EN

ZEPTO

Revision 11-2019

Original operating and assembly manual

BAL_ZEPTO_1119DE_EN 10152199

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1. Technical data

General:

Pressure connection: Ø6 mm
Operating pressure: max. 290 bar
Pressure limiting valve: set to 290 bar
Temperature range*: -25°C up to +70°C
(depending on lubricant)
Lubricant: greases from NLGI cl. 000 up to 2*
Compatible cartridge types: type S (Lube-Shuttle®**)
type L (Ritter grease cartridge 400 ml)
type F (SYSTEM REINER***)
Delivery rate: constant 0,9 cm³/min
Level monitoring: with prewarning
Materials: housing - high-strength plastic
mechanics - steel
Corrosion degree of protection of steel: C4 corresponding to ISO 12944-2
Drive: DC motor
Weight (without cartridge): max. 2,5 kg
Sound pressure level: <70dB(A)

DC motor:

Operating voltage: 12 V and 24 V DC
Current consumption: max. 5 A
(incl. reverse polarity protection)
Connection type for power supply: DEUTSCH plug, 4-poles, male
Fuse (not included in device: 3 A
Degree of protection: IP6K9K (ISO 20653)

* according to approved lubricant list FFG_002_ZEPTO

** Lube-Shuttle® is a registered trade mark of MATO

*** SYSTEM REINER is a registered trade mark of FUCHS LUBRITECH GmbH

2. Applicable documents

Datasheet ZEPTO
Approved lubricant list FFG_002_ZEPTO

3. Scope of delivery

ZEPTO with holder for cartridge type S (Lube-Shuttle®), **without cartridge**
Original operating and assembly manual

The ZEPTO pump is subsequently called a **device**.

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4. 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.

4.1 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!

4.2 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.

4.3 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.

4.4 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.

4.5 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.

4.6 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.

4.7 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.

4.8 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

4.9 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.

5. 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 lubricant may be supplied which complies with the machine manufacturer's specifications and which is listed in the lubricant release list FFG_002_ZEPTO (available on request or at www.beka-lube.de).
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.

6. 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.
- The number of changed empty cartridges may not exceed 100.

However, the warranty is only excluded in the above-described conditions if the non-observance of the above-described conditions is also the cause of the incurred damage.
The burden of proof for the missing causality of the damage lies with the buyer.

7. 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 lubricant contained in the cartridges. No longer use the cartridges if the lubricant is over-stored (separation of oil and soap).

8. Assembly instructions

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

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

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

8.1 Connection of lines

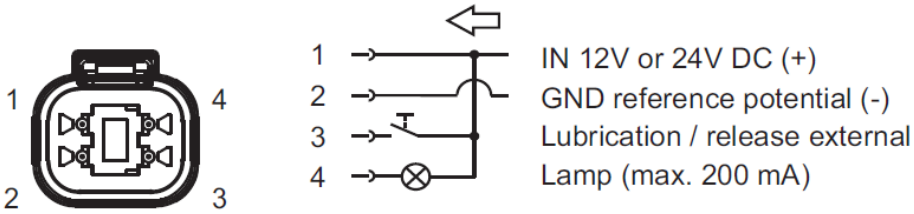
- Professional layout!
- When using pipes, observe that they are clean, seamless and of precision steel!
- Assemble the pipes professionally and free from distortion!
- A strain relief must be provided for the lubricant line at the latest 0.5 m after the device!
- The lubricant line should be prefilled in order to avoid air pockets in the system!
- Pay attention to pressure tightness of fittings!
- All components must be approved for max. operating pressure (see chapter 1. "Technical data").

8.2 Power connection

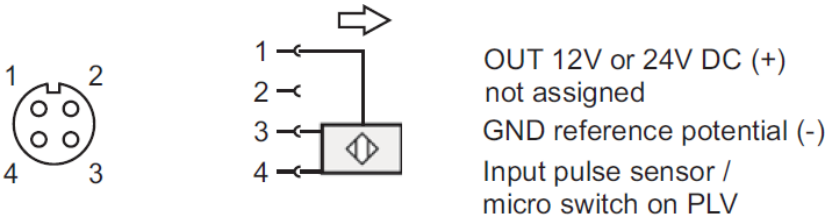
- Power supply must be done by a professional electrician!
- A strain relief must be provided for the connection cables at the latest 0.5 m after the device!
- Electrical device components must be wired professionally!
- Compare voltage details with the existing mains voltage!
- Equipotential bonding must be done professionally by the operator via an according ground connection!
- Wire the device according to the connection diagram!

Notice! The connection cables are not included in the scope of delivery and must be ordered separately if needed. The article numbers and the color assignment of the connection cables can be found in chapter 16. "Accessories".

8.2.1 Connection diagram of DEUTSCH plug male



8.2.2 Connection diagram of bushing M12x1



Notice! The bushing M12x1 is only included in devices with extended control setting (article no.: 10144013).

