

Operating Instructions

Lubricus Lubrication System

LUB - M

(24 VDC)

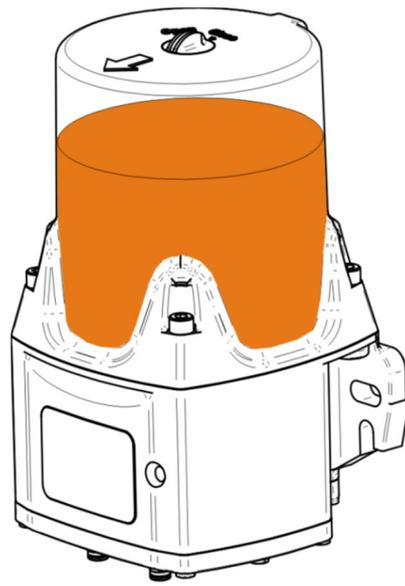


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Time control

Pulse control

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1) General information

Thank you very much for choosing the Lubricus M Lubrication System.

Please ensure you familiarise yourself with the safety instructions before using the pump and accessories supplied. This manual contains important safety information.

- The Lubricus Lubrication System is a very compact lubrication pump for oil and grease up to NLGI class 2.
- The Lubricus type LUB-M is made for a 24 VDC power supply and requires a mains connection.
- The lubricant reservoir (1500 cm³) is in a rigid, disposable cartridge.
- Supply pressure is <70 bar.
- Depending on the model, the Lubricus Lubrication System has 2, 4, 6, 8 or 10 outlets.

1.1 Warning

The Lubricus Lubrication System is designed for use in normal industrial environments, but not for use in or on motor vehicles.

Use **only original Lubricus spare parts and accessories** (cartridges, fittings, connectors, tubes and battery packs).

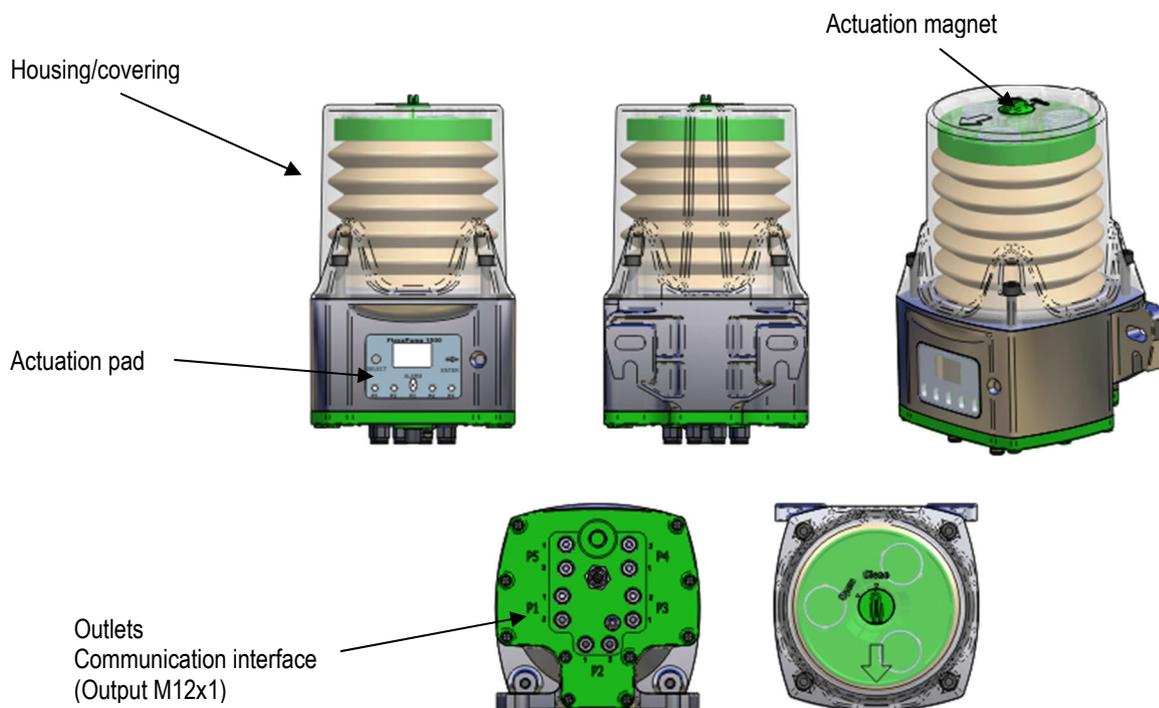
1.2 Scope of supply

The scope of supply may vary from country to country. Standard supply includes:

- the Lubricus M Lubrication System
- tube connector attached to the outlet(s) for medium-pressure PA tube 6 x 4 (Ø 6mm outer and Ø 4mm inner diameter)
- Operating Instructions

1.3 Overview – the Lubricus M Lubrication System

Installing the Lubricus Lubrication System is simple. These instructions should help you to install your pump swiftly and easily, and to quickly learn the basics.



Please note!

Unused outlets should not be closed!

1.4 Symbols & Notes

Please pay attention, not only to these safety instructions, but also to the special safety instructions on other pages.



This symbol warns of electrical voltage.



This general danger symbol denotes safety instructions, the disregarding of which could lead to bodily harm.

Attention

This heading is used if incorrect compliance or non-compliance with the Operating Instructions or specified work procedures etc. may result in damage of the system.

Please note!

This term will be used to draw your attention to special information.

Instructions attached directly to the machine must be strictly followed and kept in clearly legible condition!

1.5 Intended Use

Attention

The Lubricus Lubrication System is **only** approved for **industrial use**. The Lubricus Lubrication System may only be used in accordance with the Technical Data (see chapter "Technical Data").

Unauthorised **structural changes** to the Lubricus Lubrication System are **not permitted**.

We do not assume liability for damages to persons or machines resulting from such.

Additional instructions for use in conformity with the intended use:

- pay attention to all information in the Operating Instructions;
- carry out all maintenance work;
- use only Gruetzner GmbH lubrication tubes and connectors;
- **follow** all appropriate regulations for **work safety** and **accident prevention** during the entire lifespan of the Lubricus Lubrication System;
- only qualified and authorized personnel should carry out work of any kind on the Lubricus Lubrication System.

Attention

Other uses or uses beyond those described above shall be deemed as not in conformity with the intended use.

1.6 Liability and extent of guarantee

Proper functioning of the Lubricus Lubrication System can only be achieved through use of recommended lubricants from the **original Lubricus range of accessories**, and by observation of all installation, operation and maintenance instructions.

Gruetzner GmbH excludes all liability if these instructions are not observed.

Gruetzner GmbH grants guarantees concerning operating safety, reliability and performance only under the following conditions:

- assembly, installation, maintenance and repairs are carried out by qualified staff only;
- hazardous hot or cold machine parts must be shielded to prevent skin contact;
- the Lubricus Lubrication System must be used according to the Technical Data and instructions;
- the limit values stated in the Technical Data are under no circumstances to be exceeded;
- retrofitting and repair work on the Lubricus Lubrication System may only be carried out by the manufacturer;
- the lubrication system must be protected against damp and wet.

If a lubricant that has not yet been tested for compatibility with the Lubricus Lubrication System be supplied or requested for use in the Lubricus Lubrication System by the purchaser/customer, the purchaser/customer undertakes the risk and responsibility.

This product is subject to strict production controls and fulfils our company's factory specifications. However, guarantee of testing of each individual case cannot be given due to the numerous factors involved.

We therefore strongly recommend that test runs be carried out.

All liability is excluded.

The Lubricus Lubrication System lubricant cartridge has been constructed and produced for **one-time use** only. Multiple use of the lubricant cartridge is not envisaged. After being used once, the lubricant cartridge is to be completely replaced; refilling is not permitted. Noncompliance will lead to nullification of the guarantee.

For guarantee conditions see the sales and delivery conditions of Gruetzner GmbH

2) Safety Information

Basic information, which must be followed during assembly, operation and maintenance, is listed as follows. These Operating Instructions must be read by all installation and operation staff before assembly and operation, and must be permanently available on site.

All personnel involved in installation, maintenance and operation of the system are to read these instructions carefully before beginning assembly and operation.

2.1 General safety information

2.1.1 Qualification and training of personnel



All operation, maintenance, service and installation personnel must be appropriately qualified for this work. Responsibility and supervision of the personnel must be clearly defined by the end user. If staff do not have the necessary knowledge, they must be trained and instructed. The end user must ensure that staff have completely understood the contents of the Operating Instructions.

2.1.2 Danger of non-compliance with the safety instructions



Non-compliance with the **safety information** can be **dangerous for people**, environment and machines. Non-compliance with the safety information can mean the loss of any or all damage claims. In certain cases, non-compliance can, for example, lead to the following hazards:

- malfunction of important system functions.
- malfunction of prescribed methods of maintenance and servicing.
- danger to people due to electrical, mechanical and chemical effects.
- danger to the environment due to leakage of dangerous substances.

2.1.3 Safety information for end user / operating staff



- Moving, rotating, hot or cold machine parts are to be securely shielded on site to prevent accidental contact. The shielding on moving or rotating parts is not to be removed.
- Leakages of dangerous materials are to be removed in such a way as not to endanger people or the environment.
- Legal regulations are to be complied with.
- Electrical hazards are to be eliminated.

2.1.4. Safety information for maintenance, inspection and assembly work



All **maintenance, inspection and installation work** may only be carried out **by trained specialists** who have been informed appropriately by carefully studying the Operating Instructions.

All work must only be carried out when the **machine is witted off** and while wearing appropriate **protective clothing**. Always comply with the procedures for switching off as described in the Operating Instructions.

All safety and protective equipment must be replaced immediately after completing work.

Environmentally hazardous substances must be disposed of in accordance with local regulations.

Secure the system during maintenance and repair work against intentional or unintentional operation.

Dispose of lubricants in accordance with the safety data sheets of the lubricant manufacturer.

2.1.5 Unauthorised modification and manufacture of spare parts



Modification and alteration of the system is not permitted. **Original spare parts** and accessories authorised by the manufacturer are for **safety** purposes. Using other parts can result in loss of liability for claims resulting out of this. Gruetzner GmbH does not guarantee and is not liable for components retrofitted by the end user.

2.1.6 Prohibited methods of operation

Operational security of the Lubricus Lubrication System is only guaranteed if it **is operated in accordance with the Operating Instructions**. The limit values listed in the Technical Data are under no circumstances to be exceeded.

2.1.7 General hazard warning



All components of the system are designed in accordance with the prevailing regulations of the construction of technical machines regarding operational safety and accident prevention. Nevertheless, operation can lead to dangers for the user, third parties or other technical facilities. Therefore, the Lubricus Lubrication System may only be used for its intended purpose in **technically fault-free condition**. This may only be carried out under compliance with the safety regulations and the Operating Instructions.

Therefore, please **regularly check** the Lubricus Lubrication System and its attachments for possible **damage or leaks**.

