WITTENSTEIN | alpha

Operating Manual

Lubricator

LUC+ 125, 24V, pulse-controlled

1000088472

Revision: 03

Sales department

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Table of Contents

1. General information about this operating manual

This manual contains all the information required to use the lubricator LUC+125 FLEXXPump1 - N) in the 24V version, pulse-controlled - hereinafter referred to as LUC+125 - safely and as intended. In the event that supplementary sheets are attached to this manual, the information and specifications contained in the supplementary sheets are valid and replace the corresponding specifications in this operating manual. Any contradictory information in this manual is therefore invalid. If you have any questions about special applications, please contact WITTENSTEIN alpha.

The actual operator must guarantee and ensure that this manual including any supplementary sheets is read and understood by all persons assigned to install, operate, or maintain the LUC+125. For this reason, keep this manual in a suitable and ideally accessible location near the LUC+125. Inform colleagues who work in the area around the machine about the safety instructions so that no one sustains injuries.
The original operating manual was prepared in German, all other language versions are translations of the original operating manual.

1.1. Signal words

DANGER	This signal word indicates an imminent danger that will cause serious injuries or even death if not avoided.
WARNING	This signal word indicates a potential danger that could cause serious injuries if not avoided.
CAUTION	This signal word indicates a potential danger that could cause minor or serious injuries if not avoided.
NOTICE	This signal word indicates a potential danger that could result in material damage.
INFO	This signal word indicates practical application tips or especially important information for handling the device.

The design of the signal boxes is based on ANSI Z535.

1.2. Safety symbols

The following safety symbols are used in this manual to indicate dangers, things that are forbidden and important information:

		
GENERAL DANGER	***ELECTRIC VOLTAGE***	***SUBSTANCES THAT REPRESENT A FIRE RISK***

1.3. Structure of the safety instructions

The safety information in this operating manual are structured as follows:

CAUTION

The text explains the procedures and consequences of ignoring these instructions.

➔ The following text gives direct instructions on what to do!

2. Safety

This operating manual, especially the safety instructions and the rules and regulations valid for the operating site, must be observed by all persons working with the LUC⁺125.
Generally applicable rules and regulations as well as relevant rules and regulations for accident prevention (e.g. personal protective equipment - PPE) and rules for environmental protection must be observed.

2.1. EC/EU Directive

Within the scope of the EC/EU Machinery Directive, (re-)commissioning of a machine on which the LUC⁺125 has been installed and/or removed is prohibited until it has been clearly established that this machine complies with the provisions of the applicable directive.
An EC/EU Declaration of Conformity for this device can be found at the end of the operating manual.

2.2. Dangers

To avoid danger to the user or damage to the machine on which the LUC⁺125 is used, the LUC⁺125 may only be used for its intended purpose and in a technically safe condition.
Always read the general safety instructions before starting work.

2.3. Personnel

Only technicians who have read and understood this operating manual may perform work on the LUC⁺125.
Local and/or company regulations apply accordingly.

2.4. Reasonably foreseeable misuse

Any usage of the LUC⁺125 that exceeds the maximum permitted technical data is generally considered impermissible and therefore not in accordance with its intended use and is therefore prohibited.

2.5. Intended use

For the intended use of the LUC⁺125, the following points must be observed:

- The LUC⁺125 is approved for industrial use only.
- The LUC⁺125 may only be used in accordance with the technical data.
- Unauthorized structural changes to the LUC⁺125 are not permitted.
- The operating manual is to be read and acted upon.
- During operation of the LUC⁺125, regular visual inspections must be carried out on the device itself as well as on the lubrication point. Any irregularities and their cause must be corrected immediately.
- The cartridge must not be refilled. Refilling can lead to malfunctions due to air bubbles in the lubricant!
- Opening or disassembling the LUC⁺125 is not permitted.
- Only lubricants which are approved by the manufacturer may be used.
- Applicable rules and regulations on occupational safety, prevention of accidents and environmental protection must be observed.
- Any work and activities with or on the LUC⁺125 may only be carried out with appropriate authorization.

Any use other than the previously described intended use or non-compliance with one of the points specified above is regarded as misuse. In this case, no liability and/or warranty claims will be accepted.

2.6. Guarantee and liability

Any guarantee and liability claims are excluded for personal injury and/or material damage in case of:

- ignoring the information on transport and storage
- misuse
- improper or non-executed maintenance and repair
- improper assembly / disassembly or improper operation
- operation of the LUC⁺125 with defective protective devices or mountings
- operation of the LUC⁺125 without lubricant or non-approved lubricants
- operation of the LUC⁺125 with refilled cartridges
- operation of the LUC⁺125 outside the data of the technical specification
- operation of the LUC⁺125 in unusually dirty environments
- conversions or modifications made without the written consent of WITTENSTEIN alpha GmbH
- opening and/or partly or complete disassembling of the LUC⁺125

2.7. General safety instructions

DANGER

Defective or faulty electrical connections or unauthorized live components can lead to serious injury or even death.

➔ Have electrical connection work performed by authorized qualified technicians only. Immediately replace damaged cables or plugs.

NOTICE

Loose or overloaded screw connections can cause damage to the LUC⁺125.

➔ Mount and check all screw connections according to the admissible tightening torques. Use a calibrated torque wrench.

WARNING

Lubricants are flammable.

➔ Do not use water to extinguish fires. Only use suitable extinguishing agents such as powder, foam or carbon dioxide.

➔ Observe the relevant instructions of the lubricant manufacturer on the respective safety data sheet.

CAUTION

Lubricants can cause skin irritations.

➔ Avoid direct skin contact.

NOTICE

Lubricants can pollute the soil and water.

➔ Use and dispose of lubricants properly.

3. Function description

3.1. General information

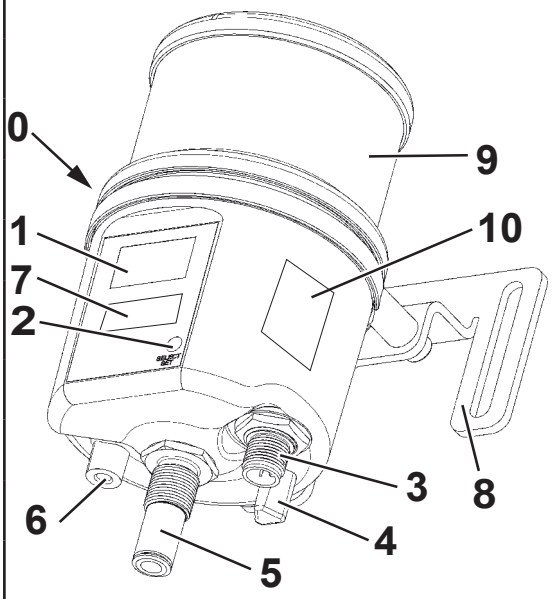


Fig. 1: Overview of the lubricator

No.	Designation
0	LUC⁺125 drive unit, 24V, pulse-controlled
1	OLED display
2	Action field (for the operating pen with magnet)
3	M12x1 plug for communication and power supply
4	Operating pen with magnet
5	Lubricant outlet (external thread G 1/4" / internal thread M6) with pre-assembled hose connection
6	M5 - internal thread for assembly from below
7	Sales name plate
8	Assembly bracket
9	Exchange cartridge
10	Manufacturer's name plate with serial number, designation and CE mark

The lubricator is designed as a highly compact piston pump for "grease" as lubricant. The outlet is secured by an integrated check valve. Approx. 0.15 cm³ of lubricant is delivered with each lubrication stroke; several lubrication strokes in succession can be set.
The various operating statuses are shown on the front display; further information (fill level, empty cartridge, maximum counterpressure, errors) can be read off.
The 24 VDC version of the LUC⁺125 has an electric interface with an M12x1 plug. The 24 VDC power supply and the communication are realized via this interface. The number of lubrication strokes and the output signal can be set via the supplied magnetic pen.

3.2. Name plate and labeling

The name plates of the LUC+125 are visibly attached to the front and side of the pump itself.
The designation, material number, CE mark and the serial number of the LUC+125 are visible there.
Please refer to Fig. 1 for the position of the name plate and the serial number.

