Issue 10-2020

Original operating and assembly manual



BAL2049_F-Super_Grease_lubrication_pump_1020EN

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1. Technical data

General:

Reservoir capacity: ..... 2,6 / 5 / 10 l
Dimensions: ..... see dimensional drawings
Number of outlets: ..... max. 21
Sense of revolution: ..... arbitrary
Delivery volume per stroke (= pump revolution) and outlet: ..... 0.06 to 0.17 cm³ (depending on pump element)
Number of max. piston strokes: ..... see dimensional drawing
Regulation: ..... possible for PE 120 V
Reservoir material: ..... steel
Operating pressure: ..... max. 250 bar
Lubricant: ..... greases up to NLGI cl. 2 without solid contents
Operating temperature: ..... 0 to + 50 °C
Installation position: ..... reservoir vertical, as shown
Weight: ..... see dimensional drawing
Sound pressure level: ..... <70dB(A)

Motor:

Drive: ..... Hydro motor
Input connection: ..... see dimensional drawing
Output connection: ..... see dimensional drawing
Drive pressure: ..... see dimensional drawing
Drive speed min: ..... see dimensional drawing
Drive speed max: ..... see dimensional drawing
Swallowing volume: ..... see dimensional drawing
Purity class of the drive medium: ..... ISO 4406: ≤ 21/19/16

Level monitoring:

Operational voltage: ..... see dimensional drawing
Switching type: ..... see dimensional drawing
Switching current: ..... see dimensional drawing

The **grease lubrication pump** is subsequently called a **device**.

2. Applicable documents

Dimensional drawing AZ
Connection diagram ES
Declaration of incorporation

3. General safety instructions

Everybody who is in charge of the assembly, start-up, maintenance and operation of the device must read these instructions carefully prior to assembly and start-up of the device at the machine! Furthermore, this manual must always be available at the site of operation!

Basic instructions for setup, operation and maintenance can be found below.

3.1 Safety instructions

Observe the general safety instructions within this key chapter as well as the special safety instructions in other chapters of this operating and assembly manual.

Warning of electrical voltage.

Safety instructions, which might cause hazards to persons in case of non-observance, are marked with the general danger symbol.

This symbol warns of hot surfaces.

Warning of suspended loads.

Warning of material damage due to electrostatic discharge! Marks potential risks which may result in material damage, if not avoided.

Caution! This heading is used if improper or general non-observance of the operating and assembly manual, instructions, specified workflow and the like might result in damage.

Notice! This term is used to point out particular details.

Instructions and notes directly attached to the device have to be strictly observed and kept in readable condition!

3.2 Qualification and training of staff

The staff in charge of operation, maintenance, inspection and assembly have to be qualified accordingly. Competence, responsibilities and supervision of staff must be clearly defined by the operator. In case the staff does not have the necessary knowledge, it has to be instructed and trained accordingly. The operator is obliged to ensure that the staff fully understands the contents of this user information.

3.3 Hazards in case of non-observance of the safety instructions

Results of **non-observance** of the **safety instructions** can be **hazards to persons**, for the environment and the device. Non-observance of the safety instructions may result in the loss of any liability claims. The non-observance could more specifically result in the following hazards (for example):

- Failure of important device functions.
- Failure of prescribed methods regarding maintenance and repair.
- Danger to persons by electrical, mechanical and chemical effects.
- Danger to the environment by leakage of hazardous substances.

3.4 Obligations of the operator / user

- If movable, rotating, hot or cold parts of the device bear risks, the customer must protect these parts against contact. This protection must not be removed.
- Any leakages of hazardous substances must be drained in a way that no risks for persons or the environment arise. Please also refer to the data or safety data sheets of the respective manufacturers.
- Observe all legal provisions.
- Hazards due to electricity are to be excluded.
- Examination of pipes and hoses regarding safe provision, use, proper assembly and function has to be carried out according to regionally applicable directives. Inspection intervals may not be exceeded.
- Defective pipes or hoses must be replaced immediately and professionally.
- Hydraulic hoses and polyamide pipes are subject to natural aging and have to be exchanged in regular intervals according to the manufacturer's specifications.
- A safety data sheet of the currently used lubricant must be provided at the device.
- Observe the universally valid Ordinance on Hazardous Substances in its latest version.