2.2 Transport and storage

Use suitable lifting gear for transport. Do not throw or expose the Lubricus Lubrication System to heavy buffeting. Store the Lubricus Lubrication System in a cool and dry place to avoid corrosion of the system's individual parts.



Comply with valid safety and accident prevention instructions when transporting.
Wear suitable protection clothing if necessary!

2.3 Installation



The following conditions have to be satisfied during the installation of this Lubricus Lubrication System so that it can be assembled to a complete machine without affecting the health and safety of humans.

To prevent the formation of condensation, the housing of the Lubricus Lubrication System should not be exposed to direct sunlight or radiant heat.

The Lubricus Lubrication System must be protected against damp and wet. We strongly recommend that the lubrication system be enclosed in a housing.

Lubricus Lubrication Systems should never be exposed to outside weather conditions. If using outdoors, ensure the system has suitable protection (e.g. housing) and never use this product in or under water.

2.3.1 Electrical connection



- Only a qualified electrician should connect the power supply!
- Connection of electrical components is to be carried out professionally.
- Compare the voltage details with the existing power supply voltage!

2.4 Maintenance

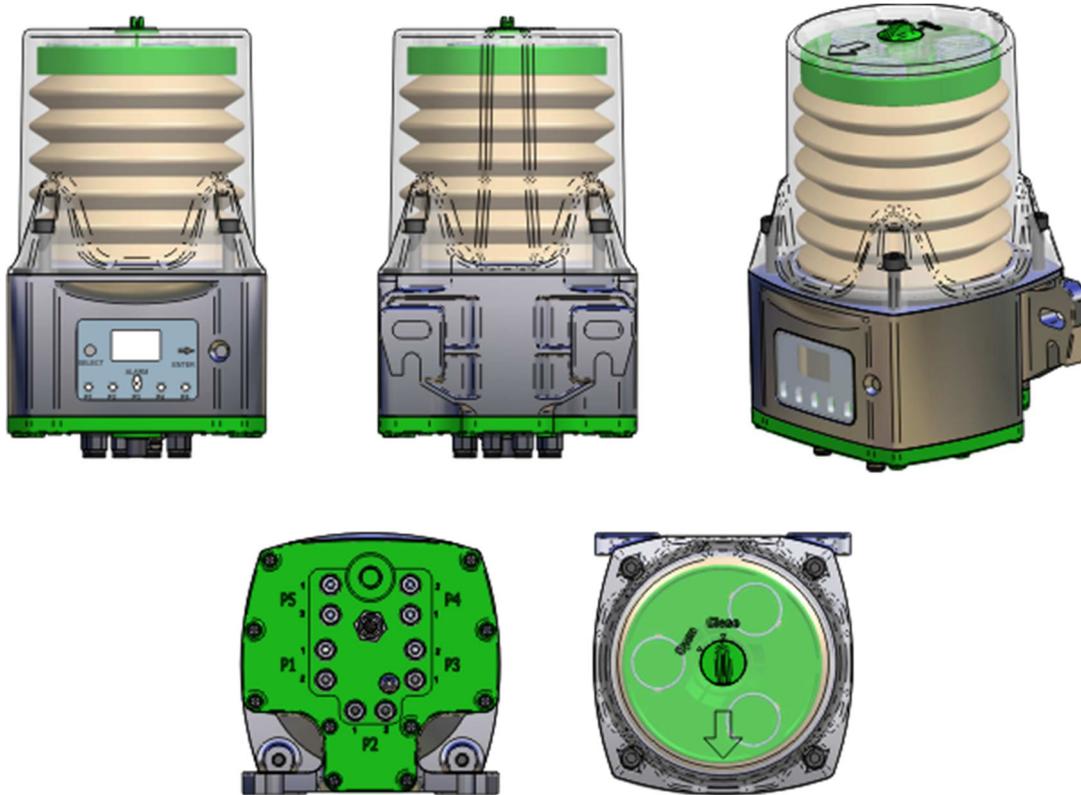


Disconnect the system from the mains before starting with **maintenance or repair work**.

- **Maintenance and repair work** may only be done with the system **completely switched off**.
- Check the surface temperature of the Lubricus Lubrication System to **avoid burns**.
- Always wear heat-resistance gloves!
- Ensure the system cannot be restarted during maintenance and repair work!

3) Lubricus M – General Information

Lubricus M

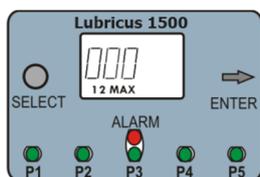


3.1 Definition of terms

Lubricus M is designed for applications with minimal amounts of lubricant:

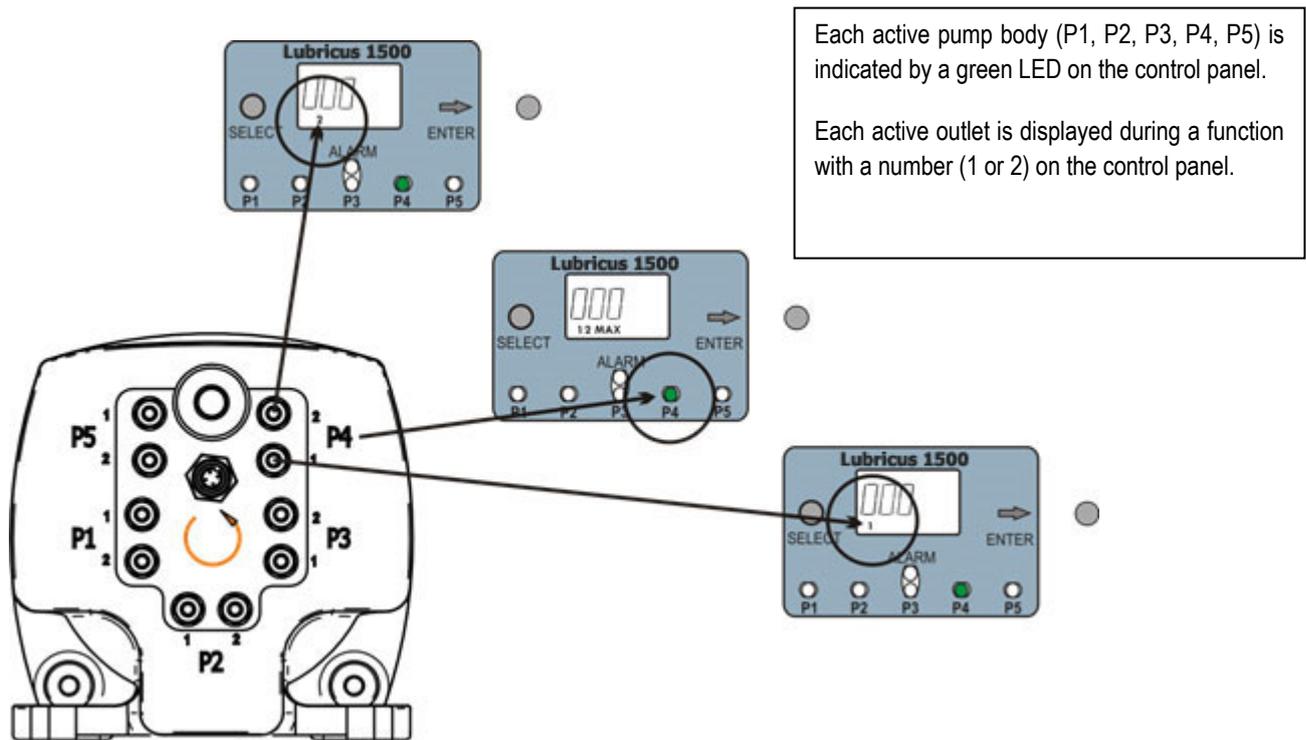
- Depending on the configuration Lubricus M is available with up to 5 pump units (P1, P2, P3, P4, P5), each with 2 outlets.
- 1 pump unit is the housing for 2 piston pumps. 1 pump unit is dispensing equal quantities from both outlets.
- Minimum quantity lubrication means the controlled and efficient supply of a lubrication point with selected, high performance lubricants
- Run = back pressure control – preventive check on a lubrication point: The measurement of the back pressure is done during the pumping process and the result will be shown on the display. The displayed value is a first orientation over the pressure range.

3.2 Actuation Pad



Pump unit P1 ... P5:	display green LED
Error messages (ALARM):	display red LED

3.3 Identification pump units and outlets



Each active pump body (P1, P2, P3, P4, P5) is indicated by a green LED on the control panel.

Each active outlet is displayed during a function with a number (1 or 2) on the control panel.

3.4 Grease cartridge

The lubricant reservoir (1500 cm³) is in a disposable grease cartridge.



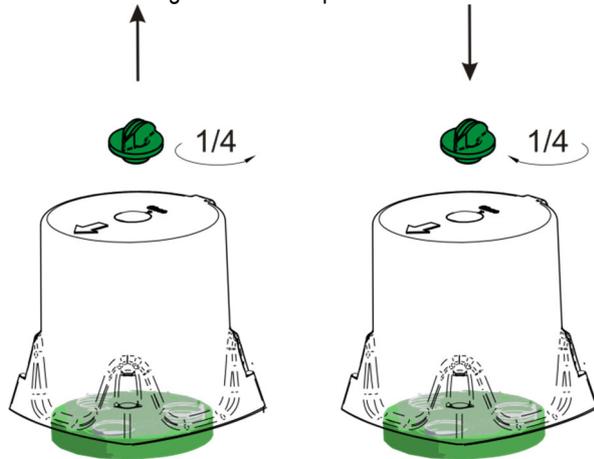
4) Function/Principle

After starting, the integrated pump transports the lubricant to the outlets according to the settings that have been made. The integrated electronics control and monitor the amount of lubricant and the time intervals between lubrications.

The Lubricus M Type uses a four-pin socket to connect a M12X1 plug allowing communication with the machine controller. An external 24 VDC power supply is used to switch ON and OFF (voltage 24 VDC +/- 5%), supplied to PIN 1. When voltage is supplied the lubrication pump is in operating condition. If there are no errors (Pump OK) the input voltage will be transferred to the output signal (PIN 4) indicating all is OK. Once the voltage supply to PIN 1 is stopped (switched OFF), the pump rests and saves the current operating conditions in memory. When the pump is turned back on the saved operating conditions will be continued. PIN 4 relays the operating condition.

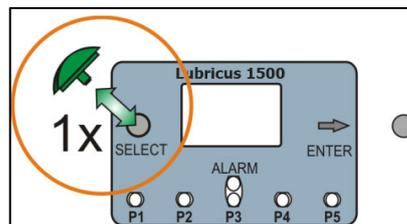
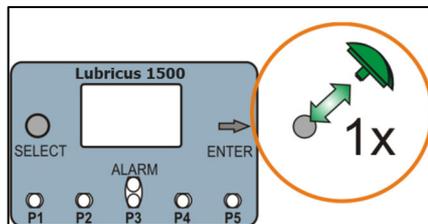
4.1 Basic operation

All changes to the settings are made with the actuation magnet (ventilation lock). Open the ventilation lock (turn clockwise to OPEN) and remove it from the cover. The tip of the ventilation lock is your programming key. If there are no desired changes to the settings, please set the actuation magnet back at its place and close the ventilation lock (turn counter clockwise to CLOSE).



