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# BEKA-MAX

## Grease lubrication pump PICO with integrated control unit PICO-troniX1 PICO-tronic

Version 05-2019

# Original operating and assembly manual



BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

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## 1. Technical data

**General:**

Delivery rate per stroke and outlet: . . . . . depending on pump element (see chapter 8.4 „Pump elements“)
No. of outlets: . . . . . pump elements PE-5 to PE-50: . . . . . max. 8
. . . . . pump elements PE-60 F to PE-170 F: . . . . . max. 2
Pressure connection: . . . . . Ø4 mm, Ø6 mm or thread M10x1 (multi-line lubrication systems)
. . . . . Ø6 mm, Ø8 mm or thread G1/4" (progressive lubrication systems)
Lubricant: . . . . . greases up to NLGI cl. 2
. . . . . (greases with solids content on request)
Operating pressure: . . . . . max. 200 bar (multi-line lubrication systems)
. . . . . max. 300 bar (progressive lubrication systems)
Pressure limiting valve: . . . . . set to 290 bar (progressive lubrication systems)
Operating temperature: . . . . . -35°C up to +70°C
Transport and storage temperature: . . . . . -40°C up to +70°C
Reservoir material: . . . . . plastic, transparent
Reservoir size: . . . . . 1,5 l
Effective volume: . . . . . 1,2 l
Installation position: . . . . . optional (version with follow-up piston)
. . . . . reservoir in a vertically upright position (version with agitator blade)
Level monitoring: . . . . . with, installed in pump body (version with follow-up piston)
. . . . . without (version with agitator blade)
Rotational direction of the agitator blade: . . . . . clockwise
Degree of protection: . . . . . IP 65
Weight: . . . . . approx. 4,8 kg
. . . . . (without pump element, without grease filling, depending on equipment)

**Motor:**

Supply voltage: . . . . . 12 or 24 V DC
Current load max.: . . . . . 6,3 A at 12 V
. . . . . 3,3 A at 24 V
Pump speed: . . . . . 15 r.p.m

**Integrated control unit:**

Supply voltage: . . . . . 10 to 60 V
Current load max.: . . . . . 6,0 A
Output for signal lamp: . . . . . 0,4 A
Fuse (not included in device): . . . . . 6,3 A
. . . . . (5x20) medium time lag

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

## 2. 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.

### 2.1 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!**

### 2.2 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.

## 2.3 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.

## 2.4 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.

## 2.5 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.

### 2.6 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.

### 2.7 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.

### 2.8 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.

### 2.9 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.**

## 3. Intended use

**Caution!**

The device is only approved for the **industrial** or **commercial use**.
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 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.

**Caution!**

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

## 4. 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.

## 5. 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.

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).

## 6. 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:

Devices with agitator blade have to be assembled balanced at both sides at the setup location and the **reservoir has to be in an upright position** in order to ensure a safe operation! Devices with follow-up piston do **not** have to be assembled in a vertically upright position. 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.

### 6.1 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 chapter 1. „Technical data“).

### 6.2 Power connection

- Power 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!

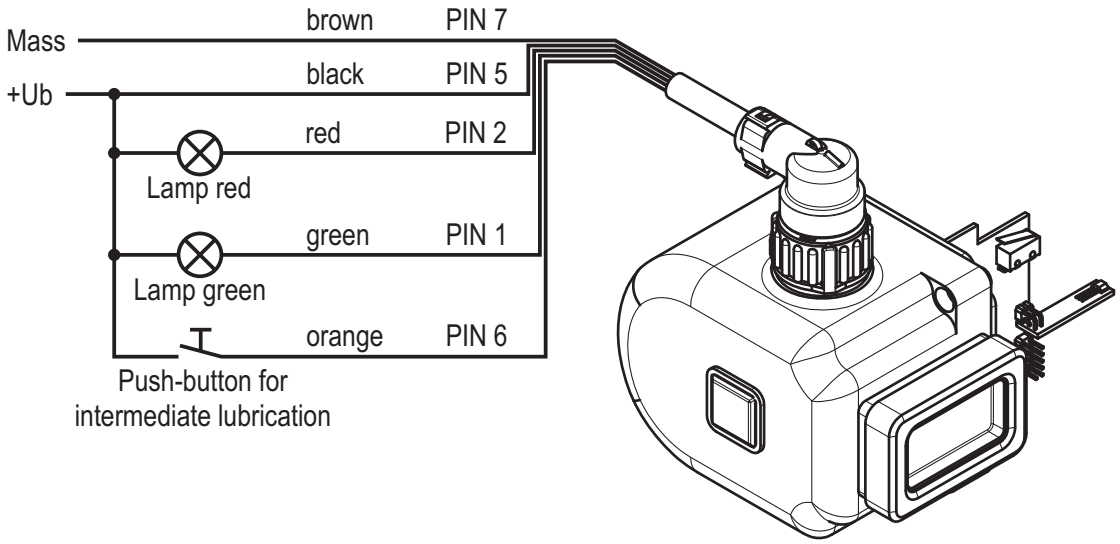
**Notice!**

Devices with integrated control unit PICO-troniX1 can be supplied with **bayonet plug-type connection** or **Hirschmann plug-type connection**. The **connection plug** and a **10 m long connection cable** are included in the scope of delivery for both versions.
Devices with integrated control unit PICO-tronic are supplied with two **Hirschmann plug-type connections**. The **connection plug for the voltage connection** (see fig. 40) and a **10 m long connection cable** are included in the scope of delivery. The **connection plug for the additional equipment** (see fig. 40) is supplied **without connection cable**. If you need a connection cable, it has to be ordered **separately** (order numbers on request).

The following listed connection diagrams are valid for standard versions.
Other connection diagrams may be valid for special versions. These are available on request.

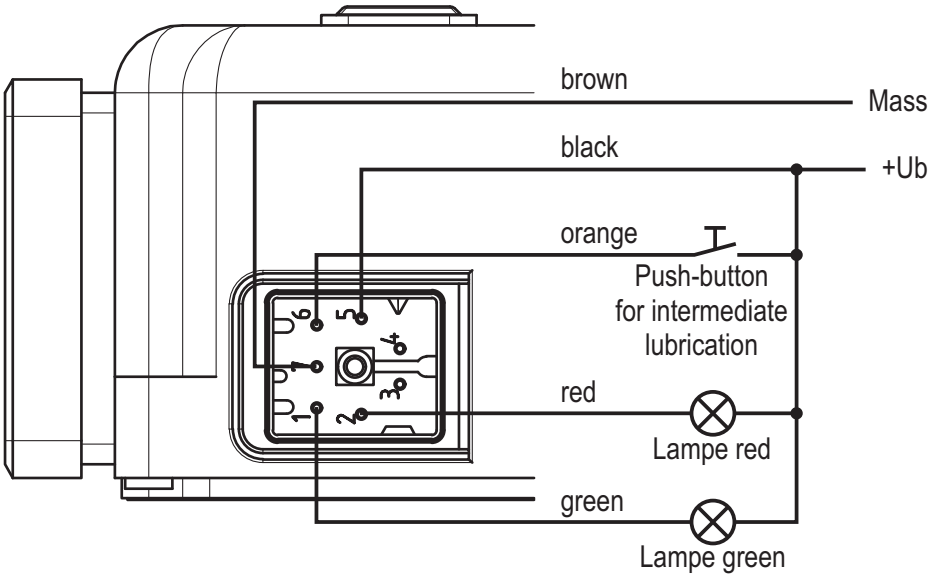
### 6.2.1 Connection diagram for devices with PICO-troniX1 and bayonet plug-type connection

Fig. 1:




### 6.2.2 Connection diagram for devices with PICO-troniX1 and Hirschmann plug-type connection

Fig. 2:





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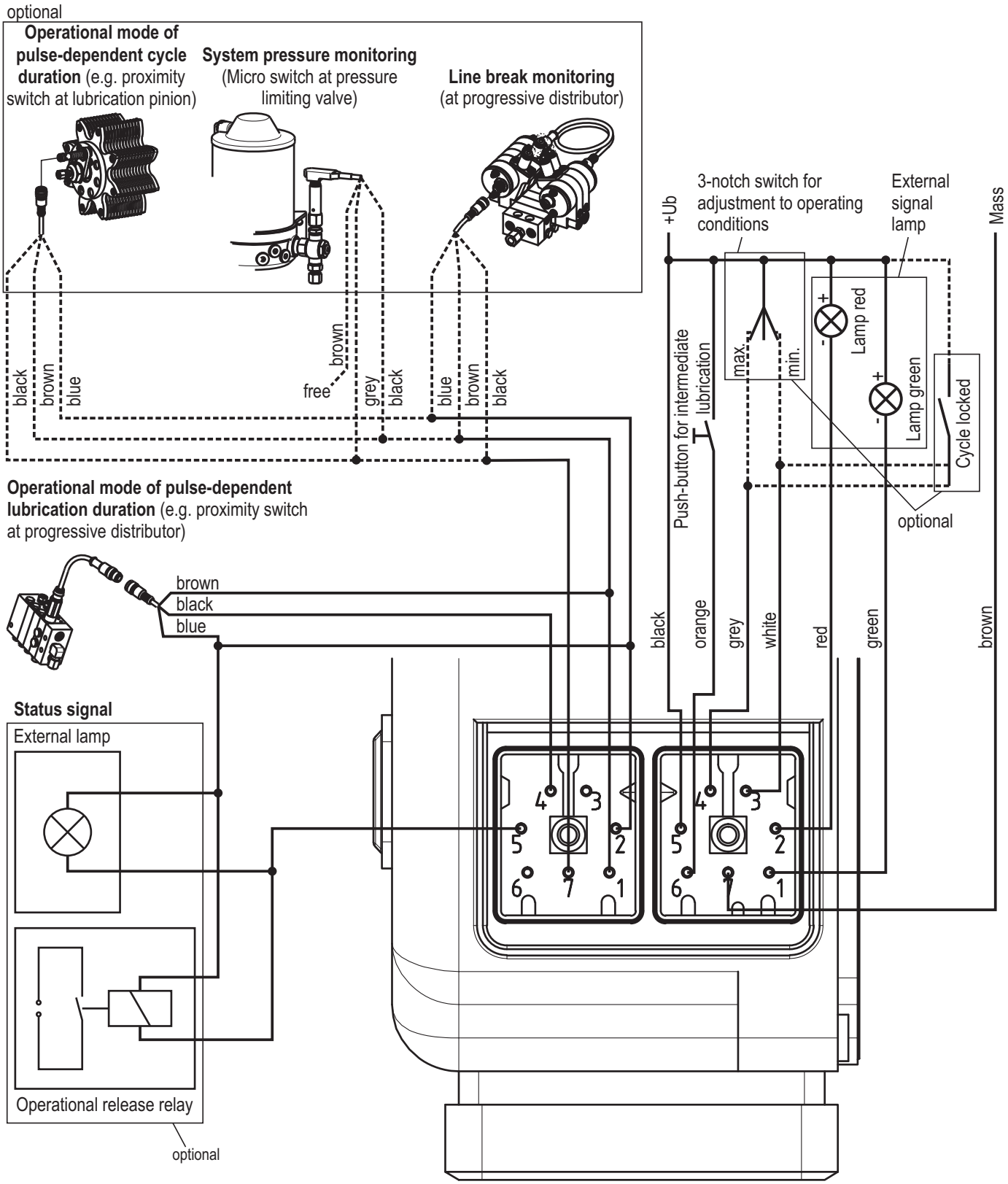
### 6.2.3 Connection diagram for devices with PICO-tronic

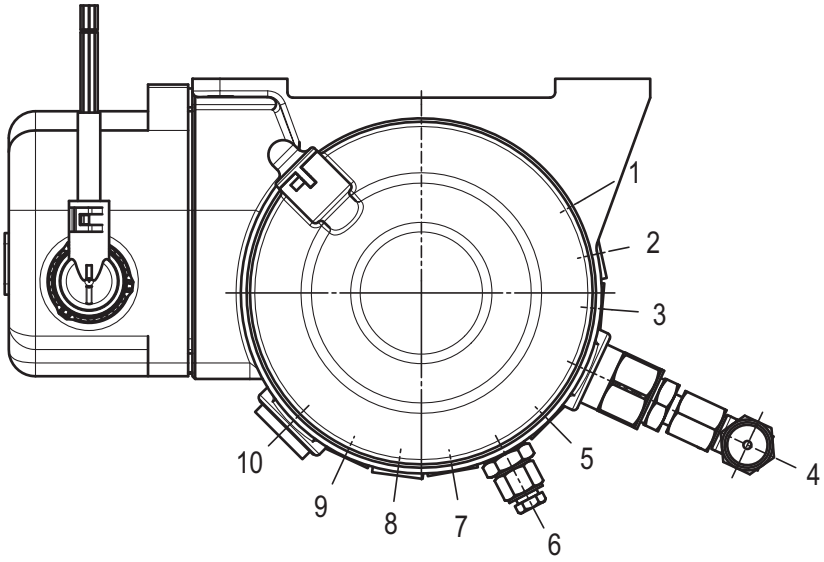
Fig. 3:



### 6.3 Assembly of the pump elements

Different pump elements can be installed into the device (see chapter 8.4 „Pump elements“).

Fig. 4:




The pump elements PE-60 F, PE-120 F, PE-170 F and PE-120 FV can be screwed into the outlets 4 and 10 (see fig. 4).

The pump elements PE-5, PE-10, PE-15, PE-25 and PE-50 can be screwed into the outlets 1 to 3 and 5 to 9 (see fig. 4).

Remove the screw plug with an Allen key AF 10 (outlets 4 and 10, see fig. 4) or AF 6 (outlets 1 to 3 and 5 to 9, see fig. 4) from the outlet into which you want to screw in the pump element.

Exchange the sealing of the pump element in order to avoid that damaged sealings are reused.

**Notice!**

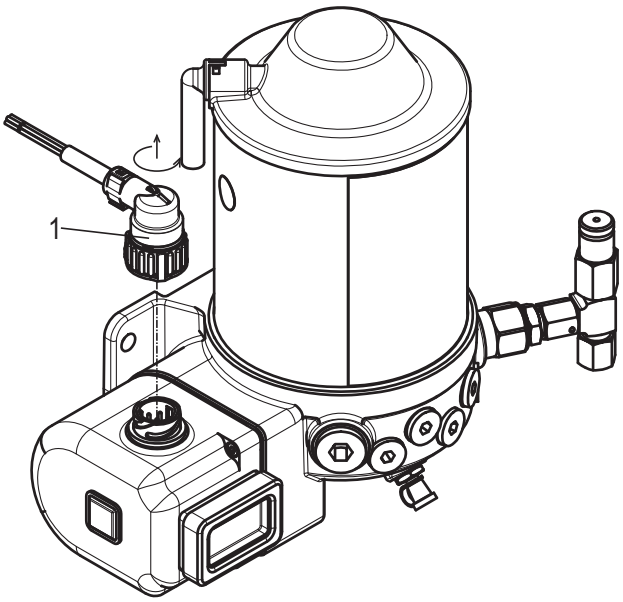
When the pump elements PE-5 to PE-50 are ordered separately, the sealing is not included in the scope of delivery and has to be ordered separately if needed (see chapter 8.4.5 „Code of the pump elements for multi-line lubrication systems“).

In the following, the disassembly and assembly of the pump elements is described at the example PE-120 F.

### 6.3.1 Disassembly of a pump element

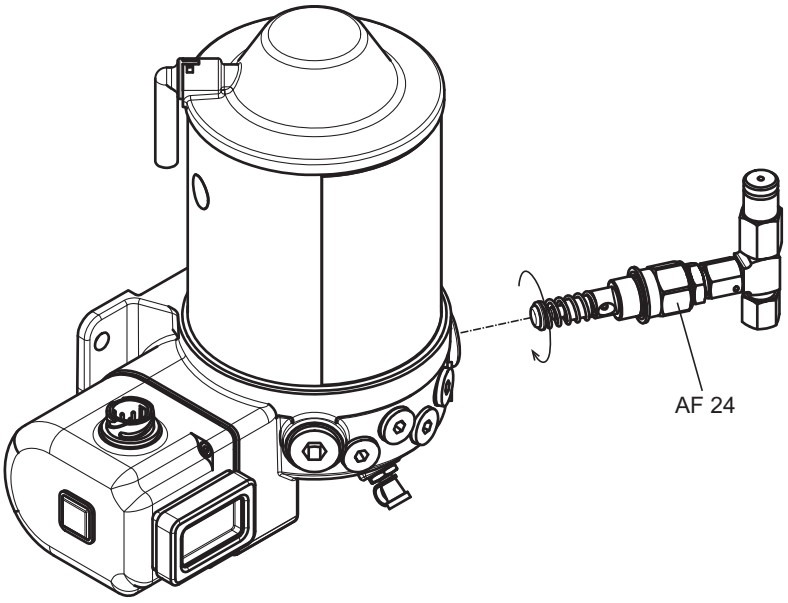
**A)** Disconnect the device from the power supply (pos. 1, see fig. 5) and secure it against recommissioning.

Fig. 5:




**B)** Unscrew the pump element.

Fig. 6:



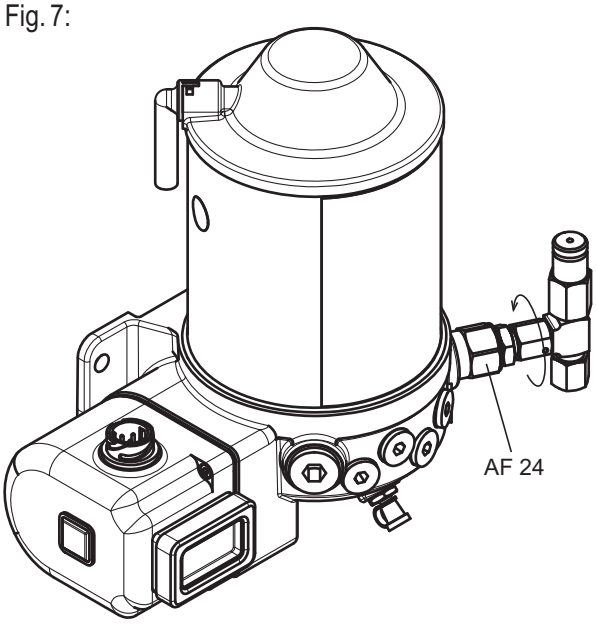

**Caution!**

Make sure that the piston of the pump element does not remain in the pump housing!
If the piston remains in the pump housing, the eccentric may be damaged or the device might block.

### 6.3.2 Assembly of a pump element

**C)** Exchange the sealing, screw in the pump element and adjust it until the desired position has been reached. Tighten the pump element with the below indicated tightening torque (see fig. 7).

Fig. 7:

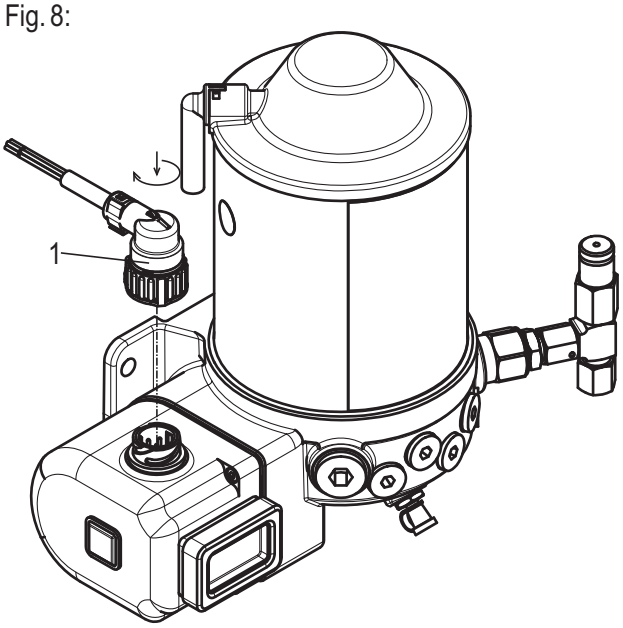



**Notice!**

Tighten the pump elements PE-5 to PE-50 with a tightening torque of 20 Nm ±10%.
Tighten the pump elements PE-60 F to PE-170 F and PE-120 FV with a tightening torque of 45 Nm ±10%.

**D)** Reconnect the device to the power supply (pos. 1, see fig. 8)

Fig. 8:




Initiate a trial run and let the device operate with open outlets until the lubricant leaks out bubble-free.

# 7. Start up

## 7.1 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, e.g. graphite or MoS2)

## 7.2 Filling with lubricant

- Fill the lubricant reservoir with clean lubricant at the filling nipple or a filling connection!
- 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!**

By default, you receive the device with a basic filling. The procedure for filling devices with basic filling can be found in chapter 7.2.2 „Filling of the device“.
If the device has no basic filling, observe the procedure for the initial filling for devices with follow-up piston which is described in chapter 7.2.1 „Initial filling of devices with follow-up piston“. You can proceed as described in chapter 7.2.2 „Filling of the device“ for the initial filling of devices with agitator blade.

### 7.2.1 Initial filling of devices with follow-up piston

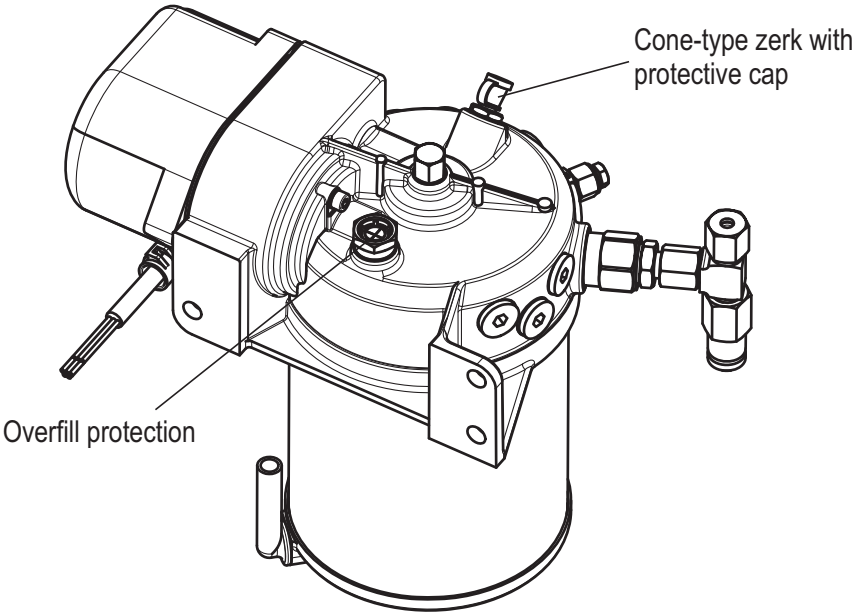
Use a standard grease pump (hand lever grease gun) for the initial filling of the device with follow-up piston and fill the device via the cone-type zerk.

**Caution!**

Pay attention to utmost cleanliness at the initial filling of 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.

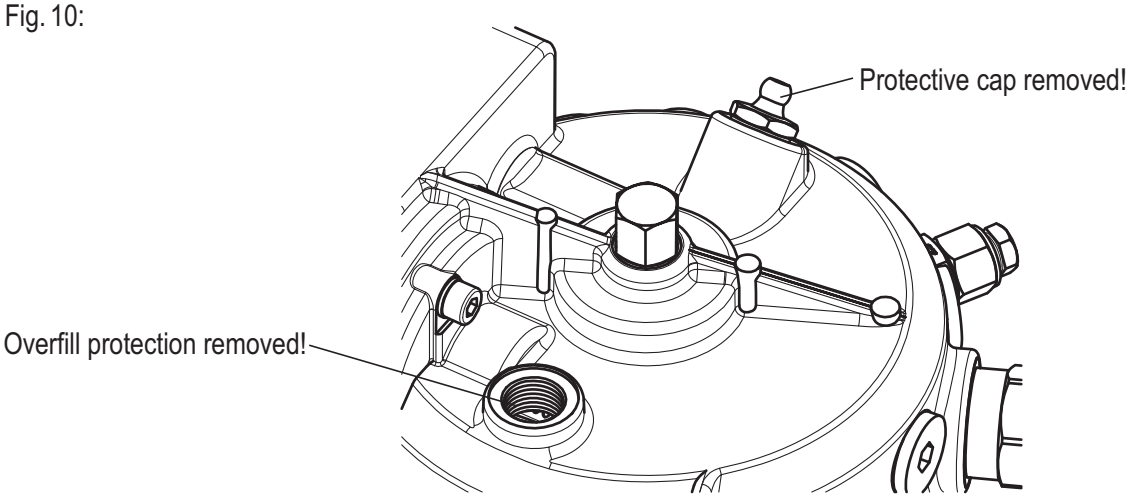
**A)** Connect the device according to the connection diagram (see chapter 6.2 „Power connection“) and turn it around so that the reservoir cover points down (see fig. 9).