3.5 Safety instructions for maintenance, inspection and assembly

All **maintenance**, **inspection** and **assembly work** may only be carried out by **qualified personnel** who is sufficiently informed by thorough reading of the user information.

Any work at the device may generally only be carried out at **complete standstill** and in **pressureless** as well as **disconnected condition**. Furthermore, appropriate **personal protective equipment** (goggles among others) is necessary. The shutdown procedure of the device as described in the manual must be strictly followed.

Secure the device against intentional or unintentional recommissioning during maintenance or repair. All safety and protection arrangements have to be put back in place again immediately after completion of the work.

Environmentally hazardous media must be disposed of professionally and according to the relevant legal provisions. **Polluted** and **contaminated surfaces** have to be cleaned before maintenance. Please wear protective equipment to that purpose. See the lubricant manufacturers' safety data sheets hereto, respectively the data sheets provided by the manufacturers of auxiliaries and working materials.

Check the surface temperature of the device as a possible heat transfer bears the **risk of burns**. Wear heat resistant protective gloves!

Open flame and fire are strictly forbidden during maintenance, inspection and repair due to fire hazard.

3.6 Unauthorized modification and production of spare parts

Modification, repair and alterations of the device are only accepted after manufacturer feedback. **Original spare parts** and authorized accessories from the manufacturer contribute to **safety**. The use of other parts can result in the loss of any liabilities for the resulting consequences. BEKA does not assume liability for parts that are retrofit by the operator.

3.7 Inadmissible modes of operation

Operational safety of the device is only guaranteed when it is appropriately applied as indicated in the operating and assembly manual. Never exceed or fall below the limit values, as stated in the technical data.

3.8 Electrostatic discharge

Avoid electrostatic discharge! There are electronic components integrated into the devices which might be destroyed by electrostatic discharge. Observe the safety precautions against electrostatic discharge according to DIN EN 61340-5-1/-3. Ensure that the environment (persons, workplace and packing) is well grounded when handling these devices.

3.9 General hazard warning – residual risk

All components are designed according to valid regulations for the construction of technical systems with regard to operational safety and accident prevention. Nevertheless, their use can lead to hazards for the user or third parties as well as other technical facilities. Therefore, the device may only fulfill its intended purpose in a **technically perfect and faultless condition**. This has to happen in adherence to the relevant safety regulations as well as the operating and assembly manual. **Inspect** the device and its attachment parts **regularly** and **check** them for possible **damage** or **leakages**. **Liquids** could **escape under high pressure** from pressurized components which become **leaky**.

4. Intended use

Caution!

The device is part of a central lubrication system. It serves **for conveying lubricant for the lubrication** of machines as described in this operating manual. The device is approved for **industrial** and **commercial** use **only**.
Only operate the device if it is installed in/at another machine and operated together with it.
Only lubricants which comply with the machine manufacturer's specifications may be conveyed.
The device must only be used according to the technical data (see chapter 1 „Technical data"). The values may never exceed or fall below the values mentioned in the technical data. Never operate the device without lubricant.

Unauthorized modifications of the device are **not permitted**. BEKA is not liable for personal injury or damage of machine resulting thereof.

The device was manufactured in compliance with Machinery Directive 2006/42/EG. The customer has to check whether further guidelines apply for the area of application and site of operation. If the device is not in conformity with these guidelines, it may not be put into operation.

The intended use also includes:

- paying attention to all chapters and notes in the operating and assembly manual.
- carrying out all maintenance work.
- **observing** all relevant instructions for **work safety** and **accident prevention** during all life cycles of the device.
- having the necessary professional training and authorization of your company to operate the device and to carry out the necessary work on the device.