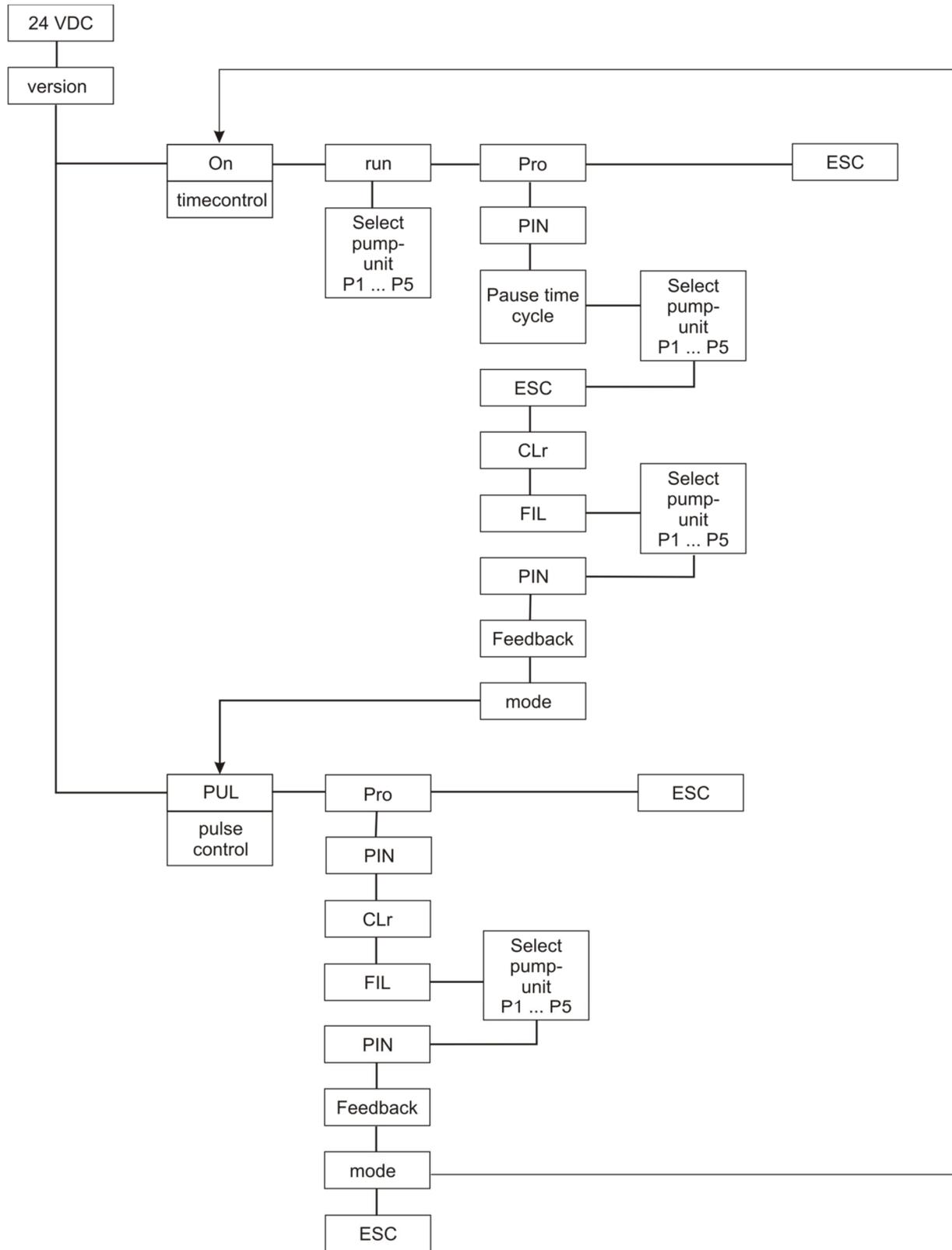
Programming Lubricus M

- ⇒ **SELECT:** Change settings - touch the operating pad with the actuation magnet
- ⇒ **ENTER:** Confirmation of all changes - touch the actuation pad actuation magnet. The display flashes 2 times for confirmation
- ⇒ **TIMEOUT:** If no interaction takes place for a period, the device automatically returns to the previous display mode.

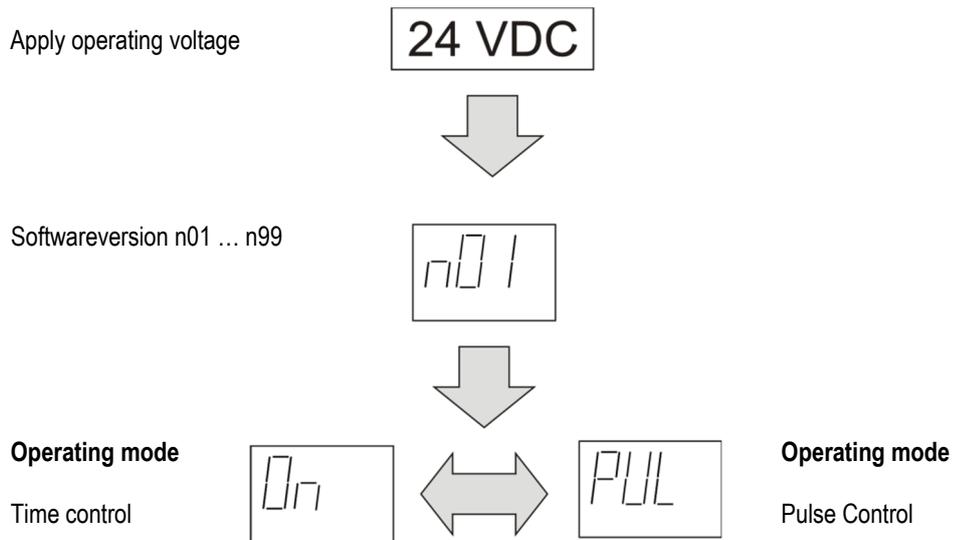


4.2 Lubricus M operation menu (overview)

Two modes are possible: „time control“ and „pulse control“



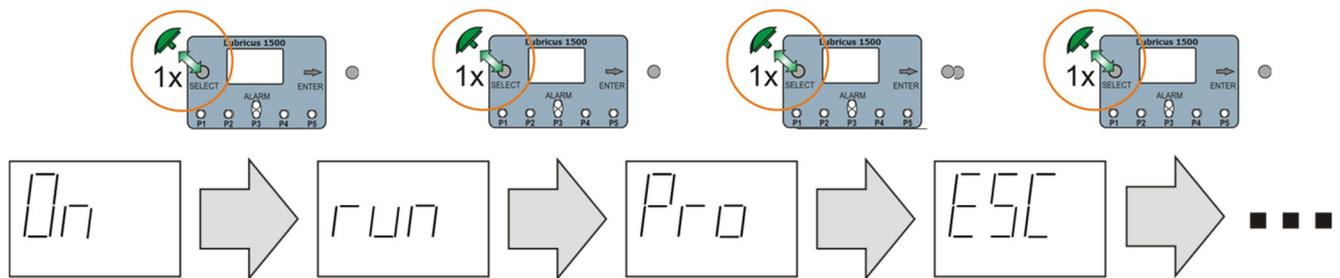
4.3 Start: control panel.



4.4 Default indication control panel (time control)

- ⇒ **SELECT:** Change settings - touch the operating pad with the actuation magnet
- ⇒ **ENTER:** Confirmation of all changes - touch the actuation pad actuation magnet.
- ⇒ *If no interaction takes place for a period, the device automatically returns to the previous display mode.*

Basic menu in time mode:



On: Operating mode – time control

run: Run = back pressure control – preventive check on a lubrication point: The measurement of the back pressure is done during the dispensing pumping process and the result will be shown on the display. The displayed value is a first orientation over the pressure range.

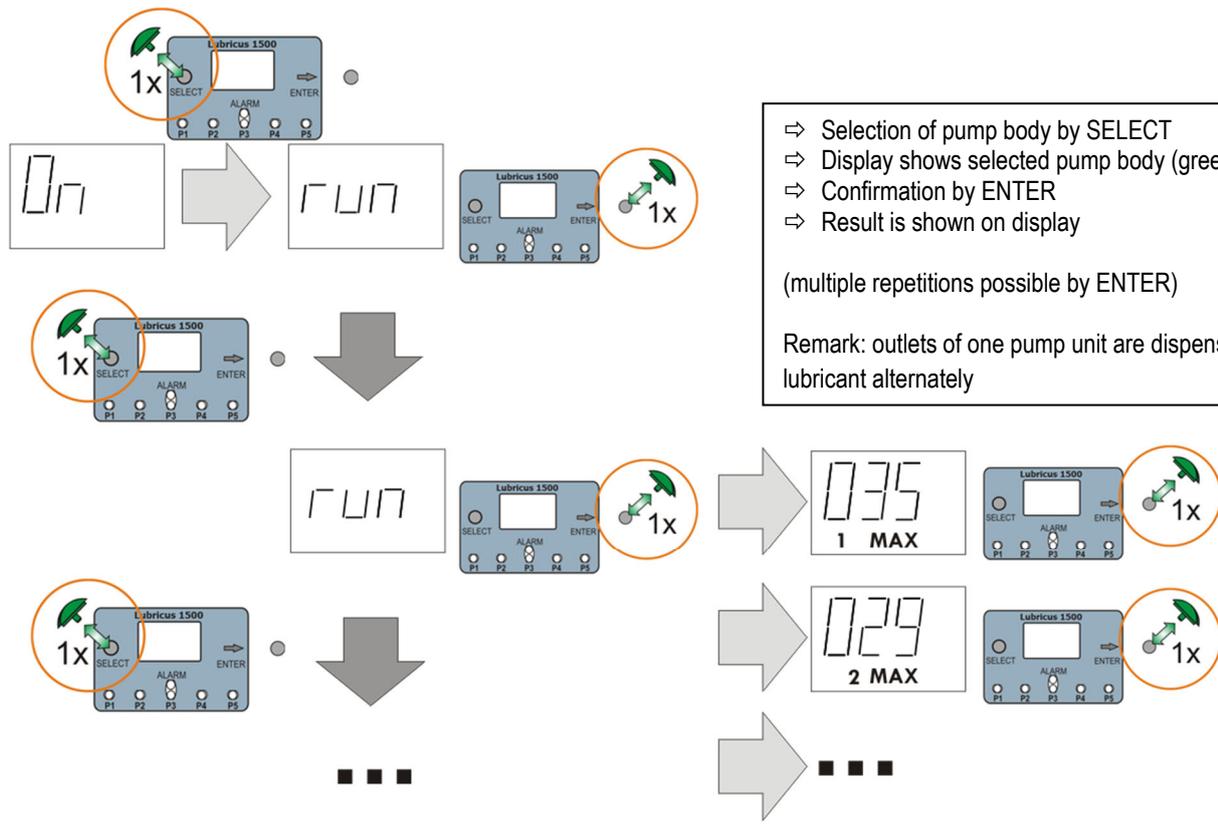
Pro: Other functions, PIN code protected

ESC: Key to leave and return to the main menu

4.5 Quick Check – back pressure control

For test and sample purposes the installed lubrication pump can easily be used to dispense small amounts of lubricant. For this purpose, the available pressure between the lubrication point and pump is measured. The value displayed is the back pressure in bar.