3.3. Technical data

Housing	Data	
Dimensions without cartridge	83 x 82 x 85 (W x H x D)	dimensions in mm
Dimensions with 125 ml cartridge	83 x 149 x 85 (W x H x D)	dimensions in mm
Dimensions with 250 ml cartridge	83 x 185 x 85 (W x H x D)	dimensions in mm
Weight (drive without cartridge)	Approx. 350 g	
Assembly options	Rear (2 x M5), max. tightening torque 3 Nm Bottom (1 x M5) and 1 external thread G 1/4"	
Housing materials	PA 6.6 GF30 / POM	
Outlet material	Stainless steel	
Operating temperature	-20 °C ... +70° C (low-temperature suitability always depends on the lubricant used)	
Preferred mounting position	Vertical (cartridge at the top, drive at the bottom)	
Protection class	IP 54	

Lubricant, hydraulics, electrics	Data
Volume of the cartridges	125 ml / 250 ml
Limits of lubricant application	Oils up to 1000 cSt/ 40°C, greases up to NLGI class 2
Number of outlets	1
Hydraulic connection	PA hoses with 6 mm outer diameter
Maximum number of lubrication points	1 ... 14 (with progressive distributors)
Maximum pressure build-up	50 bar (adjustable 12 bar, 35 bar)
Dispensing volume per stroke	0.15 cm³ (+ / - 10%)
Display	OLED display with screen saver function
Operating voltage	+20 VDC ... +28 VDC (nominally 24 VDC)
Power consumption	I_{max} < 0.3 A (typical < 0.2 A), I_{idle} < 0.02 A
Recommended protection	0.75 A (slow-blow fuse)

CAD data (STEP) and the corresponding dimension sheets are available on request.
The **Dimensions** can be found
- in our catalog
- at www.wittenstein-alpha.de

3.4. Hose lengths

It is generally recommended to assemble the lubricator as close as possible to the lubrication point. Ideally, assembly should take place directly at the lubrication point.
In cases where direct assembly at the lubrication point is not possible for space reasons, hoses can also be used between the lubricator and the lubrication point.
The maximum hose length depends on the lubricant used, the ambient temperature, the hose used (recommendation: hose with an outer diameter of 6 mm and an inner diameter of 4 mm) and the resistance of the lubrication point itself. A hose length of 5 m should not be exceeded.

3.5. Scope of delivery

The lubricator is available in different variants. These differ in terms of the version, the lubricant filled in and the range of accessories supplied. The coding of the variants is shown in chapter 3.7.

3.6. Lubricants

Only use lubricants approved by **WITTENSTEIN alpha GmbH** in dedicated original cartridges exclusively developed for the lubricator.

NOTICE

The lubricant used differs depending on the application.

➔ The respective designation can be found on the label of the cartridge.

For further information about lubricants, documentation and safety data sheets, please contact **WITTENSTEIN alpha GmbH**.

3.7. Ordering code

LUC+ 125-05 1 1-05

Version
LUC+ = Electro-mechanical lubricator, complete set

Size (lubricant volume)
125 = 125 cm³
250 = 250 cm³

Lubricant
05 = WITTENSTEIN alpha G11
06 = WITTENSTEIN alpha G12
07 = WITTENSTEIN alpha G13

Pump variants
1 = 1 pump, 1 outlet

Hose length per connection
00 = No hose
02 = 2000 mm
05 = 5000 mm

Functional system
1 = 24V, pulse-controlled (Manual doc. no. 1000088472)
2 = 24V, time-controlled (Manual doc. no. 1000088471)
3 = Battery version, time-controlled (Manual doc. no. 1000088470)
4 = Battery version, time-controlled, 12 bar pressure-reduced (Manual doc. no. 1000088470)

4. Transport and storage

4.1. Packaging

The LUC⁺125 is delivered in outer packaging (cardboard box) and – depending on the scope of delivery, with a lubricant cartridge and other accessories – in the same bundle. For protection against humidity and dirt, it is additionally packaged in PE foil. Dispose of the packaging materials at the recycling sites designated for this purpose in compliance with applicable national and operational regulations. After receipt of the LUC⁺125, check the completeness of the delivery against the delivery note. Immediately notify the carrier, the insurance company, or WITTENSTEIN alpha in writing of any potentially missing parts or damage.

4.2. Transport

NOTICE

Hard knocks, e.g. due to falling or hard dropping, can damage the LUC⁺125.

- ➔ Do not throw the LUC⁺125 (not even with the outer carton).
- ➔ When using lifting equipment, ensure proper handling. The permissible lifting force of the lifting equipment must not be exceeded.

4.3. Storage

Store the LUC⁺125 in its original packaging in a vertical position in a dry, frost-free environment at an ambient temperature of –20°C bis +40°C. The maximum storage period in unopened condition is 2 years.
For storage logistics, the "First-In-First-Out principle" (FiFo) is recommended.

5. Assembly

The lubricator is supplied to you with the lubricant cartridge inserted and vented as a ready-to-install component with assembly bracket and hose connection fitted. The outlet is sealed with a yellow cap. The provided hose lines have already been prefilled with the respective lubricant.

5.1. Preparations

Before starting work, inform yourself in detail about the LUC⁺125 using this operating manual; in particular about the general safety instructions (chapter 2.7).
Thoroughly prepare the assembly location.

NOTICE

Compressed air can lead to damage to the seals of the LUC⁺125 and/or to contamination of the LUC⁺125 or lubricant by dirt and particles.

- ➔ Do not use compressed air for cleaning.
- ➔ Make sure that the assembly location is not heavily contaminated.

5.2. Mechanical assembly

NOTICE

The threadlocker used can be dangerous when used directly.

- ➔ Observe the safety and processing instructions for the threadlocker used.

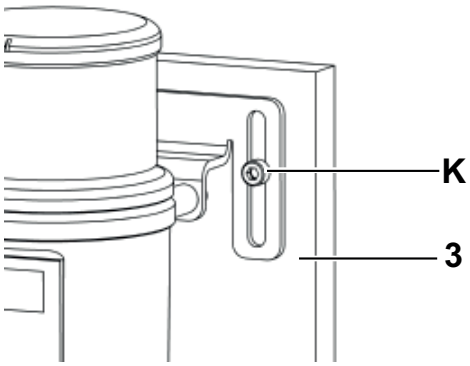


Fig. 2: Fastening

- Apply threadlocker (e.g. LOCTITE® 243) to the fastening screws [K].
- Install the lubricator with the pre-assembled assembly brackets [3] at the intended position. The slotted holes enable fine adjustment of the installation height.

ⓘ The prescribed screw sizes and tightening torques can be found in the table "Tbl - 3".

Hole spacing [mm]	Quantity x diameter [ ] x [mm]	For screw size / property class	Tightening torque [Nm]
95	2 x 6.6	M6 / 8.8	9.0

Tbl - 3: Through-holes in the assembly bracket

5.3. Connection of the prefilled hose

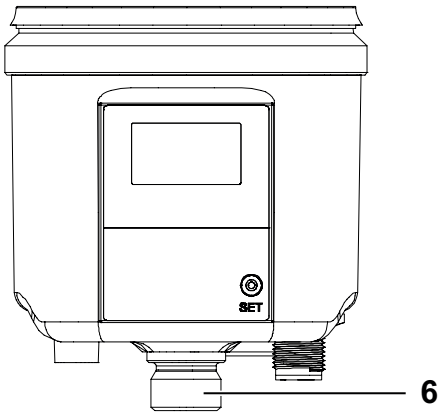


Fig. 3: Hose assembly

- Remove the yellow closing cap.
- Screw in the provided hose connection [6].

ⓘ Max. tightening torque 2 Nm.

- Establish the hydraulic connection between the consumer and the lubricator [6]. Ensure that hoses and connection elements are tight and properly assembled.

ⓘ If possible, use hoses prefilled with the appropriate lubricant from the scope of delivery.

ⓘ Further important instructions on how to connect the hose can be found in the separate manual "Prefilled high pressure hose" (doc. no. 2098-D072334). The manual is included in the scope of delivery of the hose or is available on request from **WITTENSTEIN alpha GmbH**. Always state the material number.

5.4. Electrical connection

DANGER

Defective or faulty electrical connections or unauthorized live components can lead to serious injury or even death.

➔ Have electrical connection work performed by authorized qualified technicians only.
➔ Immediately replace damaged cables or plugs.
➔ Observe the five safety rules of electrical engineering before starting electrical installations:
  - Switch off the power supply
  - Secure against unintended reactivation
  - Ensure that there is no voltage
  - Ground and short-circuit
  - Cover neighboring live parts

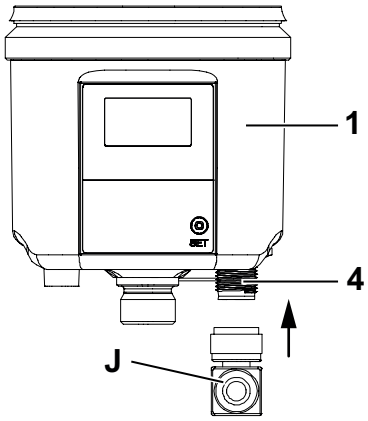


Fig. 4: Cable connection

- Connect the lubricator [1] to the external power supply or control system with a suitable connection cable [J] via the M12x1 interface [4] at the bottom of the lubricator.

ⓘ Depending on the application, connection cables with a straight or an angled socket can be used.

ⓘ For the properties of the connection cable, please refer to chapter 8.1 "Pin assignment M12x1 plug".

6. Startup and operation

- Read the general safety instructions before starting work (see chapter 2.7 - "General safety instructions").
- Make sure that the lubricator is properly and fully assembled. In particular, the power supply must be connected, and a lubricant cartridge must be screwed on.