Another use or a use beyond this scope is deemed improper.

5. Scope of warranty

Warranties regarding operational safety, reliability and performance will only be granted by the manufacturer if the device is used according to the regulations and under the following conditions:

- Assembly, connection and maintenance are only carried out by authorized and qualified staff.
- The device is only used according to the operating and assembly manual.
- Never exceed or fall below the limit values as defined in the technical data.
- Modifications and repairs at the device may only be done by BEKA.

Caution!

Guaranty and warranty will expire for any damage of the device caused by improper lubricant (e.g. wear of piston, piston jamming, blockades, brittled sealings etc.).
BEKA will generally not accept guaranty claims for any damage caused by lubricants, even though those have been laboratory tested and released by BEKA, as such damage (e.g. by over-stored or incorrectly stored lubricants, batch fluctuations, etc.) cannot be verified or reconstructed later.

6. Transport and storage

Use suitable lifting devices for transport.
Do not **throw** the device or expose it to **shocks**.
Secure the device against toppling down or slipping during transport.
The device may only be transported completely empty.

Observe all valid safety and accident prevention regulations for the transport. Wear suitable **protective equipment** if necessary. **Keep adequate distance to suspended loads**. The transport help or the elevating device must have the **adequate carrying capacity**.

Notice!

When storing the device pay attention that the storage area is cool and dry in order to avoid corrosion of the individual parts of the device.
Observe the storability of the contained lubricant for devices which are filled with lubricant. Exchange the lubricant when it is over-stored (separation of oil and soap).

7. Assembly instructions

Check the device for possible transport damage and for completeness before the assembly. Any installed equipment for transportation safety has to be removed.

Comply with the following conditions when assembling a complete machine from this device and other components. Mind a proper and eco-friendly assembly without impairment of persons' health and safety:

Assemble the device in balance on the installation location in order to ensure safe operation. Observe the information on the fastening holes given in the dimensional drawing. When selecting the set-up location, please mind that the device should be protected against ambient and mechanic influences. Ensure full access, e.g. for filling with lubricant.
Special measures concerning noise prevention or oscillation reduction do not have to be taken.

7.1 Connection of lines

- Professional layout!
- When using pipes, observe that they are clean, seamless and of precision steel!
- Assemble the pipes professionally and free from distortion!
- Pay attention to pressure tightness of fittings!
- All components must be approved for max. operating pressure (see technical data).

7.2 Motor and level monitoring (optional)

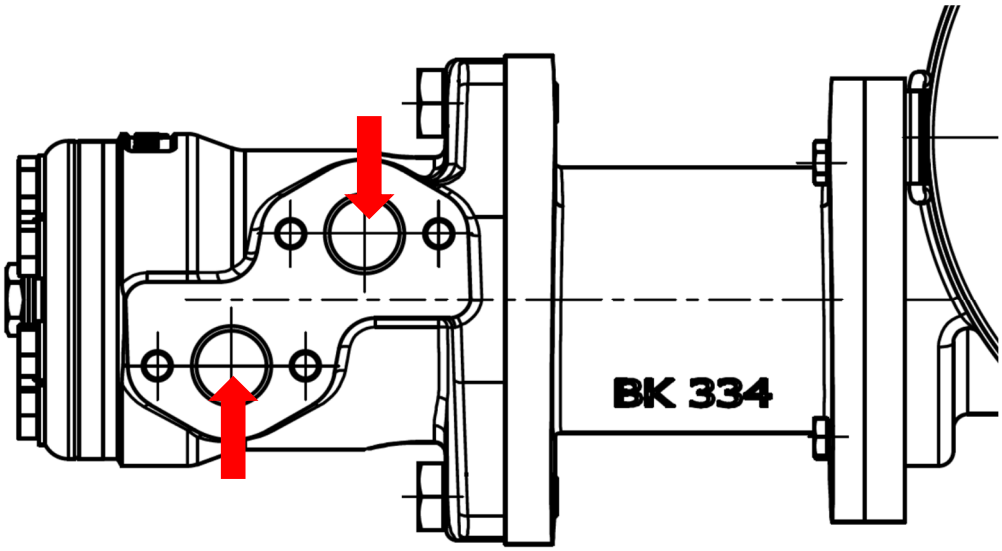
- Electrical energy supply must be done by a professional electrician!
- Electrical device components must be wired professionally!
- Compare voltage details with the existing mains voltage!
- Equipotential bonding must be done professionally by the operator via an according ground connection!
- Wire the device according to the connection diagram!