Fig. 9:




**B)** Remove the overfill protection and the protective cap of the cone-type zerk (see fig. 10).

Fig. 10:



**C)** Take the device into operation.

Operate the filling gun until lubricant leaks out visibly at the outlet (see fig. 12).

Connect the filling gun to the cone-type zerk and fill the device until lubricant leaks out at the opening of the overfill protection (see fig. 11).

Fig. 11:

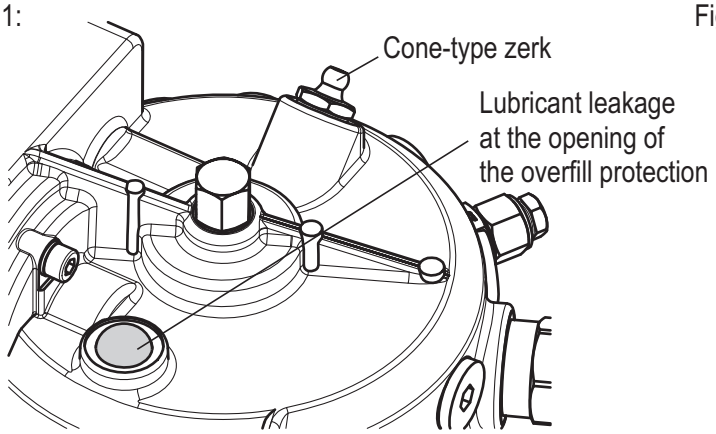
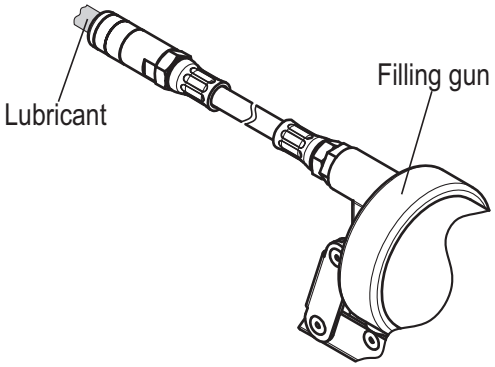
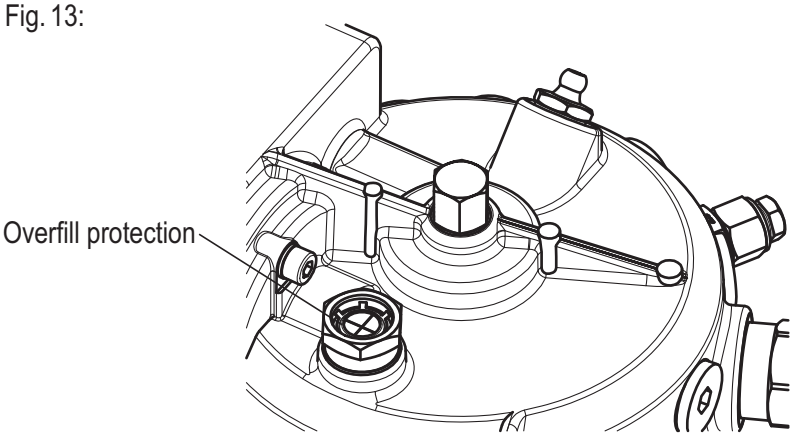



Fig. 12:



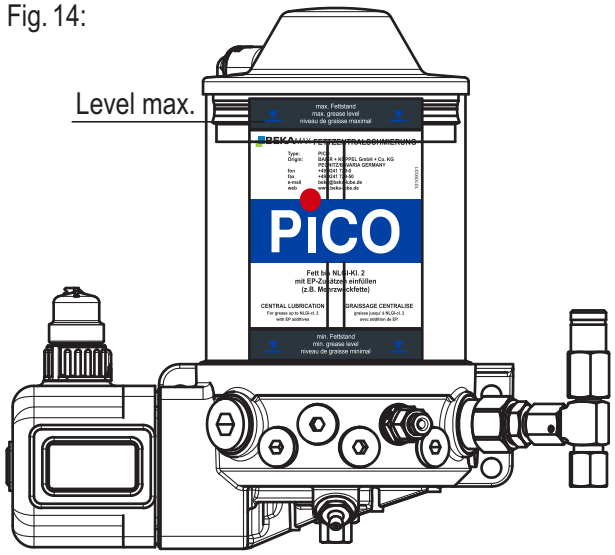

**D)** Screw the overfill protection back in and tighten it with a tightening torque of 15 Nm ±10%.

Fig. 13:




**E)** Turn the device around again and fill it up to the maximum level (see fig. 15). Put the protective cap back on the cone-type zerk after finishing the filling process.

Fig. 14:




**Caution!**

Avoid overfilling the device; otherwise lubricant might leak out which can cause environmental damage!

### 7.2.2 Filling of the device

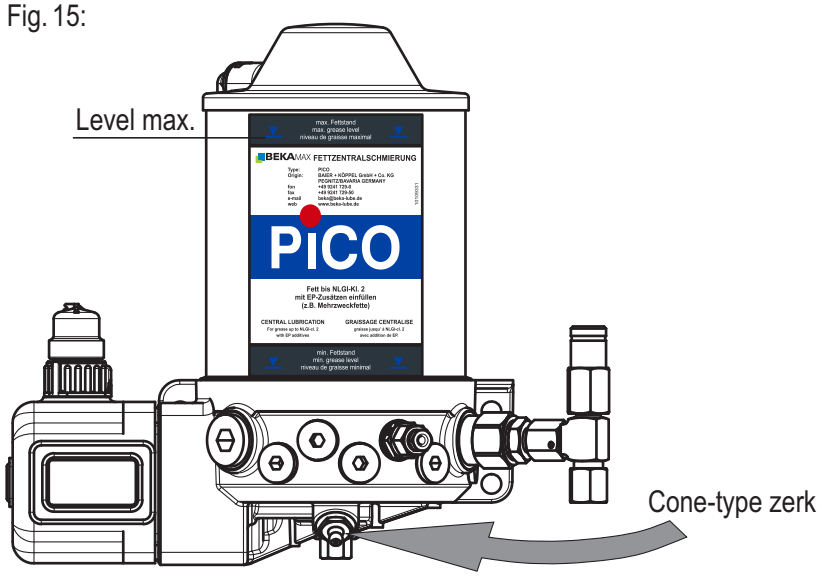
**Caution!**

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!

#### A) Filling via the cone-type zerk with a filling gun (standard)

Remove the protective cap of the existing cone-type zerk, connect a suitable filling gun (manually operated or pneumatic) to this one and fill the device up to the maximum level (see fig. 15). Put the protective cap back on the cone-type zerk after finishing the filling process.

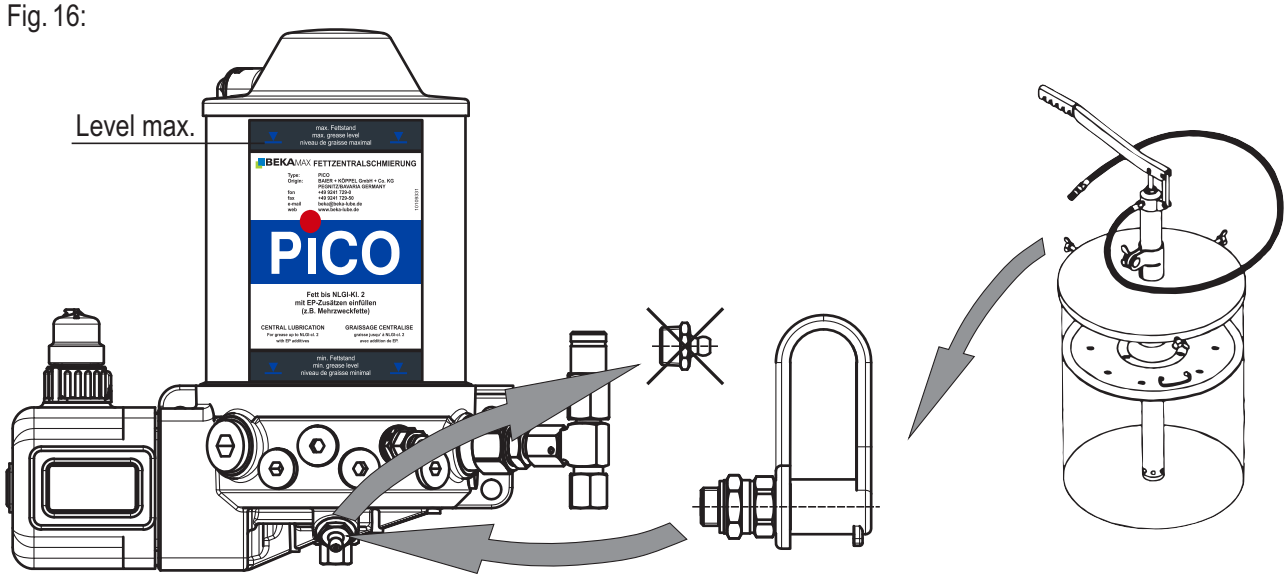
Fig. 15:




#### B) Filling via the filling connection G1/4

Remove the cone-type zerk and replace it by a filling connection G1/4 (order no.: 21590061006). Connect a suitable filling pump to the filling connection G1/4 and fill the device up to the maximum level (see fig. 16).

Fig. 16:



### C) Filling via the filling set PICO Fill

The filling set PICO Fill (order no.: 208103027) has been developed for an easy and quick filling of the device. It consists of a filling connection M20x1,5 (order no.: 21520152) and a filling gun (order no.: 208103026).

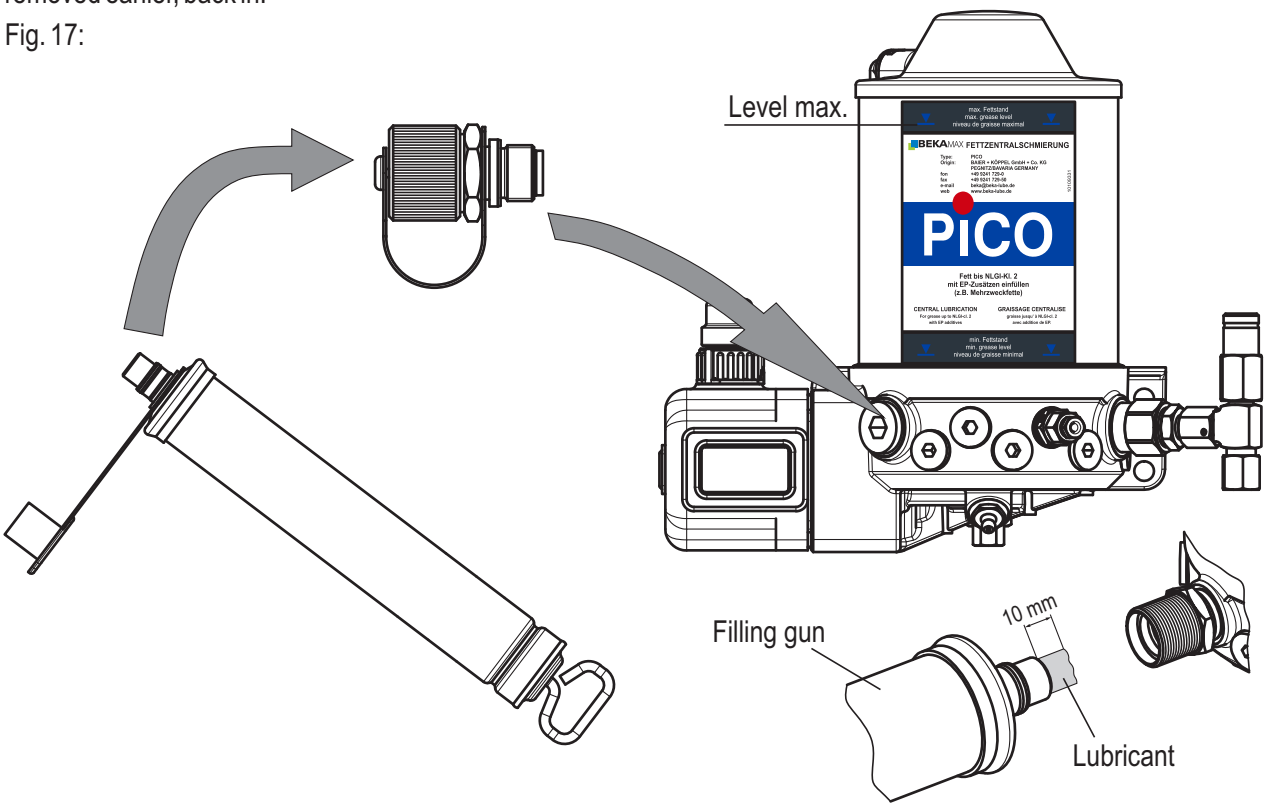
Remove the screw plug from the outlet 4 or 10 (see fig. 4 in chapter 6.3 „Assembly of the pump elements“) and screw in the filling connection M20x1,5.

Operate the filling gun until the lubricant leaks out visibly at the outlet (approx. 10 mm, see fig. 17).

Connect the filling gun to the filling connection M20x1,5 and fill the device up to the maximum level.

Remove the filling connection M20x1,5 after finishing the filling process and screw the screw plug, which had been removed earlier, back in.

Fig. 17:



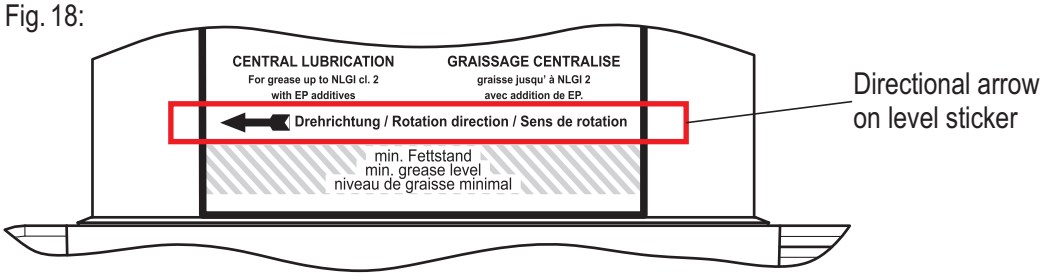

### 7.3 Check of rotational direction of the device

- Compare the rotational direction of the agitator blade with the directional arrow on the level sticker (see fig. 18) for devices with agitator blade.
- Check the electrical connections of the device at a wrong rotational direction and change these if necessary.

**Caution!**

The **motor** and the **device** will be **damaged** when they are operated in the **wrong rotational direction** for a longer time!

Fig. 18:



### 7.4 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 device until lubricant escapes from the pressure connection without air inclusions.

## 8. Functional description

### 8.1 Lubrication systems

The device can be used for the lubrication in progressive lubrication systems, multi-line lubrication systems or in mixed lubrication systems. The lubrication systems are also controlled by the integrated control unit PICO-troniX1 or PICO-tronic.

Up to two lubrication circuits, which are independent from each other, can be connected to the device at installation into a progressive lubrication system.

Up to 8 lube points can be supplied with lubricant when the device is used in a multi-line lubrication system.

Both systems can also be combined with the device (mixed lubrication system).

#### 8.1.1 Progressive lubrication systems

Progressive lubrication systems are lubrication systems which can process lubricants up to NLGI cl. 2.

A progressive lubrication system mainly consists of a lubrication pump and one or several progressive distributors. The lubrication pump supplies the lubricant into a main distributor. This distributor distributes the lubricant in the correct relation to the secondary distributors, which redistribute the lubricant to the lube points.

If one lube point does not take any lubricant from the distributor, it blocks. Pressure builds up in the system by this. The system pressure is limited to 290 bar by a pressure limiting valve at the pump element (see fig. 19, pos. 11 and pos. 12). The system is thereby protected from being damaged by too high pressure.

#### 8.1.2 Multi-line lubrication systems

Multi-line lubrication systems are lubrication systems which can process lubricants up to NLGI cl. 2.

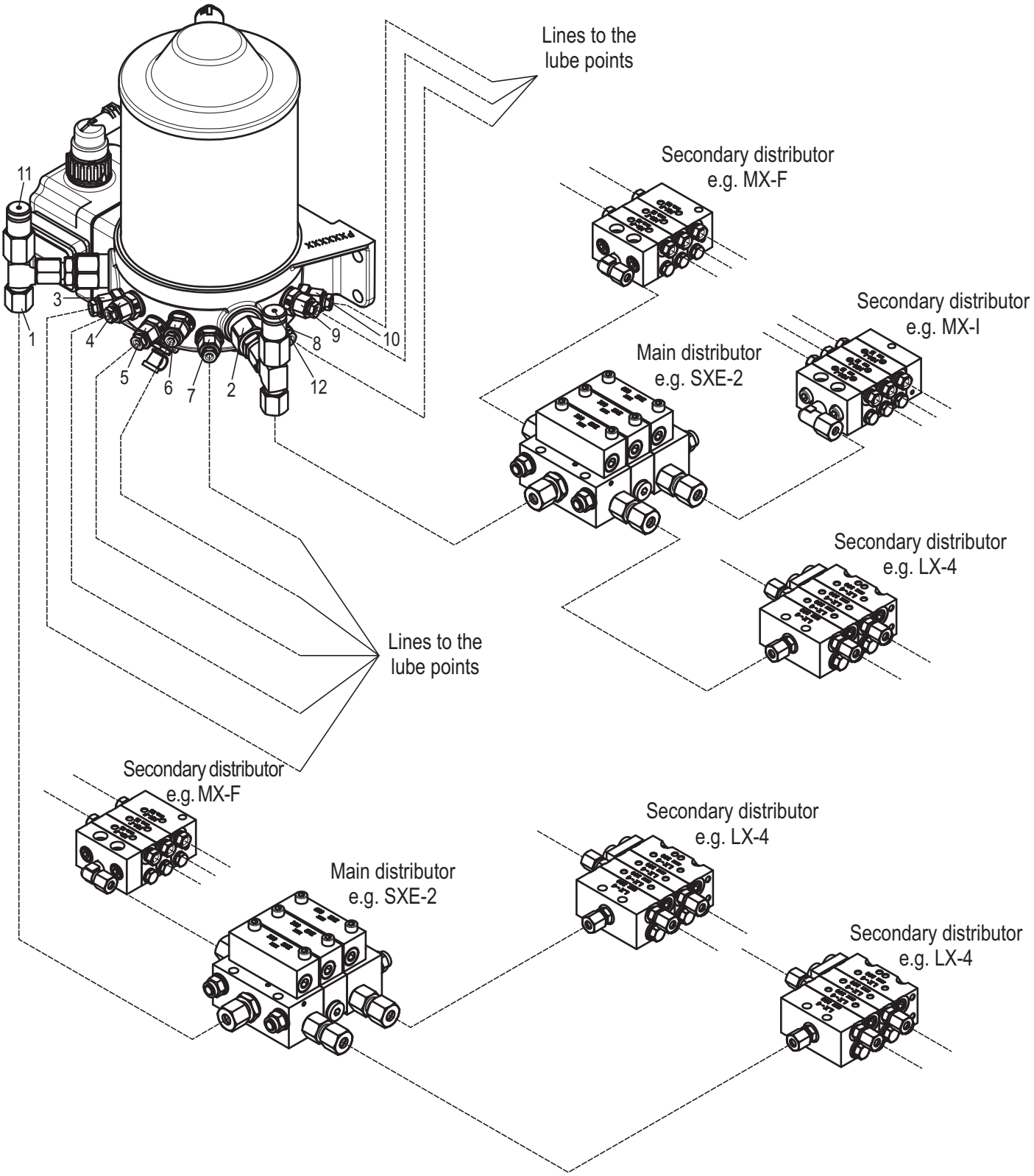
A multi-line lubrication system mainly consists of a lubrication pump and several lubrication lines which are connected directly to the lube points. Each lube point requires its own pump element at the lubrication pump (see fig. 19, pos. 3 up to pos. 10).

#### 8.1.3 Mixed lubrication systems

A progressive lubrication system and a multi-line lubrication system can be connected to the device at the same time; this is called a mixed lubrication system.

One lubrication circuit with progressive distributors can each be connected to the pump elements pos. 1 and pos. 2 (see fig. 19). One lube point can each be connected to the pump elements pos. 3 to pos. 10 (see fig. 19).

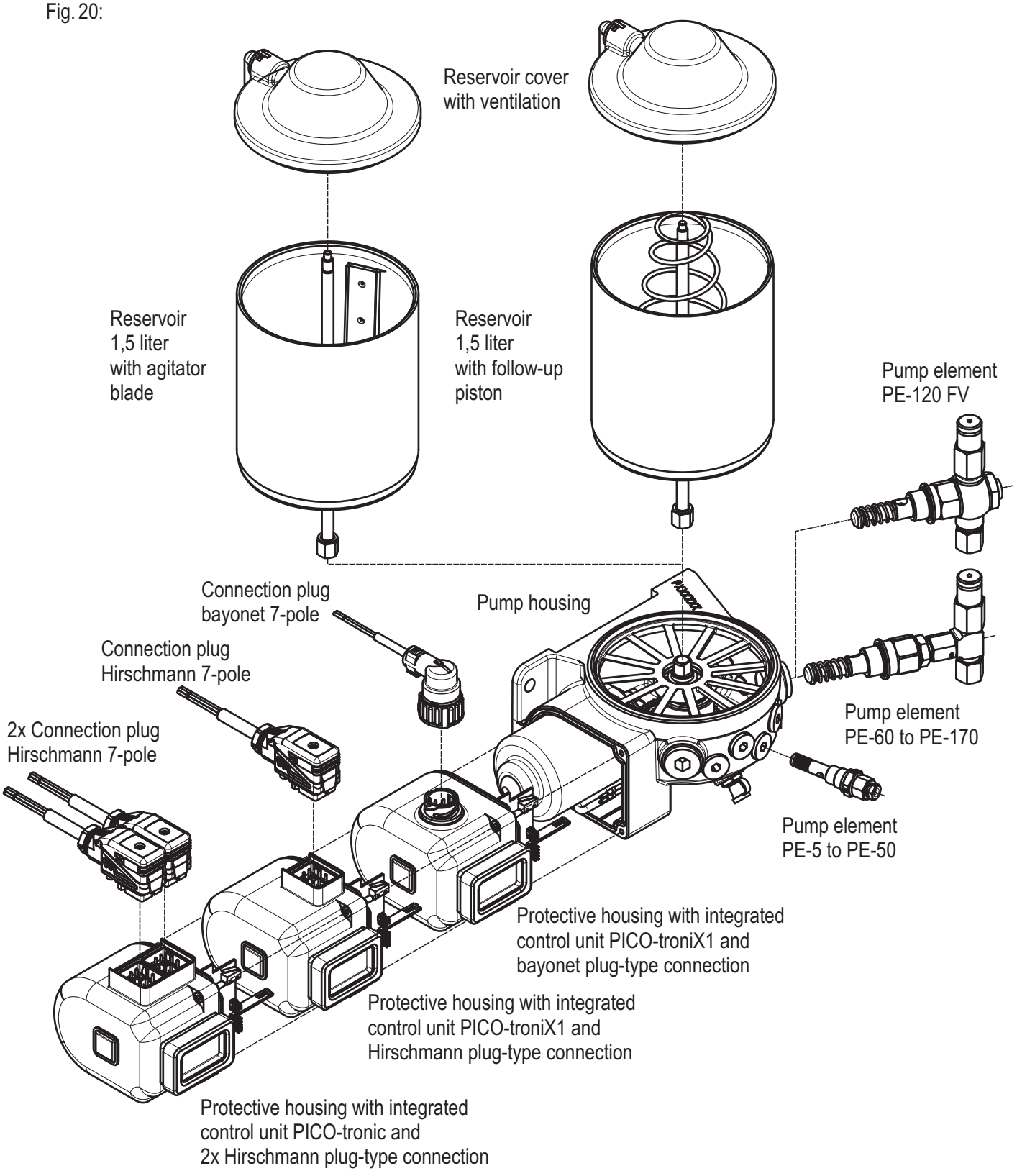
Fig. 19:



### 8.2 Setup of the device

The device mainly consists of 6 assemblies (see fig. 20).