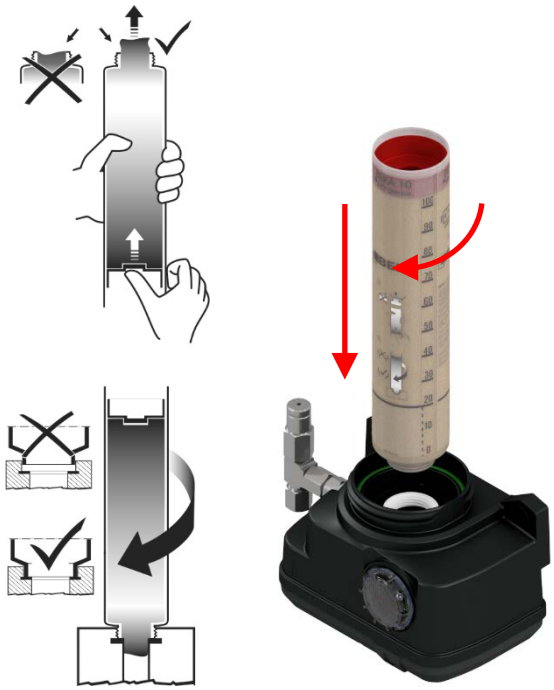
9. Start up

9.1 Filling with lubricant

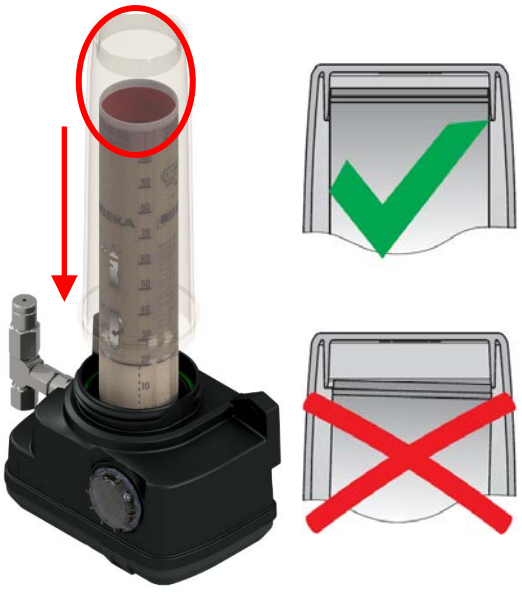
- Screw in the cartridge as described in chapter 9.1.1 "Screwing in or changing the cartridge"!
- Observe the machine manufacturer's lubricant details! Only use lubricants which are listed in the lubricant release list FFG_002_ZEPTO (available on request or at www.beka-lube.de)!
- Collect leaking lubricant 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.
- Ensure utmost cleanliness when changing the cartridge!

9.1.1 Screwing in or changing the cartridge

1. Clean the nut and the cartridge pipe, then loosen the nut and remove both.
   Unscrew the cartridge if present.
   Compare the cartridge to be screwed in with the existing connection thread, use an adapter if necessary or change the existing adapter (see chapter 9.1.2. “Changing the cartridge adapter”).



2. In order to avoid air pockets, push the piston of the cartridge slightly upwards until lubricant escapes before inserting it into the device. Then screw the cartridge into the holder or into the adapter in the device (see also: sticker on the cartridge).



3. Put on the cartridge pipe, making sure that the cartridge fits properly in the guide of the cartridge pipe (fig. type S).

5. Set the cartridge size depending on the cartridge capacity via the display as described in chapter 11.6 “Setting the cartridge size”.

4. Tighten the nut hand-tight.

9.1.2 Changing the cartridge adapter

The device is designed ex works for the use of cartridges type S (Lube-Shuttle®).
When using a different cartridge type (type L [Ritter grease cartridge 400 ml] or type F [SYSTEM REINER]), the corresponding cartridge adapter can be screwed into the holder for type S.

1. Loosen the nut and remove it together with the cartridge pipe (see step 1. in chapter 9.1.1 „Screwing in or changing the cartridge“).

2. Clean the housing and the holder for type S, unscrew any existing adapter (type L or type F) beforehand.

3. Clean the new cartridge adapter (e.g. type L) and screw it into the holder for type S.

Notice! The cartridge adapters type L and type F are not included in the scope of delivery and must be ordered separately if necessary (see chapter 16. “Accessories”).

9.2 Ventilation of the device

Caution! The device must be ventilated when it is put into operation for the first time or when it has sucked in air for a longer time and no longer supplies lubricant.

There are two ways to ventilate the device. Both options are described below.

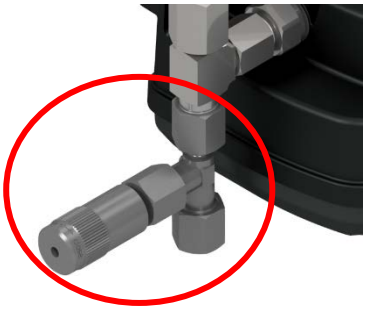
9.2.1 Ventilation via disassembly of the lubricant line

- Disassemble the lubricant line after the pressure limiting valve.
- Trigger an intermediate lubrication at the push-button for intermediate lubrication (see chapter 10.2 “Intermediate lubrication”) until the lubricant escapes bubble-free from the pressure connection of the pressure limiting valve.
- Reconnect the lubricant line professionally.

9.2.2 Ventilation via ventilation element

For this type of ventilation, the ventilation element must be assembled directly on the pump element in the pressure line using the corresponding swivel run tee.

- Open the ventilation element.
- Trigger intermediate lubrications at the push-button for intermediate lubrication (see chapter 10.2 “Intermediate lubrication”) until lubricant escapes bubble-free from the ventilation element.
- Close the ventilation element again and clean it.



Notice! When using the ventilation element, no tools are needed for the ventilation itself.
The ventilation element and the corresponding adjustable swivel run tee are not included in the scope of delivery and must be ordered separately (see chapter 16. “Accessories”).

9.3 Presettings on the control

The device is delivered by default with the following presettings unless otherwise specified at order:

	Presetting	Shown in the display	
		left side	right side
Program	Operational mode of time-dependent lubrication duration	P	1
Lubrication duration | Cycle duration*	1 min | 0,5 h	1	0
Cartridge size	400 g	C	1
Level prewarning	activated	---	

The set program, the lubrication duration and the cycle duration are shown alternately in the display of the device when the device is in operation (see chapter 15.1 “Signal displays of the control”).
The settings can be changed at any time (see chapter 11. “Control”).

* Lubrication and cycle duration are displayed at the same time.

10. Functional description

The DC motor sets the eccentric via a gear into a rotating motion, whereby the stroke movement of the pump element piston is carried out. The suction and the pressure stroke forcedly arise due to the stroke movement of the piston. The lubricant is sucked out of the cartridge during the suction stroke and is supplied into the connected line at the subsequent pressure stroke.

The device can be operated with a connection voltage of 12 V and 24 V. The speed and delivery rate remain constant, independent of the connection voltage.