Caution!

If the grease level monitoring is connected to an intelligent control (e.g. PLC or board computer), observe that the grease level signal is only evaluated after a period of 10 seconds. This means that the lubricant reservoir is empty and the pump should be switched off (NC contact) only if the capacitive proximity switch sends a permanent signal for more than 10 seconds. If the NO contact is used, the pump must only be switched off after the signal fails for at least 10 seconds. In order to ensure a wire break monitoring, the NO contact must be used (standard).

7.3 Hydraulic connection of the hydro motor

- The connection line for the hydraulic supply pressure and the return can be connected to the hydraulic motor (thread G1/2) as requested (red arrows).
- All components must be approved for the maximum operating pressure (see chapter 1 “Technical data“).



The customer can install a throttle piece or a 2-way directional valve on the hydraulic supply line for regulation of the volume flow to the hydro motor.

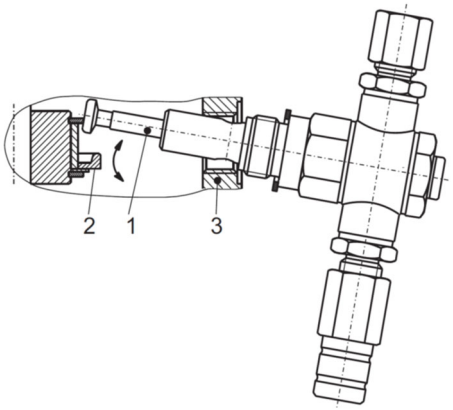
7.4 Assembly of pump elements

The pump elements must be hung in the piston eccentric ring (2) and then screwed into the pump housing (3).
Please observe the following:

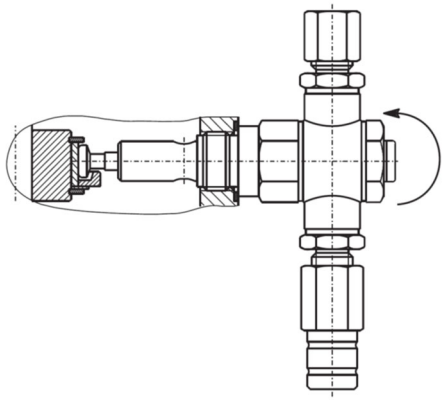
Assembly and disassembly only at complete standstill of the device. Do **not reach** into the **pump housing bore. Risk of injury**. If a pump element is removed, the pump housing bore must be closed with a screw plug.

- Switch off the device when the agitator blade is in the opposite position of the pump element that is to be installed.
- At installation, insert the pump element with sealing ring with partly extracted piston (1) diagonally towards the top into the pump housing bore (see sketch A).
- If the piston head lies on the piston eccentric ring (2), move the element into a horizontal position (see sketch B).
- The piston head must run in the groove of the piston eccentric ring (2).
- Tighten the pump element clockwise.
- Disassembly is done in reverse order.
- At disassembly of the pump elements, make sure that the piston (1) does not remain in the pump housing (3).

Sketch A



Sketch B



Caution! The pump element or device are destroyed when the pump is first started if the pump element was hung in incorrectly.