- ⇒ **SELECT**: Change settings
- ⇒ **ENTER**: Confirmation of all changes
- ⇒ *If no interaction takes place for a period, the device automatically returns to the previous display mode*

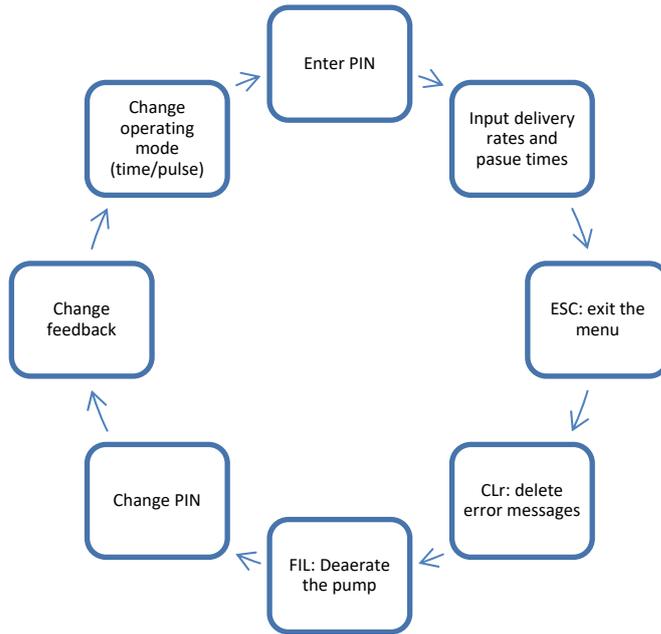


- ⇒ Selection of pump body by SELECT
 - ⇒ Display shows selected pump body (green LED)
 - ⇒ Confirmation by ENTER
 - ⇒ Result is shown on display
- (multiple repetitions possible by ENTER)
- Remark: outlets of one pump unit are dispensing lubricant alternately

Select other pump unit or timeout:
leave the menu

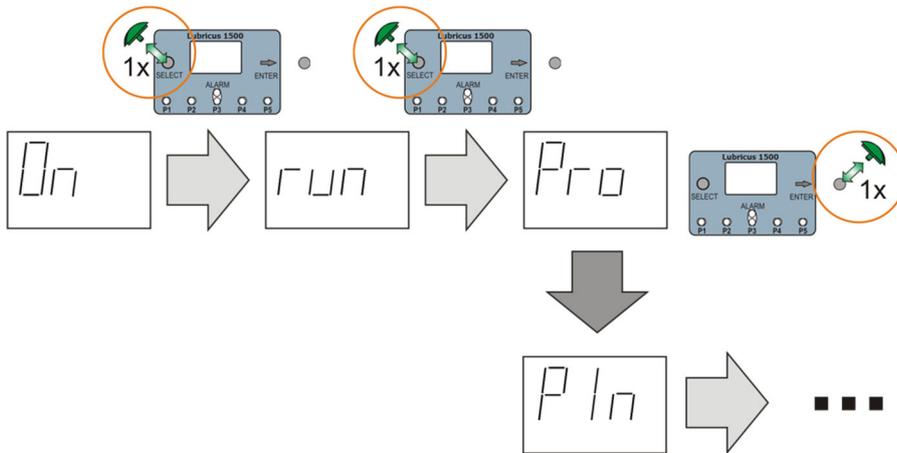
5) Pro Program – time controlled lubrication intervals

The „pro program“ of the time mode contains the following editable options:

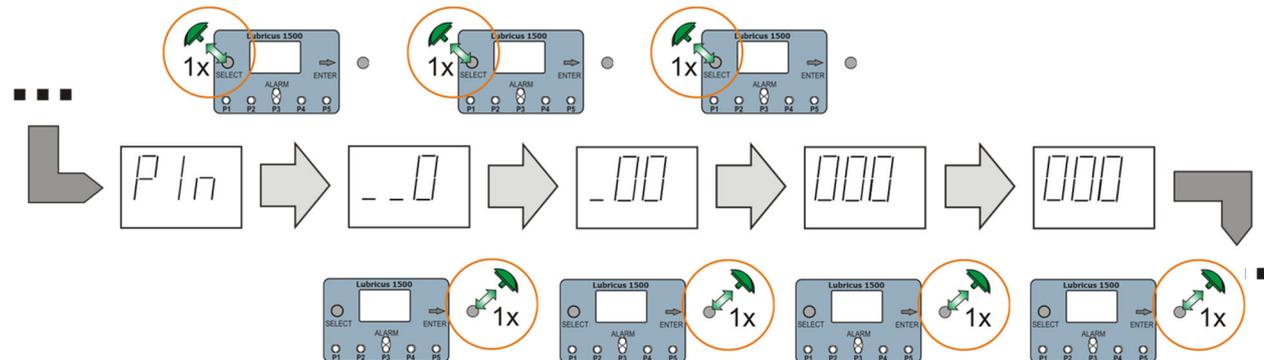


5.1 Enter PIN: Access to Pro Program is protected (PIN)

Selection of other menu items with PIN entry possible.



The settings are performed with „ENTER“ and „SELECT“.
The factory setting is: 000 (Master PIN siehe Service)



After entering the the PIN the lubrication intervals can be programmed.

5.2 Input pause time and amount of lubricant

The following settings can be made for each pump body.

H: TIME (pause time): time between the lubrication intervals in hours (1 to 240 h are possible)

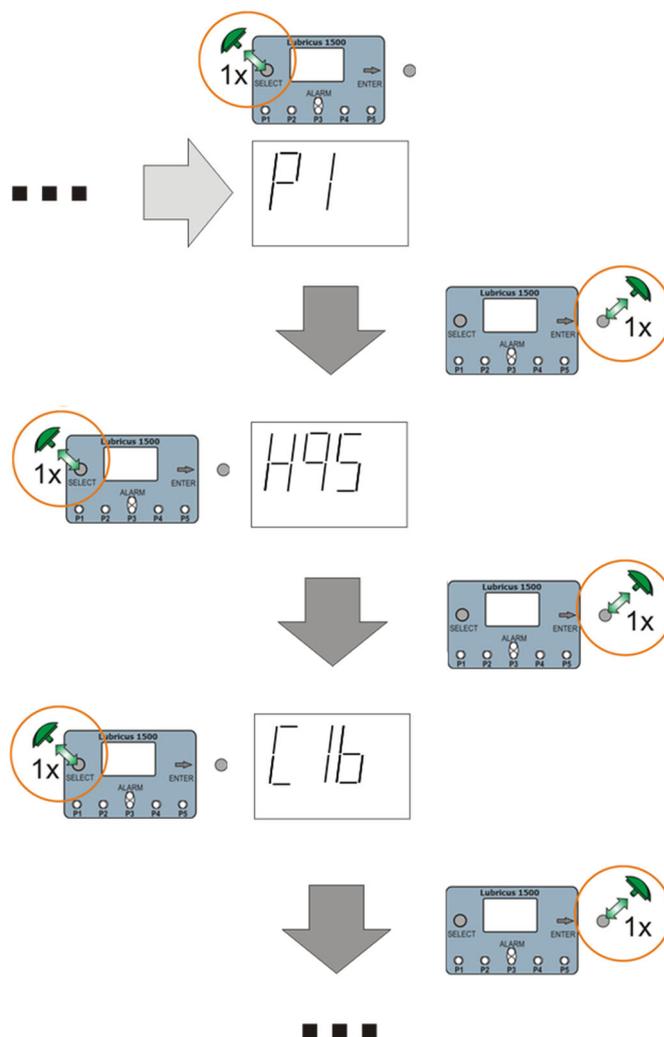
Attention: If H: TIME = 0 it is not possible to input cycles.

C: CYCLE (number of cycles) = amount of lubricant per interval (1 to 30 possible, 1 cycle = 0,15 cm³)

Pump units can be turned off by setting **C: CYCLE = 0**

Factory setting for every pump unit: **H: TIME = 4h, C: CYCLE = 1**

step-by-step approach:



- ⇒ SELECT: Change settings
- ⇒ ENTER: Confirmation of all changes

If no interaction takes place for a period, the device automatically returns to the previous display mode

Select pump body (P1-P5) via SELECT
indicated by a green LED on the control panel.
⇒ Confirmation with ENTER

Input pause time (H: TIME) via SELECT
max. 240 h possible
⇒ Confirmation with ENTER

Input number of cycles (C: Cycle) via SELECT,
max. 30 possible
⇒ Confirmation with ENTER

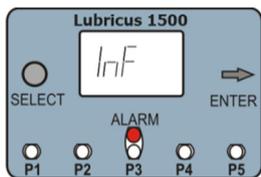
Select other pump unit or timeout: exit the menu.

Important: Changes of the parameters are only applied by confirming.

Attention Lubricus M is designed for minimum quantity lubrication.

The microprocessor calculates from the inputs of pause time and number of cycles a comparison value. If this value is too high, a reduction in the lifetime of Lubricus M is accepted consciously.

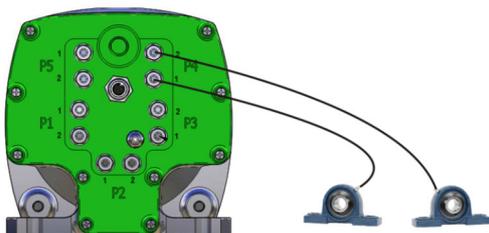
Warning: The ALARM LED flashes on the control panel and the display shows "InF" (for information) for 10s. During this 10s, the operation of Lubricus M is blocked.



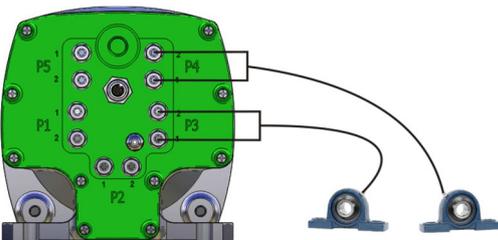
If a higher demand for lubricant at one lubricating point is required, the outlets of different pump units can be combined externally.

Please note! unused outlets must remain open to avoid damage to the pump!