The device has a level prewarning. The control determines the operating time of the device until the emptying of the cartridge by the set cartridge size. With a residual quantity in the cartridge of approx. 10 – 30 %, the control shows the error LO. Despite this error, the device continues to operate. The level prewarning must be reset after each cartridge change (see chapter 11.5 “Level prewarning”).

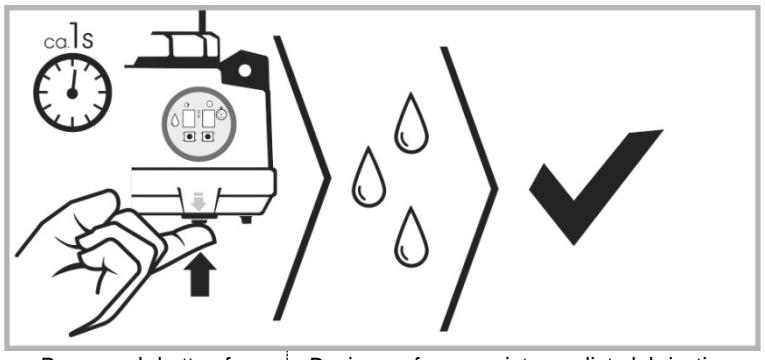
10.1 Pressure limiting valve

A pressure limiting valve is located on the pump element. It is preset to 290 bar and protects the device from being damaged by too high pressure. If the pressure in the device exceeds the set value, the pressure limiting valve opens and the lubricant escapes at the top of the valve.

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

10.2 Intermediate lubrication

An intermediate lubrication can be triggered at any time at the device by pressing the push-button for intermediate lubrication:

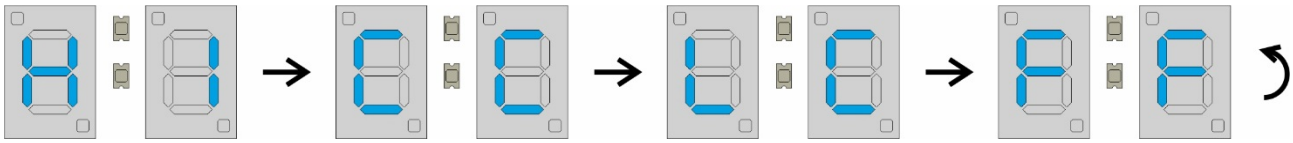


Press push-button for intermediate lubrication briefly (approx. 1 s).	Device performs an intermediate lubrication.

The device continues to operate in the set lubrication cycle after the intermediate lubrication.

10.2.1 Display sequence of the push-button for intermediate lubrication

The following indications appear one after the other in the display of the device when the push-button for intermediate lubrication is held down (> 1 s). The device does not perform an intermediate lubrication in this case.



Reset level prewarning (see chapter 11.5 “Level prewarning”)	Evaluate operating hours counter (see chapter 11.7 “Operating hours counter”)	Deactivate / activate level prewarning (see chapter 11.5.1 “Deactivate / activate level prewarning”)	Display of the firmware version

11. Control

The device can be used for various applications due to the integrated control.
The device is available with a simple or a complex control version:

	Simple version Device 10142862 (DEUTSCH plug)	Complex version Device 10144013 (DEUTSCH plug + bushing M12x1)
Permanent operation for external control	✓	✓
Operational mode of time-dependent lubrication duration Time-dependent lubrication duration Time-dependent cycle duration	✓	✓
Operational mode of time-dependent lubrication duration with system pressure monitoring Time-dependent lubrication duration Time-dependent cycle duration		✓
Operational mode of pulse-dependent lubrication duration Pulse-dependent lubrication duration Time-dependent cycle duration		✓

All programs and parameters of the device can be set directly with the control keys on the display under the inspection glass.
Unscrew the inspection glass for this, make the desired settings and retighten the inspection glass.
No additional software or tools are needed.

Caution! Screw the inspection glass **properly** back on, otherwise **dirt** and **water** can enter the housing and **can destroy** the device!

The integrated control operates depending on 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.

Lubrication cycle

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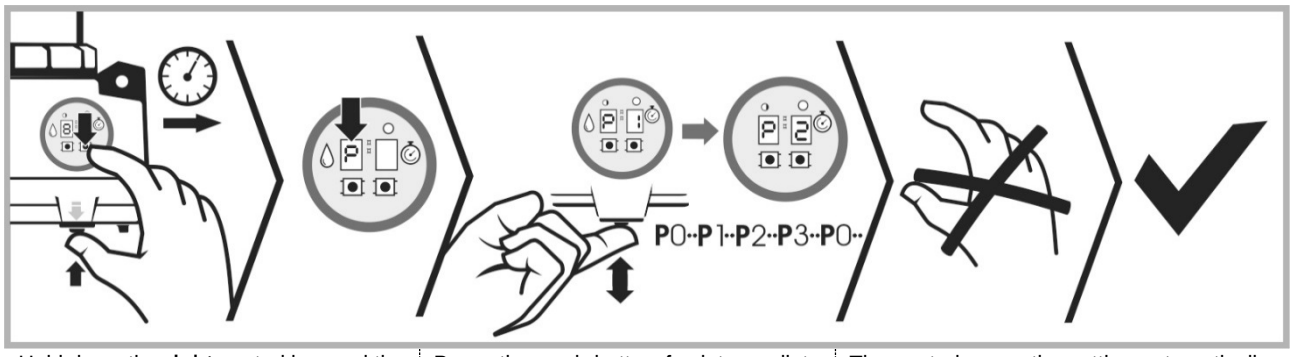
11.1 Program setting

Depending on the version, you can choose between **two** or **four** different program settings at the device.



Hold down the **right** control key and the push-button for intermediate lubrication until "P" appears in the left segment of the display. The current program is displayed in the right segment.	Press the push-button for intermediate lubrication again briefly; the next program number appears. Repeat pressing the buttons until the desired program is reached.	The control saves the setting automatically; no further confirmation is necessary.