Fig. 20:



### 8.3 Functional description of the device

#### 8.3.1 Functional description of the version with follow-up piston

The following listed positions can be found in fig. 21.

A DC motor, optionally with 12 or 24 V DC (pos. 1), drives the eccentric shaft (pos. 3) via a worm drive (pos. 2). The delivery pistons (pos. 4) of the integrated pump elements are pushed into the pump element body (pos. 5) by the rotary movement and the eccentricity of the shaft (= delivery stroke). The delivery pistons return into their initial position by the compression springs (pos. 6) and suck new lubricant from the reservoir (= suction stroke).

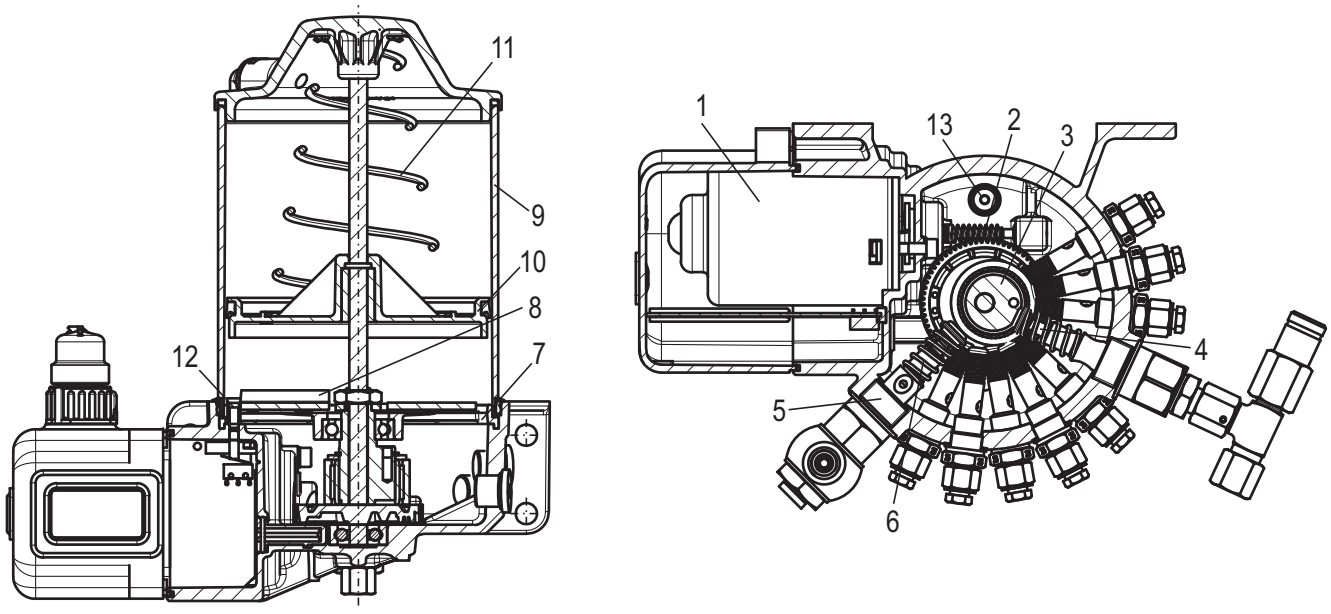
Non-return valves are integrated in the pump elements which prevent that lubricant, which has already been displaced, is sucked back. An agitator blade (pos. 8), which is firmly connected with the eccentric shaft, is located above the centering ring (pos. 7), which is used as grease strainer. The agitator blade pushes the lubricant towards the pump elements. There is a follow-up piston (pos. 10) in the reservoir (pos. 9) which is pushed onto the lubricant by a conical compression spring (pos. 11). By this, the follow-up piston pushes the lubricant evenly to the agitator blade or to the pump elements. It is therefore not strictly necessary to assemble the device vertically.

If the reservoir is empty, the follow-up piston pushes onto a feeler (pos. 12), which sends a signal to the integrated control unit. The integrated control unit displays the error *Level too low* and switches the device off in order to prevent that air gets into the lubrication system (see chapter 13 „Troubleshooting“).

The device can be filled via a cone-type zerk which is located in the pump housing. In order to avoid an overfilling of the device, a pressure limiting valve (pos. 13) is integrated in the pump housing which is used as overfill protection.

Refer to chapter 7.2 „Filling with lubricant“ for further information on filling the device.

Fig. 21:



### 8.3.2 Functional description of the version with agitator blade

The following listed positions can be found in fig. 22.

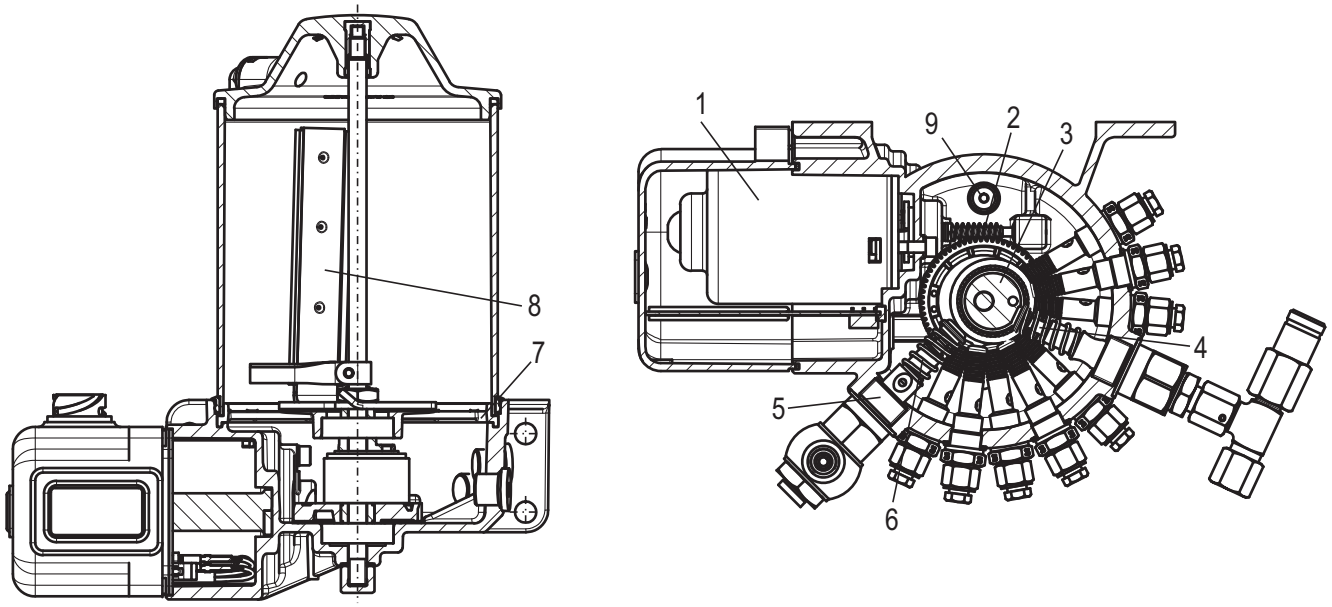
A DC motor, optionally with 12 or 24 V DC (pos. 1), drives the eccentric shaft (pos. 3) via a worm drive (pos. 2). The delivery pistons (pos. 4) of the integrated pump elements are pushed into the pump element body (pos. 5) by the rotary movement and the eccentricity of the shaft (= delivery stroke). The delivery pistons return into their initial position by the compression springs (pos. 6) and suck new lubricant from the reservoir (= suction stroke).

Non-return valves are integrated in the pump elements which prevent that lubricant, which has already been displaced, is sucked back. An agitator blade (pos. 8), which is firmly connected with the eccentric shaft, is located above the centering ring (pos. 7), which is used as grease strainer. The agitator blade pushes the lubricant towards the pump elements.

The device can be filled via a cone-type zerk which is located in the pump housing. In order to avoid an overfilling of the device, a pressure limiting valve (pos. 9) is integrated in the pump housing which is used as overfill protection.

Refer to chapter 7.2 „Filling with lubricant“ for further information on filling the device.

Fig. 22:



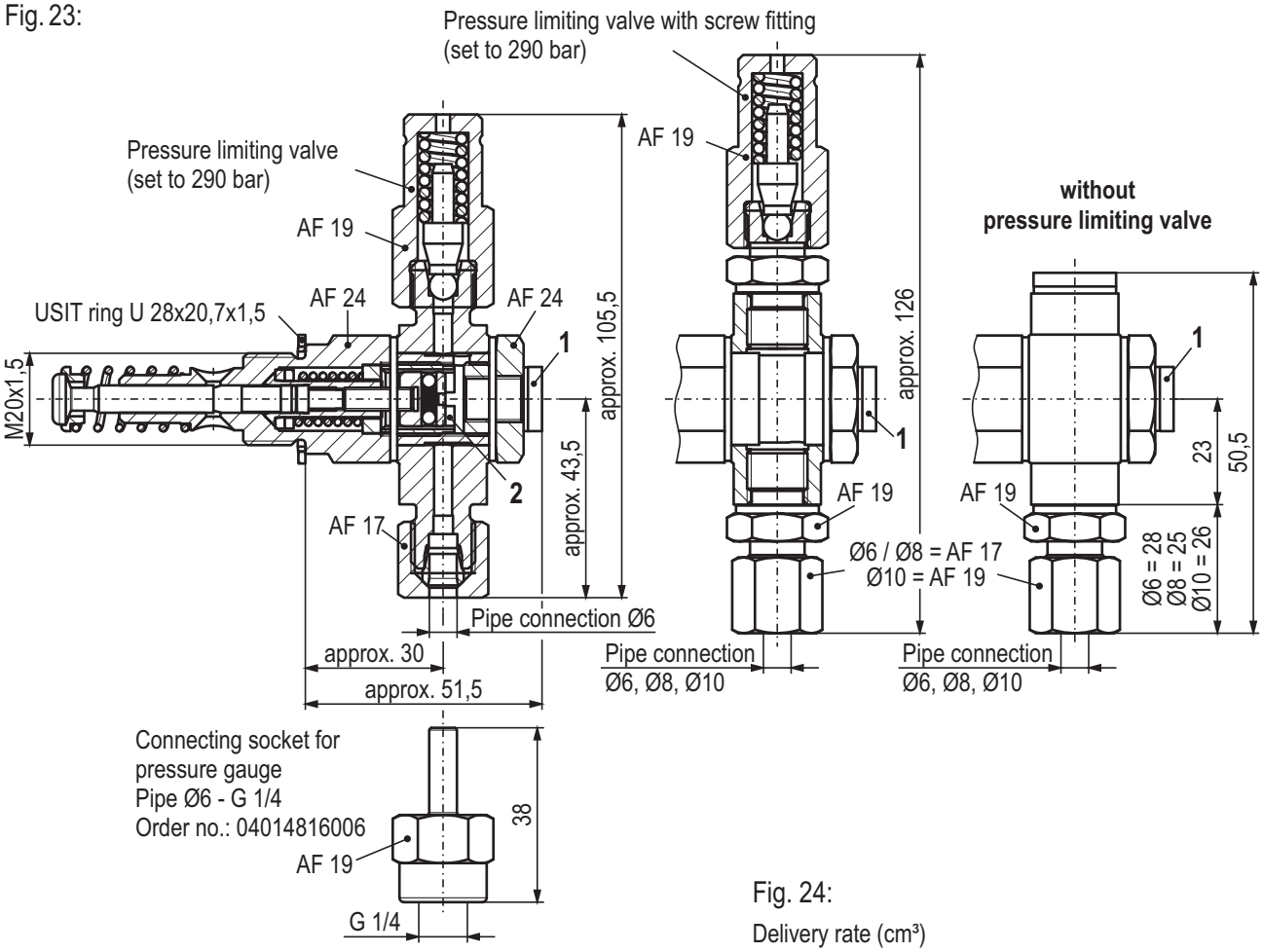

### 8.4 Pump elements

Two different construction types of pump elements can be installed into the device, depending on for which lubrication system or for which lubrication system combination the device is used.

### 8.4.1 Pump elements PE-120 FV

The pump element PE-120 FV is intended for the use in progressive lubrication systems. The delivery rate of this pump element can be set in the range from 0,04 cm³/stroke to 0,12 cm³/stroke. The pump element is deliverable with different pipe connections and with or without pressure limiting valve (see fig. 23).

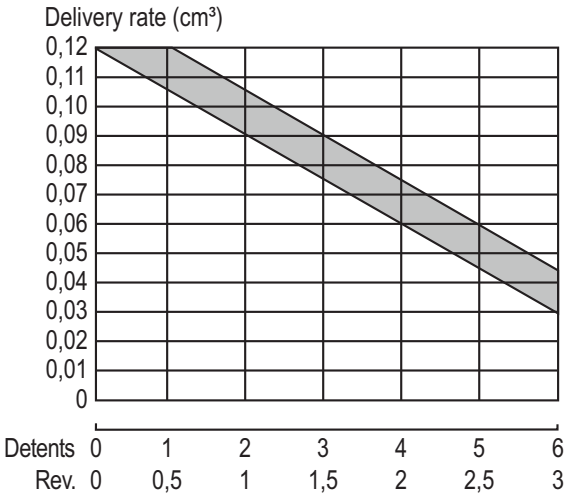
Fig. 23:




**Setting the delivery rate**

- Remove the screw plug (1, see fig. 23) with an Allen key AF 5.
- Adjust the set screw (2, see fig. 23) with a screwdriver up to the required delivery rate.
- Turning clockwise reduces the delivery rate; turning counterclockwise increases the delivery rate.
- A revolution of the set screw corresponds to 2 detents. The set screw can be adjusted by a maximum of 6 detents (3 revolutions, see fig. 24).
- Retighten the set screw (1) incl. sealing ring with a tightening torque of 15 Nm ± 10% after setting the delivery rate.

Fig. 24:

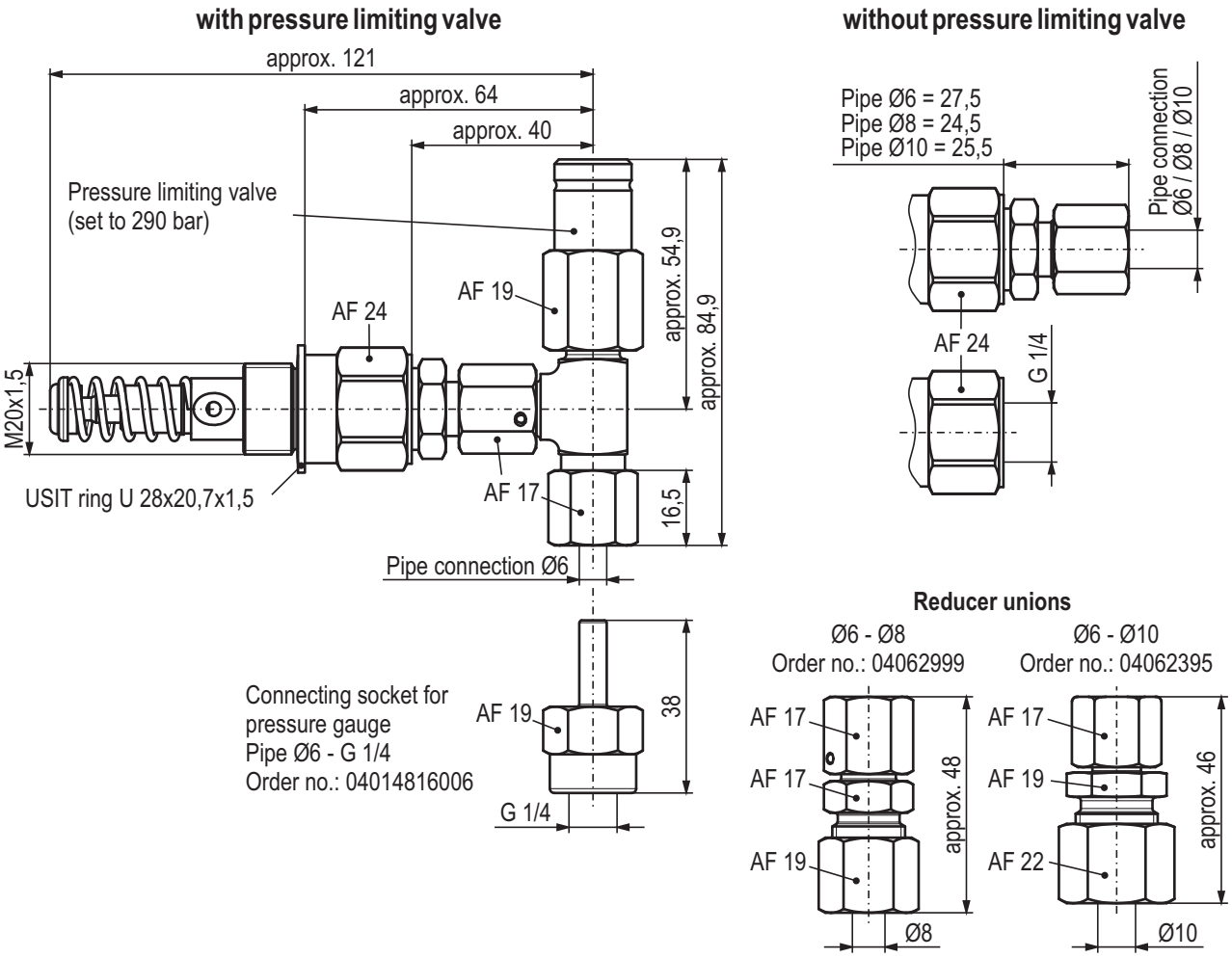



**Notice!** **The pump element PE-120 FV is set to full stroke ex works.**

### 8.4.2 Pump elements PE-60 F, PE-120 F and PE-170 F

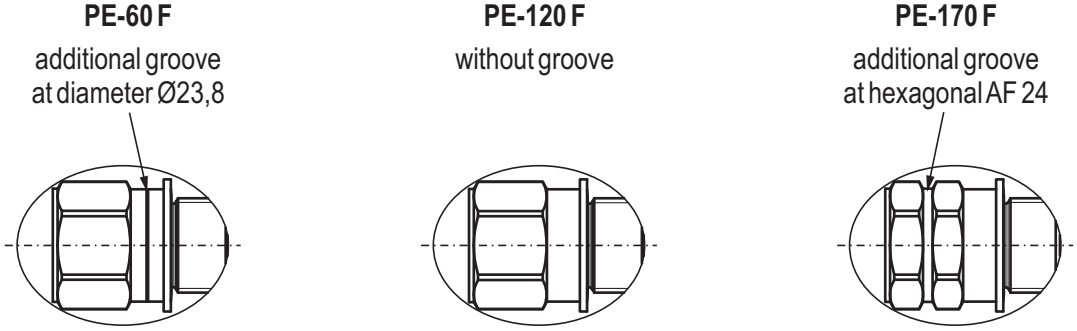
The pump elements PE-60 F, PE-120 F and PE-170 F are intended for the use in progressive lubrication systems. The delivery rate of these pump elements is set to 0,06 cm³/stroke ( PE-60 F), 0,12 cm³/stroke (PE-120 F) or 0,17 cm³/stroke (PE-170 F) and cannot be adjusted. The pump elements are deliverable with different pipe connections and with or without pressure limiting valve (see fig. 25).

Fig. 25:




Each type of pump element has its own marking in order to enable a visual differentiation (see fig. 26).

Fig. 26:



### 8.4.3 Order numbers of the pump elements for progressive lubrication systems

| Pump element | Pipe connection | Order no. (PE* w/o PLV**) | Order no. (PE* with PLV**) |
|---|---|---|---|
| PE-60 F | Ø6 mm | 2152990671000 | 2152990671003 |
| | Ø8 mm | 2152990671101 | 2152990671004 |
| | Ø10 mm | 2152990671102 | 2152990671005 |
| | G 1/4 | 2152990671100 | 2152990671006 |
| PE-120 F | Ø6 mm | 2185990610100 | 2185990610000 |
| | Ø8 mm | 2185990610101 | 2185990610001 |
| | Ø10 mm | 2185990610102 | 2185990610002 |
| | G 1/4 | 2185990610010 | 2185990610005 |
| PE-170 F | Ø6 mm | 10137168 | 10117173 |
| | Ø8 mm | 10137172 | 10137194 |
| | Ø10 mm | 10137174 | 10137199 |
| | G 1/4 | 10122889 | 10137202 |
| PE-120 FV | Ø6 mm | 2185990630100 | 2185990630000 |
| | Ø8 mm | 2185990630101 | 2185990630002 |
| | Ø10 mm | 2185990630102 | 2185990630003 |
| | G 1/4 | 2185990630103 | 2185990630001 |

* PE = Pump element
** PLV = Pressure limiting valve

**Notice!**

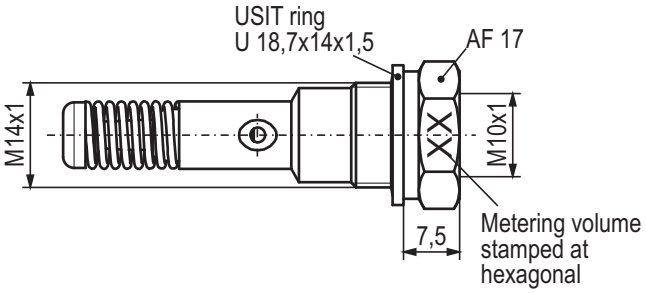
When these pump elements are ordered separately, the sealing is already included in the scope of delivery and does not have to be ordered separately.

### 8.4.4 Pump elements PE-5, PE-10, PE-15, PE-25 and PE-50

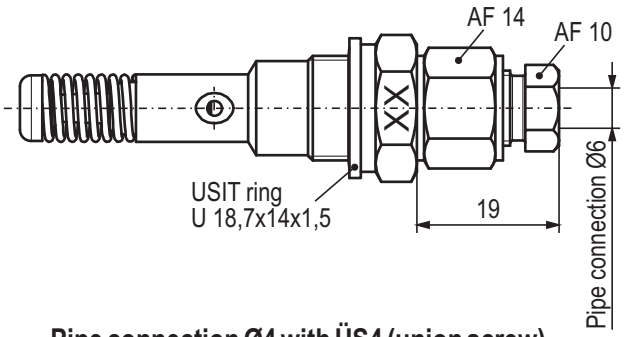
The pump elements PE-5, PE-10, PE-15, PE-25 and PE-50 are intended for the use in multi-line lubrication systems. The delivery rate of these pump elements is set to 5 mm³/stroke (PE-5), 10 mm³/stroke (PE-10), 15 mm³/stroke (PE-15), 25 mm³/stroke (PE-25) or 50 mm³/stroke (PE-50) and cannot be adjusted. The pump elements are deliverable with different pipe connections (see fig. 27).