6.1. General information

- This lubricator is designed as a single-point lubricator for a single lubrication point. Depending on the specific application, however, the device can also reliably supply a limited number of lubricant points with lubricant by connecting lubricant distributors (e.g. splitters and progressive distributors). Changes may need to be made to the lubricator settings to ensure safe and reliable operation.
- The lubricator is a lubricator controlled in "pulse mode", which must be connected to a control system (PLC), commanded and controlled.
- The single-use changeable cartridges with a lubricant capacity of 125 cm³ / 250 cm³ ensure controlled and consistent quality of lubricants. Filling is completely free of air and bubbles.
- The lubricator ensures a high level of supply reliability to the lubrication points and prevents downtime of machinery.
- This version of the lubricator is designed for the lubricant grease.
- The lubricator cannot be used without an external power supply of 24 VDC.
- The lubricant cartridge is included in the scope of delivery and is already properly fitted and vented.
- The respective operating states of the lubricator are visible on the integrated OLED (graphic display) at all times after connecting the supply voltage.
- The use of cartridges of a different size requires consultation with **WITTENSTEIN alpha GmbH**.
- In case of any questions regarding your specific applications and the correct settings for the lubricator, please contact **WITTENSTEIN alpha GmbH**.

6.2. Factory settings

Parameter	Designation	Factory setting	Result
c	Strokes (dispensing strokes per dispensing interval)	1	1 dispensing stroke per pulse
P	Pressure Pmax (bar)	50	Maximum pressure build-up 50 bar
Mode	Pulse mode	Pulse	Lubricator operates in pulse mode
V	Volume V, cartridge size	125	125 cm³ cartridge installed
Language	Language	English	English language in OLED
E	Error level	LOW	Output of an error via a LOW signal at PIN 4
Empty	Display of the empty status of the cartridge	LOW	Output of a LOW signal when the cartridge is empty
Motor run	Motor run signal	LOW	A LOW signal is output during the dispensing stroke (motor run).

The parameters P, mode, volume, error level, empty signal and motor run signal may only be changed after consultation. If you have any questions, please contact **WITTENSTEIN alpha GmbH** Sales / Customer Service.

6.3. Basic settings of the pulse mode

In pulse mode, the lubricator can be integrated into a machine control system (PLC). The PLC can send commands to the lubricator and control the responses. Depending on the requirements of the lubrication point, the lubricator is given signals by the PLC to carry out one or more dispensing strokes (one dispensing stroke = 0.15 cm³). After receiving the signals, the lubricator delivers a corresponding amount of lubricant.

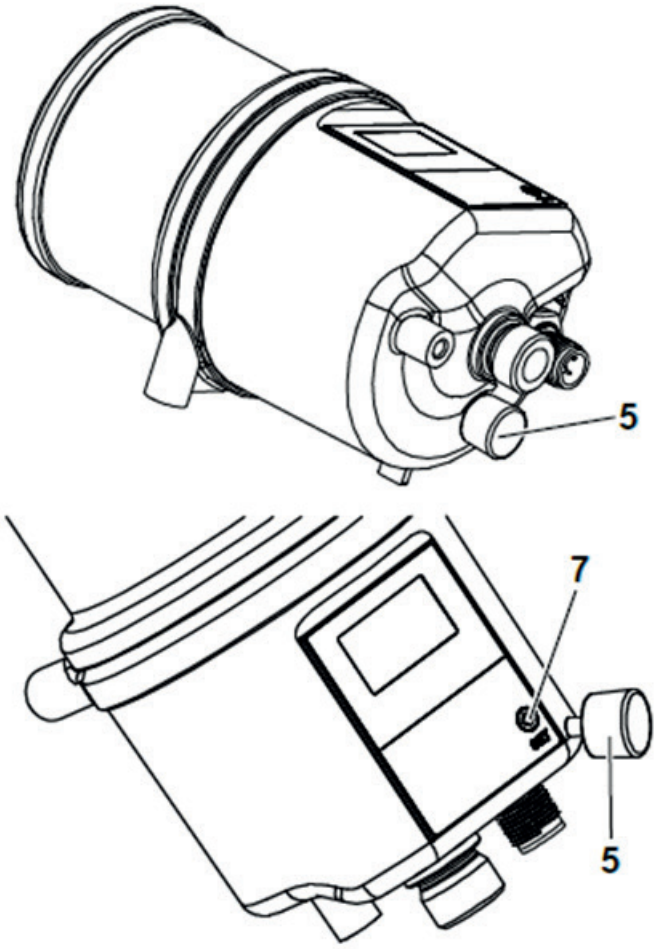
INFO

To use the lubricator, it must be properly assembled, installed and connected.

- ➔ Ensure that the lubricator is securely assembled and connected in accordance with the instructions in chapter 5.
- ➔ If you purchase or have purchased a special version of the lubricator from the factory, the information on the enclosed sheet is authoritative!

6.4. Actions with the magnetic pen

The magnetic pen attached to the bottom of the lubricator allows to perform actions and changes of settings on the lubricator. This magnetic pen can be stored permanently and securely on the underside of the device (figure 6).



- Remove the magnetic pen [5] from the bottom of the lubricator.

The magnetic pen is permanently held magnetically in the receptacle on the bottom. Simply pull it out!

- Guide the magnetic pen [5] onto the action field [7] labeled "SET" at the front of the lubricator.
- Once the magnetic pen has been recognized, the OLED will display this symbol:

- The menu scrolls through the various menus automatically when the magnetic pen is actuated.
- Remove the magnetic pen at the desired menu item.

Fig. 6: Magnetic pen, actuation

After having performed the desired action or setting, insert the magnetic pen back into the receptacle provided on the bottom of the lubricator.

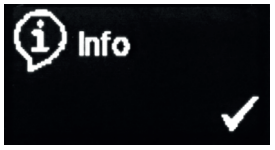
Basic operation with the magnetic pen

The lubricator is always operated with the magnetic pen.
Touching the action field [7] shown in Fig. 6 with the magnetic pen [5] activates the electronics, which is then indicated by a symbol of the action field on the display.
The example shown here of the activation of the device from the switched-off state (OFF) to the information display illustrates the procedure for activating a function.

Activation by the magnetic pen

Hold the magnetic pen on the action field

the display automatically switches to the next menu!



Remove the magnetic pen

a tick appears as confirmation and is executed after flashing twice:

6.5. Operation and messages on the display

The display (graphic OLED) of the lubricator can be used to read information and to make changes to the settings using the magnetic pen. All changes to the settings are retained even after switching off or disconnecting the power supply.
All individual menu structures are explained in the following chapters.
The lubricator is supplied in the switched-off state (OFF). By activation with the magnetic pen (see chapter 6.4), an info menu can be activated and the device can be switched on. The basic procedure is shown in figure 7.

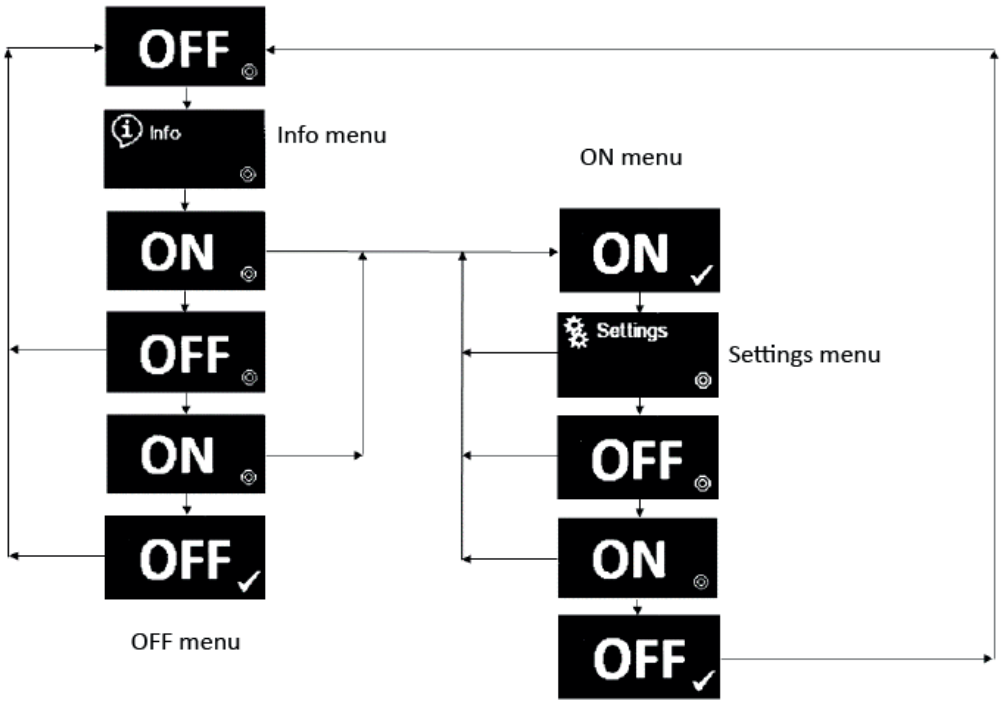


Fig. 7: Menu navigation procedure

The various menus can generally be accessed from this main menu.