Program	Simple version Device 10142862	Complex version Device 10144013
P0	Permanent operation	Permanent operation
P1 (Standard)	Operational mode of time-dependent lubrication duration	Operational mode of time-dependent lubrication duration
P2	unavailable	Operational mode of time-dependent lubrication duration with system pressure monitoring
P3	unavailable	Operational mode of pulse-dependent lubrication duration

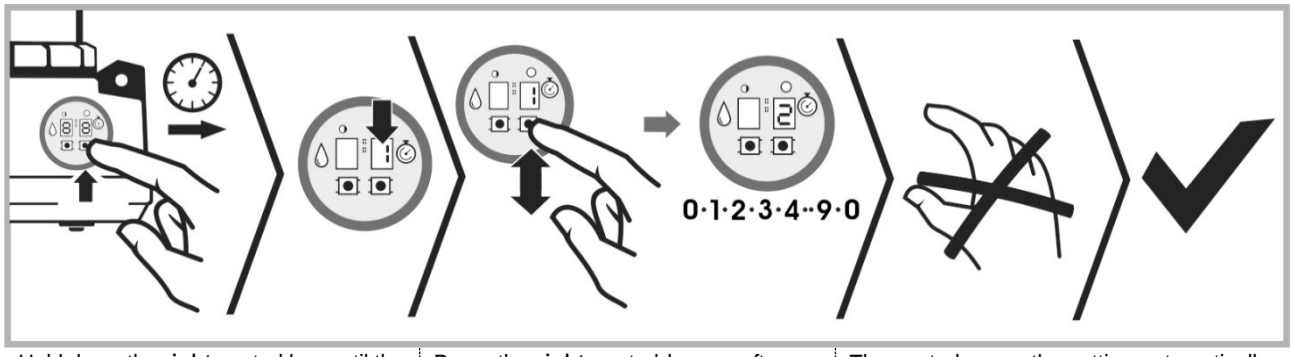
11.2 Permanent operation P0

The device is always ready-to-use in permanent operation. However, it only operates as long as a release signal is applied at PIN 3 of the DEUTSCH plug (see chapter 8.2.1 "Connection diagram of DEUTSCH plug male").

11.3 Cycle duration

The cycle duration is always determined time-dependent in the programs P1, P2 and P3. It is shown in the **right segment** of the display and can be set via the **right control key**.

Setting:



Hold down the **right** control key until the current setting appears in the right segment of the display, e.g. "1"	Press the **right** control key as often as required until the desired setting is reached.	The control saves the setting automatically; no further confirmation is necessary.

Display	0	1	2	3	4	5	6	7	8	9
Cycle duration (h)	0,5	1	2	3	4	5	6	7	8	9

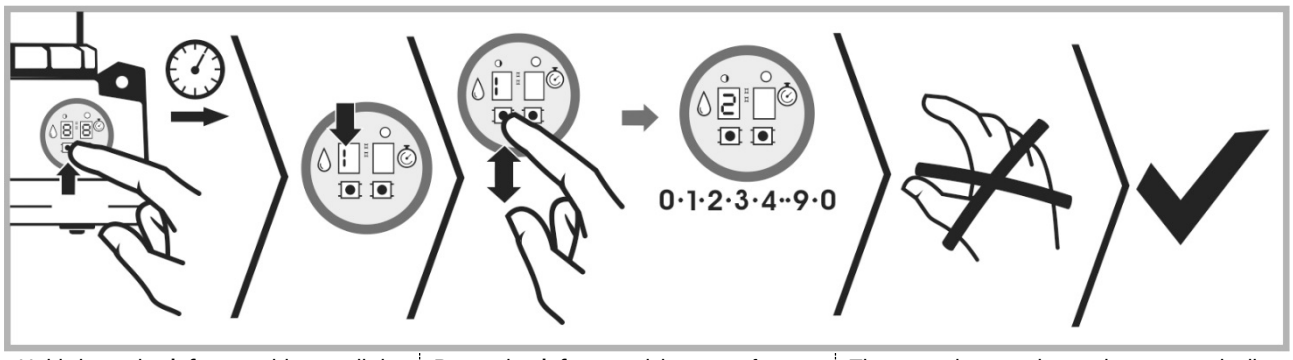
11.4 Operational mode of lubrication duration P1 to P3

The lubrication duration can only be determined time-dependent for the device 10142862.
It can be determined time-dependent or pulse-dependent for the device 10144013.
The lubrication duration is displayed in the left segment of the display and can be set via the left control key.

11.4.1 Operational mode of time-dependent lubrication duration P1

The device operates dependent on the set lubrication duration in program P1.

Setting:



Hold down the left control key until the current setting appears in the left segment of the display, e.g. "1"	Press the left control key as often as required until the desired setting is reached.	The control saves the setting automatically; no further confirmation is necessary.

Display	0	1	2	3	4	5	6	7	8	9
Lubrication duration (min)	0,5	1	2	3	4	5	6	7	8	9

11.4.2 Operational mode of time-dependent lubrication duration with system pressure monitoring P2

In program P2, the device operates as described in chapter 11.4.1 "Operational mode of time-dependent lubrication duration P1". In addition, the operating pressure in the lubrication system is monitored by a micro switch which is attached at the pressure limiting valve.

If the pressure in the lubrication system exceeds the set value (290 bar), the pressure limiting valve opens and the micro switch is actuated. The micro switch sends a signal to the control. The device shows the error E5 and signals a malfunction (see chapter 15.1 "Signal displays of the control").

After eliminating the cause of error, the error must be reset as described in chapter 15.2 "Resetting the error E5".

The micro switch is connected to the bushing M12x1.

Notice!