Fig. 27:

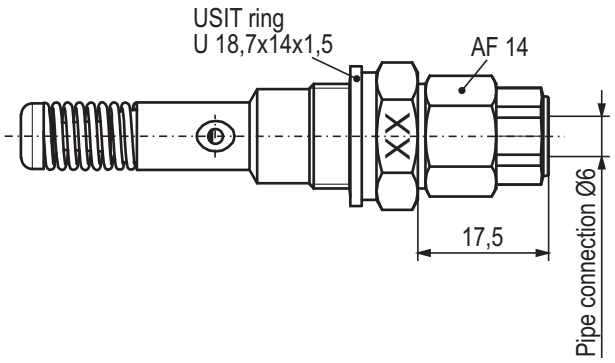
**Thread connection M10x1**



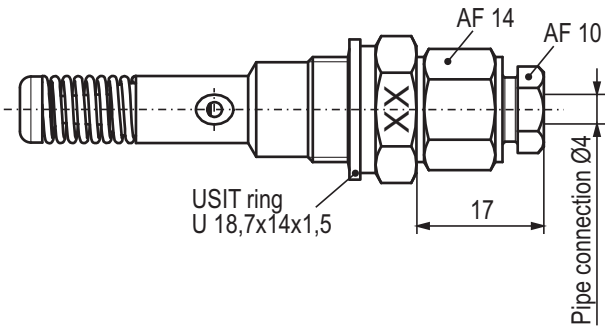

**Pipe connection Ø6 with ÜS6 (union screw) and DKR6 (double conical ring)**



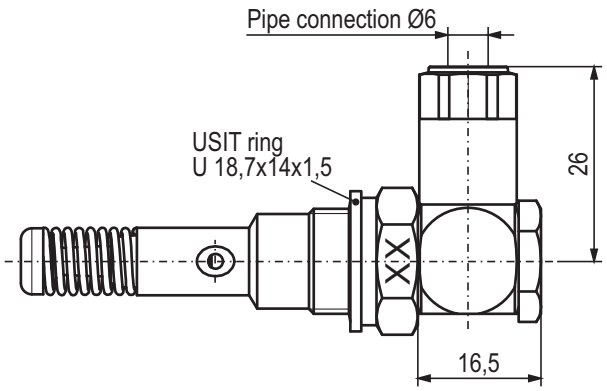

**Straight plug-type connection Ø6**




**Pipe connection Ø4 with ÜS4 (union screw) and DKR4 (double conical ring)**




**Plug-type connection 90° for pipe Ø6**

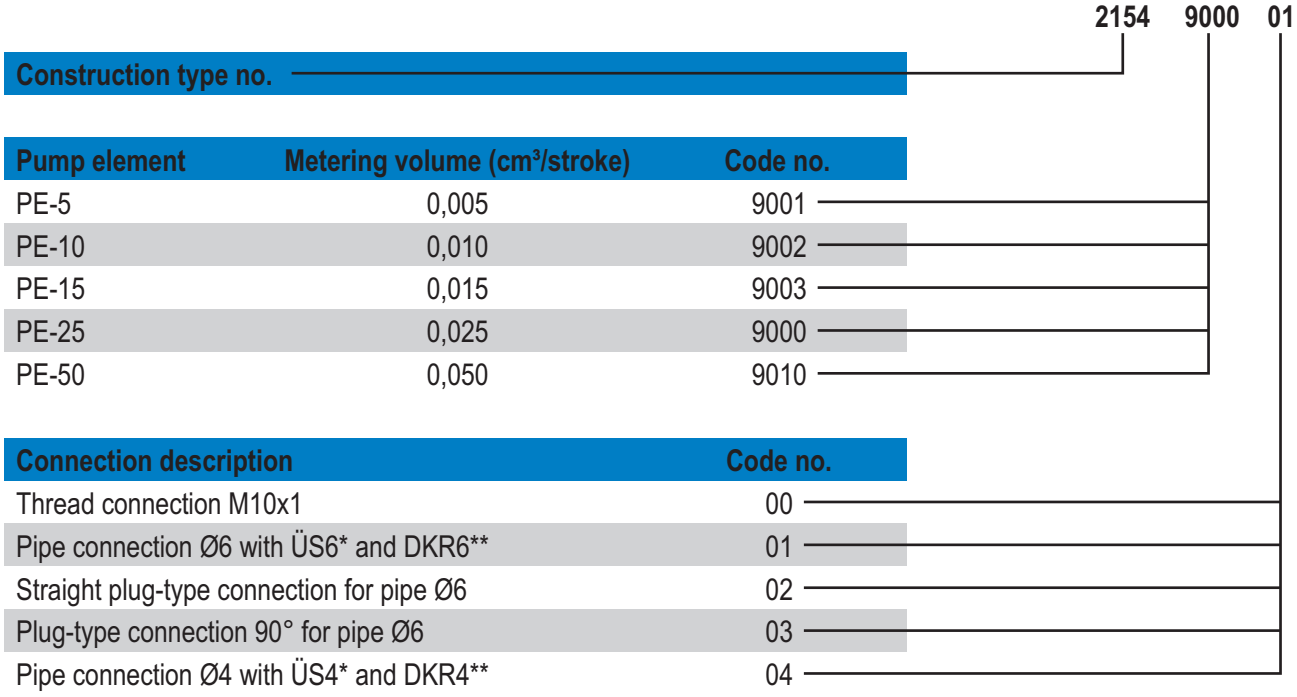







BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

### 8.4.5 Code of the pump elements for multi-line lubrication systems




| Construction type no. |
|---|

| Pump element | Metering volume (cm³/stroke) | Code no. |
|---|---|---|
| PE-5 | 0,005 | 9001 |
| PE-10 | 0,010 | 9002 |
| PE-15 | 0,015 | 9003 |
| PE-25 | 0,025 | 9000 |
| PE-50 | 0,050 | 9010 |

| Connection description | Code no. |
|---|---|
| Thread connection M10x1 | 00 |
| Pipe connection Ø6 with ÜS6* and DKR6** | 01 |
| Straight plug-type connection for pipe Ø6 | 02 |
| Plug-type connection 90° for pipe Ø6 | 03 |
| Pipe connection Ø4 with ÜS4* and DKR4** | 04 |

* ÜS = Union screw
** DKR = Double conical ring

**Notice!**

When the pump elements are ordered separately, the sealing is not included in the scope of delivery and has to be ordered separately if needed:
**USIT ring U 18,7 x 14 x 1,5, order no.: 100150010148**

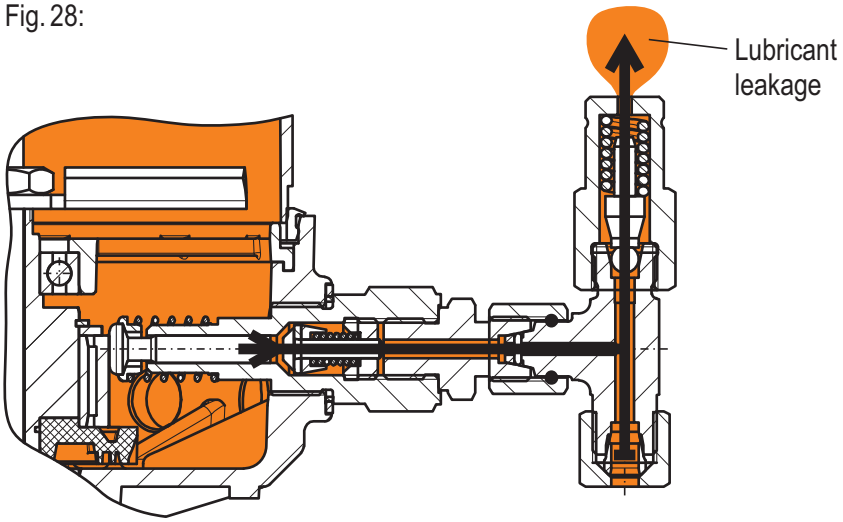
### 8.5 Pressure limiting valves

The individual lubrication circuits can be secured by a pressure limiting valve which can be attached at the pump elements PE-60 F, PE-120 F, PE-170 F and PE-120 FV when the device is used in a progressive lubrication system.

#### 8.5.1 Pressure limiting valves without micro switch

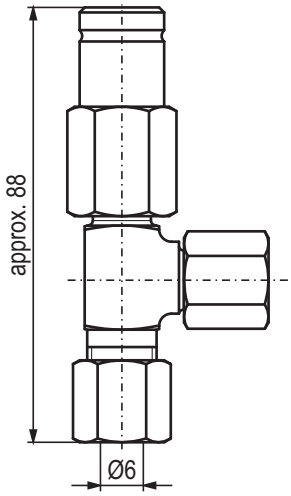
If the pressure in the lubrication system exceeds the value set at the pressure limiting valve, the pressure limiting valve opens and the lubricant leaks out at the top at the valve (see fig. 28).

Fig. 28:

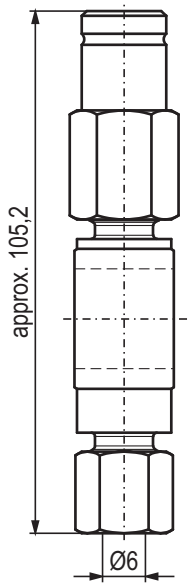



Lubricant can leak out at the pressure limiting valve under high pressure (290 bar)!
Wear corresponding personal protective equipment (e.g. safety goggles) and keep out of the direct area of the pressure limiting valve when there is a malfunction at the device.
Only work at the device when it is in a disconnected and pressureless state!

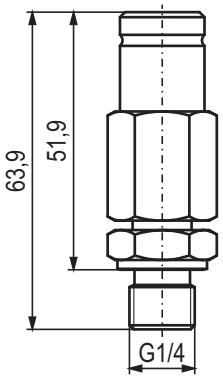
Fig. 29:




Pressure limiting valve
for PE-60 F, PE-120 F and PE-170 F
set to 290 bar
Order no.: 21520062




Pressure limiting valve for PE-120 FV
set to 290 bar
Order no.: 21520063




Pressure limiting valve
with fitting, for PE-120 FV
set to 290 bar
Order no.: 2152990630020

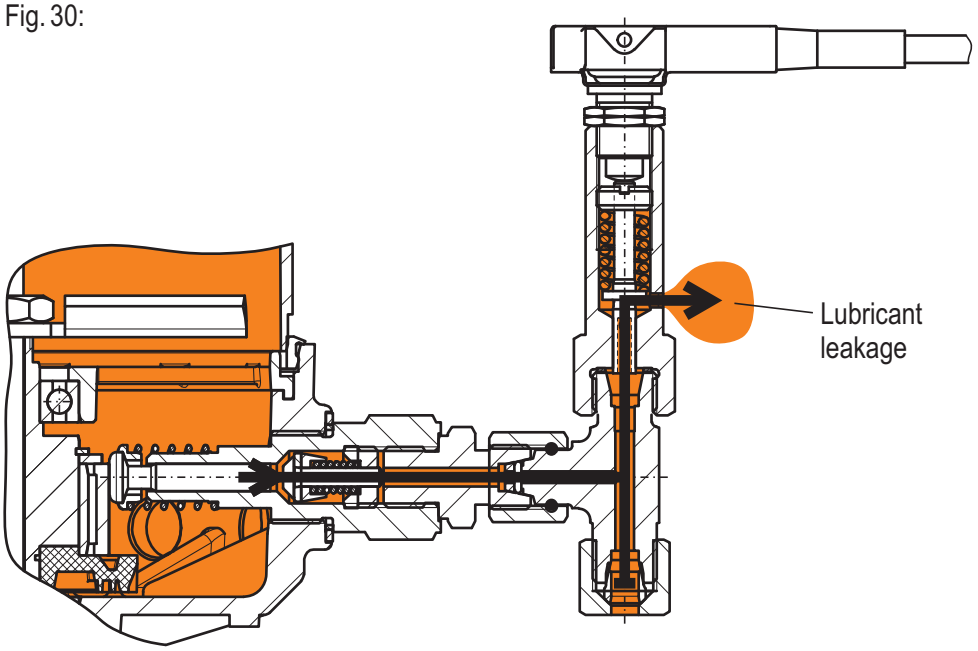
BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

### 8.5.2 Pressure limiting valves with micro switch

The maximum operating pressure in the lubrication system can be electronically monitored by a micro switch which is attached at the pressure limiting valve.

The micro switch is operated when the pressure in the lubrication system exceeds the value set at the pressure limiting valve (see fig. 30). The emitted signal of the micro switch can be used customer specifically, e.g. for switching off the device, or it is evaluated by the integrated control unit PICO-tronic (see chapter 9.2.8 „Function *System pressure monitoring*“).

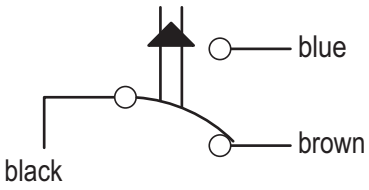
Fig. 30:




**Technical data of the micro switch**

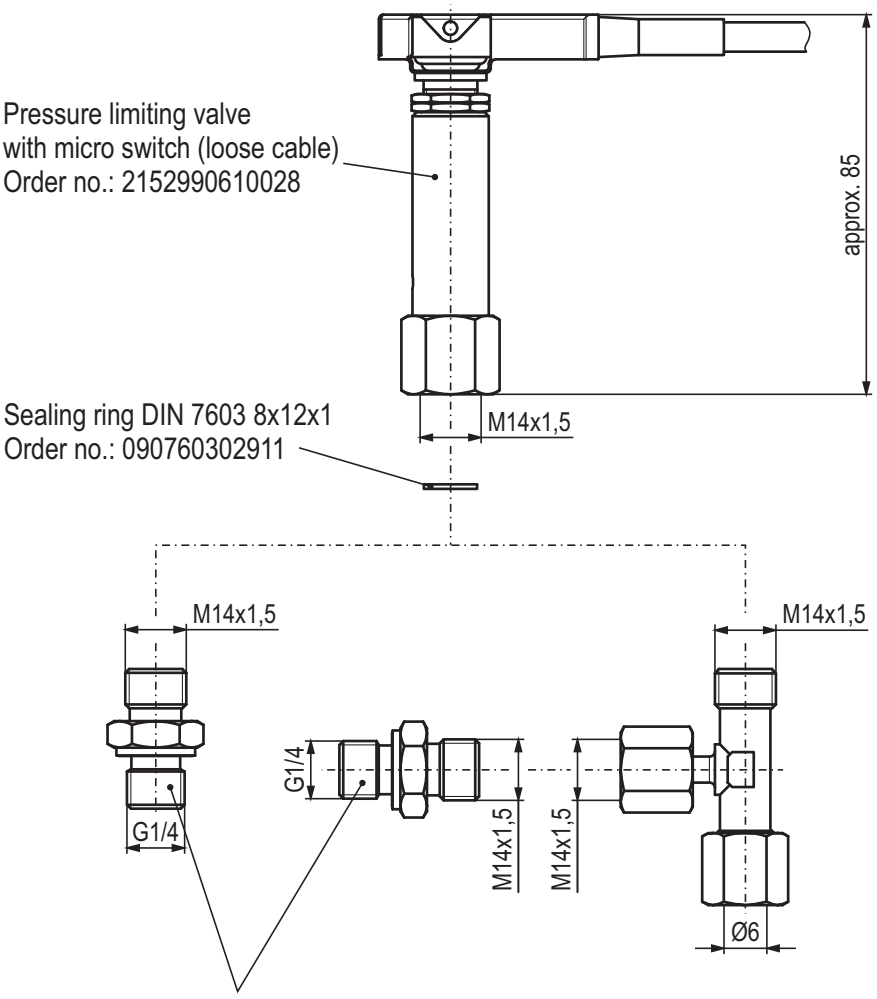
| | |
|---|---|
| Supply voltage: | 10 to 60 V DC |
| Current load max.: | I = 1,7 A |
| Contact type: | changeover contact |
| Temperature range: | -25°C to +85°C |
| Degree of protection: | IP 67 |
| Connection: | cable 0,5 m long, welded (standard) |

**Connection diagram**




Lubricant can leak out at the pressure limiting valve under high pressure (290 bar)!
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!

Fig. 31:




Socket for pump element
PE-120 FV
(only for pipe Ø8 and pipe Ø10,
no socket is needed for pipe Ø6!)
Order no.: 04012132006o

Adjustable union tee
for pump elements
PE-60 F, PE-120 F and PE-170 F
Order no.: 04015722006

## 8.6 Level monitoring

### 8.6.1 Level monitoring for devices with follow-up piston

A level monitoring is installed in devices with follow-up piston by default (see fig. 32).

When the reservoir of the device is empty, the follow-up piston (1) pushes onto a feeler (2). This feeler actuates a switch (3) which sends a signal to the integrated control unit. The control unit displays the error *Level too low* and switches the device off in order to prevent that air is pumped into the lubrication system.

When the reservoir of the device is refilled, the switch interrupts the signal and the error is automatically reset.

The current level can additionally be checked visually at the level sticker (see fig. 33).

Fig. 32:

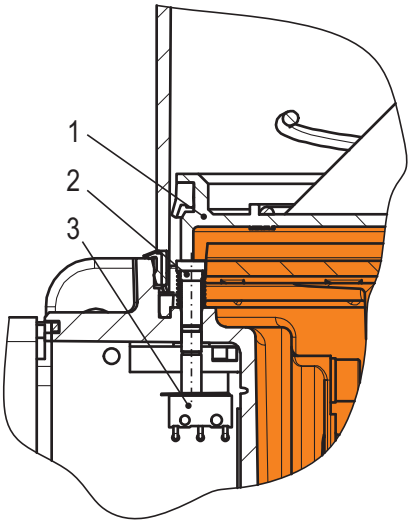


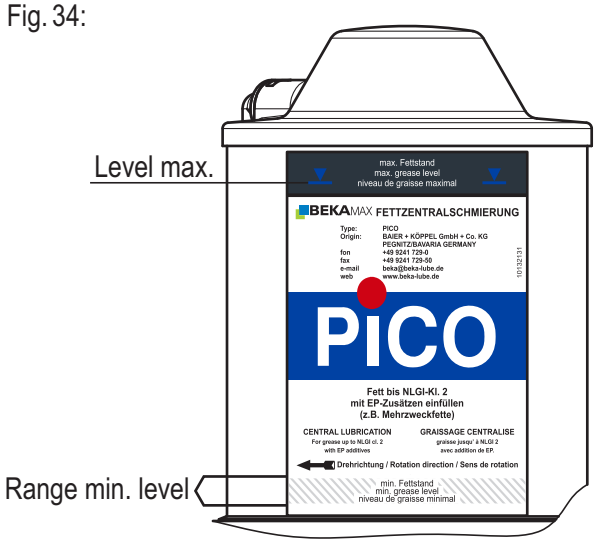

Fig. 33:


### 8.6.2 Level monitoring for devices with agitator blade

The installation of an electronic level monitoring is impossible for devices with agitator blade!

The level can only be visually checked at the level sticker (see fig. 34).

Fig. 34:



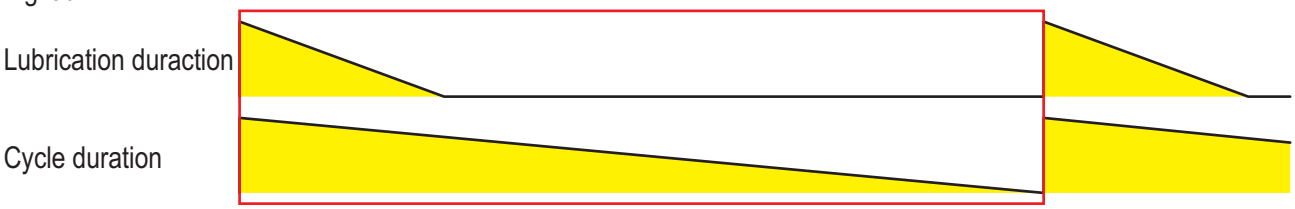
# 9. Integrated control unit

Progressive lubrication systems, multi-line lubrication systems and mixed lubrication systems can be controlled with the control unit PICO-troniX1 or PICO-tronic which is integrated in the device.

The integrated control unit PICO-troniX1 or PICO-tronic operates dependent from the lubrication cycle.

A lubrication cycle consists of the cycle duration and the lubrication duration (pump operating time) which is included in the cycle duration. Cycle duration means the period from the beginning of a lubrication to the beginning of the next lubrication (see fig. 35).

Fig. 35:




**Lubrication cycle**

## 9.1 PICO-troniX1

The **cycle duration** is determined **time-dependently** for the integrated control unit PICO-troniX1.

The **lubrication duration** can be determined **time-** or **revolution-dependently**.

**Functions:**

The following functions can be evaluated with the integrated control unit:

- Level monitoring (only for devices with follow-up piston, see chapter 8.6 „Level monitoring“)

**Signal indicators:**

The following messages are displayed by the integrated control unit by the red and green LED in the inspection window of the protective housing (see chapter 13.1 „Signal indicators of the integrated control unit PICO-troniX1"):

- Operational capability
- Lubrication in process
- Reservoir empty (only for devices with follow-up piston)
- Set number of pump revolutions has not been reached within the monitoring time of revolutions
- CPU / memory defective
- Trial lubrication in process

**Operational database:**

The integrated control unit has an operational database in which the following values are stored:

- Data of the control unit (type, version, serial number, manufacturing date)
- Current settings (cycle duration, operational mode of the lubrication duration, lubrication duration, monitoring times)
- Statistical values (operating hours, operating time of the device, number of the intermediate lubrications, number of the level errors, number of the revolution errors, number of the overall diagnoses etc.)
- Date and time of the last diagnosis

**Notice!**

The operational mode of the lubrication duration, the setting ranges of the cycle and lubrication duration and the setting of the monitoring time can be changed at any time using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

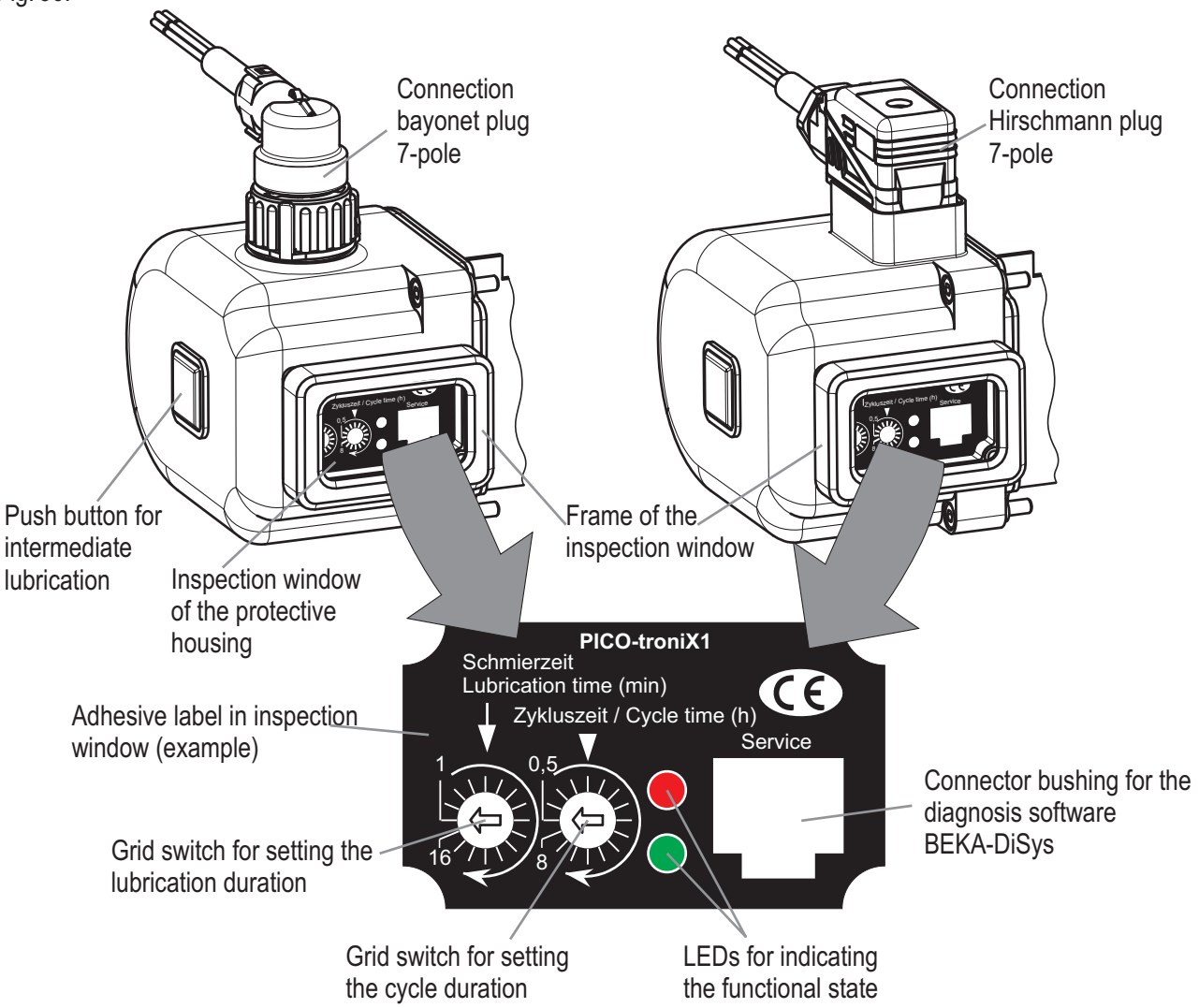




BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

### 9.1.1 Functional description

Fig. 36:




A lubrication starts at initial connection of the integrated control unit.