8. Start up

8.1 Lubricants

- The device is designed for standard multi-purpose greases up to NLGI cl. 2.
- Use lubricants with high-pressure additives.
- Only use lubricants of the same soaping criteria.
- Do not use any lubricants with solids content (lubricants with solids content on request).

8.2 Filling with lubricant

- Observe the machine manufacturer's lubricant details! Only use lubricants according to machine manufacturer's specifications!
- Collect leaking lubricant in a suitable reservoir and dispose it professionally!
- Observe the safety data sheet of the lubricant manufacturer!
- The lubricant viscosity changes with the operating temperature.
- Check the level several times in equal intervals during the first hours of operation and refill lubricant, if necessary.
- Pay attention to utmost cleanness when refilling the reservoir!

Caution!

Pay attention to utmost cleanliness when filling the device. Only fill in clean lubricant. When dirt particles get into the device, the pistons of the pump elements can wear, which results in the destruction of the pump elements. The dirt particles can also get into the lubrication system and can clog lines or connected progressive distributors. Avoid overfilling the device; otherwise lubricant might leak out which can cause environmental damage!

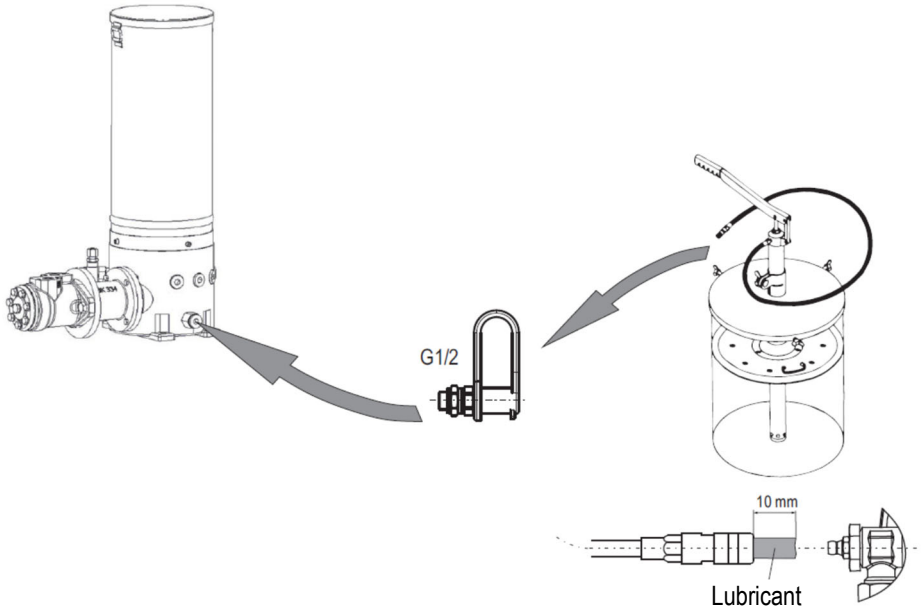
8.2.1 Filling via the filling cover

The device must be at a complete standstill during the filling via the filling cover. When the **device** is **running** and the **cover** is **open**, there is the **risk of injury** because of the **moving agitator blade**.

- Open the filling cap.
- Fill the lubricant into the reservoir avoiding air inclusions.
- Close the filling cap.

8.2.2 Filling via the filling connection or coupling plug and a filling pump

- Remove the screw plug and replace it by a coupling plug with reducer (article no. 10101421 and 10149043).
- Remove the optional protective cap (article no. 10101446) of coupling plug.
- Press out about 10mm of lubricant from the suitable filling gun (manually operated or pneumatic).
- Connect the filling pump to the filling connection or the coupling plug and fill the device up to the maximum level.
- Put the protective cap back on the coupling plug.



8.3 Setting the hydro motor

The speed of the hydraulically driven hydro motor is regulated via the volume flow of the drive medium.
Please see the dimensional drawing for the technical data of the hydraulic motor.
One revolution of the eccentric incl. agitator corresponds to one stroke of the pump element.