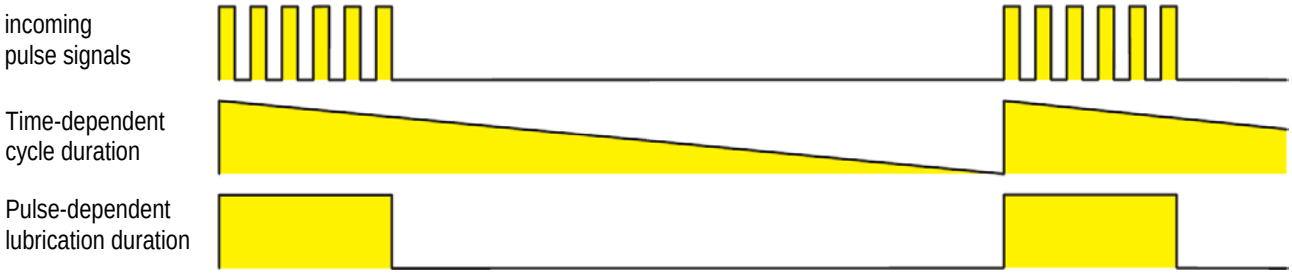
If program P2 is selected, a micro switch must be connected, otherwise the device displays the error E5 and signals a malfunction (see chapter 15.1 "Signal displays of the control").

11.4.3 Operational mode of pulse-dependent lubrication duration P3

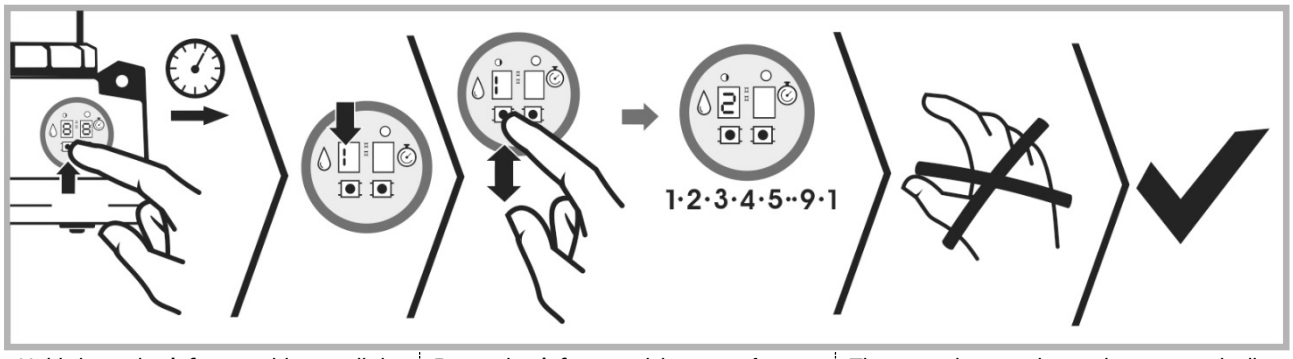
In program P3, the lubrication duration is determined by the number of the incoming pulses of a sensor (e.g. proximity switch on a progressive distributor). If the control does not receive all set pulse signals within the monitoring time (25 minutes), it shows the error E5 in the display and the device signals a malfunction (see chapter 15.1 "Signal displays of the control").

After eliminating the cause of error, the error must be reset as described in chapter 15.2 "Resetting the error E5".

The sensor is connected to the bushing M12x1.



Setting:



Hold down the **left** control key until the current setting appears in the left segment of the display, e.g. "1"	Press the **left** control key as often as required until the desired setting is reached.	The control saves the setting automatically; no further confirmation is necessary.

Display	1	2	3	4	5	6	7	8	9
Lubrication duration (pulse[s])	1	2	3	4	5	6	7	8	9

Notice!

If program P3 is selected, a sensor **must** be connected, otherwise the device displays the error E5 after 12 minutes and signals a malfunction (see chapter 15.1 "Signal displays of the control").

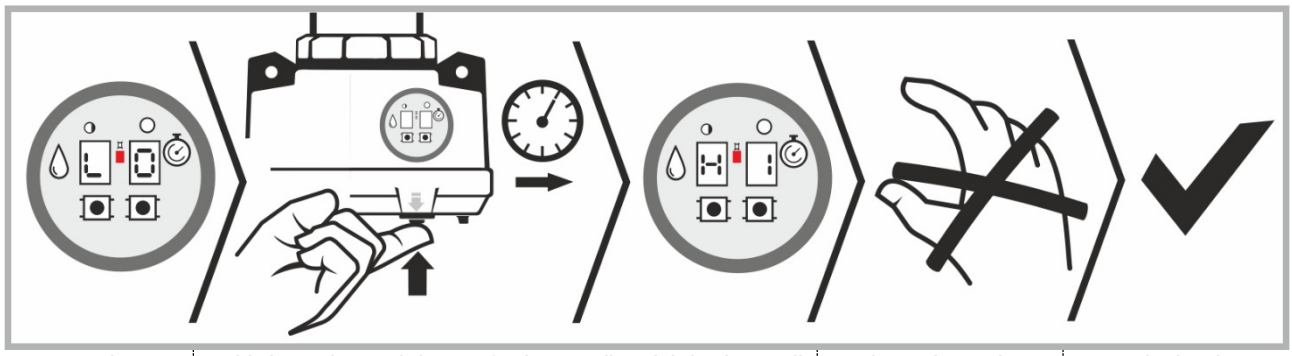
11.5 Level prewarning

The control determines how long the device can operate until the cartridge is empty via the set cartridge size.
The prewarning (error LO, see chapter 15.1 “Signal displays of the control“) is emitted at a residual quantity in the cartridge of approx. 10 – 30 %. The residual quantity depends on the backpressure, the lubricant used and the temperature.

Caution!

If the error LO is shown on the display, the cartridge should be changed as soon as possible (see chapter 9.1.1 “Screwing in or changing the cartridge“). If the cartridge is completely emptied, the device might suck in air and deliver it into the lubrication system!

After each cartridge change, the level prewarning must be reset in order to enable a reliable use:



Error LO is displayed, red LED glows	Hold down the push-button for intermediate lubrication until “HI” appears on the display	Then release the push-button for intermediate lubrication	The level prewarning is reset, the red LED goes out

* see also chapter 10.2.1 “Display sequence of the push-button for intermediate lubrication”

Notice!