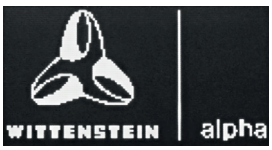
The following items can be accessed from OFF mode:
- ON menu
- Info menu

The following items can be accessed from ON mode:
- Settings menu
- OFF menu

These different menus are described individually in the following chapters.

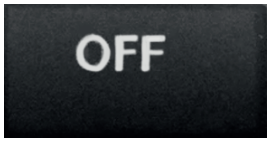
6.6. OFF menu

The lubricator is always supplied in the switched-off state (OFF mode).
If the supply voltage is not connected, nothing can be seen on the display.



After the supply voltage 24 VDC has been applied, the company logo appears on the display for a brief moment.

"OFF" then appears on the display, indicating that the device is switched off.



After 20 seconds of inactivity, the screen saver is activated on the display.
The respective mode is reduced in size and displayed darker. In addition, the smaller display "moves" from left to right.

If the magnetic pen is now held against the action field, OFF appears again in the normal size of the operating status together with the symbol for the action field (actuation active).

If the magnetic pen is still held against the action field, the next menu item automatically appears. After OFF, "Info" appears.
The Info menu can now be accessed by removing the magnetic pen.
Reference to the Info menu

If the magnetic pen is still held on the action field, "ON" appears automatically after "Info". It is now possible to switch the device on by removing the magnetic pen (ON menu).
Reference to the ON menu

If the magnetic pen is still held on the action field, "OFF" appears again.

If the magnetic pen is then removed from the action field, the lubricator remains switched off in the OFF menu.

Reference to the INFO menu

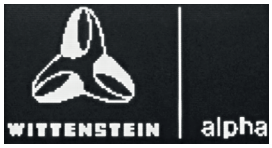
After removing the magnetic pen, the menu becomes active.
The Info menu is described in chapter 6.6.

Reference to the ON menu

After removing the magnetic pen, the mode becomes active.
The ON menu is described in chapter 6.8.

6.7. Info menu

The Info menu is accessed by removing the magnetic pen when "Info" is displayed in the OFF menu. An automatic process then takes place!
All relevant information on the current setting of the software for controlling the lubricator is displayed in the menu. No changes can be made to any of the parameters!



The first screen shows the company logo of the company that placed this device on the market: **WITTENSTEIN alpha GmbH.**

This information means:
The latest N13 software is installed on the device as firmware.

This information means:
Pulse mode is currently activated (see chapter 6.10).

This information means:
The lubricator is set for a 125 cm³ cartridge.

This information means:
The maximum pressure that the device can build up during operation is set to a maximum of 50 bar.

This information means:
The number of all the dispensing strokes already completed is displayed.
The device is practically new, it has only completed 4 dispensing strokes.

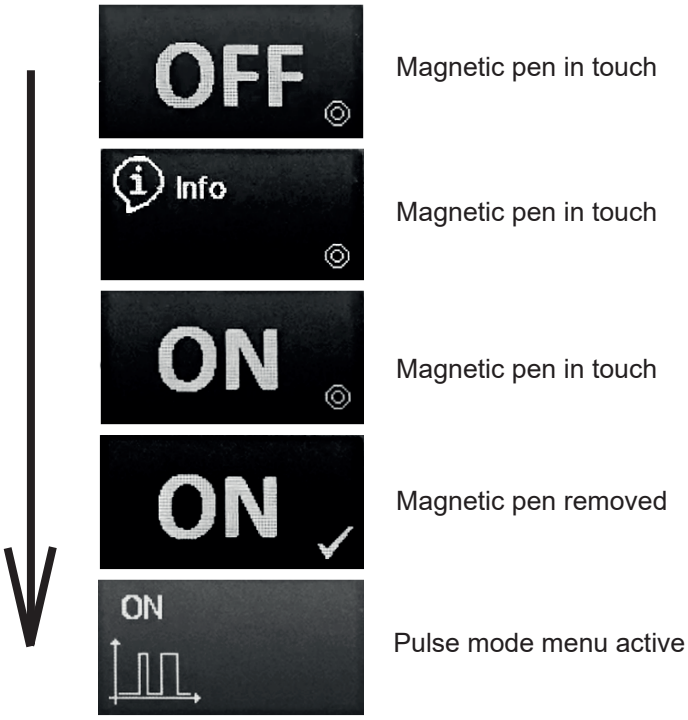
The menu jumps back to the OFF state of the lubricator to exit automatically.

Note:
The small "i" symbol is always shown in the entire Info menu for orientation purposes.
Nothing can be changed!

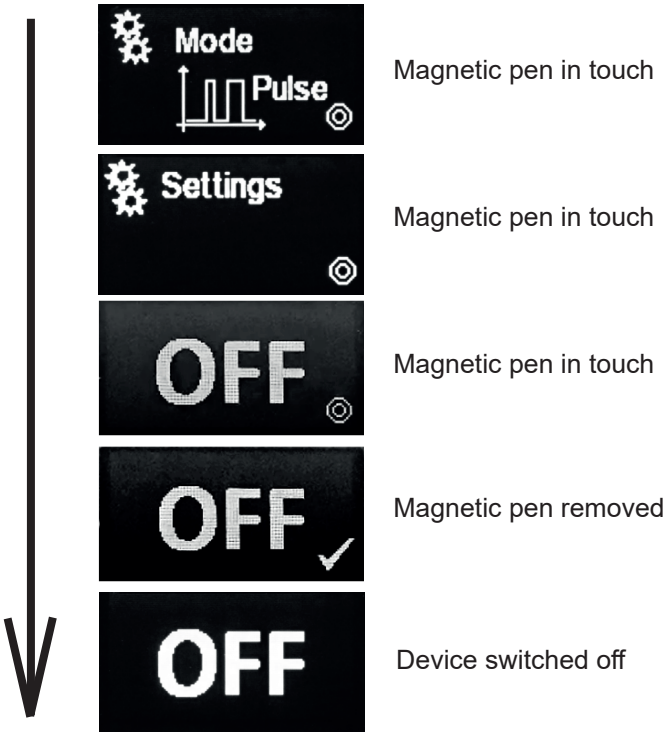
6.8. Switching the lubricator on / off

The lubricator is switched on / off with the magnetic pen [5] by removing it from its storage location underneath the device and touching the action field [7] - see figure 8.
The menu is switched on / activated by touching the action field with the magnetic pen.

Switching on



Switching off



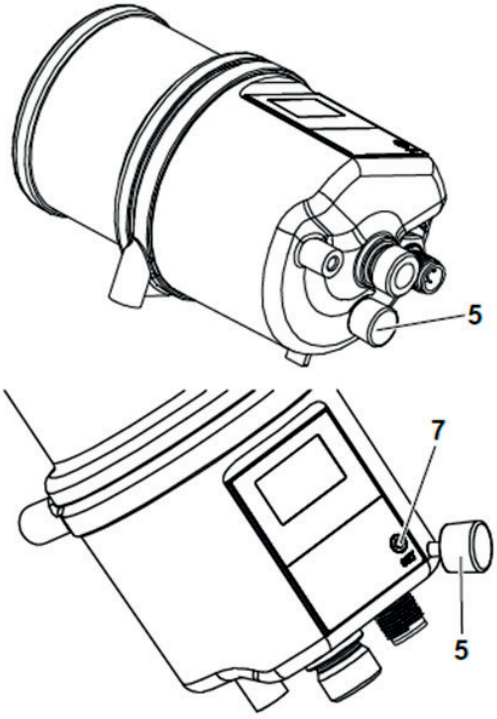


Fig. 8: Actuation

6.9. ON menu

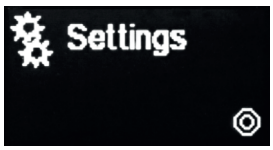
The lubricator can be switched on by removing the magnetic pen at "ON" in the OFF menu (chapter 6.6).

"ON" is immediately displayed together with the set mode of the device.
Pulse mode is active here.
The lubricator is now switched on!

After about 20 seconds, the display switches to the screen saver. In ON mode, the fill level of the cartridge is then shown in small and slightly darker letters on the display (here almost full: 99%).
The small display of the fill level moves from left to right.

By touching the action field with the magnetic pen, the "ON" appears in the ON menu with the set mode (here pulse mode).

If the magnetic pen is not removed from the action field, the entire menu runs automatically until it is restarted (ON).



The next option is to access the "Settings" menu.
The various settings can be changed in this menu (see chapter 6.10).

It is now possible to switch the device off again.

The process automatically switches back to "ON" if switching off the device was not intended.

After removing the magnet:
The device is now switched on again (ON).