Notice! In order to obtain a reproducible lubrication result, the volume flow of the drive medium must not be changed retrospectively.

The number of revolutions of the eccentric incl. agitator can be adjusted during commissioning. Proceed as follows:

- Use of a two-way control valve by which the number of revolutions of the eccentric incl. agitator can be set individually.
- Use of a throttle piece which adjusts the revolution of the eccentric incl. agitator.
- Regulation of the revolutions by changing the volume flow of the drive medium.

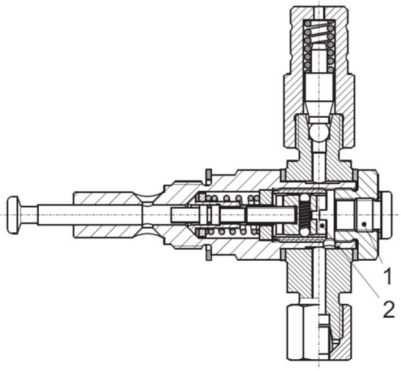
8.4 Ventilation of the lubrication system

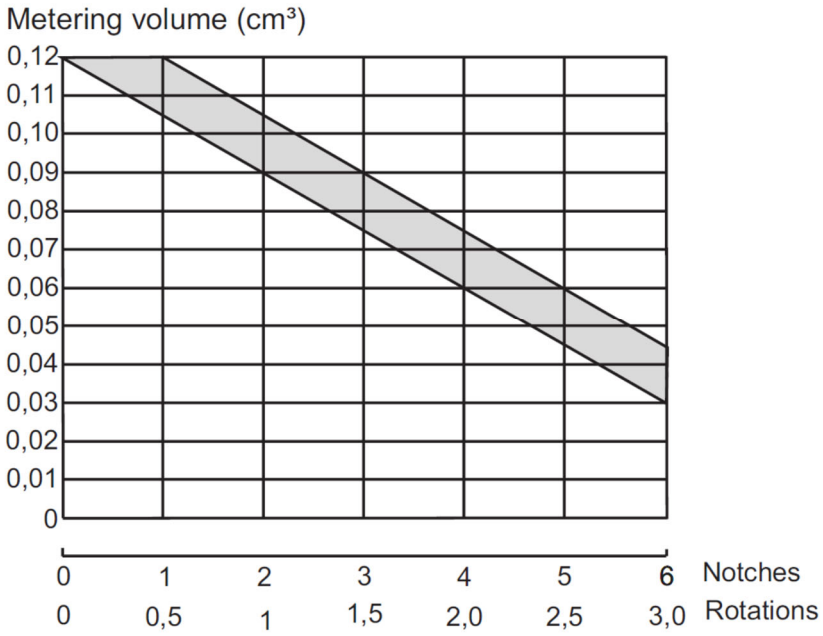
- Ventilate the whole lubrication system on first start-up and after each lubricant change!
- Ventilation is done by operating the system in pressureless condition and with open system outlets!
- Operate the pump until lubricant escapes from the pressure connection without air inclusions.

8.5 Delivery volume setting

The delivery volume for the pump elements PE 60, PE 120 or PE 170, can not be regulated as they have a fixed delivery volume. The setting of the delivery volume for a pump element PE 120 V is possible as follows:

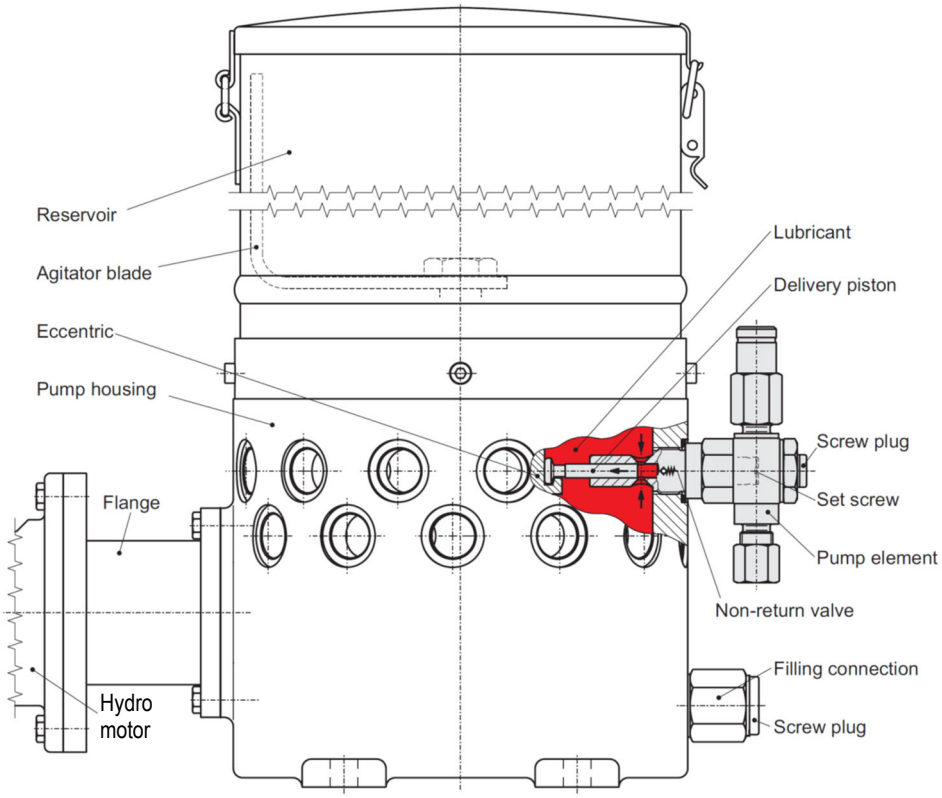
- Pump element PE 120 V is set to full stroke by default
- Reduction of the delivery volume by 0,013 cm³ per notch = ½ revolution
- Remove screw plug (1) by means of an internal hexagon screw (AF5)
- Delivery volume is changed by means of a screw driver at the washer disc (2).
- Turning clockwise reduces the delivery volume
- Turning counter clockwise increases the delivery volume
- Max. stroke of washer disc = 2,4 mm = 6 notches
- 1 revolution of the washer disc = 0,8 mm = 2 notches
- Tighten the screw plug (1) incl. sealing ring





9. Functional description

9.1 General



9.2 Function

A hydro motor drives the eccentric evenly via a coupling and a gearbox. The delivery pistons of the pump elements are hung in the groove of the eccentric. The rotary movement is transferred to the eccentric and the agitator blade construction via a worm gear which is located in the pump housing. The pump elements are screwed in circularly on 1 to 2 levels in the pump housing. The delivery pistons of the pump elements are hung in the annular groove of the eccentric ring whereby a suction and pressure stroke is forcedly performed. A non-return valve prevents that the lubricant is sucked back. The lubricant gets to the pressure connection on the pump element.
In order to guarantee an unproblematic suction of the lubricant, the reservoir is equipped with an agitator (standard). This rolls out any air traps in the lubricant and at the same time presses the lubricant into the suction chamber.
Lubricant can be refilled via the cover of the reservoir or the filling connection, which is equipped with a sieve insert.
The pressure limiting valve on the pump element protects the system against overload.

9.3 Components

9.3.1 Level monitoring

The device can also be equipped with an electric min. (standard) and max. level monitoring.
The level monitoring reliably prevents an accidental emptying or overfilling of the reservoir of the device. If the level falls below/exceeds the set value, an electric impulse is triggered by the capacitive proximity switch. This must be evaluated system-specifically.