If the error LO is displayed although the residual quantity in the cartridge is above 25 - 30%, the cartridge size can be switched at the control (see chapter 11.6 “Setting the cartridge size”).
The level prewarning can also be reset when the error LO is not shown on the display (see chapter 10.2.1 “Display sequence of the push-button for intermediate lubrication”).

Caution!

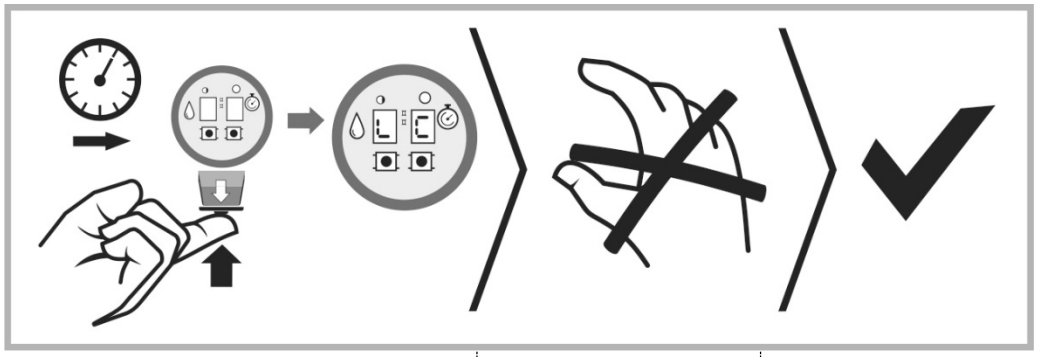
In some applications (changing lubricant, extreme temperature fluctuations etc.) it can happen that the level cannot be calculated accurately.
Please always make sure that there is a sufficient amount of lubricant in the cartridge even if the error LO is not yet displayed!

11.5.1 Deactivate / activate the level prewarning

The level prewarning is always activated by default. However, it can also be deactivated if it is not desired.

Caution!

BEKA recommends to **always** operate the device with **activated** level prewarning.
If the cartridge is completely emptied, the device might **suck in air** and **deliver** it **into the lubrication system**!
Please always make sure that there is a sufficient amount of lubricant in the cartridge!

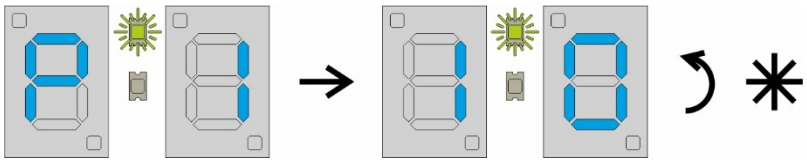


Hold down push-button for intermediate lubrication until "LC" appears on the display	Release push-button for intermediate lubrication	The level prewarning is deactivated or activated

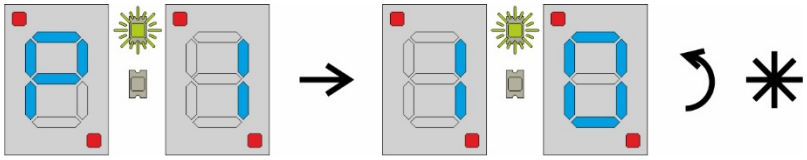
* see also chapter 10.2.1 "Display sequence of the push-button for intermediate lubrication"

If the level prewarning is deactivated, the four indicator points in the display of the device will light up permanently.

Example of a display sequence with activated level prewarning:

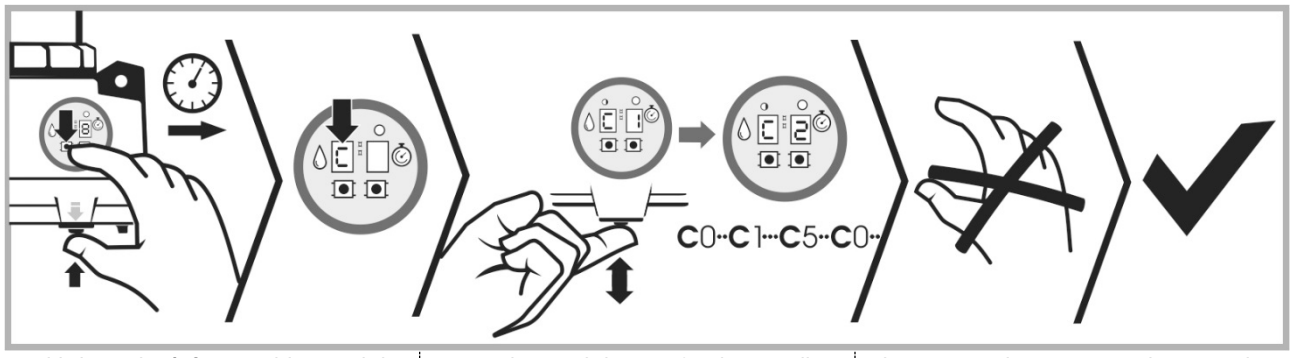


Example of a display sequence with deactivated level prewarning:



11.6 Setting the cartridge size

The device must be set to the inserted cartridge size in order to enable a reliable use of the level prewarning:

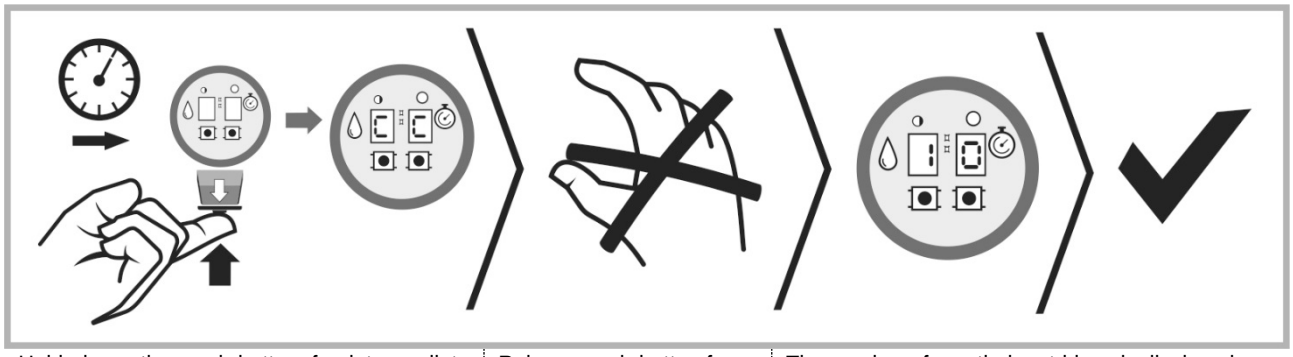


Hold down the **left** control key and the push-button for intermediate lubrication until "C" appears in the left segment of the display.	Press the push-button for intermediate lubrication as often as required until the desired setting is reached.	The control saves the setting automatically; no further confirmation is necessary.

Setting	Filling quantity
C0	350 g
C1	400 g (Standard)
C2	450 g
C3	500 g
C4	550 g

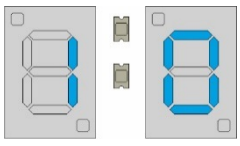
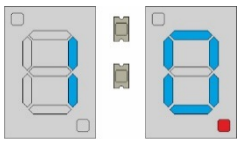
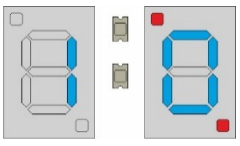
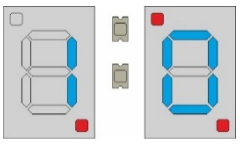
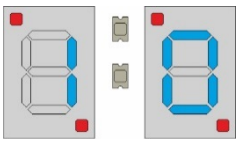
11.7 Operating hours counter

The device has an integrated operating hours counter which indicates the operating time of the device in emptied cartridges (400g).



Hold down the push-button for intermediate lubrication until "CC" appears.	Release push-button for intermediate lubrication and wait until display changes	The number of emptied cartridges is displayed

* see also chapter 10.2.1 "Display sequence of the push-button for intermediate lubrication"

Display and evaluation				
				
10** cartridges	10** +1 x 100 = 110 cartridges	10** + 2 x 100 = 210 cartridges*	10** + 3 x 100 = 310 cartridges*	10** + 4 x 100 = 410 cartridges

** Example

12. 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!

12.1 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.

12.2 Change of lubricant and cartridge

Caution! Always observe **cleanliness** when **changing** the **cartridge**!

- Check the level regularly, if necessary insert a new cartridge as described in chapter 9.”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 (see also lubricant release list FFG_002_ZEPTO)!
- 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!

12.3 Change of the non-return valve

When aggressive lubricants are used, it can happen that the seal in the non-return valve of the pump element wears faster and becomes leaky. The device no longer builds up pressure.
In this case, the non-return valve can be changed using an assembly kit (see chapter 17. “Spare parts”).
The relevant manual for changing the non-return valve is included in the assembly kit.

13. Shutdown

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

14. 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 and the cartridges must be done properly and professionally and according to the national and international laws and regulations.

15. Troubleshooting

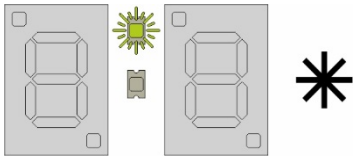
Malfunction	Possible cause	Possible remedy
Device does not aspire	Lubricant level too low	Insert new cartridge and ventilate device
	Lubricant cannot be conveyor	Use lubricant with correct viscosity
Supply interrupts but drive is ok	Wear on the non-return valve in the pump element	Change non-return valve (see chapter 12.3 “Change of the non-return valve” and 17. “Spare parts”)
	Cartridge connection leaky	Retighten cartridge, possibly change sealing washer or cartridge
	Lubricant level too low	Insert new cartridge and ventilate device
Device supplies without or with low pressure	Wear on the non-return valve in the pump element	Change non-return valve (see chapter 12.3 “Change of the non-return valve” and 17. “Spare parts”)
	Heavy wear on the device	Renew device
	Pressure limiting valve does not close	Exchange pressure limiting valve
Device is too noisy	Device defective	Renew device

15.1 Signal displays of the control

Notice!

The device signals a malfunction when the errors E1 to E5 are displayed.
With the errors E1, E2, E3 and E4, the signal display goes out automatically after eliminating the cause of error.
The error E5 must be reset as described in chapter 15.2 “Resetting the error E5”.
In general, an intermediate lubrication should be triggered after eliminating any cause of error in order to test the faultless function of the device (see also chapter 10.2 “Intermediate lubrication”).

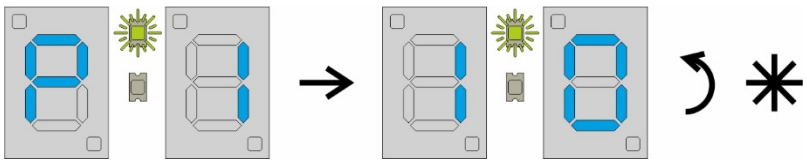
Device active



o The device is operational

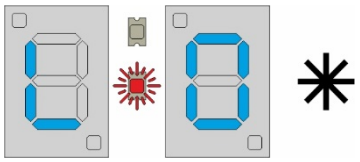
Device operates

Display sequence:



o The device performs a lubrication

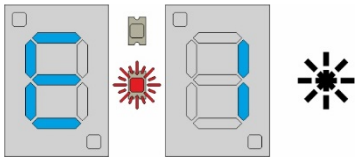
Level prewarning



(permanent display)

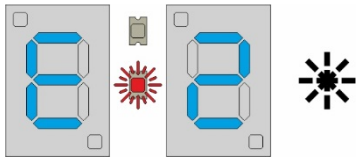
- The inserted cartridge becomes empty
  - ► Insert new cartridge and reset level prewarning (see chapter 11.5 “Level prewarning”)