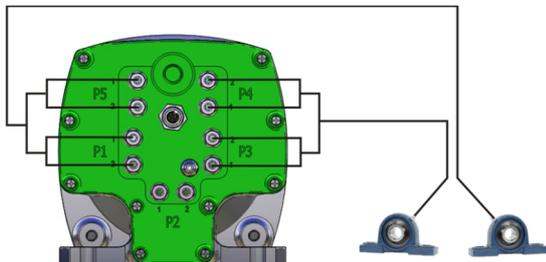
Examples:



1 outlet supplying 1 lubrication point:
Allowed amount of lubricant for 1 lubrication point = max. 5,000 cm³ at 50 bar back pressure



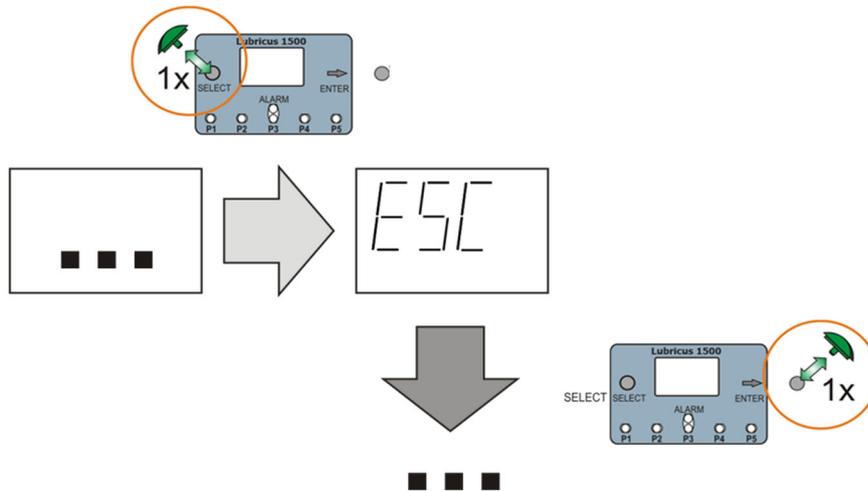
2 outlets supplying 1 lubrication point:
Allowed amount of lubricant for 1 lubrication point = max. 10,000 cm³ at 50 bar back pressure



4 outlets supplying 1 lubrication point:
Allowed amount of lubricant for 1 lubrication point = max. 20,000 cm³ at 50 bar back pressure

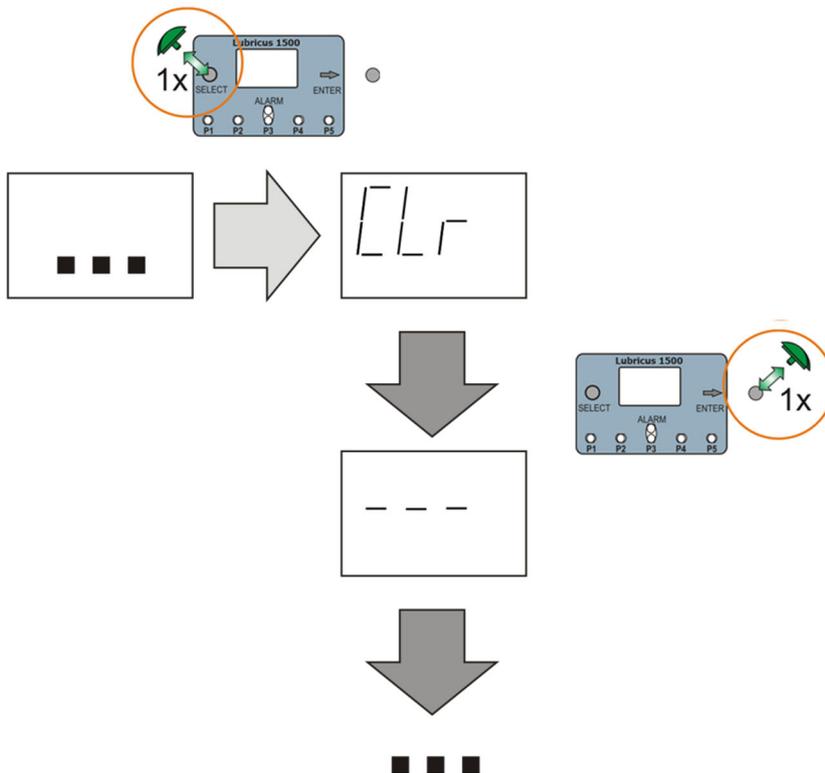
5.3 ESC – Exit the menu

Confirm „ESC“ with "ENTER" => exit to main menu.



5.4 CLr – delete error messages and delete filling cycles

With Confirmation of „CLr“ error messages will be deleted.
In „FIL“-Modus the filling operation will be stopped with „CLr“.



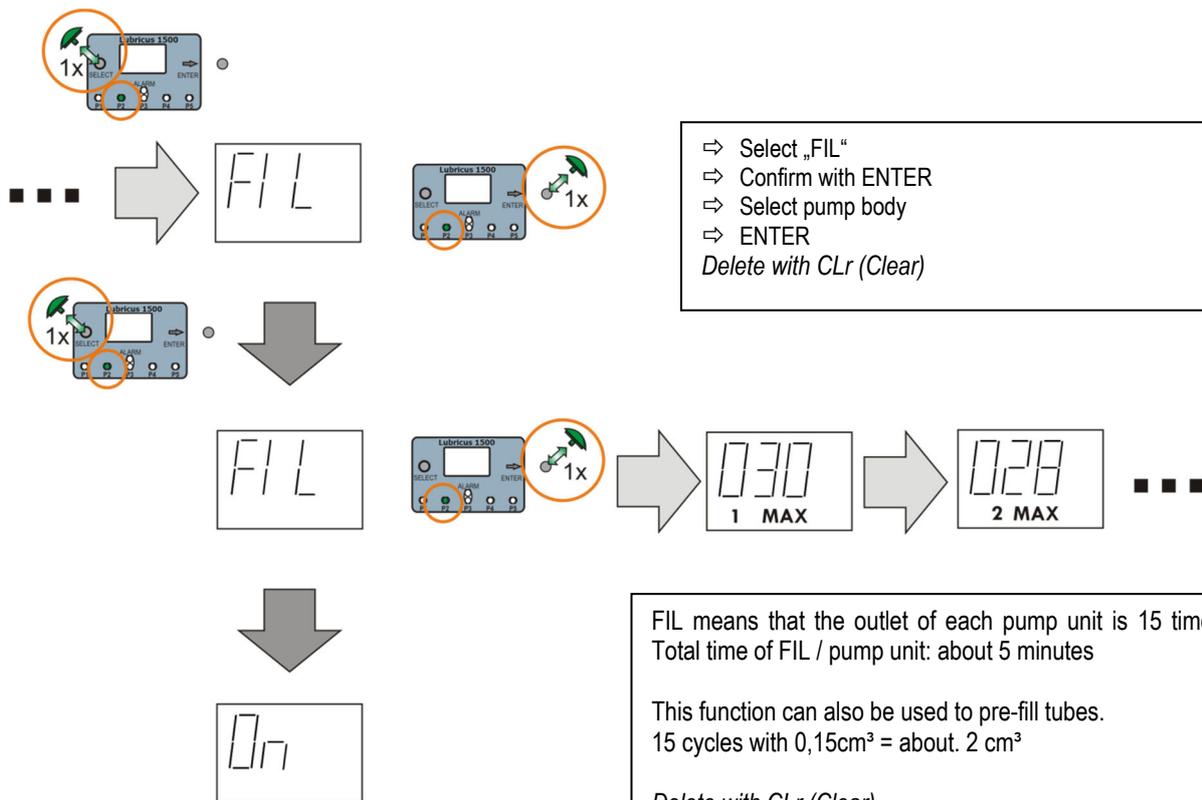
5.5 FIL – first start-up, venting the pump und filling of lubrication lines

Attention: Lubricus M lubrication pumps must be filled at initial operation. Each pump unit must be filled separately. The operation is completed when lubricant is visible at the outlet.

First start-up:

Attention!

Prefill housing inlet with 50 ml of suitable lubricant (same grease type as content of cartridge)
Attention: Low level indicator in the inlet must not be damaged.
Then place grease cartridge and start FIL function.



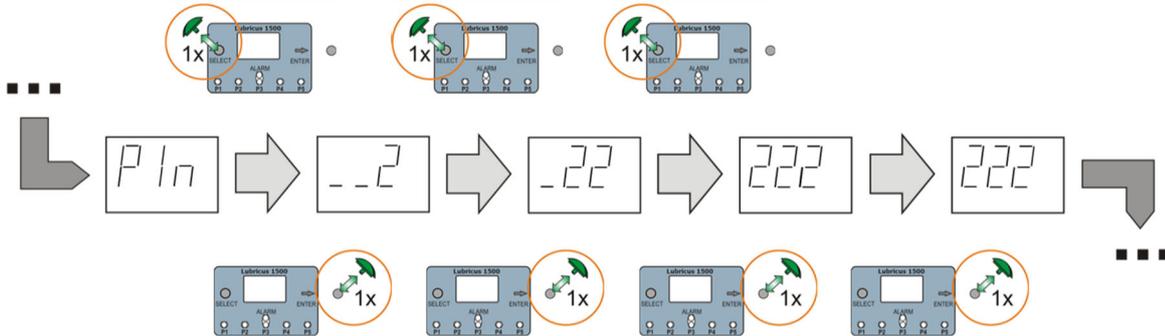
Select other pump units with:

- ⇒ Pro
 - ⇒ PIN
 - ⇒ FIL
- or timeout => exit the menu

5.6 Change PIN , factory setting PIN: 000 (Master PIN see Service)

In the menu point „PIN“ you can change the PIN for the access of the PRO-Menus.

Example: Change PIN to 222

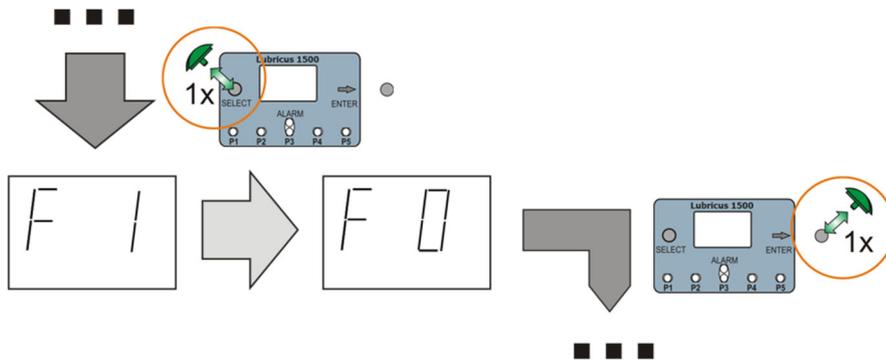


The new PIN is saved.

5.7 Change Feedback (Pump function control)

Feedback = Pump function control: During the function of the pump (about 7 s) the output signal at PIN 4 is switching from High (+ 20...30 VDC) to Low (0 V). By counting the signals of the pump function control there is a possibility to estimate the delivered quantity of lubricant and the remaining quantity in the lubricant reservoir (delivery rate per cycle = 0,15 cm³).