9.3.2 Pump elements

The delivery volume cannot be regulated for the pump elements PE 60, PE 120 or PE 170 because they have a fixed delivery volume. The delivery volume can be regulated for the pump element PE 120 V (see chapter 8.6 Delivery volume setting). The optional pressure limiting valve on the pump element protects the system against overload.

Delivery volume of pump element PE 60 per stroke:	0.06 cm³
Delivery volume of pump element PE 120 per stroke:	0.12 cm³
Delivery volume of pump element PE 170 per stroke:	0.17 cm³
Delivery volume of pump element PE 120 V per stroke:	0.03 to 0.12 cm³

There is a **risk of injury** if **pump elements with pressure limiting valve** are **installed!**
Lubricant can **leak out** at the **pressure limiting valve** under **high pressure**!
Wear corresponding **personal protective equipment** (e.g. safety goggles) and **keep out of the direct area** of the **pressure limiting valve** when there is a **malfunction at the device**.
Only **work** at the device when it is in a **disconnected and pressureless state**.

10. Maintenance


Disconnect the device from electrical energy supply before **maintenance or repairs.**
Only carry out **maintenance and repair** in **complete device standstill** and **pressureless condition**.
Check the surface temperature of the device to avoid the **risk of burns** by radiant heat. Wear heat-resistant gloves and safety goggles! Clean soiled or contaminated surfaces before maintenance, wearing protective equipment if necessary! Secure the device against recommissioning during maintenance and repair work!

10.1 General maintenance

- Retighten all fittings 6 weeks after start up!
- Check all components for leakages and damage at least every four weeks!

If leakages are not repaired, lubricant **might escape under high pressure**. Remove possible puddles of lubricant immediately.

10.2 Lubricant change

Caution! Pay attention to utmost **cleanness** when refilling lubricant!

- Check the level regularly and refill clean lubricant as necessary, see chapter start up.
- Change the lubricant according to the specifications of the lubricant manufacturer. Environmental influences like increased temperature or pollution may shorten these intervals!
- Please make sure to only use lubricants that are suitable for the device as well as the lubricated machine and that comply with the requirements of the particular operating conditions.
- In case of **different lubricant manufacturers**, ensure that the lubricant **quality** corresponds to the quality of the previously used one! As precautionary measure, drain the lubricant reservoir properly and clean it!

11. Shutdown

- Relieve the device from pressure!
- Turn off electrical energy supply!
- A qualified electrician has to disconnect electrical components from the electrical energy supply!
- Remove all pipes and hoses from the device and loosen all fastenings for disassembly!

12. Disposal

Notice!

Observe the disposal instructions of the lubricant manufacturer when lubricant is changed! Lubricants or cloths contaminated with lubricant, etc. must be collected in specially marked reservoirs and disposed of accordingly.
Disposal of the device must be done properly and professionally and according to the national and international laws and regulations.

Moreover, BEKA devices could contain batteries. Professionally and properly disposed batteries will be recycled. They contain important raw materials.

13. Troubleshooting

Malfunction	Possible cause	Possible remedy
Pump does not aspirate	Lubricant viscosity too high	Fill in lubricant with correct viscosity
	Level too low	Refill lubricant
Supply interrupts but drive is ok	Coupling defective	Renew coupling
	Air below pump element	Ventilate pump
	Lack of lubricant in reservoir	Refill lubricant
	Drive lines interchanged	Connect drive lines correctly
Pump supplies without or with low pressure	Pressure limiting valve does not close	Exchange pressure limiting valve
	High pump wear	Renew pump
Pump is too noisy	Hydro motor defective	Renew hydro motor
	Coupling defective	Renew coupling
	Pump defective	Renew pump
	Shaft sealing ring defective	Renew shaft sealing ring

14. Spare part list and drawing

Spare part lists and drawings are available on request.
Please indicate the article number of your device for this.

15. Dimensional drawing

See following pages in the attachment.

16. Details of the manufacturer

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