Each time after the voltage (ignition) is switched on, the red and the green LED glow for approx. 1.5 seconds in the inspection window of the protective housing and display the operational capability of the integrated control unit.

If the voltage is interrupted (ignition switched off) during the cycle sequence or during the lubrication duration, the data is stored in the operational database of the integrated control unit. When the voltage (ignition) is switched on again, the cycle sequence starts where it was interrupted before.

When the voltage is switched on, an intermediate lubrication can be triggered at any time by pushing the push-button for intermediate lubrication. The current data of the cycle is deleted and a new lubrication cycle starts immediately.

Some errors have to be reset after the troubleshooting by pushing the push-button for intermediate lubrication (see chapter 13. „Troubleshooting“).

Then, the device immediately starts with a lubrication cycle.

### 9.1.2 Changing and setting the parameters

The setting ranges of the lubrication duration and of the cycle duration and the operational mode of the lubrication duration can be changed at any time using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

When the parameters are changed, the adhesive label in the inspection window of the protective housing has to be exchanged accordingly.

The adhesive labels for the inspection window can be ordered as needed.

| | | Time-dependent cycle duration | | | |
|---|---|---|---|---|---|
| | | **0,5 - 8 h** | **1 - 16 min** | **2 - 32 min** | **2 - 32 h** |
| **Time-dependent lubrication duration** | | | | | |
| I | **1 - 16 min** | 10115124 | 10116308 | 10115125 | 10115126 |
| II | **2 - 32 min** | 10115127 | 10116309 | 10115128 | 10115129 |
| III | **2 - 32 s** | 10115130 | 10116312 | 10115131 | 10115132 |
| **Revolution-dependent lubrication duration** | | | | | |
| I | **1 - 16*** | 10115133 | 10116313 | 10115134 | 10115135 |
| II | **10 - 160*** | 10115136 | 10116315 | 10115138 | 10115139 |
| III | **170 - 320*** | 10115140 | 10116320 | 10115141 | 10115142 |

*** revolutions**

Within the setting range, the lubrication duration and the cycle duration can be changed at the grid switches in the inspection window of the protective housing (see fig. 36) using a flat screwdriver

For this, remove the frame at the inspection window of the protective housing using a flat screwdriver, loosen the four cross point screws and remove the transparent inspection window.

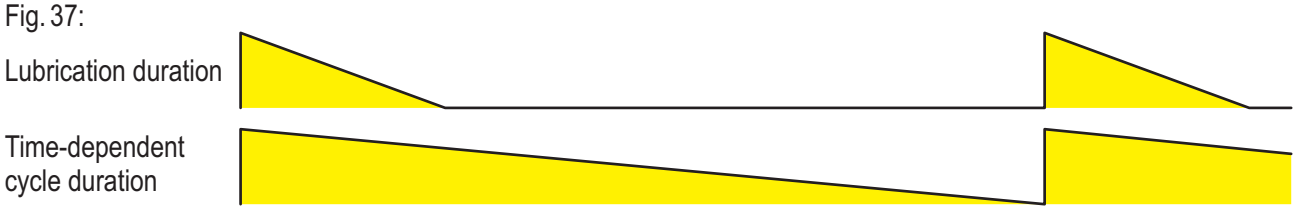
**Caution!**

After setting the parameters, the inspection window and the frame have to be **closed properly** again; otherwise **water** can **enter** into the integrated control unit and can **destroy** it!

### 9.1.3 Operational mode of time-dependent cycle duration

At the operational mode of time dependent cycle duration, the cycle duration can be set in hours or minutes, depending on the selected setting range. The setting range can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 37:



**Setting ranges of the time-dependent cycle duration:**

- 0,5 to 8 h (16 notches à 0.5 h)
- 1 to 16 min (16 notches à 1 min)
- 2 to 32 min (16 notches à 2 min)
- 2 to 32 h (16 notches à 2 h)

The cycle duration can be set (within a setting range) using the right grid switch in the inspection window of the protective housing (see fig. 36).

### 9.1.4 Operational mode of time-dependent lubrication duration

At the operational mode of time-dependent lubrication duration, the lubrication duration can be set in minutes or seconds, depending on the selected setting range. The setting range can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 38:


**Setting ranges of the time-dependent lubrication duration:**

- 1 to 16 min (16 notches à 1 min)
- 2 to 32 min (16 notches à 2 min)
- 2 to 32 s (16 notches à 2 s)

The time-dependent lubrication duration can be set (within a setting range) using the left grid switch in the inspection window of the protective housing (see fig. 36).

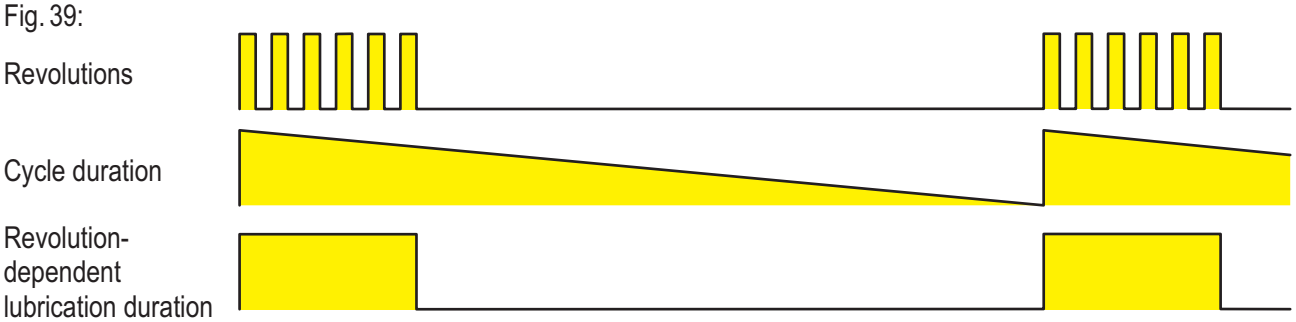
### 9.1.5 Operational mode of revolution-dependent lubrication duration

At the operational mode of revolution-dependent lubrication duration, the lubrication duration is determined by the number of the counted pump revolutions. A sensor is installed into the device for this, which sends a signal to the control unit at each revolution of the pump. If the control unit receives no signal within the adjustable monitoring time of revolutions (standard setting 30 s), it sends an error (see chapter 13.1 „Signal indicators of the integrated control unit PICO-troniX1").

When the cause of error has been eliminated, the error has to be reset by pushing the push-button for intermediate lubrication (see fig. 36).

The setting range and the monitoring time of revolutions can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 39:



**Setting ranges of the revolution-dependent lubrication duration:**

- 1 to 16 revolutions (16 notches à 1 revolution)
- 10 to 160 revolutions (16 notches à 10 revolutions)
- 170 to 320 revolutions (16 notches à 10 revolutions)

The revolution-dependent lubrication duration can be set (within a setting range) using the left grid switch in the inspection window of the protective housing (see fig. 36).

### 9.1.6 Function *Level monitoring*

See chapter 8.6 „Level monitoring“.

## 9.2 PICO-tronic

The **cycle duration** can be determined **time-** or **pulse-dependently** for the integrated control unit PICO-tronic.

The **lubrication duration** can be determined **time-, pulse-** or **revolution-dependently**.

**Functions:**

The following functions can be evaluated with the integrated control unit:

- System pressure monitoring (monitoring of the line pressure in the lubrication system)
- Level monitoring (only for devices with follow-up piston, see chapter 8.6 „Level monitoring“)
- Line break monitoring (monitoring of the lines in the lubrication system)

**Notice!**

The functions ***System pressure monitoring*** and ***Line break monitoring*** cannot be selected in the operational mode of **pulse-dependent cycle duration** and **cannot** be selected **at the same time**.

**Special functions:**

The following special functions can be used with the integrated control unit:

- External status signal as error signal (signal, when an error occurs) or OK-signal (signal, when everything is alright)
- Adjustment to operating conditions
- Cycle locked (lock of the cycle sequence when the machine part or vehicle part, that is to be lubricated, is temporarily out of order)

**Notice!**

The special function ***Adjustment to operating conditions*** and ***Cycle locked*** **cannot** be selected **at the same time**.

**Signal indicators:**

The following messages are displayed by the integrated control unit by the red and green LED in the inspection window of the protective housing (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic"):

- Operational capability
- Lubrication in process
- Next pulse of the cycle duration has not been reached within the pulse monitoring time of cycle duration
- Set number of pulses of the lubrication duration has not been reached within the pulse monitoring time of lubrication duration
- Set number of pump revolutions has not been reached within the monitoring time of revolutions
- Reservoir empty (only for devices with follow-up piston)
- System pressure too high
- Pressure drop in line system (line break)
- Cycle locked
- Lubrication deficit (lubrication cannot be finished during the lubrication duration)
- CPU / memory defective
- Trial lubrication in process

**Operational database:**

The integrated control unit has an operational database in which the following values are stored:

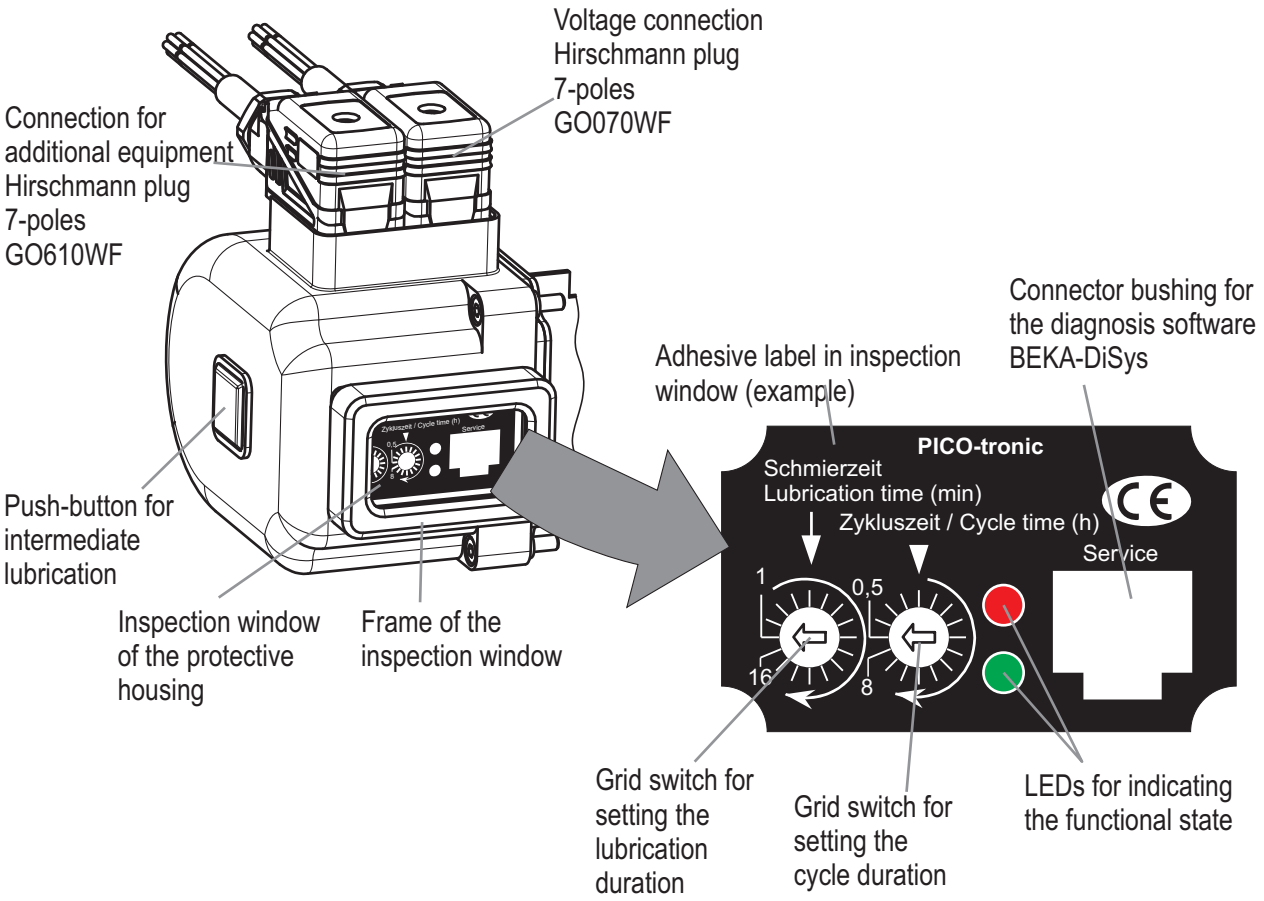
- Data of the control unit (type, version, serial number, manufacturing date)
- Current settings (operational mode, cycle duration, lubrication duration, monitoring times)
- Statistical values (operating hours, operating time of the device, number of the intermediate lubrications, number of the level errors, number of the pulse errors, number of the revolution errors, number of the overall diagnoses etc.)
- Date and time of the last diagnosis
- Error log of the last 100 errors with indication of the type of error as well as the indication of the time and date
- Event log of the last 100 setting changes with indication of time and date

**Notice!**

The operational mode and the setting range of the cycle and lubrication duration and the setting of the monitoring times can be changed at any time using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

### 9.2.1 Functional description

Fig. 40:




A lubrication starts at initial connection of the integrated control unit.

Each time after the voltage (ignition) is switched on, the red and the green LED glow for approx. 1.5 seconds in the inspection window of the protective housing and display the operational capability of the integrated control unit.

If the voltage is interrupted (ignition switched off) during a cycle sequence or during the lubrication duration, the data is stored in the operational database of the integrated control unit. When the voltage (ignition) is switched on again, the cycle sequence starts where it was interrupted before.

When the voltage is switched on, an intermediate lubrication can be triggered at any time by pushing the push-button for intermediate lubrication. The current data of the cycle is deleted and a new lubrication cycle starts immediately.

Some errors have to be reset after the troubleshooting by pushing the push-button for intermediate lubrication (see chapter 13. „Troubleshooting“).

Then, the device immediately starts with a lubrication cycle.

### 9.2.2 Changing and setting the parameters

The operational modes and setting ranges of the cycle duration and lubrication duration can be changed at any time using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

When the parameters are changed, the adhesive label in the inspection window of the protective housing has to be exchanged accordingly.

The adhesive labels for the inspection window can be ordered as needed.

| | | Time-dependent cycle duration | | | | Pulse-dependent cycle duration | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0,5 - 8 h | 1 - 16 min | 2 - 32 min | 2 - 32 h | 1 - 16* | 10 - 160* | 20 - 320* | 100 - 1600* | 500 - 8000* |
| **Time-dependent lubrication duration** | | | | | | | | | | |
| I | **1 - 16 min** | 10115218 | 10116324 | 10115219 | 10115220 | 10115221 | 10115222 | 10115223 | 10115224 | 10115225 |
| II | **2 - 32 min** | 10115227 | 10116325 | 10115228 | 10115229 | 10115230 | 10115231 | 10115232 | 10115233 | 10115234 |
| III | **2 - 32 s** | 10116326 | 10116327 | 10116328 | 10116331 | 10116332 | 10116334 | 10116335 | 10116336 | 10116338 |
| **Pulse-dependent lubrication duration** | | | | | | | | | | |
| I | **1 - 16 Takte** | 10115235 | 10116340 | 10115238 | 10115239 | 10115240 | 10115241 | 10115242 | 10115243 | 10115245 |
| II | **17 - 32 Takte** | 10115246 | 10116342 | 10115247 | 10115248 | 10115249 | 10115250 | 10115251 | 10115252 | 10115253 |
| III | **33 - 48 Takte** | 10115254 | 10116345 | 10115255 | 10115256 | 10115257 | 10115258 | 10115259 | 10115260 | 10115261 |
| **Revolution-dependent lubrication duration** | | | | | | | | | | |
| I | **1 - 16**** | 10115263 | 10116348 | 10115266 | 10115267 | 10115268 | 10115269 | 10115270 | 10115271 | 10115272 |
| II | **10 - 160**** | 10115273 | 10116351 | 10115274 | 10115275 | 10115276 | 10115277 | 10115278 | 10115280 | 10115281 |
| III | **170 - 320**** | 10115282 | 10116352 | 10115284 | 10115285 | 10115286 | 10115287 | 10115288 | 10115290 | 10115291 |

*** pulses** **** revolutions**

Within a setting range, the lubrication duration and the cycle duration can be changed at the grid switches in the inspection window of the protective housing (see fig. 40) using a flat screwdriver

For this, remove the frame at the inspection window of the protective housing using a flat screwdriver, loosen the four cross point screws and remove the transparent inspection window.

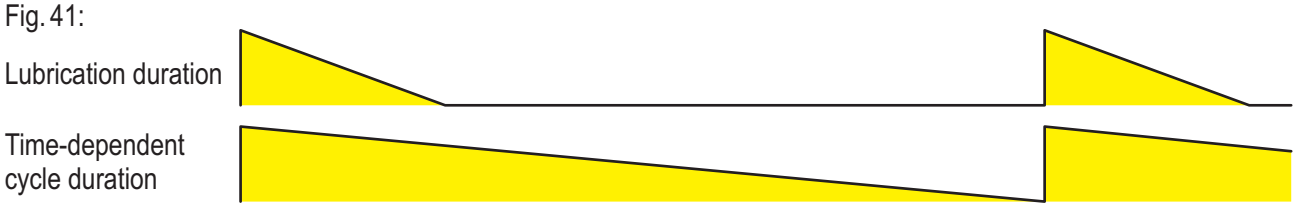
**Caution!**

After setting the parameters, the inspection window and the frame have to be **closed properly** again; otherwise **water** can **enter** into the integrated control unit and can **destroy** it!

### 9.2.3 Operational mode of time-dependent cycle duration

At the operational mode of time-dependent cycle duration, the cycle duration can be set in hours or minutes, depending on the selected setting range. The setting range can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 41:



**Setting ranges of the time-dependent cycle duration:**

- 0,5 to 8 h (16 notches à 0,5 h)
- 1 to 16 min (16 notches à 1 min)
- 2 to 32 min (16 notches à 2 min)
- 2 to 32 h (16 notches à 2 h)

The time-dependent cycle duration can be set (within a setting range) using the right grid switch in the inspection window of the protective housing (see fig. 40).

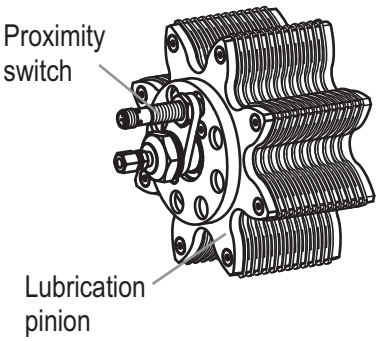
### 9.2.4 Operational mode of pulse-dependent cycle duration

At the operational mode of pulse-dependent cycle duration, the cycle duration is determined by the number of incoming pulses of a sensor (e.g. proximity switch at the lubrication pinion, see fig. 42). If the integrated control unit receives no pulse signal within the adjustable pulse monitoring time of cycle duration (standard setting 7 days), it displays an error (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic").

When the integrated control unit receives a pulse signal again, the error is automatically reset and the cycle continues normally.

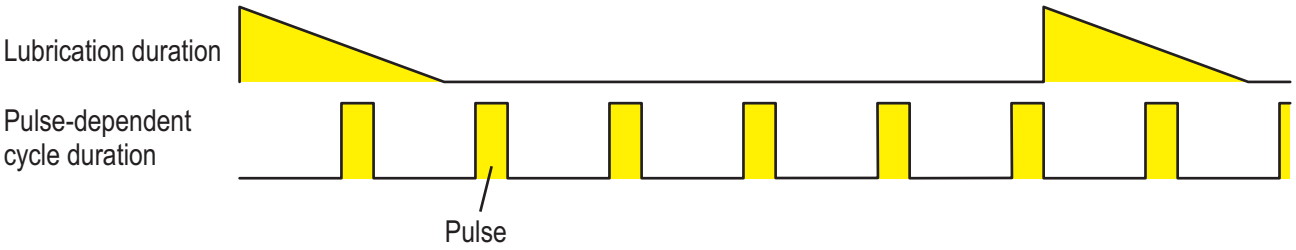
The sensor can be connected to the integrated control unit at the left Hirschmann plug-type connection on the protective housing (GO610WF, see fig. 40).

Fig. 42:




The setting range and the pulse monitoring time of the cycle duration can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 43:




**Setting ranges of the pulse-dependent cycle duration:**

- 1 to 16 pulses (16 notches à 1 pulse)
- 10 to 160 pulses (16 notches à 10 pulses)
- 20 to 320 pulses (16 notches à 20 pulses)
- 100 to 1600 pulses (16 notches à 100 pulses)
- 500 to 8000 pulses (16 notches à 500 pulses)

The pulse-dependent cycle duration can be set (within a setting range) using the right grid switch in the inspection window of the protective housing (see fig. 36).

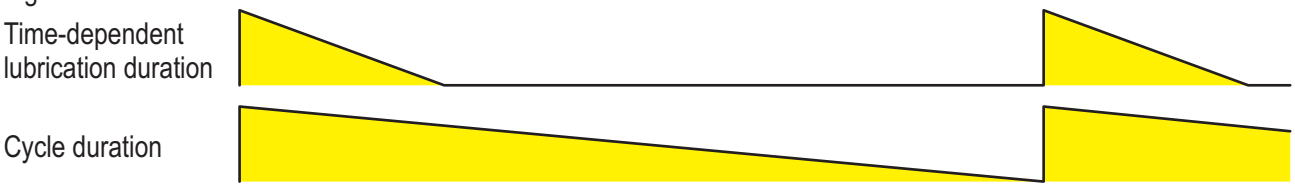
**Notice!**

The functions ***System pressure monitoring*** and ***Line break monitoring*** cannot be selected in the operational mode of **pulse-dependent cycle duration**.

### 9.2.5 Operational mode of time-dependent lubrication duration

At the operational mode of time-dependent lubrication duration, the lubrication duration can be set in minutes or seconds, depending on the selected setting range. The setting range can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 44:



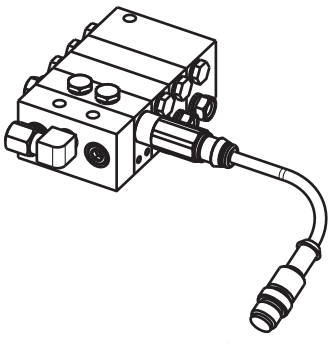

**Setting ranges of the time-dependent lubrication duration:**

- 1 to 16 min (16 notches à 1 min)
- 2 to 32 min (16 notches à 2 min)
- 2 to 32 s (16 notches à 2 s)

The time-dependent lubrication duration can be set (within a setting range) using the left grid switch in the inspection window of the protective housing (see fig. 40).