- Factory setting: F 1 = Feedback "on"
- Alternative: F 0 = Feedback "off"



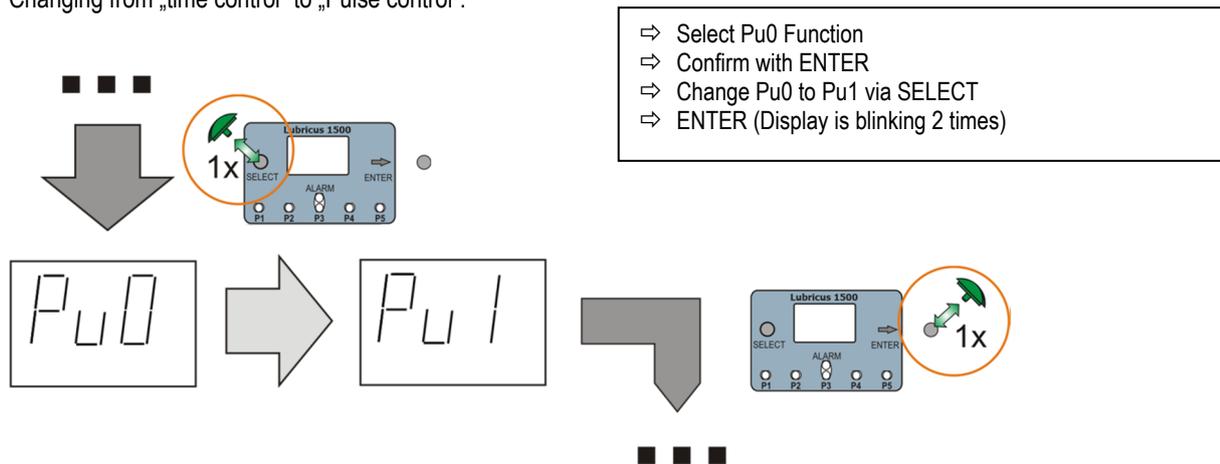
5.8 Change operating mode: Time control / pulse control

Factory setting: Lubricus M works in the „time modus“.

Basic setting: **Time control Pu0** = Time control „on“, pulse control „off“
ON appears on the control panel and activated pump units flashing in sequence (indicated by a green LED).

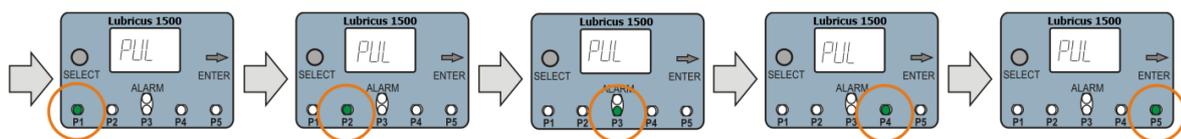
Alternative: **Pulse Control Pu1** = Pulse control „on“, time control „off“
PUL appears on the control panel and installed pump units flashing in sequence (indicated by a green LED).

Changing from „time control“ to „Pulse control“:



Lubricus M ist changed to pulse control.
 „PUL“ is shown on the Display.

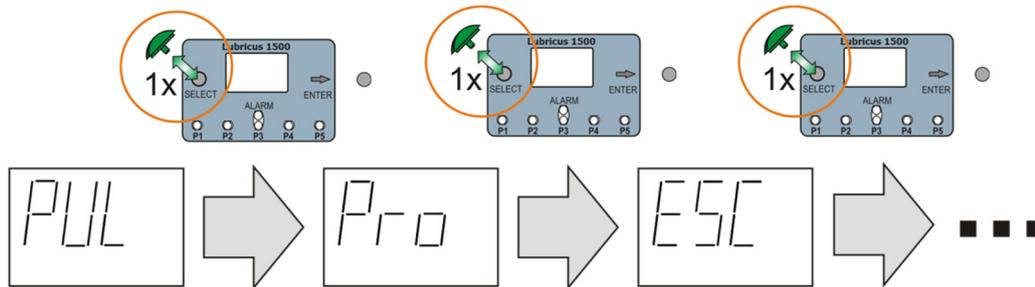
Example Pulse control (5 installed pump units)



6. pulse controlled lubrication intervals

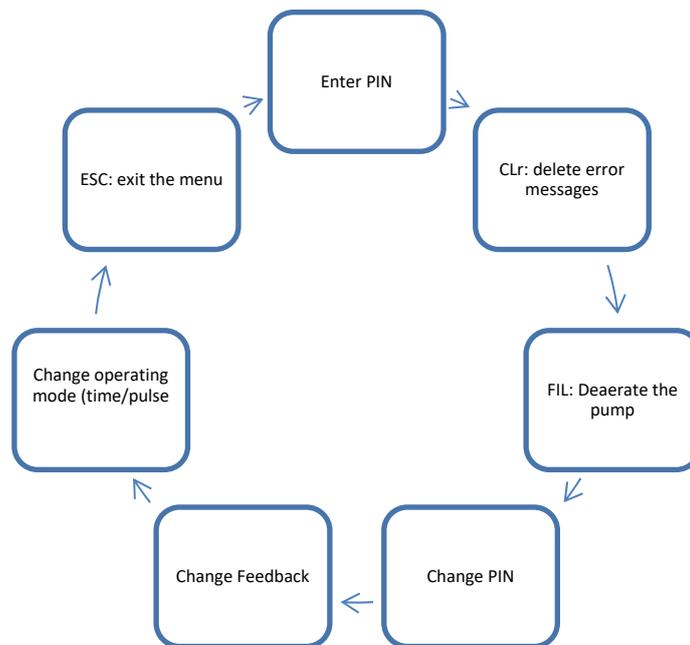
6.1 Default indication control panel (pulse control)

Basic menu in control mode:



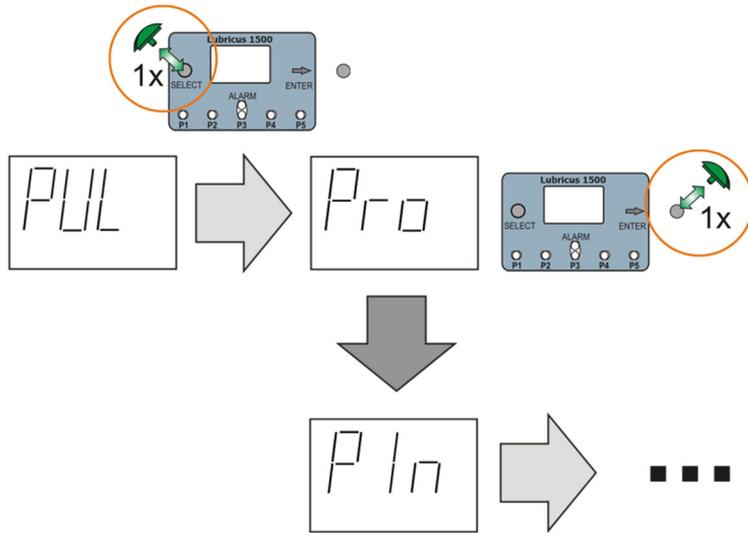
- PUL:** pulse control
- Pro:** Other functions, PIN code protected
- ESC:** exit and return to the main menu

The „pro program“ of the pulse mode contains the following editable options:



6.2 Enter PIN: Access to Pro Program is protected (PIN)

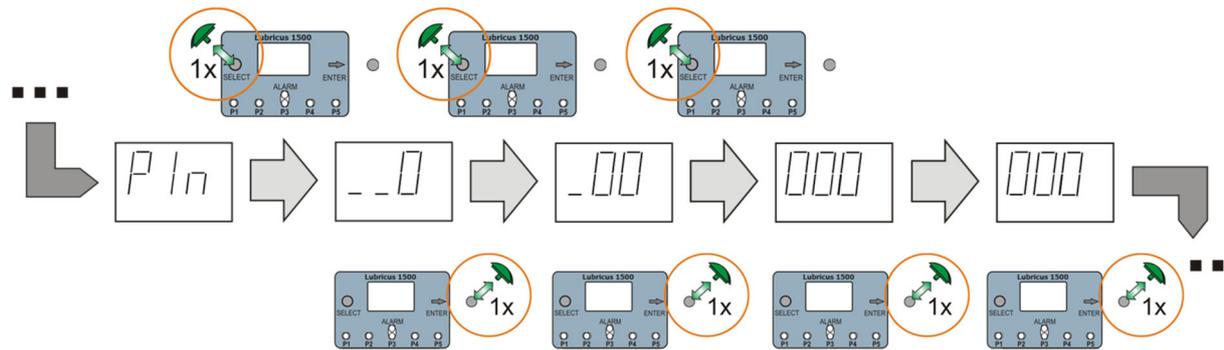
Selection of other menu items with PIN entry possible.



⇒ SELECT: Change settings
 ⇒ ENTER: Confirmation of all changes

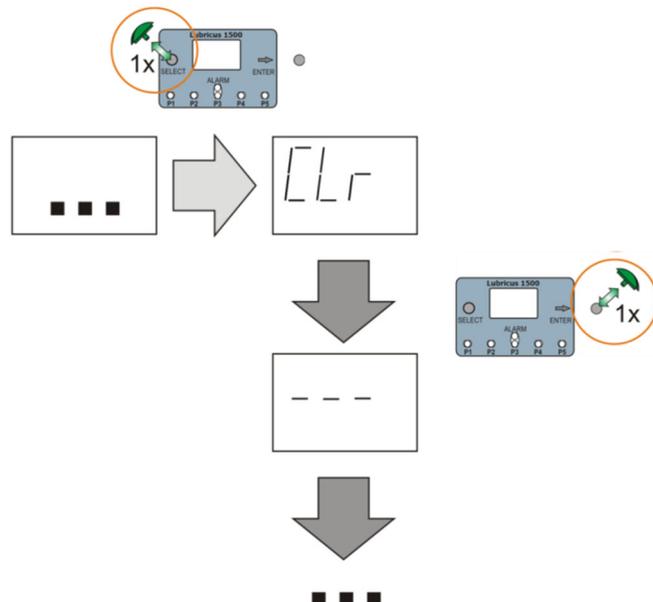
If no interaction takes place for a period, the device automatically returns to the previous display mode

The settings are performed with „ENTER“ and „SELECT“.
 The factory setting is: 000 (Master PIN siehe Service)



6.3 CLr – delete error messages and delete filling cycles

With Confirmation of „CLr“ error messages will be deleted.
 In „FIL“-Modus the filling operation will be stopped with „CLr“.



6.4 FIL – first start-up, venting the pump und filling of lubrication lines

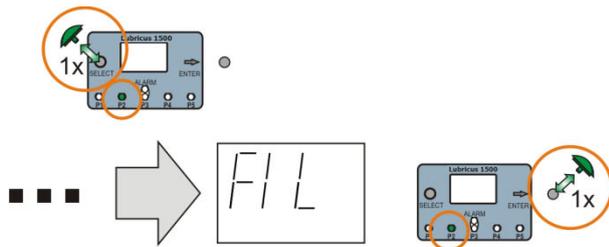
Attention: Lubricus M lubrication pumps must be filled at initial operation.
Each pump unit must be filled separately. The operation is completed when lubricant is visible at the outlet.