6.10. "Settings" menu

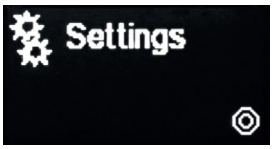
The menu for setting the parameters of the lubricator is opened by activating after the pulse mode has been displayed in the ON menu.

Changing these setting parameters has a significant influence on the result of automatic relubrication and must be carried out with the utmost care!

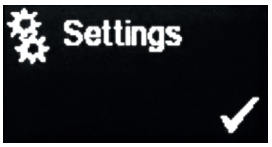
WARNING

Incorrect settings can lead to damage to machines or systems.

- Carefully determine the required lubricant quantity before selecting the settings.
- Then set the correct lubrication intervals on the control system (PLC).
- Regularly check the settings you have selected at the lubrication points. Excessive or insufficient lubrication must be avoided.



The "Settings" menu is accessed from the ON menu.
After the Pulse mode menu item, "Settings" appears.



After removing the magnetic pen from the action field, the "confirmation tick" appears and the menu is activated.

The first selection option in the settings is the language. The default setting is "English". This means that all words used for explanation appear on the display in English (exception: language ... is always retained).
Setting option: English, Italian, German

The second setting option is the number of dispensing strokes c after a certain pause time has elapsed. The default setting here is strokes c = 1.
The figure shows the selection c = 4 strokes.

The next setting option (special options) relates to a total of three different settings with regard to the communication (electrical output of the lubricator) with a connected control system.
Since the adjustment has a direct effect on the monitoring and thus on the safety of the device, it is shown separately.

The menu navigation ends with the automatic return to the respective ON mode (in this case the pulse setting).

6.10.1. "Settings" menu - dispensing strokes

The number of dispensing strokes c per lubrication cycle indicates how many strokes are carried out per lubrication cycle. A single dispensing stroke always delivers 0.15 cm³ of grease to the lubrication point.

Number of cycles c	1	2	3	4	5	6	7	8	9	10
Lubrication quantity per cycle [cm³]	0.15	0.3	0.45	0.6	0.75	0.9	1.05	1.20	1.35	1.5

Number of cycles c, strokes per cycle

6.10.2. "Settings" menu - special options

Selecting Show special options "Yes" enables a total of three setting options for communication:
1. Change of the output signal for error E
2. Change of the output signal when empty
3. Change of the output signal during a motor run

1. Change of the output signal in the event of an error message E

The factory setting of the error output is a LOW signal on PIN 4 (plug output). When functioning correctly, the device emits a HIGH signal to the output.
This logic of the output signals can be completely swapped (inverted) with this option. If the error signal E is inverted (see point 1) to error E = HIGH, the output signal for the motor run is also inverted (LOW for the motor run becomes HIGH)!

2. Change of the output signal when empty

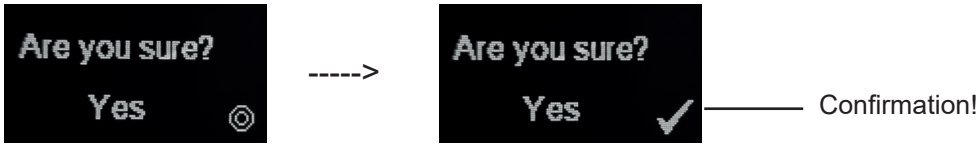
The factory setting for the error output when the cartridge is empty is a 0.5 Hz signal on PIN 4 (output of the plug).
If a distinction from the signal for error E is not desired, the output level can be switched to a LOW signal.
This means that it is not possible to clearly distinguish between an error and the cartridge being empty.

3. Change of the output signal during a motor run (dispensing stroke)

The factory setting for signaling a dispensing of the lubricator sets the normal output signal from HIGH or LOW (depends on the setting - see point 1) to LOW or HIGH for the duration of the dispensing when the motor is running (dispensing). This makes it possible to check that the dispensing has been made.
If this output signal is not required, it can also be switched off. However, it is no longer possible to check a dispensing that has been made.
If the error signal E is inverted (see point 1) to error E = HIGH, the output signal for the motor run is also inverted (LOW for the motor run becomes HIGH)!

NOTICE

Each time you make a change to one of these special options, you will be asked again whether you are sure. You must actively confirm this, otherwise the change will be ineffective.

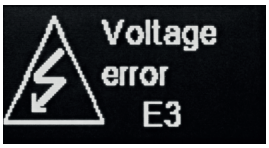


NOTICE

After each change, even of just one parameter in the "Settings" menu, a one-time confirmation of a change is made by a dispensing stroke after the menu is closed.

7. Error messages on the display

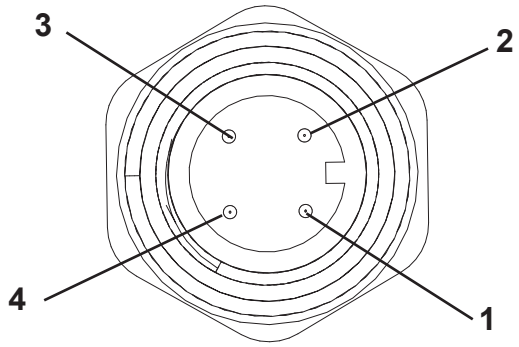
The status of the device is permanently monitored by the microelectronics integrated in the lubricator. In case of any irregularities, an addressed message is issued and shown on the display.
If the lubricator has detected an error and issues a corresponding error message for better identification of the error, no more lubricant is delivered. In addition, the screen saver changes and gives an indication of the type of error by displaying the error.
The errors must be rectified as soon as they occur. If you operate the device in "Pulse setting" mode, errors must be acknowledged with a command from the control system (PLC) and actions must be carried out. The command for acknowledging an error is a 10s HIGH command (see chapter 8.4.5).

Error symbol on the display		Meaning	Remedy
	E1	Empty cartridge	Place a new cartridge on the drive unit. The error is automatically cleared after a new cartridge has been fitted.
	E2	No cartridge fitted	Place a new cartridge on the drive unit. The error is cleared after a cartridge has been fitted.
	E3	Undervoltage/overvoltage at the drive	Switch off the voltage. Check the power supply (permissible 20...28 VDC). Switch the device back on after correction.
	E4	Motor run too short	Switch off the voltage. Switch it back on. If the error occurs again, there is a device error. The device needs to be repaired.
	E5	Motor run too long	Switch off the voltage. Switch it back on. If the error occurs again, there is a device error. The device needs to be repaired.
	E6	Internal system error	Switch off the voltage. Switch it back on. If the error occurs again, there is a device error. The device needs to be repaired.
	E7	Excessive counterpressure at the lubrication point	Switch off the voltage. Check the lubrication point and the grease supply, remove the blockage. Switch the voltage back on. Alternative: 10s HIGH command.
	E8	HIGH signal too long during pulse operation.	Check the signal length of the control. If the signal length exceeds 15 seconds, error E8 is output.

8. Connection of the lubricator

The lubricator only works as a pulse-controlled lubrication system if unchangeable input signals (HIGH signal) are transmitted in a defined order from a control system (PLC) to PIN2 of the lubricator.
The lubricator is supplied with 24 VDC via the M12x1 plug on the underside of the device. Using PIN 4 on this plug, the device sends feedback signals to the connected control system regarding the status of the lubricator.

8.1. Pin assignment M12x1 plug



PIN	Assignment	Color
1	+ 24 VDC (20...28 VDC)	Brown
2	Input signal in pulse mode	White
3	Ground (GND)	Blue
4	Output signal	Black
	Type: M12x1 plug, 4-pin A-coding	

The lubricator can be fully shut down in pulse control mode by disconnecting the supply voltage. The settings made are not lost.

INFO After a longer standstill of the lubricator, a special dispensing by sending an additional dispensing pulse is useful.

INFO The output signal at PIN 4 is intended for further processing by the external control system. The maximum permissible output current at PIN 4 must not exceed Imax < 20mA. Inductive loads (e.g. relays) must not be connected!

8.2. Output signals on pin 4 of the M12x1 plug

Condition of LUC⁺125	Output signal level (factory setting)	Comment
OFF	LOW	- Signal can be inverted, see chapter 6.10.2
ON	HIGH	- The HIGH signal is used for wire breakage monitoring, the operating voltage is switched through - Signal inversion is possible (chapter 6.10.2)
Dispensing	LOW	- A LOW signal is applied to pin 4 for the duration of the dispensing (motor run); after the dispensing has ended the signal switches back to HIGH - Signal inversion is possible (chapter 6.10.2) - A reserve message is possible (see chapter 8.3)
Empty cartridge	0.5 Hz	- The signal can also be switched, but it is no longer possible to distinguish it from the error
Error	LOW	- If an error occurs (see chapter 7), the output signal is switched from HIGH to LOW - Signal inversion is possible (chapter 6.10.2)

8.3. Use of the reserve message (low fill level)

The microelectronics integrated in the lubricator permanently monitors the status of the device and the fill level of the cartridge. The lubricator indicates on the display that the cartridge will soon be empty when it falls below approx. 18% remaining fill level. In addition, the device shows the remaining fill level in % on the display after the low level warning has been activated. This allows you to track the fill level and reorder a new cartridge in good time before the cartridge is completely empty.