### 9.2.6 Operational mode of pulse-dependent lubrication duration

Fig. 45:



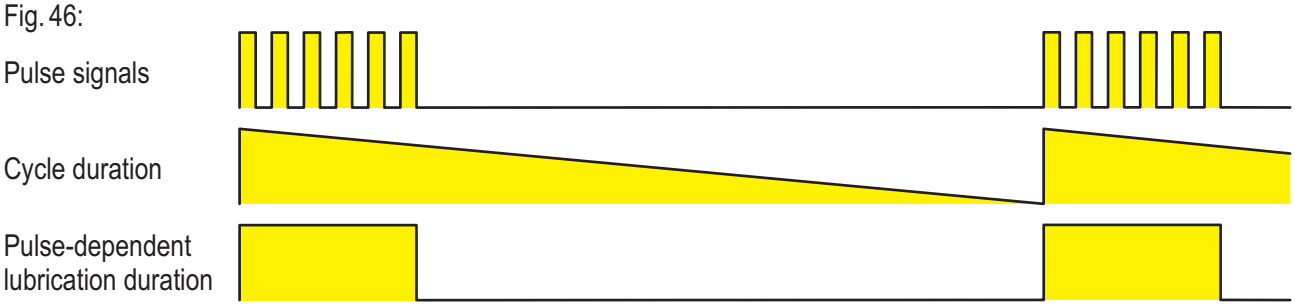
At the operational mode of pulse-dependent lubrication duration, the lubrication duration is determined by the number of incoming pulses of a sensor (e.g. proximity switch at a progressive distributor, see fig. 45). If the integrated control unit receives no pulse signal within the adjustable pulse monitoring time of lubrication duration (standard setting 12 min), it displays an error (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic").

When the cause of error has been eliminated, the error has to be reset by pushing the push-button for intermediate lubrication (see fig. 40).

The sensor can be connected to the integrated control unit at the left Hirschmann plug-type connection on the protective housing (GO610WF, see fig. 40).

The setting range and the pulse monitoring time of lubrication duration can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 46:




**Setting ranges of the pulse-dependent lubrication duration:**

- 1 to 16 pulses (16 notches à 1 pulse)
- 17 to 32 pulses (16 notches à 1 pulse)
- 33 to 48 pulses (16 notches à 1 pulse)

The pulse-dependent lubrication duration can be set (within a setting range) using the left grid switch in the inspection window of the protective housing (see fig. 40).

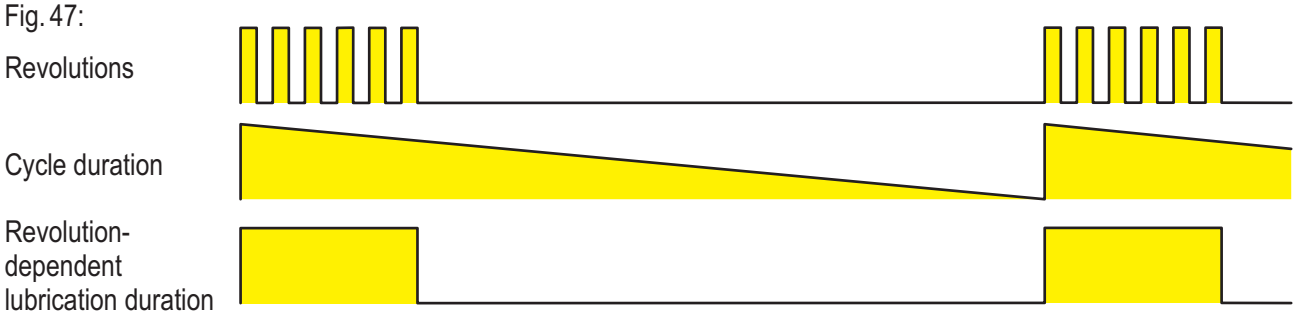
### 9.2.7 Operational mode of revolution-dependent lubrication duration

At the operational mode of revolution-dependent lubrication duration, the lubrication duration is determined by the number of the counted pump revolutions. A sensor is installed into the device for this, which sends a signal to the control unit at each revolution of the pump. If the control unit receives no signal within the adjustable monitoring time of revolutions (standard setting 30 s), it sends an error (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic").

When the cause of error has been eliminated, the error has to be reset by pushing the push-button for intermediate lubrication (see fig. 40).

The setting range and the monitoring time of revolutions can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

Fig. 47:



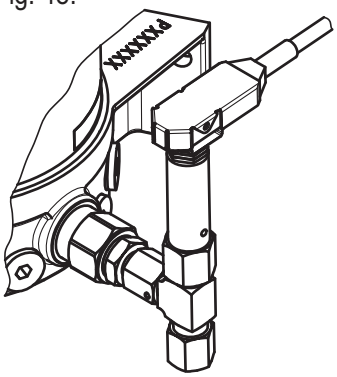

**Setting ranges of the revolution-dependent lubrication duration:**

- 1 to 16 revolutions (16 notches à 1 revolution)
- 10 to 160 revolutions (16 notches à 10 revolutions)
- 170 to 320 revolutions (16 notches à 10 revolutions)

The revolution-dependent lubrication duration can be set (within a setting range) using the left grid switch in the inspection window of the protective housing (see fig. 40).

### 9.2.8 Function *System pressure monitoring*

Fig. 48:



The operating pressure in the lubrication system can be monitored by a micro switch which is attached at the pressure limiting valve (see chapter 8.5.2. „Pressure limiting valves with micro switch“).

If the pressure in the lubrication system exceeds the set value, the pressure limiting valve opens and the micro switch is operated.

The micro switch sends a signal to the integrated control unit, which switches the device off and displays an error (see 13.2 „Signal indicators of the integrated control unit PICO-tronic").

When the cause of error has been eliminated, the error has to be reset by pushing the push-button for intermediate lubrication (see fig. 40).

The micro switch can be connected to the integrated control unit at the left Hirschmann plug-type connection on the protective housing (GO610WF, see fig. 40).

The function *System pressure monitoring* is always active; a micro switch can be attached at any time.

**Notice!**

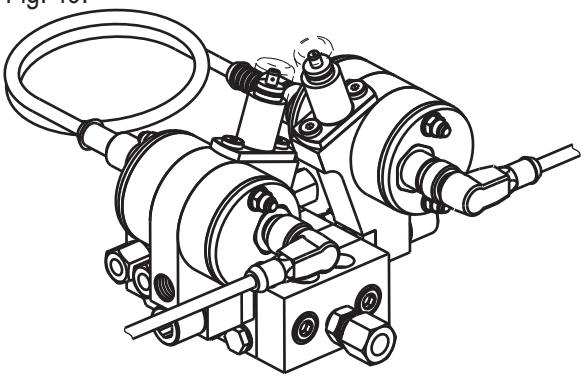
The function ***System pressure monitoring*** cannot be selected in the operational mode of **pulse-dependent cycle duration** or together with the function ***Line break monitoring***.

### 9.2.9 Function *Level monitoring*

See chapter 8.6 „Level monitoring“.

### 9.2.10 Function *Line break monitoring*

Fig. 49:



It is possible to electronically evaluate the line break monitoring of a progressive distributor with the integrated control unit PICO-tronic.

Micro switches, which will be connected to the control unit, are installed in the line break monitoring at the progressive distributor. The micro switches send a signal to the control unit when there is sufficient pressure in the lines.

If the pressure in the lines falls, e.g. because the machine that is to be lubricated was switched off over night, the micro switches switch the signal off.

When the machine that is to be lubricated and thus also the device are switched on again, the device starts to rebuild the pressure in the lines. If the pressure has not been rebuilt after the start cycles (standard setting 2 cycles) and the following adjustable line break monitoring time (standard setting 1 min) have finished, e.g. because a line is broken or leaky, the integrated control unit displays an error (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic"). However, the device continues to operate in order to supply the lube points with lubricant, which are connected to the intact lines.

The micro switches of the line break monitoring are connected in series. If a micro switch does not switch on the signal, the signal is absent at the integrated control unit. The error is automatically reset when the pressure rebuilds in all lines after the troubleshooting.

The line break monitoring can be connected to the integrated control unit at the left Hirschmann plug-type connection on the protective housing (GO610WF, see fig. 40).

The function *Line break monitoring* can be activated at any time using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**). When the function is activated, a line break monitoring **has to be** connected; otherwise a permanent error occurs.

**Notice!**

The function ***Line break monitoring*** cannot be selected in the operational mode of **pulse-dependent cycle duration** or together with the function ***System pressure monitoring***.

### 9.2.11 Special function *External status signal*

With the integrated control unit PICO-tronic, a status signal can optionally be emitted as **error signal** (standard setting) or as **OK-signal**.

A permanent signal is emitted when there is an error in the setting **error signal**.

A permanent signal is emitted, which is interrupted when there is an error, in the setting **OK-signal**.

The signals can be evaluated e.g. by a relay or a lamp.

**Messages:**

- Pulse error during the cycle duration
- Pulse error during the lubrication duration
- Revolution error during the lubrication duration
- Reservoir empty (only for devices with follow-up piston)
- System pressure too high
- Pressure drop in line system (line break)
- Lubrication deficit (lubrication cannot be finished during the lubrication duration)
- CPU / memory defective

The component (e.g. relay or lamp) for the evaluation of the signals can be connected to the integrated control unit at the left Hirschmann plug-type connection on the protective housing (GO610WF, see fig. 40). The component and the connection cable etc. are not included in the scope of delivery.

**By default**, the integrated control unit is delivered with the **setting error signal**.

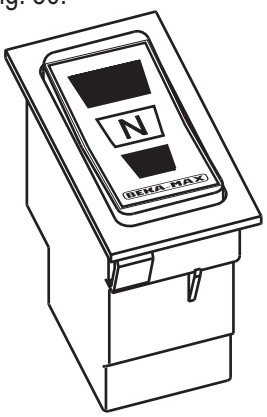
If the **setting OK-signal** is required, it can be directly **indicated at order** or can be changed using the diagnosis software **BEKA-DiSys** (with the current version available at **www.beka-lube.de**).

### 9.2.12 Special function *Adjustment to operating conditions*

An adjustment to the operating conditions can be done via a 3-notch switch (see fig. 50) within the first 30 seconds after switching on the voltage.

The 3-notch switch is not included in the scope of delivery, however, it can be ordered separately (order no.: 1000950018).

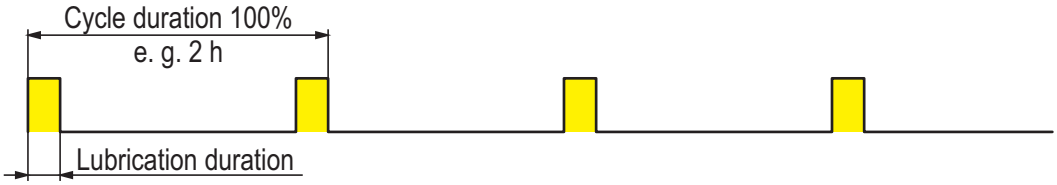
Fig. 50:




**Operating conditions:**

**Normal** - The lube points receive lubricant in the set interval at a normal load (see fig. 51).

Fig. 51:

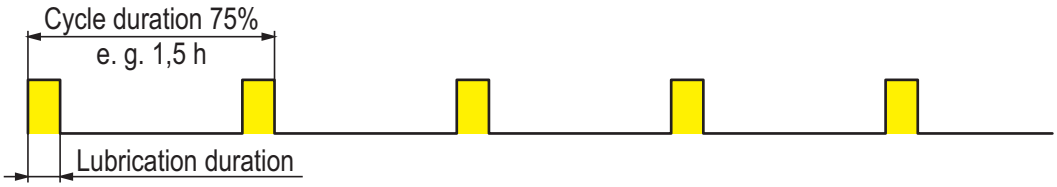



**Light** - The lube points receive lubricant in extended intervals at a light load (see fig. 52).

Fig. 52:


**Heavy duty** - The lube points receive lubricant in shorter intervals at a high load (see fig. 53).

Fig. 53:




After operating the 3-notch switch, either the voltage (ignition) has to be switched off and on again or an intermediate lubrication has to be triggered at the push-button for intermediate lubrication (see fig. 40).

**Notice!**

The special function ***Adjustment to operating conditions*** cannot be selected at the same time as the special function ***Cycle locked***.

### 9.2.13 Special function *Cycle locked*

With the special function *Cycle locked*, the function of the lubrication system can be easily locked by an external sensor (such as PLC or board computer). This special function is needed for lubrication systems which are to lubricate machine or vehicle parts only when these are in operation.

If the machine or vehicle parts are temporarily taken out of order, the cycle is locked. The green LED in the inspection window of the protective housing (see fig. 40) starts to flash (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic").

If this case happens during the lubrication duration, the lubrication is finished. The cycle is locked afterwards. The cycle is ended normally when the lock is lifted.

If this case happens outside the lubrication duration, the cycle is stopped at this point. The cycle is continued where it was interrupted when the lock is lifted.

**Notice!**

The special function ***Cycle locked*** is not displayed by the special function ***External status signal*** and cannot be selected at the same time as the special function ***Adjustment to operating conditions***.

### 9.2.14 Error *Lubrication deficit*

The error *Lubrication deficit* occurs when a lubrication cannot be finished during a cycle sequence. In this case, the device needs more time for processing the lubrication duration than there is time available by the length of the cycle duration. If this case occurs in several cycles in a row, the integrated control unit reports an error (see chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic"). However, the integrated control unit does not switch off the device because a lubrication deficit is better than no lubrication.

The integrated control unit automatically resets the error when a complete lubrication is finished within a following cycle.

## 10. Maintenance

Disconnect the device from power 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

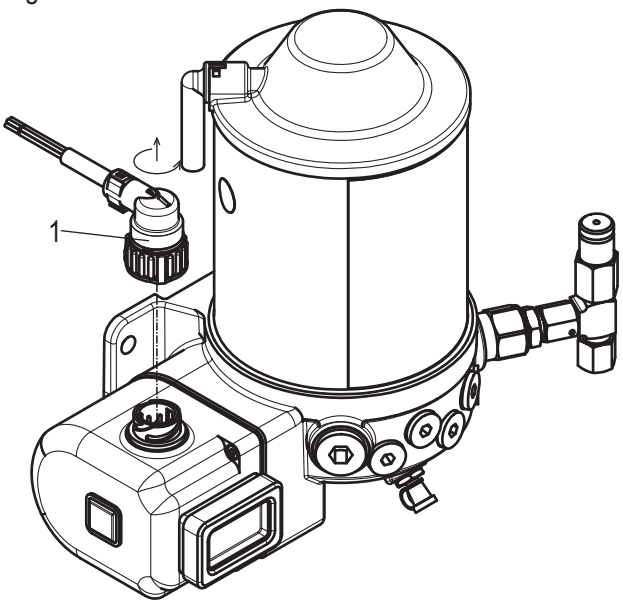
**Caution!** Pay attention to utmost **cleanness** when refilling lubricant!

- Check the level regularly and refill clean lubricant as necessary, see chapter 7. „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!

### 10.3 Changing the integrated control unit

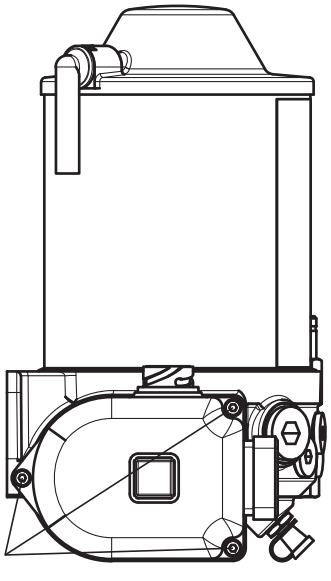
**A)** Disconnect the device from the power supply (pos. 1, see fig. 54) and secure it against recommissioning.

Fig. 54:



**B)** Remove the three hexagon socket head cap screws (pos. 1, see fig. 55) using an Allen key AF 3.

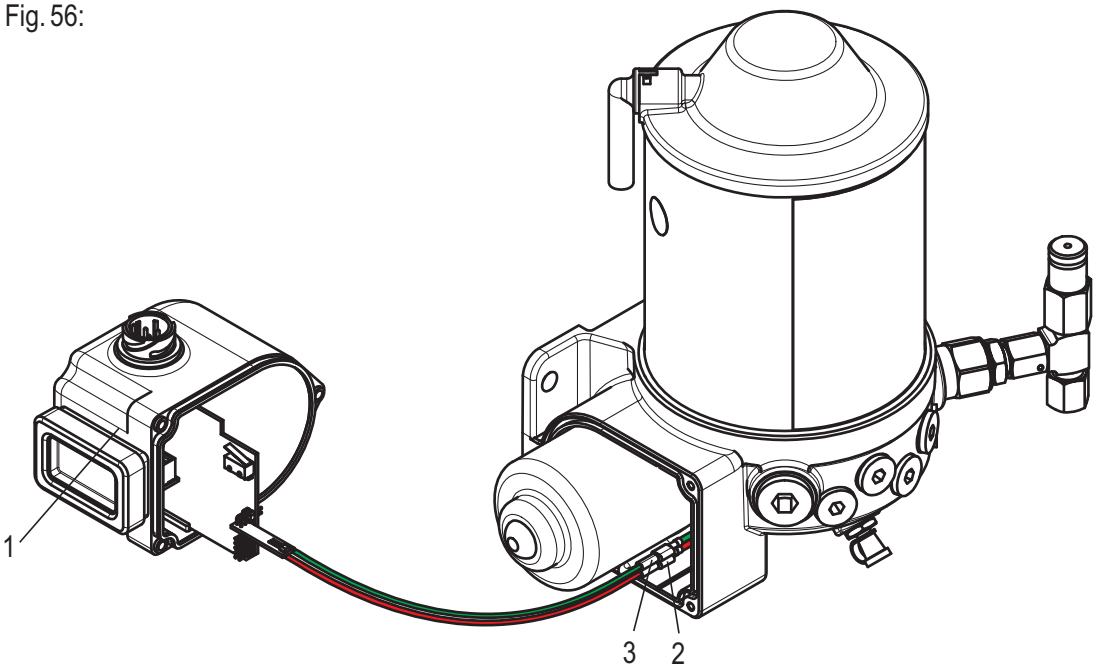
Fig. 55:




**C)** Remove the protective housing (pos. 1, see fig. 56) and loosen the receptacles of the connection cables (pos. 2 and pos. 3, see fig. 56).

**Caution!** **Make sure that the connection cables do not tear off!**

Fig. 56:



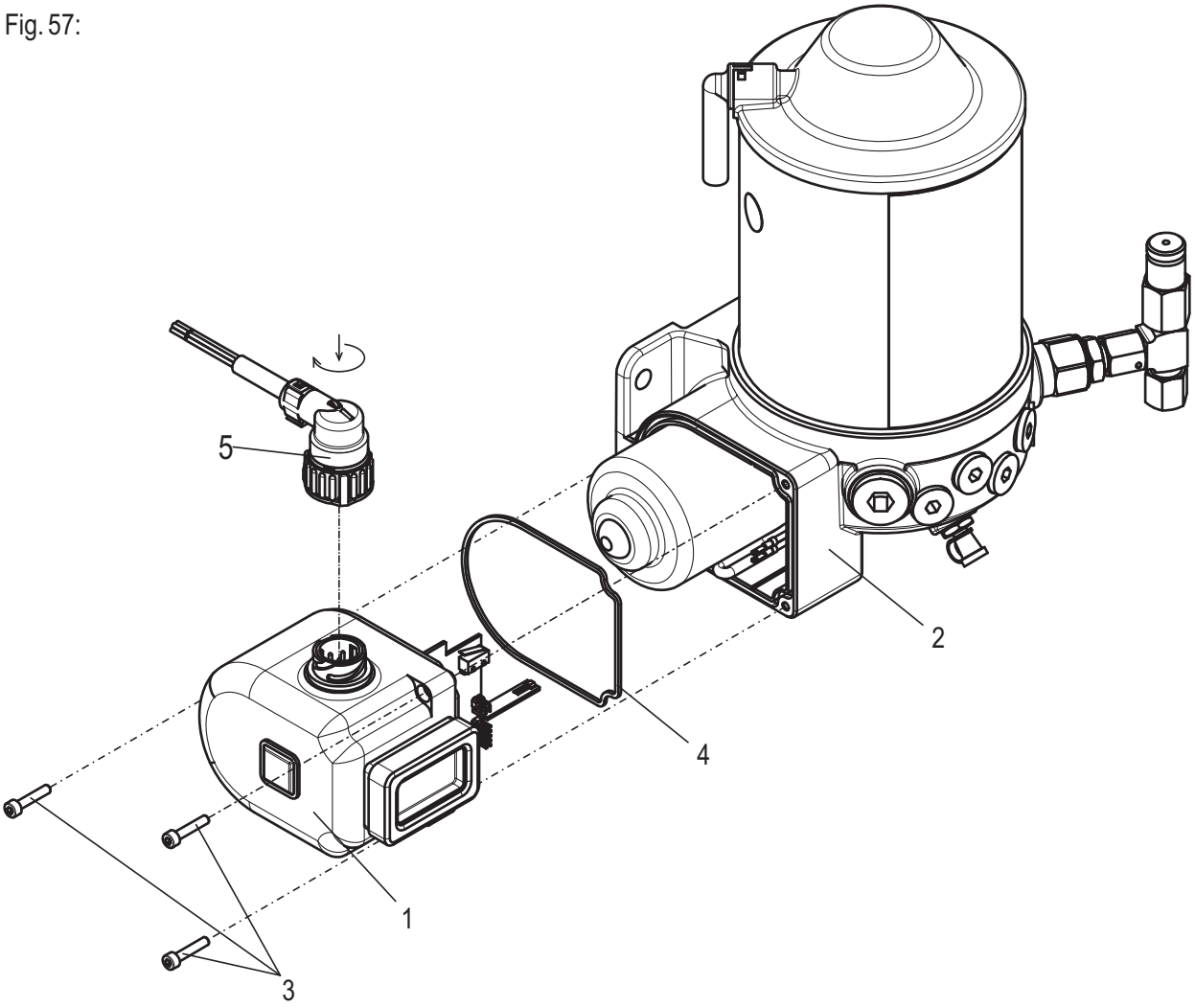

**D)** Attach the receptacles of the connection cables at the new control unit. The red connection cable at the red receptacle (pos. 2, see fig. 56) and the green connection cable at the green receptacle (pos. 3, see fig. 56).

**E)** Put the protective housing (pos. 1, see fig. 57) on the pump housing (pos. 2, see fig. 57) and screw the hexagon socket head cap screws (pos. 3, see fig. 57) back in.

**Caution!**

Make sure that the **flat gasket** (pos. 4, see fig. 57) is not **damaged**; otherwise **water** can enter into the integrated control unit and can **destroy** it!

Fig. 57:




**F)** Tighten the hexagon socket head cap screws (pos. 3, see fig. 57) with a tightening torque of approx. 2.5 Nm and reconnect the device to the power supply (pos. 5, see fig. 57).