First start-up:

Pulse control

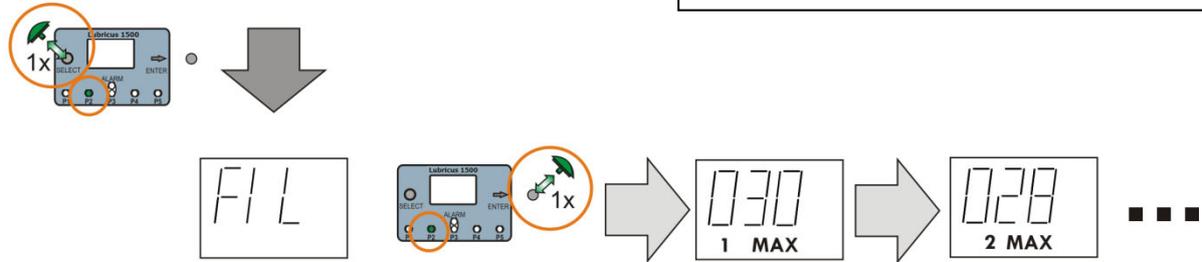
Attention!

Prefill housing inlet with 50 ml of suitable lubricant (same grease type as content of cartridge)
Attention: Low level indicator in the inlet must not be damaged.
Then place grease cartridge and start FIL function.



- ⇒ Select „FIL“
- ⇒ Confirm with ENTER
- ⇒ Select pump body
- ⇒ ENTER

Delete with CLr (Clear)



FIL means that the outlet of each pump unit is 15 times active.
Total time of FIL / pump unit: about 5 minutes

This function can also be used to pre-fill tubes.
15 cycles with 0,15cm³ = about 2 cm³

Delete with CLr (Clear)

Select other pump units with:

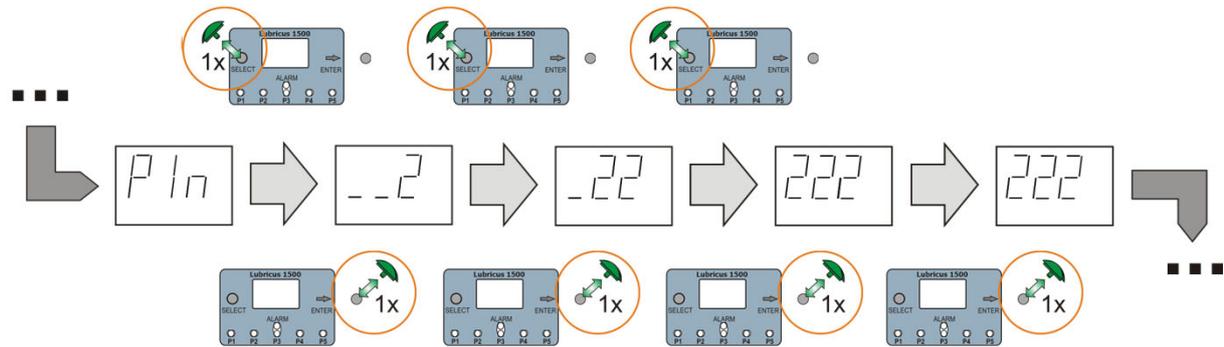
- ⇒ Pro
- ⇒ PIN
- ⇒ FIL

or timeout => exit the menu

6.5 Change PIN , factory setting PIN: 000 (Master PIN siehe Service)

In the menu point „PIN“ you can change the PIN for the access of the PRO-Menus.

Example: Change PIN to 222



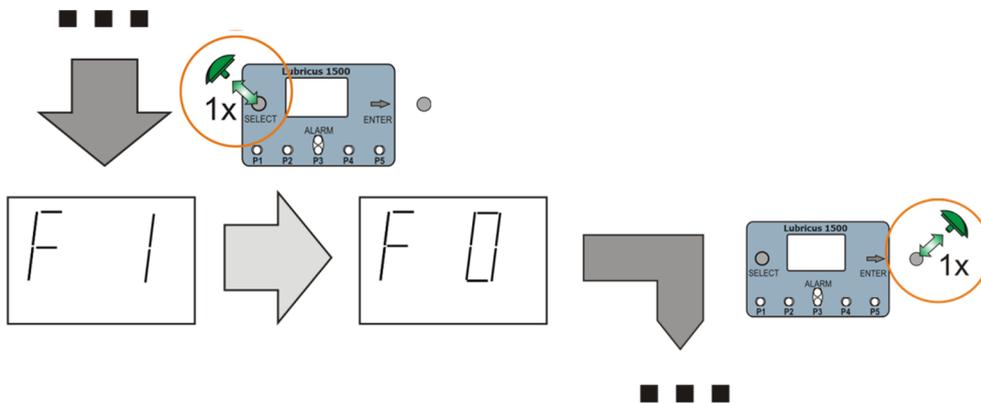
The new PIN is saved.

6.6 5.7 Change Feedback (Pump function control)

Feedback = Pump function control: During the function of the pump (about 7 s) the output signal at PIN 4 is switching from High (+ 20...30 VDC) to Low (0 V). By counting the signals of the pump function control there is a possibility to estimate the delivered quantity of lubricant and the remaining quantity in the lubricant reservoir (delivery rate per cycle = 0,15 cm³).

Factory setting: F 1 = Feedback “on”

Alternative: F 0 = Feedback “off”



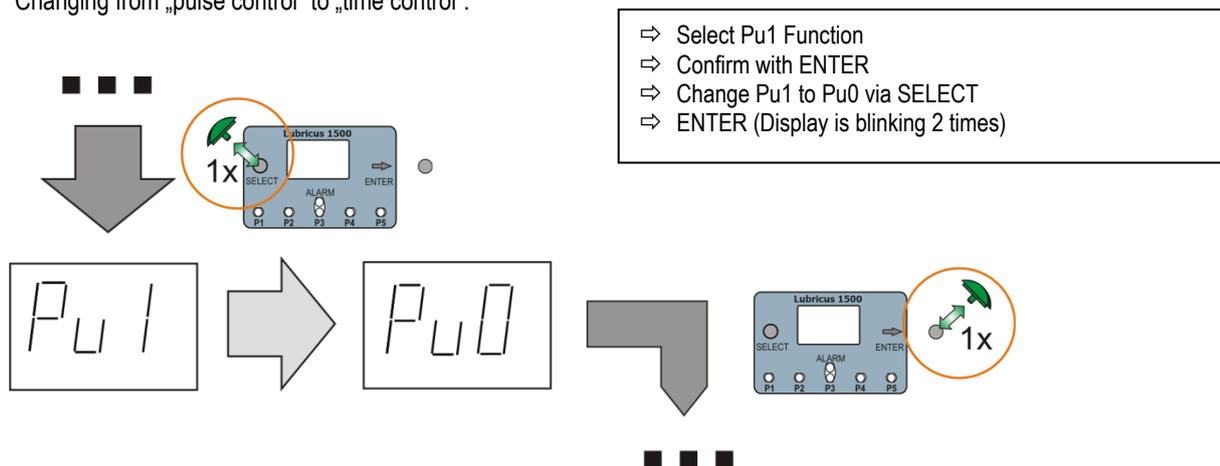
6.7 Change operating mode: Time control / pulse control

Factory setting: Lubricus M works in the „time modus“.

Basic setting: **Time control Pu0** = Time control „on“, pulse control „off“
ON appears on the control panel and activated pump units flashing in sequence (indicated by a green LED).

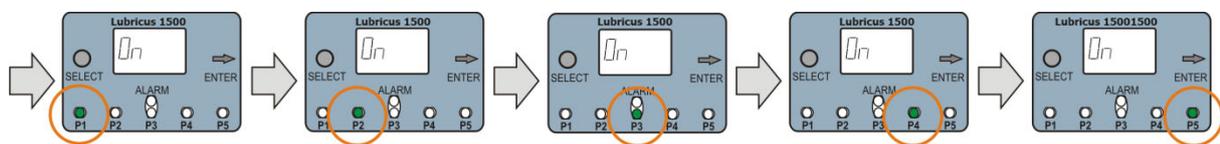
Alternative: **Pulse Control Pu1** = Pulse control „on“, time control „off“
PUL appears on the control panel and installed pump units flashing in sequence (indicated by a green LED).

Changing from „pulse control“ to „time control“:



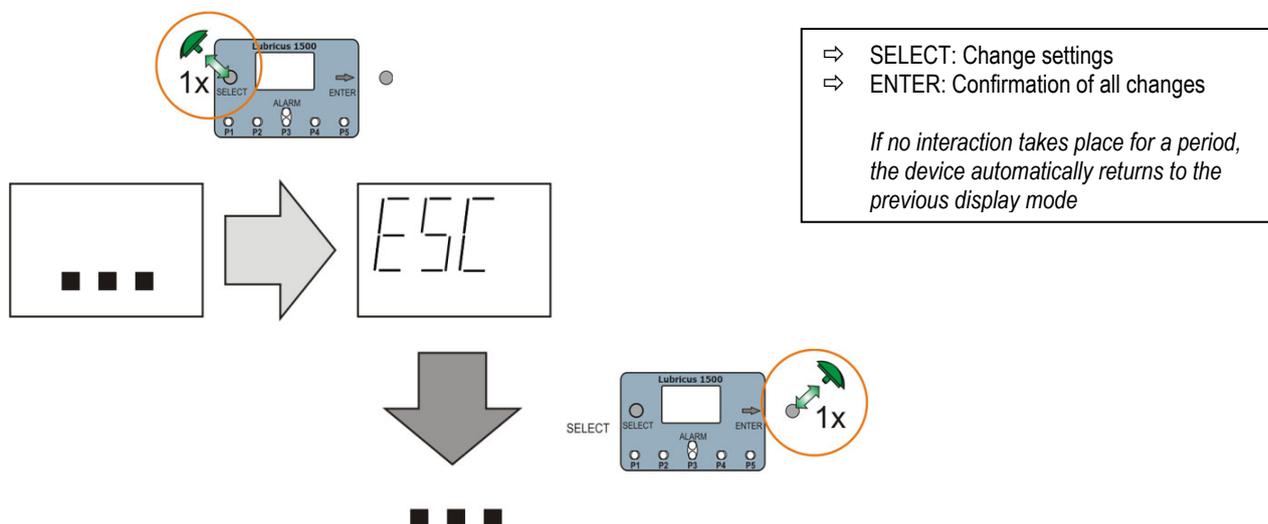
Lubricus M ist changed to time control.
 „ON“ is shown on the Display.

Example time control (5 installed pump units)



6.8 ESC – Exit the menu

Confirm „ESC“ with "ENTER" => exit to main menu.