"Low fill level" message on the display:

The lubricator receives this information on the fill level of the cartridge by counting the dispensing strokes after a new, full cartridge has been fitted.

NOTICE

The function of this fill level counter is only guaranteed if a new, full cartridge is fitted.

➔ Use only new original cartridges from the manufacturer.

In addition to the display indicating when the cartridge is about to run out, the output signal of the device can be used to forward the information to a control system during dispensing.
If a dispensing is made and the fill level in the cartridge falls below approx. 18%, the signal for dispensing confirmation is extended to a constant value of 17 seconds - see figure 8.

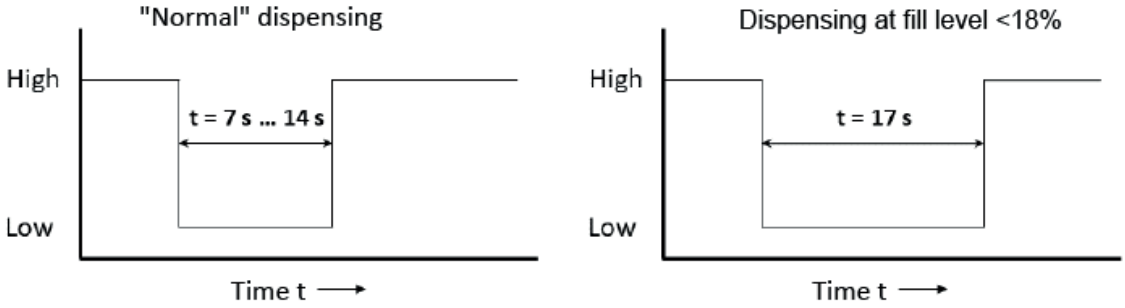


Fig. 8: Return signals during dispensing

As shown in figure 8, the dispensing time can vary depending on the load and the level of the supply voltage.
Typical times for normal dispensing are between 7 seconds (light load, low counterpressure) and 14 seconds (high counterpressure).
If the lubricator then dispenses lubricant and the counter of the dispensing strokes of a cartridge shows a value of <18%, this return signal is automatically extended to a constant value of 17 seconds.
If a connected control system evaluates not only the level of the dispensing signal but also the length of the changing signal, the lubricator informs the control system that the cartridge will soon be empty (reserve signal).

8.4. Input signals – external control system (PLC)

The lubricator can receive unchangeable input signals at PIN 2 from a control system and execute corresponding commands. These input signals must be made available as HIGH signals of a defined length at PIN 2.
The tolerance of the HIGH signals of different lengths is +/- 0.1 s. HIGH signals of a certain length with this tolerance are interpreted by the lubricator and commands are executed.
Signals with a length of >14.1 s HIGH are not interpreted and lead to an error message E8 (see chapter 7).

Signal duration	Designation	Function	Description	Chapter
2 s HIGH	Signal 2sec	1 pump stroke	Execution of a dispensing stroke	8.4.1
3 s HIGH	Signal 3sec	2 pump strokes	Execution of 2 dispensing strokes	8.4.2
4 s HIGH	Signal 4sec	c pump strokes	Execution of c dispensing strokes	8.4.3
6 s HIGH	Signal 6sec	40 pump strokes	Filling function with 40 dispensing strokes	8.4.4
10 s HIGH	Signal 10sec	Error acknowledgement	Cancel filling function, delete error	8.4.5
12 s HIGH	Signal 12sec	40 pump strokes	Filling function with 40 dispensing strokes	8.4.4

8.4.1. Signal 2 seconds (2sec)

The control signal 2sec triggers a single lubrication process (dispensing stroke). After a pause time of 22 seconds, this control signal can be repeated or another command can be sent.
The lubricator only reacts to a command in a "waiting state"; a command is ignored during the motor run.
After the motor run (dispensing stroke) has ended, a waiting time of 3 seconds should be observed until the next signal.

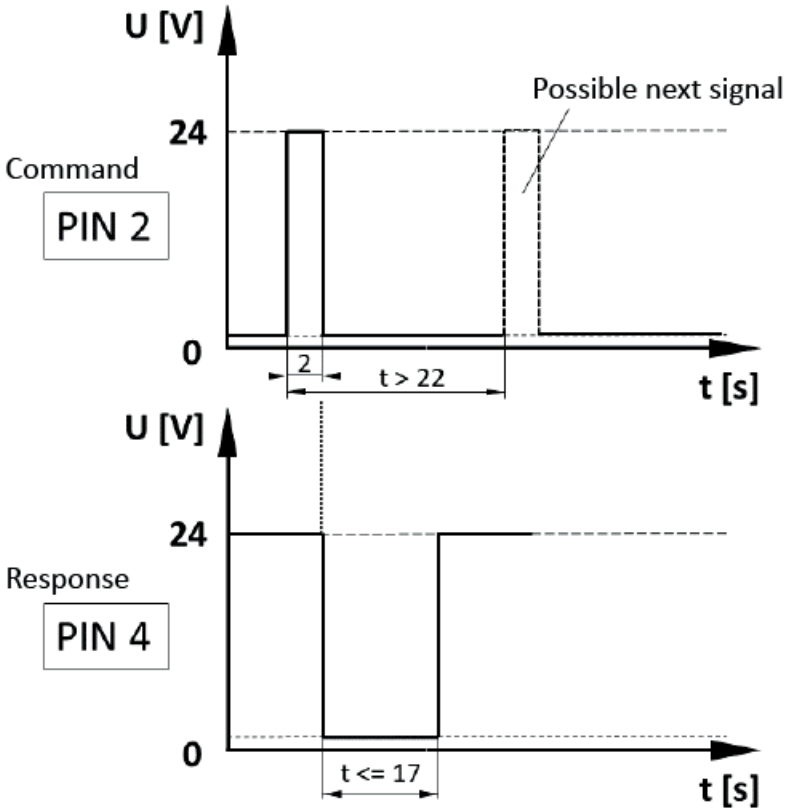


Fig. 9: Command / response on signal 2sec

The response signal (level on PIN 4) to the signal 2sec is an immediate start of the motor run for executing the dispensing stroke. The output level changes from HIGH to LOW (factory setting) or from LOW to HIGH (depending on the settings, see chapter 6.10.2) for the time of the motor run or, in the case of the reserve message, for exactly 17 seconds (see chapter 8.3).
The edge change can be used to confirm successful dispensing or can also be counted by the PLC to determine the exact fill level.
The measured counterpressure is shown on the display during motor run and the maximum counterpressure is shown at the end.
If an error is detected during dispensing, this error is shown on the display (see chapter 7) and the output signal at PIN 4 no longer returns to its original state.
This enables clear confirmation of successful dispensing of lubricant into the lubrication point or error detection.

8.4.2. Signal 3 seconds (3sec)

The control signal 3sec triggers two sequential dispensing processes. After a pause time of at least 40 seconds, this signal can be repeated, or another command can be sent.
The response signals are designed as described in chapter 8.4.1 - however, two dispensing strokes follow shortly after this signal 3sec.
The evaluation of the reserve message (17 seconds) is also possible (see chapter 8.3).

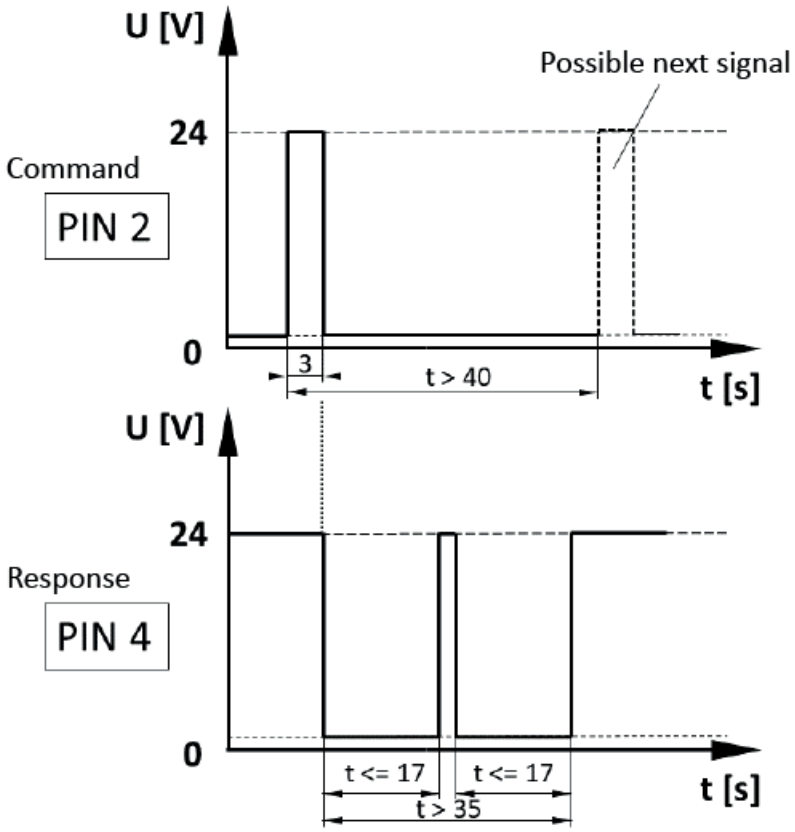


Fig. 10: Command / response on signal 3sec

8.4.3. Signal 4 seconds (4sec)

The control signal 4sec triggers a number of successive lubrication processes. The number of individual dispensing strokes depends on the setting of the value of the dispensing strokes c (see chapter 6.10.1). After a pause time of at least c * 20 seconds, this signal can be repeated or another command can be sent.
The response signals are designed as described in chapter 8.4.1 - however, 1 to max. 10 dispensing strokes follow shortly after this signal 4sec.
The evaluation of the reserve message (17 seconds) is also possible (see chapter 8.3).