## 11. Shutdown

- Relieve the device from pressure!
- Turn off power supply!
- Have the device disconnected from power supply by a qualified electrician!
- 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 |
|---|---|---|
| **Device does not operate** | No power supply | Possibly renew fuse if installed |
| | Electrical line interrupted | Renew electrical line |
| | Device defective | Renew device |
| | Integrated control unit defective | Renew integrated control unit |
| **Device operates, but does not supply** | Air pocket in delivery piston | Ventilate device |
| | Air pocket in reservoir | Ventilate device |
| | Reservoir empty | Fill reservoir |
| | Integrated control unit defective | Renew integrated control unit |
| | Pump element defective | Renew pump element |
| **No grease collar at any lube point** | Device does not operate | See malfunction „Device does not operate“ |
| | Lubrication system blocked | See malfunction „Lubricant leakage at pressure limiting valve“ |
| | Lubrication duration (pump operating time) too short | Extend lubrication duration |
| | The error *Lubrication deficit* is shown | See chapter 9.2.14 „Error *Lubrication deficit*“ |
| **No grease collar at several lube points** | Supply lines to secondary distributor burst or leaky | Renew lines |
| | Fittings leaky | Retighten or renew fittings |
| **Device‘s speed reduced** | High system pressure | Check lubrication system / lube point (no damage) |
| | Supply voltage too low | Check supply voltage |
| **Lubricant leakage at pressure limiting valve** | System pressure too high | Check lubrication system |
| | Progressive distributor blocked | Renew affected progressive distributor |
| | Lubrication system blocked | Repair clogged / firm lube point |
| | Valve spring broken | Renew pressure limiting valve |
| **Level monitoring sends a signal although the reservoir is filled** | Level monitoring defective | Send device to BEKA for repair |
| | Integrated control unit defective | Renew integrated control unit |

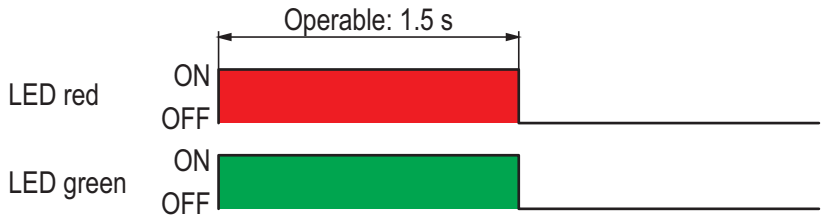
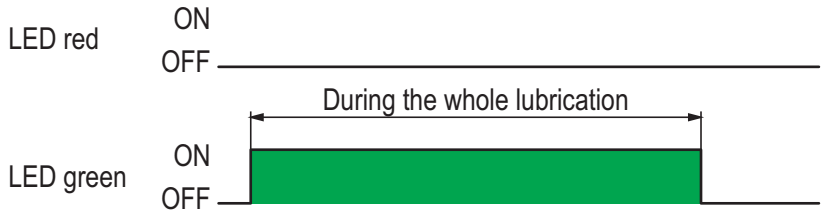
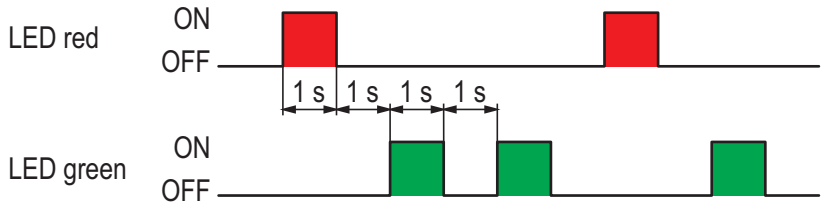
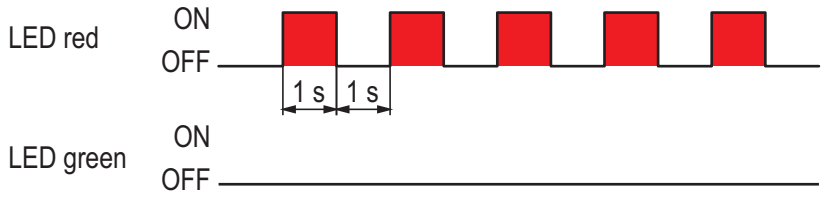
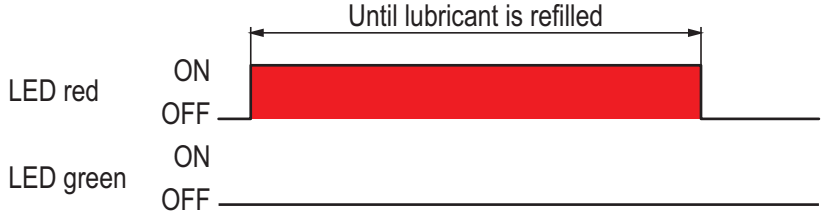
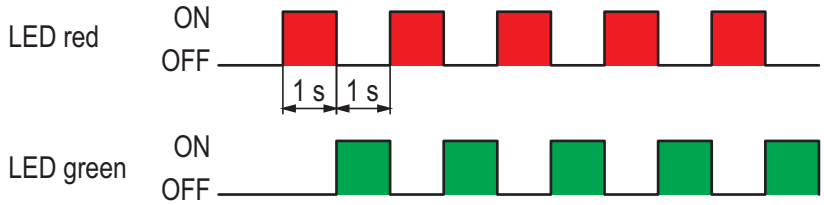
| Malfunction | Possible cause | Possible remedy |
|---|---|---|
| **Device does not switch off although the reservoir is empty** | Level monitoring defective | Send device to BEKA for repair |
| | No level monitoring installed (devices with agitator blade) | Fill reservoir, ventilate device |
| | Integrated control unit defective | Renew integrated control unit |
| **LEDs in the inspection window of the integrated control unit flash (see chapter 13.1. „Signal indicators of the integrated control unit PICO-troniX1" or chapter 13.2 „Signal indicators of the integrated control unit PICO-tronic“)** | Device operates | No malfunction |
| | Cycle locked | Device is temporarily out of order |
| | Pulse error in operational mode of pulse-dependent cycle duration | Check and possibly renew external sensor and connected cable |
| | Pulse error in operational mode of pulse-dependent lubrication duration | Check and possibly renew external sensor and connected cable<br>Reset error with intermediate lubrication |
| | Error *Lubrication deficit* | No malfunction (see chapter 9.2.14 „Error *Lubrication deficit*“)<br>Trigger intermediate lubrication 1 to 2 times |
| | Error *Line break* | Renew affected lines, retighten or renew belonging fittings |
| | Error *Level too low* | Fill reservoir |
| | Error *System pressure too high* | Check, possibly repair, lubrication system<br>Reset error with intermediate lubrication |
| | Revolution error in operational mode of revolution-dependent lubrication duration | Check, possibly repair, lubrication system or device<br>Reset error with intermediate lubrication |
| **The functions of the device (operational mode, cycle duration or lubrication duration) do not correspond to the values set at the integrated control unit** | The operational mode or the setting range of the integrated control unit has been changed, but the adhesive label in the inspection window of the protective housing has not been exchanged | Establish a diagnosis with the diagnosis software **BEKA-DiSys** and adjust the settings correspondingly or exchange the adhesive label in the inspection window |

13.1 Signal indicators of the integrated control unit PICO-troniX1

The functions of the device are displayed via two LEDs (green and red) in the inspection window of the protective housing (see fig. 36), whereby the red LED always displays an error in the program sequence.

The functions of the device can also be displayed by externally installed signal lamps. However, these have to be ordered separately (order number on request).

If several errors occur at the same time, they are displayed one after the other with a break of approx. 2 seconds.

| Signal indicators | Function |
|---|---|
|  | Indication of the operational capability after switching on the voltage for the first time |
|  | Sequence of a lubrication |
|  | Error *Lubrication deficit* |
|  | Revolution error in operational mode of revolution-dependent lubrication duration |
|  | Error *Level too low*<br>(only for devices with follow-up piston) |
|  | Trial lubrication (permanent lubrication); In order to initiate a permanent lubrication for service purposes in the operational mode of time-dependent lubrication duration, the lubrication duration has to be set higher than the cycle duration. |





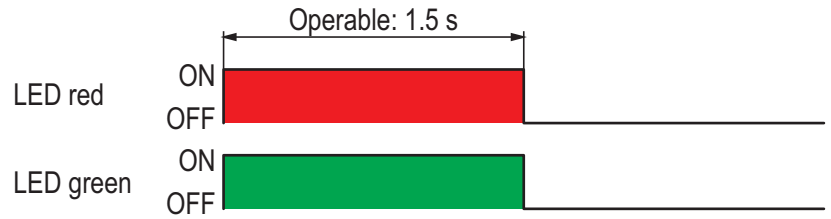
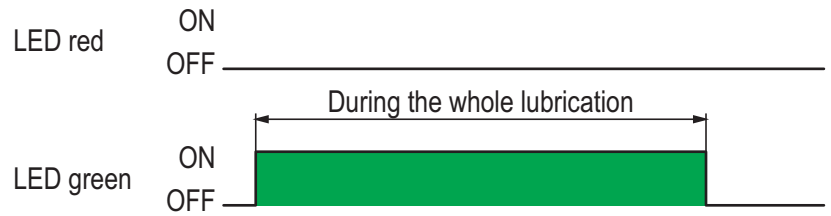
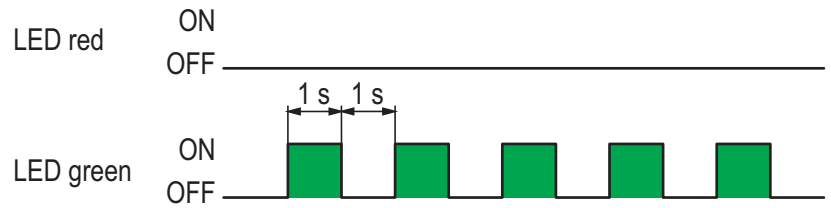
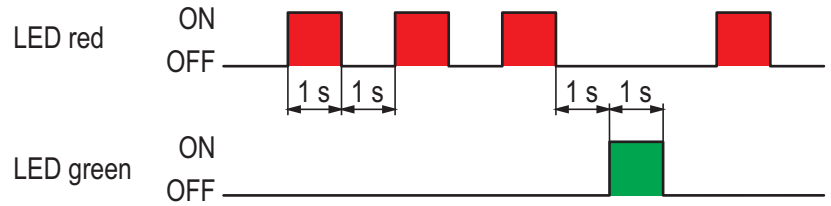
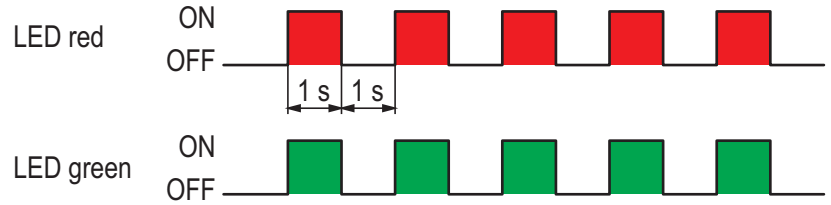
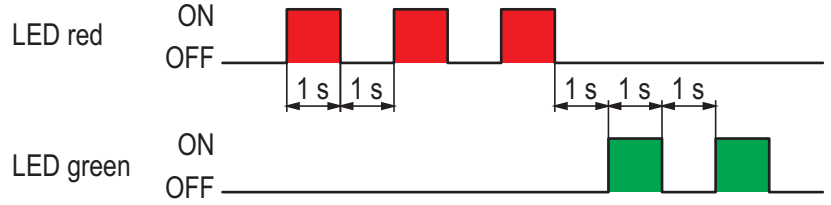
BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

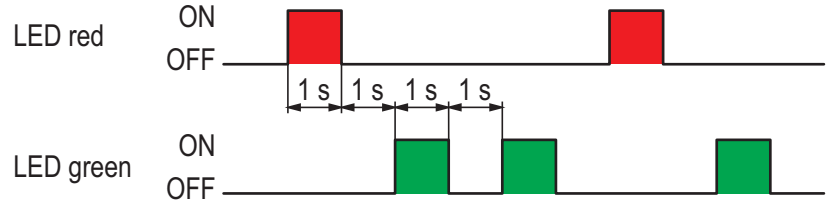
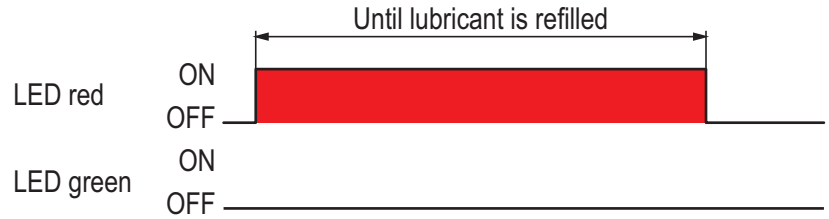
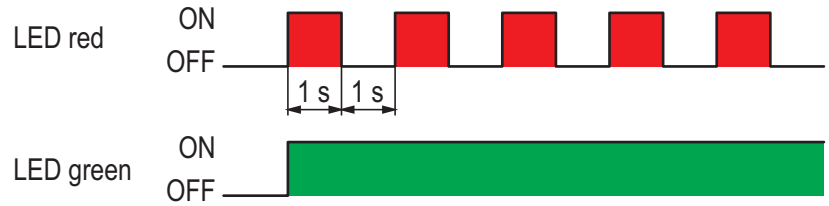
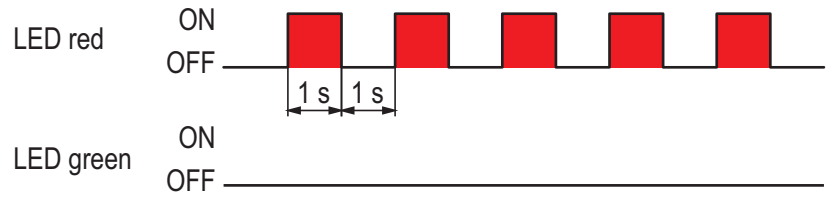
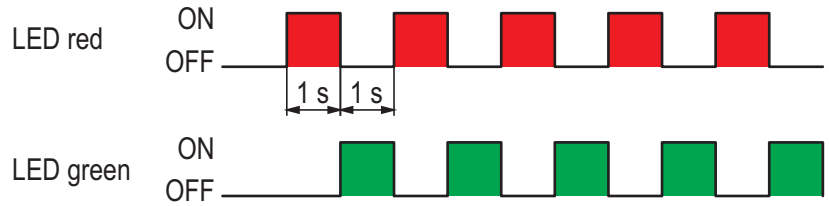
### 13.2 Signal indicators of the integrated control unit PICO-tronic

The functions of the device are displayed via two LEDs (green and red) in the inspection window of the protective housing (see fig. 40), whereby the red LED always displays an error in the program sequence.

The functions of the device can also be displayed by externally installed signal lamps. However, these have to be ordered separately (order number on request).

If several errors occur at the same time, they are displayed one after the other with a break of approx. 2 seconds.

| Signal indicators | Function |
|---|---|
|  | Indication of the operational capability after switching on the voltage for the first time |
|  | Sequence of a lubrication |
|  | Cycle locked<br>(is not displayed via the special function *External status signal*) |
|  | Pulse error in operational mode of pulse-dependent cycle duration |
|  | Pulse error in operational mode of pulse-dependent lubrication duration |
|  | Error *Line break* |

| Signal indicators | Function |
|---|---|
|  | Error *Lubrication deficit* |
|  | Error *Level too low*<br>(only for devices with follow-up piston) |
|  | Error *System pressure too high* |
|  | Revolution error in operational mode of revolution-dependent lubrication duration |
|  | Trial lubrication (permanent lubrication); In order to initiate a permanent lubrication for service purposes in the operational mode of time-dependent lubrication duration, the lubrication duration has to be set higher than the cycle duration. |

## 14. Spare part list and drawing

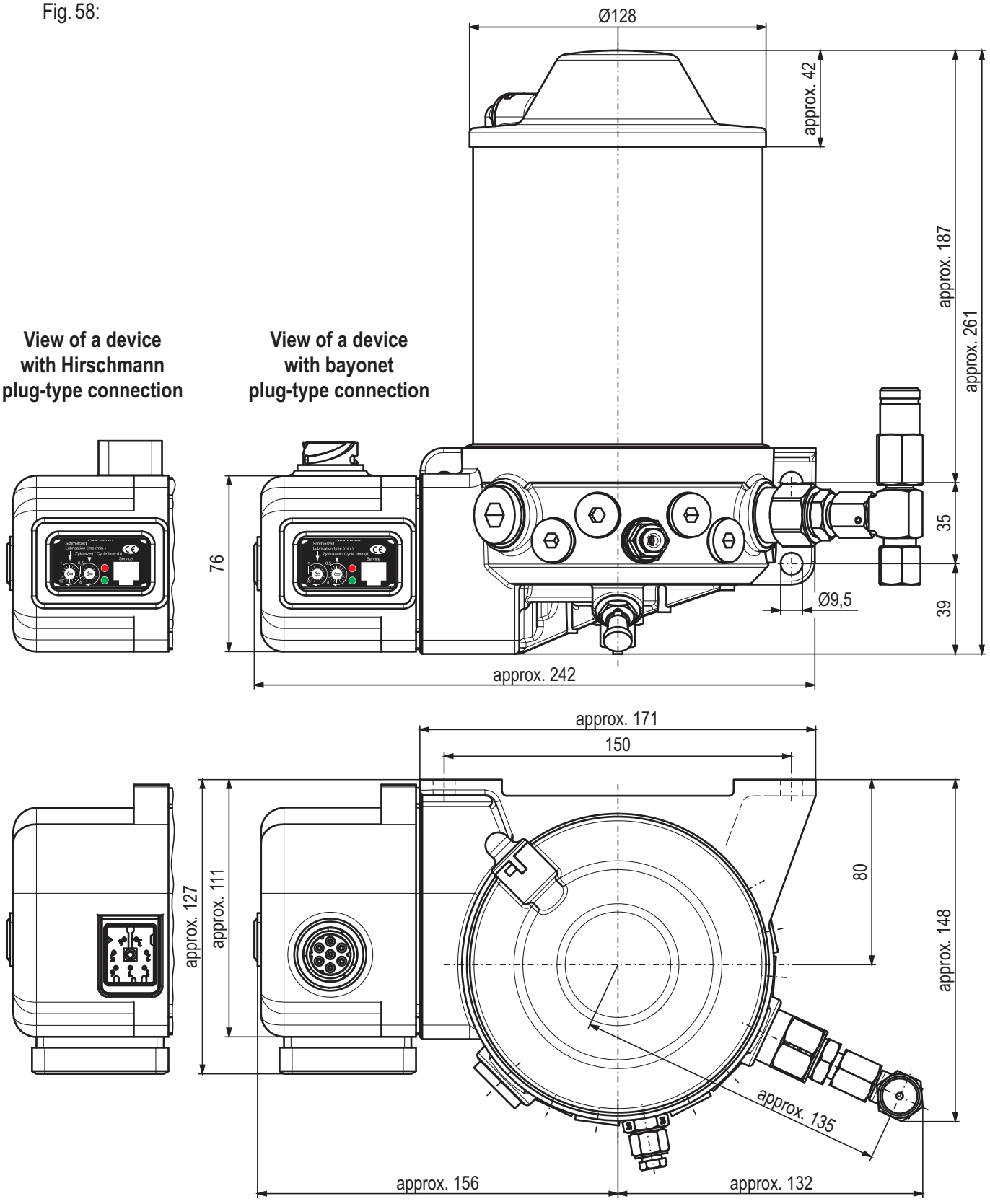
Spare part lists and drawings are available on request.

Please indicate the article number of the device in order to obtain them.

# 15. Dimensional drawing

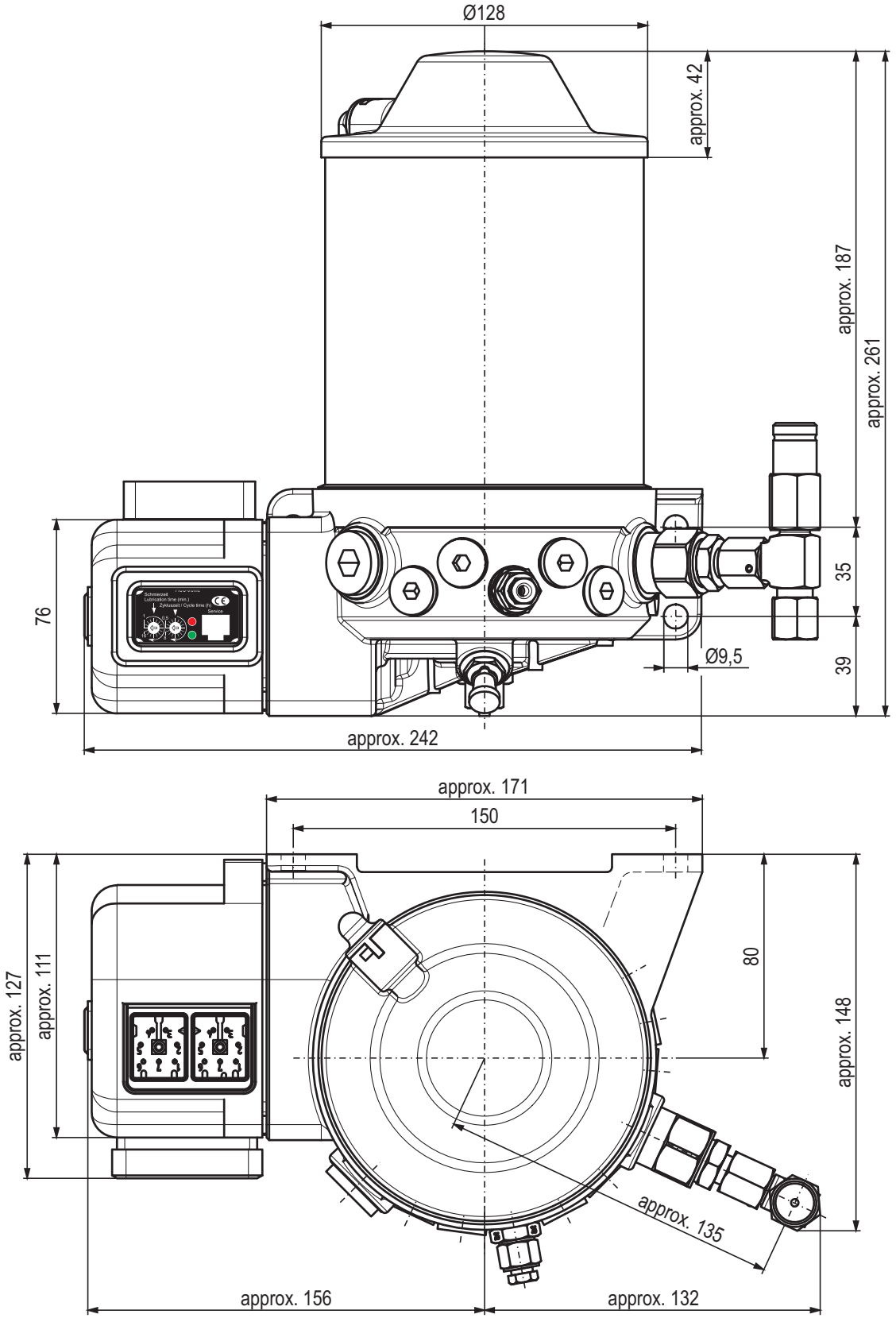
## 15.1 Dimensional drawing for devices with integrated control unit PICO-troniX1

Fig. 58:



## 15.2 Dimensional drawing for devices with integrated control unit PICO-tronic

Fig. 59:




BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

## 16. Code

**Notice!**

Pump elements, which are not selectable in the below listed codes, have to be ordered separately (see chapter 8.4.3 „Order numbers of the pump elements for progressive lubrication systems“ or chapter 8.4.5 „Code of the pump elements for multi-line lubrication systems“). Please also indicate the desired installation position per pump element (see fig. 4 in chapter 6.3 „Assembly of the pump elements“).