Motor error



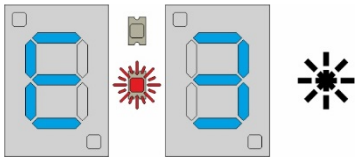
- The motor or the control in the device is defective
  - ► Renew device

Overvoltage error



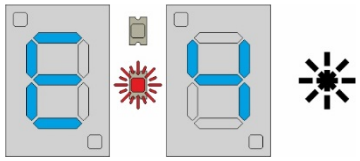
- The supplied operating voltage is too high (> 30 V)
  - ► Lower operating voltage

Undervoltage error



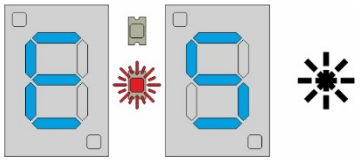
- The supplied operating voltage is too low (< 9 V)
  - ► Raise operating voltage

Temperature error



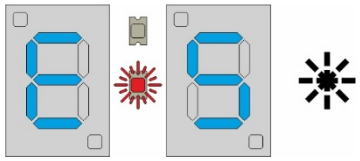
- The device is operated outside the indicated temperature range
  - ► Heat or cool the device

Overpressure error (program P2)



- Program P2 is active and the device receives a signal because no sensor is connected or the connected sensor is defective
  - ► Connect the sensor or check the connected sensor and renew it if necessary
- Program P2 is active and the device receives a signal because the pressure in the system has exceeded 290 bar and the pressure limiting valve has opened
  - ► Check system for blockades and leakages and eliminate them

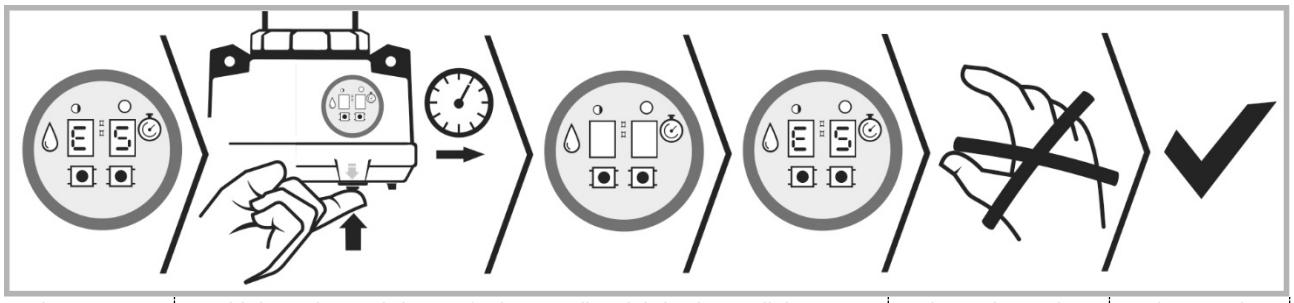
Pulse error (program P3)



- Program P3 is active, but the device receives no pulse signal because no sensor is connected or the connected sensor is defective
  - ► Connect the sensor or check the connected sensor and renew it if necessary
- Program P3 is active, but the device receives no pulse signal because there is a blockade in the lubrication system
  - ► Check system for blockades and leakages and eliminate them

15.2 Resetting the error E5

The error E5 must be reset after eliminating the cause of error as described below:



The error E5 is displayed	Hold down the push-button for intermediate lubrication until the error disappears and reappears.	Then release the push-button for intermediate lubrication	The error is reset

Notice!

The error cannot be reset if the push-button for intermediate lubrication is not pushed long enough or too long.

15.3 Error output on DEUTSCH plug

An external signal lamp (max. 200 mA) can be connected to PIN 4 of the DEUTSCH plug. PIN 4 switches GND / reference potential (see chapter 8.2.1 “Connection diagram of DEUTSCH plug male”). The occurring errors are emitted at the same time as the signal displays. The emitted signal behaves like the red LED in the display of the device (LED lights up = “high”, LED flashes = toggle 1s).

16. Accessories

Cartridge adapter

Cartridge adapter type L
(for Ritter grease cartridge 400 ml)
Article no.: 10143649

Cartridge adapter type F
(for SYSTEM REINER*)
Article no.: 10143650

* SYSTEM REINER is a registered trade mark of FUCHS LUBRITECH GmbH

Cartridges

Type	Size	Lubricant filling*	Article no.
S (Lube-Shuttle®**)	400 g	without	10112270
S (Lube-Shuttle®**)	400 g	BEKA 10 BIO grease	10144250
S (Lube-Shuttle®**)	400 g	BEKA 20 UNI grease	10104365
S (Lube-Shuttle®**)	400 g	BEKA 30 LT grease	10144246

* Further lubricants are available on request.
** Lube-Shuttle® is a registered trade mark of MATO

Connection cable

Connection type	Length	Color assignment	Article no.
1x DEUTSCH plug, female, 90° angled 4-poles, open cable end	10 m	Black = supply voltage of pump 12 V DC / 24 V DC Brown = GND reference potential Green = intermediate lubrication / release external Yellow = error output / lamp (max. 200 mA) / GND switching	10144658
1x plug M12x1, 90° angled 4-poles, open cable end	10 m	Brown = sensor supply 12 V DC / 24 V DC White = not assigned Blue = GND reference potential Black = input pulse sensor / micro switch on PLV	10122207

Ventilation element and fitting

Ventilation element
Article no.: 10143709

Adjustable L fitting
Article no.: 10105629

17. Spare parts

Assembly kit for non-return valve

Article no.: 10145292
consisting of:

- Disassembly tool
- Non-return valve
- Manual “Changing the non-return valve”

Cartridge pipe (protective housing)

Article no.: 10139909

Nut

Article no.:10140006

Inspection glass

Article no.: 10146925

18. Dimensional drawing