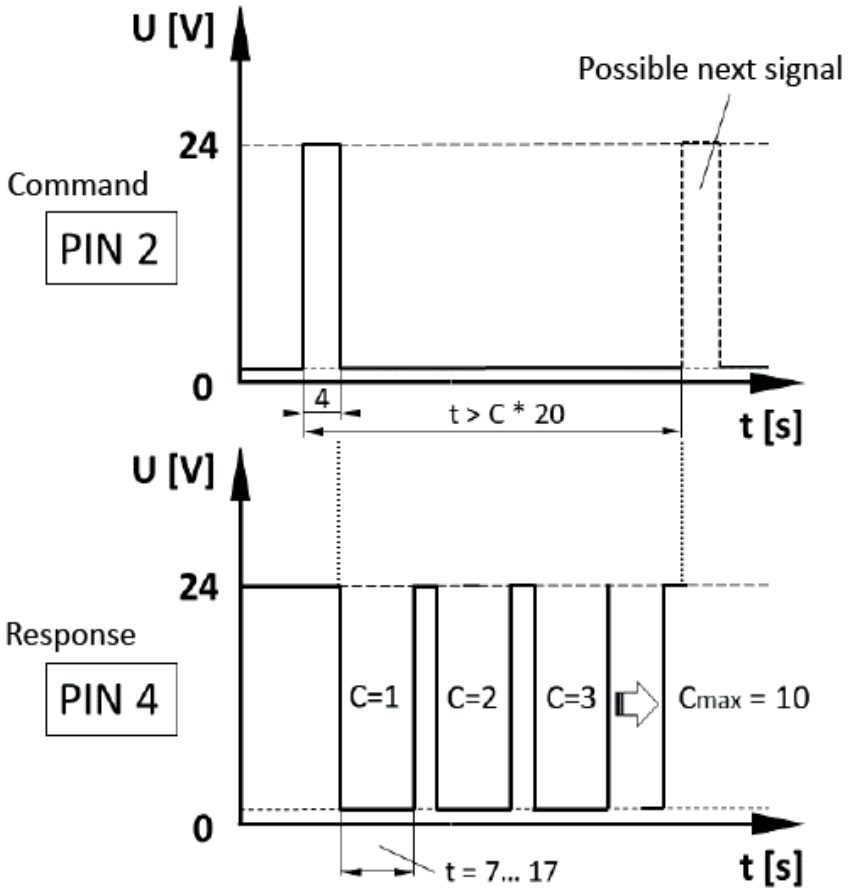


Fig. 11: Command / response on signal 4sec

8.4.4. Signal 6 seconds (6sec and 12sec)

The control signal 6sec triggers the filling function (FIL) via the connected control system. A total of 40 dispensing strokes are carried out in quick succession. After a pause time of at least 720 seconds, this signal can be repeated, or another command can be sent. The filling function can be canceled at any time by sending a signal 10sec (see chapter 8.4.5).
The purpose of this function is to fill the pump in the drive unit of the lubricator or the lubrication point. The 40 dispensing strokes are sufficient to completely fill the pump with new lubricant. This can be useful when filling an otherwise empty pump for the first time or when changing the lubrication system to a different type of grease.
If all dispensing strokes are completed, a total of 6.0 cm³ of lubricant is dispensed from the cartridge with this function (40 x 0.15 cm³).

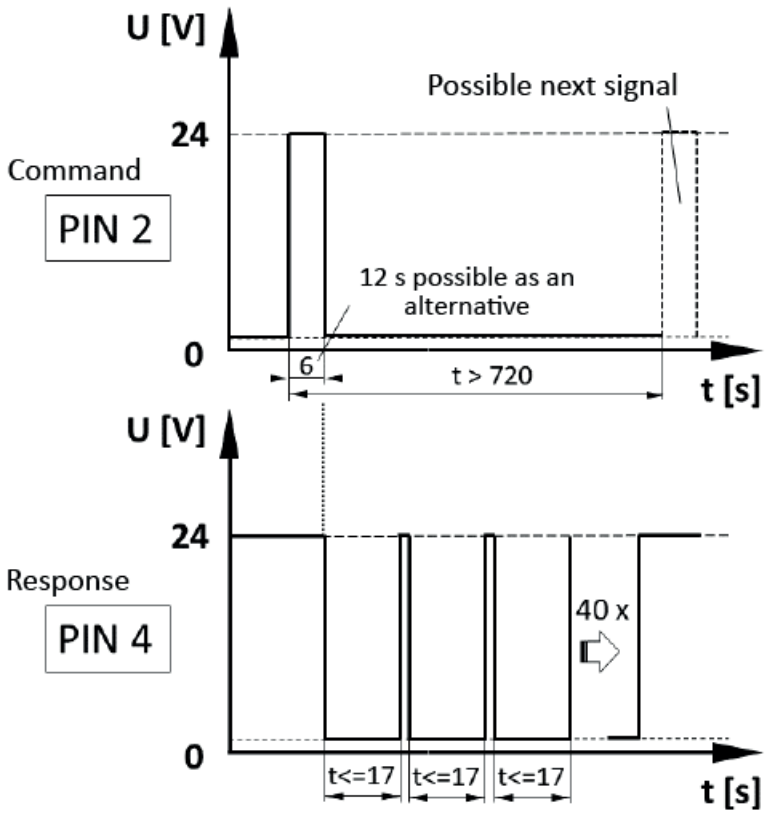


Fig. 12: Command / response on signal 6sec (12sec)

Note: The signal 12sec (signal length 12 seconds) has an identical effect. 40 dispensing strokes are then also carried out, there is no difference to the signal 6sec.

8.4.5. Signal 10 seconds (10sec)

The control signal 10 seconds is used to acknowledge error messages (see chapter 7) and to cancel the filling function (see chapter 8.4.4). The control signal 10sec can also be processed by the lubricator if an error message is present at PIN 4.
However, deleting the error does not release the user from the obligation to eliminate the cause of the detected error beforehand. If the cause of an error is not rectified, the error message may reappear as before the acknowledgement.
Figure 13 shows the diagrams for the input and output signal for the signal 10sec.

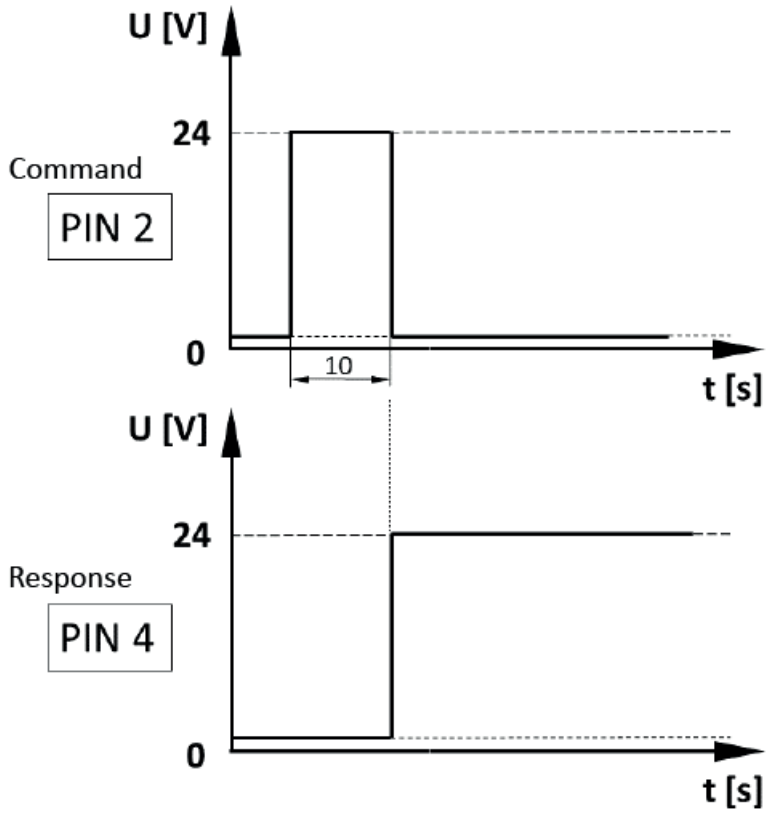


Fig. 13: Command / response on signal 10sec

9. Maintenance and disposal

CAUTION

Maintenance work can be dangerous and lead to accidents if the applicable regulations are not observed.