### 16.1 Code for devices with integrated control unit PICO-troniX1

**2185 . X . X . X . 7X . XXXX**

| **Contruction type no.** | **2185** |
|---|---|

| **Motor voltage** | **12 V DC** | **24 V DC** |
|---|---|---|
| with Hirschmann plug-type connection | 1 | 2 |
| with bayonet plug-type connection | 3 | 4 |

| **Pump elements*** **Outlet position** | **4** | **10** | **4+10** |
|---|---|---|---|
| without | 0 | 0 | 0 |
| PE-120 F | 1 | 2 | 3 |
| PE-120 FV | 4 | 5 | 6 |
| PE-120 F (pos. **4**) + PE-120 FV (pos. **10**) | - | - | 7 |
| PE-120 F (pos. **10**) + PE-120 FV (pos. **4**) | - | - | 8 |

| **Reservoir capacity (l)** | **1,5** |
|---|---|
| **Effective volume (l)** | **1,2** |
| Version with follow-up piston | 1 |
| Version with agitator blade | 4 |

| **Integrated control unit** | **PICO-troniX1** |
|---|---|
| Code no. | 7 |

| **Parameters** | | **Time-dependent cycle duration** | | | |
|---|---|---|---|---|---|
| | | **0,5 - 8 h** | **1 - 16 min** | **2 - 32 min** | **2 - 32 h** |
| **Time-dependent** | **1 - 16 min** | 1 | 4 | A | J |
| **lubrication** | **2 - 32 min** | 2 | 5 | B | K |
| **duration** | **2 - 32 s** | 3 | 6 | F | L |
| **Revolution-** | **1 - 16 rev.** | 7 | C | G | O |
| **dependent** | **10 - 160 rev.** | 8 | D | H | Q |
| **lubr. duration** | **170 - 320 rev.** | 9 | E | I | R |

| **Special version** | |
|---|---|
| Code no. | 0000 |

* with pressure limiting valve

## 16.2 Code for devices with integrated control unit PICO-tronic

**2185 . X . X . X . 6 . XX . X . XXX**

| Contruction type no. | 2185 |
|---|---|

| Motor voltage | 12 V DC | 24 V DC |
|---|---|---|
| with Hirschmann plug-type connection | 1 | 2 |

| Pump elements* Outlet position | 4 | 10 | 4+10 |
|---|---|---|---|
| without | 0 | 0 | 0 |
| PE-120 F | 1 | 2 | 3 |
| PE-120 FV | 4 | 5 | 6 |
| PE-120 F (pos. **4**) + PE-120 FV (pos. **10**) | - | - | 7 |
| PE-120 F (pos. **10**) + PE-120 FV (pos. **4**) | - | - | 8 |

| Reservoir capacity (l) | 1,5 |
|---|---|
| Effective volume (l) | 1,2 |
| Version with follow-up piston | 1 |
| Version with agitator blade | 4 |

| Integrated control unit | PICO-tronic |
|---|---|
| Code no. | 6 |

| Parameters | | Time-dependent cycle duration 0,5 - 8 h | 1 - 16 min | 2 - 32 min | 2 - 32 h |
|---|---|---|---|---|---|
| Time-dependent lubrication duration | 1 - 16 min | 21 | 22 | 23 | 25 |
| | 2 - 32 min | 2A | 2B | 2C | 2E |
| | 2 - 32 s | 24 | 29 | 2D | 2J |
| Pulse-dependent lubr. duration | 1 - 16 pulses | 30 | 3A | 31 | 32 |
| | 17 - 32 pulses | 36 | 3J | 37 | 38 |
| | 33 - 48 pulses | 3C | 3K | 3D | 3E |
| Revolution-dependent lubr. duration | 1 - 16 rev. | 51 | 52 | 53 | 55 |
| | 10 - 160 rev. | 5A | 5B | 5C | 5E |
| | 170 - 320 rev. | 5L | 5M | 5N | 5R |

| | | Pulse-dependent cycle duration 1 - 16** | 10 - 160** | 20 - 320** | 100 - 1600** | 500 - 8000** |
|---|---|---|---|---|---|---|
| Time-dependent lubrication duration | 1 - 16 min | 26 | 27 | 28 | 2K | 2L |
| | 2 - 32 min | 2F | 2G | 2H | 2M | 2N |
| | 2 - 32 s | 2K | 2L | 2P | 2Q | 2R |
| Pulse-dependent lubr. duration | 1 - 16 pulses | 33 | 34 | 35 | 3K | 3L |
| | 17 - 32 pulses | 39 | 3A | 3B | 3M | 3N |
| | 33 - 48 pulses | 3F | 3G | 3H | 3P | 3R |
| Revolution-dependent lubr. duration | 1 - 16 rev. | 56 | 57 | 58 | 5J | 5V |
| | 10 - 160 rev. | 5F | 5G | 5H | 5W | 5X |
| | 170 - 320 rev. | 5S | 5T | 5U | 5Y | 5Z |

| Additional functions | external status signal as error signal | as OK-signal |
|---|---|---|
| without monitoring | 1 | 2 |
| with system pressure monitoring*** | 3 | 5 |
| with line break monitoring*** | 4 | 6 |

| Special version | |
|---|---|
| Code no. | 000 |

* with pressure limiting valve ** pulses *** not selectable together with pulse-dependent cycle duration

BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

## 16.3 Code for integrated control unit PICO-troniX1

| Construction type no. | 2185 |
|---|---|

**2185 . XXX . 7 . X . XXXX**

| Connection* | Bayonet plug-type connection | Hirschmann plug-type connection |
|---|---|---|
| Code no. | 901 | 900 |

| Integrated control unit | PICO-troniX1 |
|---|---|
| Code no. | 7 |

| Parameters | | Time-dependent cycle duration | | | |
|---|---|---|---|---|---|
| | | 0,5 - 8 h | 1 - 16 min | 2 - 32 min | 2 - 32 h |
| Time-dependent | 1 - 16 min | 1 | 4 | A | J |
| lubrication | 2 - 32 min | 2 | 5 | B | K |
| duration | 2 - 32 s | 3 | 6 | F | L |
| Revolution- | 1 - 16 rev. | 7 | C | G | O |
| dependent | 10 - 160 rev. | 8 | D | H | Q |
| lubr. duration | 170 - 320 rev. | 9 | E | I | R |

| Special version | |
|---|---|
| Code no. | 0000 |

*** for 12 and 24 V DC**

**Notice!**

The integrated control unit PICO-troniX1 can be retrofit at devices without integrated control unit or can be used as replacement for another integrated control unit.
The integrated control unit is supplied without connection plug and without connection cable.
Required connection plugs or connection cables have to be ordered separately (order numbers on request).

## 16.4 Code for integrated control unit PICO-tronic

| Construction type no. | | 2185 |
|---|---|---|

2185 . 900 . 6 . XX . X . XXX

| Integrated control unit | PICO-tronic |
|---|---|
| Code no. | 6 |

| Parameters | | Time-dependent cycle duration | | | |
|---|---|---|---|---|---|
| | | 0,5 - 8 h | 1 - 16 min | 2 - 32 min | 2 - 32 h |
| Time-dependent | 1 - 16 min | 21 | 22 | 23 | 25 |
| lubrication | 2 - 32 min | 2A | 2B | 2C | 2E |
| duration | 2 - 32 s | 24 | 29 | 2D | 2J |
| Pulse- | 1 - 16 pulses | 30 | 3A | 31 | 32 |
| dependent | 17 - 32 pulses | 36 | 3J | 37 | 38 |
| lubr. duration | 33 - 48 pulses | 3C | 3K | 3D | 3E |
| Revolution- | 1 - 16 rev. | 51 | 52 | 53 | 55 |
| dependent | 10 - 160 rev. | 5A | 5B | 5C | 5E |
| lubr. duration | 170 - 320 rev. | 5L | 5M | 5N | 5R |

| | | Pulse-dependent cycle duration | | | | |
|---|---|---|---|---|---|---|
| | | 1 - 16* | 10 - 160* | 20 - 320* | 100 - 1600* | 500 - 8000* |
| Time-dependent | 1 - 16 min | 26 | 27 | 28 | 2K | 2L |
| lubrication | 2 - 32 min | 2F | 2G | 2H | 2M | 2N |
| duration | 2 - 32 s | 2K | 2L | 2P | 2Q | 2R |
| Pulse- | 1 - 16 pulses | 33 | 34 | 35 | 3K | 3L |
| dependent | 17 - 32 pulses | 39 | 3A | 3B | 3M | 3N |
| lubr. duration | 33 - 48 pulses | 3F | 3G | 3H | 3P | 3R |
| Revolution- | 1 - 16 rev. | 56 | 57 | 58 | 5J | 5V |
| dependent | 10 - 160 rev. | 5F | 5G | 5H | 5W | 5X |
| lubr. duration | 170 - 320 rev. | 5S | 5T | 5U | 5Y | 5Z |

| Additional functions | external status signal | |
|---|---|---|
| | as error signal | as OK-signal |
| without monitoring | 1 | 2 |
| with system pressure monitoring** | 3 | 5 |
| with line break monitoring** | 4 | 6 |

| Special version | |
|---|---|
| Code no. | 000 |

* pulses ** not selectable together with pulse-dependent cycle duration

**Notice!**

The integrated control unit PICO-tronic can be retrofit at devices without integrated control unit or can be used as replacement for another integrated control unit.
The integrated control unit is supplied without connection plug and without connection cable.
Required connection plugs or connection cables have to be ordered separately (order numbers on request).

BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410

## 17. Declaration of incorporation

BEKA

### Einbauerklärung für unvollständige Maschinen

(nach EG-RL 2006/42/EG)

Der Hersteller: BAIER + KÖPPEL GMBH + Co. KG
Beethovenstrasse 14
91257 Pegnitz / Germany
Tel.: +49 9241 729-0

erklärt hiermit, dass folgende unvollständige Maschine:

| | |
|---|---|
| Produktbezeichnung: | FETTSCHMIERPUMPE |
| Typenbezeichnung: | PICO |
| Bestellschlüssel: | 2185 ... |
| Seriennummer: | von AB1360000bis AB9999999 |

den folgenden grundlegenden Anforderungen der Richtlinie **Maschinen (2006/42/EG)** entspricht: Anhang I, Artikel 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, und 1.5.1.

Folgende harmonisierte Normen wurden angewandt:

DIN EN 809: 2012-10

DIN EN ISO 12100: 2011-03

Folgende sonstige Spezifikationen/Normen wurden angewandt:

VDE 0530-1: 2011-02

ECE Genehmigung
Folgende Pumpentypen wurden getestet und durch das Kraftfahrt-Bundesamt (KBA) zur Verwendung genehmigt.
PICO mit PICO-tronic 12V 2185 ...
PICO mit PICO-tronic 24V 2185 ...
PICO mit PICO-troniX1 12V 2185 ...
PICO mit PICO-troniX1 24V 2185 ...
Das Genehmigungszeichen lautet (E1) 10R-057978

Die Schutzziele der Richtlinie **Elektrische Betriebsmittel 2014/35/EU** wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie eingehalten.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in welche die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie Maschinen (2006/42/EG) entspricht.
Die zur Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.

Der Hersteller (Abt. Dokumentation, Tel.: +49 9241 729-779 E-Mail: tb3@beka-lube.de) verpflichtet sich, die speziellen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln.

Pegnitz, den 23.11.2016

ppa. A. Zapf (Verkaufsleitung)

FOR00024-20091222

## Declaration of incorporation for incomplete machinery (acc. to EC-directive 2006/42/EG)

The manufacturer: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Germany Tel.: +49 9241 729-0

declares hereby, that the following partly completed machinery:

Product description: FETTSCHMIERPUMPE
Type designation: PICO
Order key: 2185 ...
Serial number: from AB1360000to AB9999999

is complying with all essential requirements of the above mentioned machinery directives (2006/42/EG):
Annex I, article 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, and 1.5.1.

The following coordinated standards have been used:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
The following other specifications and standards have been used:

VDE 0530-1: 2011-02

ECE authorization
The following pump types have been tested and were approved for use by the Federal Office for Motor Vehicles (KBA).

PICO with PICO-tronic 12V 2185 ...
PICO with PICO-tronic 24V 2185 ...
PICO with PICO-troniX1 12V 2185 ...
PICO with PICO-troniX1 24V 2185 ...

The approval mark is (E1) 10R-057978

The protection targets of the directive for electric equipment 2014/35/EU have been observed according to the annex I, no. 1.5.1 of the machine directive.
The incomplete machine may only be put into service as soon as there has been stated that the machine, into which the incomplete machine shall be installed, responds to the determinations of the machine directive (2006/42/EG).
The special documentation that responds to the machine, has been prepared according to annex VII part B.
The manufacturer (documentation department, phone +49 9241 729-779, email: tb3@beka-lube.de) obliges itself to pass on electronically the special documentation for partly completed machinery to individual national authorities upon request.

Pegnitz, 23.11.2016

ppa. A. Zapf (sales manager)

## Dichiarazione d'installazione per attrezzature (macchinari) (secondo EG-RL 2006/42/EG)

Il produttore: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Germany Tel.: +49 9241 729-0

Con la presente dichiara che la seguente attrezzatura (macchinario):

Denominazione prodotto: FETTSCHMIERPUMPE
Denominazione modello: PICO
Numero d'ordinazione: 2185 ...
Numero di serie: da AB1360000a AB9999999

E' conforme alle disposizioni della direttiva per attrezzature (macchinari) (2006/42/EG):
Allegato I, Articoli 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, e 1.5.1.

Di seguito le certificazioni che sono state applicate:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
Di seguito ulteriori specifiche/certificazioni che sono state applicate:

VDE 0530-1: 2011-02

Autorizzazione ECE
I seguenti tipi di pompa sono stati testati e sono stati approvati per l'uso da parte dell'Ufficio Federale per i Veicoli a Motore (KBA).

PICO con PICO-tronic 12V 2185 ...
PICO con PICO-tronic 24V 2185 ...
PICO con PICO-troniX1 12V 2185 ...
PICO con PICO-troniX1 24V 2185 ...

Il marchio dell'omologazione è (E1) 10R-057978

La direttiva di sicurezza sulle normative elettriche 2014/35/EU viene rispettata secondo l'allegato I, Nr. 1.5.1 per le attrezzature (macchinari).
L'attrezzatura (macchinario) può essere attivata solo dopo aver appurato che l'impianto in cui deve essere installata sia conforme alle direttive dell'impianto. (2006/42/EG).
La documentazione tecnica specifica relativa all'attrezzatura (macchinario) si trova nella parte B dell'allegato VII.
Il produttore (reparto documentazione, Tel.: +49 9241 729-779 E-Mail: tb3@beka-lube.de) si impegna a trasmettere elettronicamente su richiesta ai singoli organismi nazionali la specifica documentazione tecnica relativa all'attrezzatura (macchinario).

Pegnitz, 23.11.2016

ppa. A. Zapf (Direttore Vendite)

## Déclaration d'incorporation relative aux quasi-machines (selon EG-RL 2006/42/EG)

Le fabricant : BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Allemagne Tél.: +49 9241 729-0

déclare par la présente que la quasi-machine suivante:

Désignation du produit: FETTSCHMIERPUMPE
Désignation du type: PICO
Numéro de commande: 2185 ...
Numéro de série: du AB1360000au AB9999999

est conforme aux exigences essentielles suivantes de la directive Machines (2006/42/CE):
annexe I, articles 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, et 1.5.1.

Les normes harmonisées suivantes ont été appliquées:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
Les autres normes/spécifications suivantes ont été appliquées:

VDE 0530-1: 2011-02

Autorisation ECE
Les types des pompes étaient testés et permettaient pour l'utilisation par l'Office Fédéral des véhicules (KBA).

PICO avec PICO-tronic 12V 2185 ...
PICO avec PICO-tronic 24V 2185 ...
PICO avec PICO-troniX1 12V 2185 ...
PICO avec PICO-troniX1 24V 2185 ...

La référence d'autorisation est (E1) 10R-057978

Les objectifs de protection de la directive Matériel électrique 2014/35/EU ont été respectés conformément à l'annexe I, n°1.5.1 de la directive Machines.
La quasi-machine ne doit pas être mise en service avant que la machine finale dans laquelle elle doit être incorporée ait été déclarée conforme aux dispositions de la directive Machines (2006/42/EG).
La documentation technique pertinente concernant la machine a été constituée conformément à l'annexe VII, partie B.
Le fabricant (service documentation, tél. : +49 9241 729-779 e-mail : tb3@beka-lube.de) s'engage à transmettre par voie électronique aux autorités nationales qui en feront la demande la documentation pertinente concernant la quasi-machine.

Pegnitz, 23.11.2016

p. p. A. Zapf (Direction des ventes)

## Declaración de instalación para máquinas incompletas (según EG-RL 2006/42/EG)

El fabricante: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Alemania Tel.: +49 9241 729-0

declara por medio de la presente que la siguiente máquina incompleta:

Denominación del producto: FETTSCHMIERPUMPE
Tipo: PICO
Número de pedido: 2185 ...
Número de serie: de AB1360000hasta AB9999999

cumple los siguientes requisitos fundamentales de la directiva sobre maquinaria (2006/42/CE):
Anexo I, Artículos 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 y 1.5.1.

Se han aplicado las siguientes normas armonizadas:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
Se han aplicado las siguientes especificaciones/normas adicionales:

VDE 0530-1: 2011-02

Autorización ECE
Los siguientes tipos de bombas han sido testadas y han sido aprobadas para ser utilizadas por la oficina federal para vehiculos de motor (KBA)

PICO con PICO-tronic 12V 2185 ...
PICO con PICO-tronic 24V 2185 ...
PICO con PICO-troniX1 12V 2185 ...
PICO con PICO-troniX1 24V 2185 ...

El certificado de aprobación es: (E1) 10R-057978

Los objetivos de protección de la directiva relativa a material eléctrico 2014/35/EU se han cumplido de conformidad con el Anexo I, nº 1.5.1 de la directiva sobre maquinaria.
La máquina incompleta no debe ponerse en servicio hasta que se haya comprobado que la máquina donde debe instalarse la máquina incompleta cumple las disposiciones de la directiva sobre maquinaria (2006/42/EG).
Se ha elaborado la documentación técnica específica perteneciente a la máquina según el Anexo VII, Parte B.
El fabricante (Dpto. Documentación, tel.: +49 9241 729-779 e-mail: tb3@beka-lube.de) se obliga a facilitar electrónicamente la documentación específica de la máquina incompleta a organismos nacionales cuando así lo requieran.

Pegnitz, 23.11.2016

p.o. A. Zapf (Dirección de ventas)

## Prohlášení o vestavbě – zamontování pro neúplné stroje(podle směrnice 2006/42/ES)

Výrobce: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Německo Tel.: +49 9241 729-0

tímto prohlašuje, že následující neúplný stroj:

označení výrobku: FETTSCHMIERPUMPE
typové označení: PICO
objednací číslo: 2185 ...
číslo série: od AB1360000do AB9999999

odpovídá následujícím základním požadavkům Směrnice o strojích (2006/42/ES):
Dodatek I, článek 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 a 1.5.1.

Byly použity následující harmonizované normy:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
Byly použity ostatní následující specifikace:

VDE 0530-1: 2011-02

Schváleni ECE

Následující typy pumpy byly testovány a následně spolkovým úřadem pro motorová vozidla (KBA) povoleny k používání.

PICOs PICO-tronic 12V 2185 ...
PICO s PICO-tronic 24V 2185 ...
PICO s PICO-troniX1 12V 2185 ...
PICO s PICO-troniX1 24V 2185 ...

Označení povolujícího zákona je (E1) 10R-057978

Cíle ochrany Směrnice 2014/35/EU pro elektrická zařízení byly dodrženy podle dodatku I, č. 1.5.1 Směrnice o strojích.
Neúplný stroj smí být uveden do provozu teprve tehdy, když bylo zjištěno, že stroj, do kterého má být montován, odpovídá Směrnici o strojích (2006/42/ES)
Pro stroj byly zhotoveny speciální technické podklady dle dodatku VII díl B.
Výrobce (odd. dokumentace, tel.: +49 9241 729-779 E-mail: tb3@beka-lube.de) se zavazuje, že na vyžádání elektronickou formou poskytne příslušným místům v jednotlivých státech speciální podklady pro uvedený neúplný stroj

Pegnitz dne 23.11.2016

ppa. A. Zapf (vedoucí prodeje)

## Deklaracja włączenia maszyny nieukończonej (zgodna z EG-RL 2006/42/EG)

Producent: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Niemcy Tel.: +49 9241 729-0

Oświadcza niniejszym, że następująca maszyna nieukończona:

Nazwa produktu: FETTSCHMIERPUMPE
Oznaczenie typu: PICO
Numer zamówienia: 2185 ...
Numer seryjny: od AB1360000 do AB9999999
spełnia następujące zasadnicze wymogi Dyrektywy Maszynowej (2006/42/EG):
Załącznik I, artykuły 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 oraz 1.5.1.

Zastosowano następujące normy zharmonizowane:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
oraz następujące inne specyfikacje / normy: VDE 0530-1: 2011-02

Pozwolenie ECE
Poniższe typy pomp zostały przetestowane i dopuszczone do stosowania przez Federalny Urząd ds. Ruchu Drogowego (KBA).

PICO mit PICO-tronic 12V 2185 ...
PICO mit PICO-tronic 24V 2185 ...
PICO mit PICO-troniX1 12V 2185 ...
PICO mit PICO-troniX1 24V 2185 ...

Numer pozwolenia (E1) 10R-057978

Cel Dyrektywy dotyczącej urządzeń elektrycznych 2014/35/EU, jakim jest ochrona użytkowników sprzętu elektrycznego, został spełniony zgodnie z Załącznikiem I, punkt 1.5.1 Dyrektywy Maszynowej.
Nieukończona maszyna może być przekazana do eksploatacji dopiero po stwierdzeniu, że urządzenie, w obrębie którego będzie ona zabudowana, spełnia wymogi określone w Dyrektywie Maszynowej (2006/42/EG).
Wszystkie dokumenty techniczne przynależne do maszyny zostały sporządzone zgodnie z Załącznikiem VII, część B.
Producent (Dział Dokumentacji, tel.: +49 9241 729-779, e-mail: tb3@beka-lube.de) zobowiązuje się do przekazania (w formie elektronicznej) na żądanie dokumentów dotyczących maszyny nieukończonej odpowiednim organom krajowym.

Pegnitz dne 23.11.2016

ppa: A. Zapf (Kierownik Sprzedaży)

## Inbouwverklaring betreffende niet-voltooide machines (conform Machinerichtlijn 2006/42/EG)

De fabrikant: BAIER + KÖPPEL GMBH + Co. KG Beethovenstrasse 14
91257 Pegnitz / Duitsland Tel.: +49 9241 729-0

verklaart hierbij dat de hierna genoemde niet-voltooide machine:

Aanduiding: FETTSCHMIERPUMPE
Type: PICO
Bestelsleutel: 2185 ...
Serienummer: van AB1360000tot AB9999999

voldoet aan de volgende fundamentele eisen van de Machinerichtlijn (2006/42/EG):
bijlage I, punt 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, en 1.5.1.

De volgende geharmoniseerde normen zijn van toepassing:
DIN EN 809: 2012-10 DIN EN ISO 12100: 2011-03
De volgende nadere specificaties/normen zijn van toepassing:

VDE 0530-1: 2011-02

ECE goedkeuring
De volgende pomptypen zijn getest en door het Kraftfahrt-Bundesamt (KBA) goedgekeurd voor gebruik.

PICO met PICO-tronic 12V 2185 ...
PICO met PICO-tronic 24V 2185 ...
PICO met PICO-troniX1 12V 2185 ...
PICO met PICO-troniX1 24V 2185 ...

Het goedkeuringsteken is (E1) 10R-057978

Conform punt 1.5.1, bijlage I, van de Machinerichtlijn is voldaan aan de beschermende eisen van Laagspanningsrichtlijn 2014/35/EU.
De niet-voltooide machine mag pas in gebruik worden genomen als is vastgesteld dat de machine, waarin de niet-voltooide machine zal worden ingebouwd, voldoet aan de eisen van de Machinerichtlijn (2006/42/EG).
De specifieke technische documentatie over de machine is opgesteld overeenkomstig bijlage VII, onder B.
De fabrikant (afd. Documentatie, tel.: +49 9241 729-779, e-mail: tb3@beka-lube.de) verplicht zich de specifieke documentatie over de niet-voltooide machine op verzoek langs elektronische weg te verzenden aan nationale autoriteiten.

Pegnitz, 23-11-2016

p.p. A. Zapf (Hoofd afdeling Verkoop)

## 18. For your notes

## For your notes

## 19. Details of the manufacturer

BEKA

BAIER + KÖPPEL GmbH + Co. KG

Beethovenstraße 14
91257 PEGNITZ / Bayern
Germany

Tel. +49 9241 729-0
FAX +49 9241 729-50

POSTFACH 1320
91253 PEGNITZ / Bayern
Germany

http://www.beka-lube.de
E-Mail: beka@beka-lube.de
beka@beka-max.de

## Our range of supply:

Gear pumps
Multi-line oil pumps
Multi-line grease pumps
Single-line central lubrication systems
Dual line central lubrication systems
Oil circulation central lubrication systems
Oil-air and spray lubrication
Wheel flange central lubrication systems
Rolling mill central lubrication systems
Commercial vehicle lubrication
Progressive distributors
Control and monitoring units

Subject to alterations!

We do not accept liability for errors,
technical mistakes and misprints!

BAL2185_Grease_lubrication_pump_PICO_with_PICO-troniX1_-tronic_0519EN 10158410