- Before carrying out any maintenance or work, please note the general safety instructions (see chapter 2) and observe all applicable local and operational safety regulations.
- Do not disable any protective device without authorization!

9.1. Maintenance schedule

The following maintenance schedule for the lubricator must be observed:

Maintenance	Commissioning	After 2000 hours or after 3 months	Annually	If necessary
Visual inspection	**x**	**x**	**x**	**x ***
Cleaning	**x**	**x**	**x**	**x ***
Cartridge change	**x ****		**x *****	**x ***

* Depending on the operating conditions and lubricant consumption
** Depending on the delivery condition (version ordered)
*** Recommendation: Change after 3 years at the latest

9.1.1. Visual inspection

Check the entire lubricator and any connected accessories, including hoses and distributors, for external damage (e.g. loose or loosened hoses) by means of a thorough and conscientious visual inspection.
Check the condition of the lubrication point for correct lubricant supply.
Replace damaged or defective parts immediately to ensure a continuous and permanent lubrication.
Check the fill level in the cartridge of the lubricator.
Check any error messages on the display and correct the causes respectively.

9.1.2. Cleaning

Clean the lubricator by suitable means (e.g. absorbent cloths) to remove dirt.

NOTICE

Compressed air can damage the seals and carry dirt and foreign bodies into the lubricator or into the lubricant in the cartridge.

- Do not use compressed air for cleaning.
- Always make sure that there is no coarse dirt in the assembly area of the lubricator.

9.1.3. Cartridge change

NOTICE

A lubricant cartridge that has already been partially emptied must not be fitted on the lubricator, as the integrated dispensing stroke counter is automatically reset after a cartridge has been removed.

- Always use full lubricant cartridges.
- Only use original lubricant cartridges with **WITTENSTEIN alpha** approved lubricants.

NOTICE

The original lubricant cartridges are filled air-free and under the cleanest conditions.

- ➔ It is not possible to refill the empty or partially empty cartridges.
- ➔ Only use original lubricant cartridges with **WITTENSTEIN alpha** approved lubricants.

NOTICE

Lubricants age during storage due to oxidation and other environmental influences.

- ➔ Observe the maximum shelf life (2 years) of lubricants filled in cartridges.

NOTICE

Some lubricants are not miscible with each other; hardening or even liquefaction can occur.

- ➔ Ensure that lubricant cartridges with the same content are always replaced.

NOTICE

The sizing of the lubricator with regard to its settings takes into account the relubrication quantity and emptying time as well as the size (volume) of the lubricant cartridge.

- ➔ Only use the same size of lubricant cartridges when changing cartridges.

The following table indicates the available lubricant cartridges:

Designation	Lubricant	Capacity	Material number
LUE+125-05-1	WITTENSTEIN alpha G11	125 cm³	20068231
LUE+125-06-1	WITTENSTEIN alpha G12	125 cm³	20068233
LUE+125-07-1	WITTENSTEIN alpha G13	125 cm³	20068236
LUE+125-00-1	Klüber Microlube GB0	125 cm³	20068238

Changing lubricant cartridges at the lubricator is easy and only requires two steps:

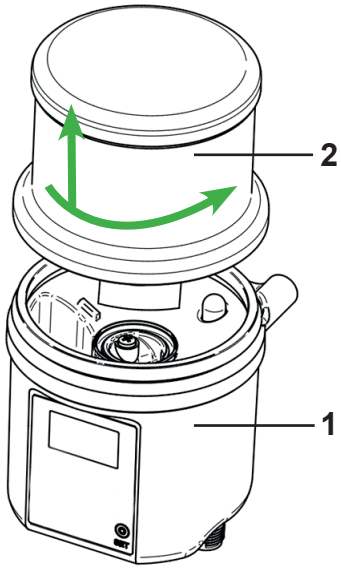
1. Unscrew the empty cartridge of the lubricator
2. Screw on the new lubricant cartridge.

The cartridge only needs to be changed if it is empty or if the useful life of the lubricant has been exceeded. A cartridge can be replaced during normal operation. Apart from changing the lubricant cartridge, no further action is required!

The situation that the lubricant cartridge of the lubricator is empty is clearly visible on the display.

Situation 1: OLED is in screen saver mode
the error message E1 is displayed

Situation 2: After touching the action field with the magnetic pen
the explanation of error E1 is displayed:

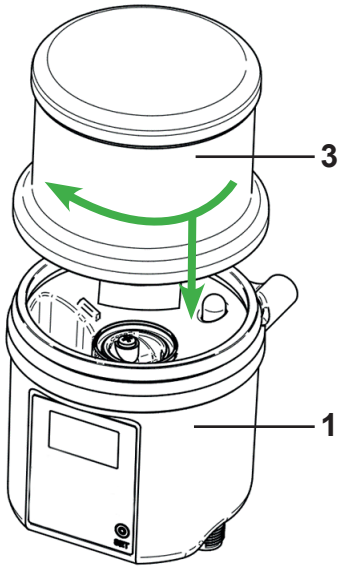


Unscrew the empty cartridge of the lubricator

> Turn the empty cartridge [2] counter-clockwise to remove it from the lubricator [1] and dispose of it in compliance with applicable regulations.
> Ensure that the work is carried out under clean conditions. Make absolutely sure that dirt, water and/or foreign bodies cannot get into the inlet of the lubricator.
> Carry out any necessary cleaning work as described in chapter 9.1.2.

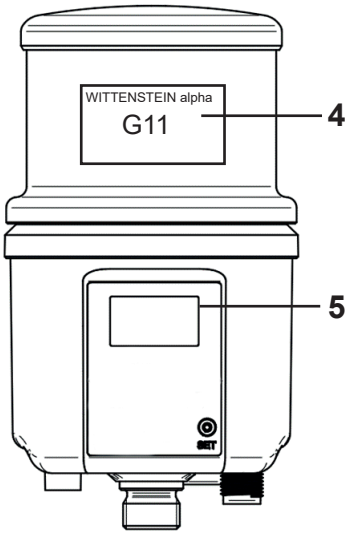
Unscrewing the cartridge lid

> Unscrew the cartridge lid of the new cartridge counterclockwise and dispose of it properly together with the empty cartridge.
> Here too, ensure that the work is carried out under clean conditions. No dirt may enter the cartridge outlet.



Screw a new cartridge onto the lubricator

> Turn the full cartridge [3] clockwise onto the lubricator [1] until you feel a tactile stop.
> The label with the name of the lubricant [4] must be positioned exactly vertically above the display [5] of the lubricator when the lubricant cartridge is assembled correctly.



If the cartridge empty level was shown on the display with E1, the error message disappears automatically. Manual acknowledgement is not necessary.

The message that a new cartridge has been installed appears on the display [5]:

Once this work is complete, the lubricator automatically returns to the mode that was active before the work.

9.1.4. Recommissioning

> Reinstall all safeguards and make sure that all tools have been removed from the danger area.

> Make sure that the lubricator is activated.

9.2. Disposal

> Observe the applicable national regulations for the disposal of empty or partially filled cartridges and the lubricator.
> For disposal, the respective safety data sheets and disposal instructions for the lubricants must be observed.
> Refilling of empty lubricant cartridges is not possible.

10. Appendix

10.1. EC/EU declaration of conformity

Declaration of EG conformity

CE

According to the Machinery Directive 2006/42/EG of 2006, May 17th

Herewith the manufacturer
TriboServ GmbH & Co. KG, Gelthari-Ring 3, D-97505 Geldersheim,
declares that the following lubricating systems

FlexxPump1 – ND

delivered by us, concerning design and construction as well as the model put into circulation, comply with the EG directives 2006/42/EG.
In particular, the following harmonized standard was applied:

EN 12100:2011-03 Safety of machinery

According the EG directive on Electromagnetic Compatibility 2014/30/EU

The manufacturer herewith declares that the following lubricating systems

FlexxPump1 – ND

delivered by us, concerning design and construction as well as the model put into circulation, comply with the above mentioned EU directive.
In particular, the following harmonized standards were applied:

EN 61000-6-2, EN 61000-6-4 Electromagnetic Compatibility (EMC)

Authorized representative for the compilation of technical documentation:
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Revision history

Revision	Date	Comment	Chapter
01	03/17/2022	New version	All
02	09/01/2023	Manufacturer's address	All
03	01/16/2024	Software	All

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