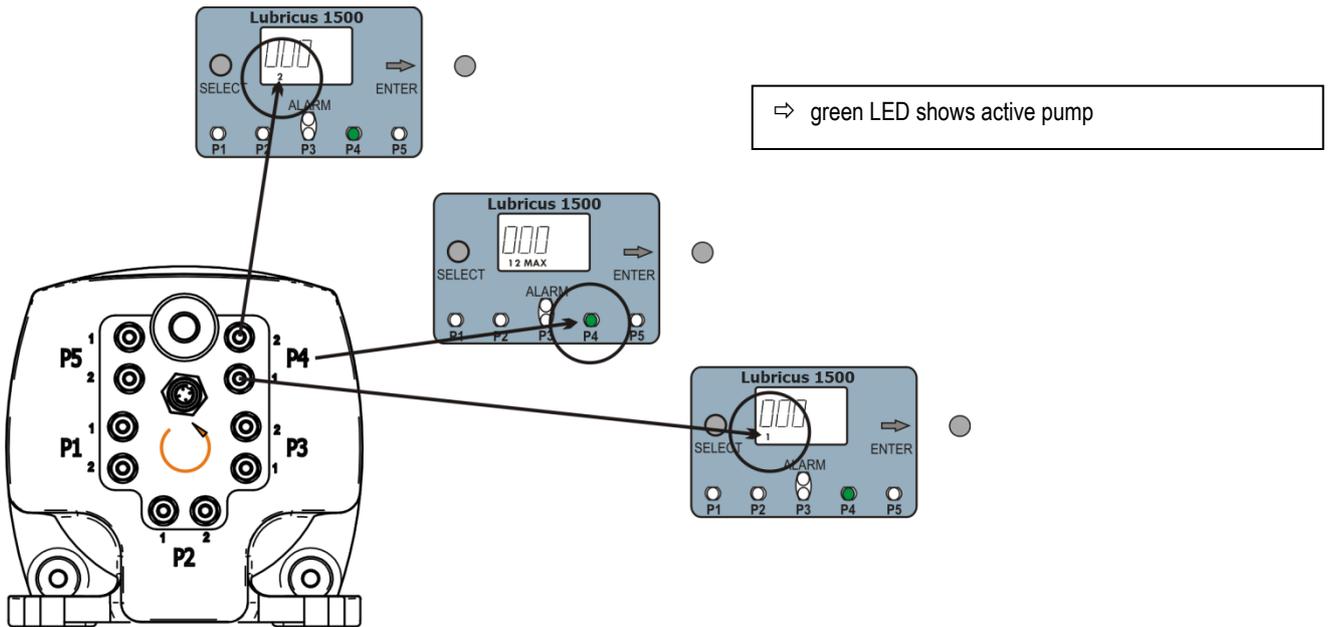


7) Pulse signals to activate the outlets

Indication in seconds, accuracy $\pm 0,2$ s, time between two signals > 20 s

Remark: During receiving a correct pulse signal at PIN 2, the display "PUL" flashes for confirmation. The green LED's (indicating the pump units) are not now active.

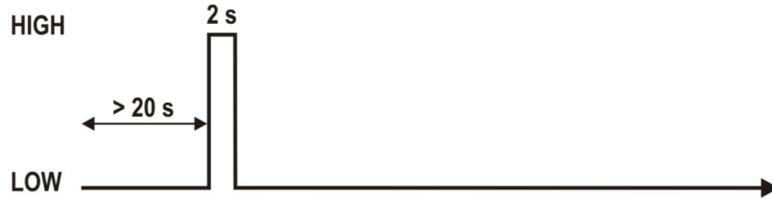
7.1 Identification pump units and outlets



7.2 Pulse signals pump unit 1

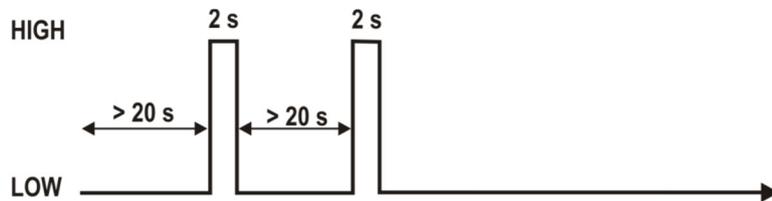
7.2.1 Pulse signals pump unit 1 – outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 2s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.2.2. Pulse signals pump unit 1 – outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 2s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. outlets will be served alternately.



7.3 Pulse signals pump unit 2

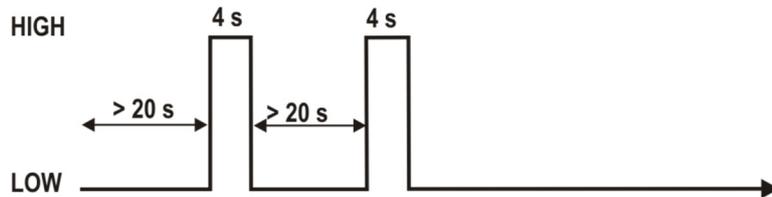
7.3.1 Pulse signals pump unit 2 - outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 4s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.3.2 Pulse signals pump unit 2 - outlet 1 and outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 4s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately



7.4 Pulse signals pump unit 3

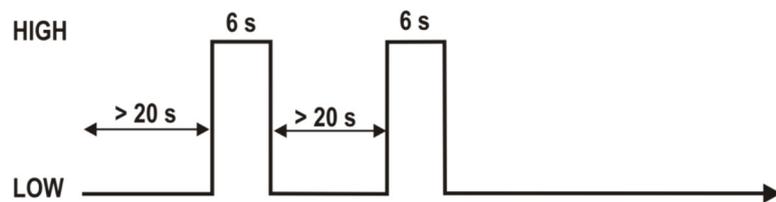
7.4.1 Pulse signals pump unit 3 – outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 6s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.4.2 Pulse signals pump unit 3 – outlet 1 and outlet 2

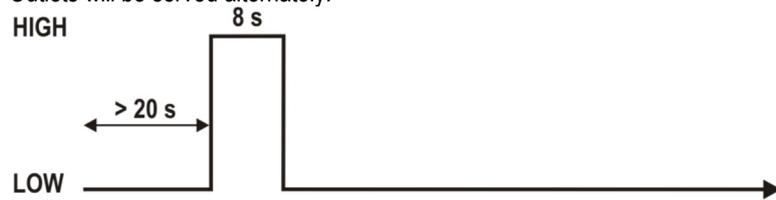
Delivery rate per pulse signal: 0,15cm³, indication: 6s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.5 Pulse signals pump unit 4

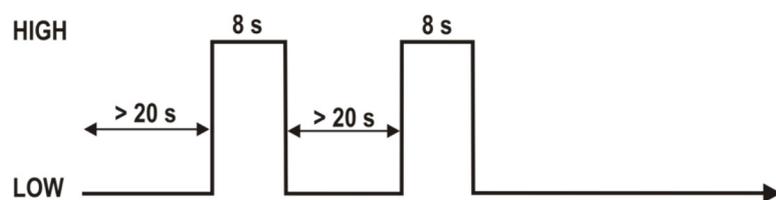
7.5.1 Pulse signals pump unit 4 – outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 8s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.5.2 Pulse signals pump unit 4 – outlet 1 and outlet 2

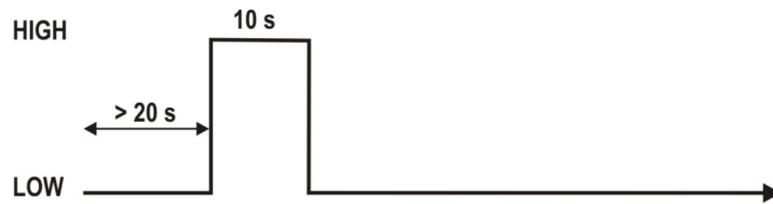
Delivery rate per pulse signal: 0,15cm³, indication: 8s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.6 Pulse signals pump unit 5

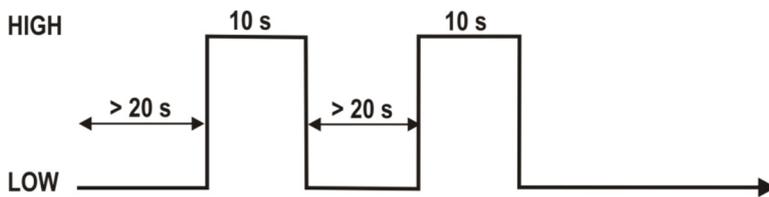
7.6.1 Pulse signals pump unit 5 – outlet 1 or outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 10s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



7.6.2 Pulse signals pump unit 5 – outlet 1 and outlet 2

Delivery rate per pulse signal: 0,15cm³, indication: 10s, time between two signals > 20 s, start of delivery rate at outlet 1 or outlet 2. Outlets will be served alternately.



Remark: A new pulse signal can be started sooner if the feedback signal (F 1 = feedback „on”) is analyzed. Requirement: After reaching normal pump running there is a clear High signal for at least 5s.

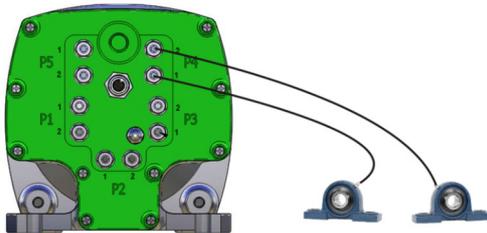
7.7 pulse control - acceptable Design

The specified lubricant quantity refers to the expected life of a piston pump or a pump unit. A service for the verification of the performance of Lubricus M is recommended. Service interval is 65,000 cycles per pump unit. 65,000 cycles correspond to 10.000 cm³ lubricant. See service: Readout of the device memory.

If a higher demand for lubricant at one lubricating point is required, the outlets of different pump units can be combined externally.

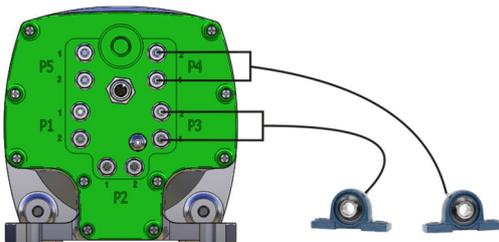
Please note! Unused outlets must remain open to avoid damage to the pump!

Examples:



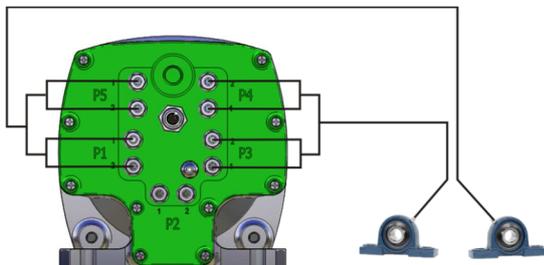
1 outlet supplying 1 lubrication point:

Allowed amount of lubricant for 1 lubrication point =
max. 5,000 cm³ at 50 bar back pressure



2 outlets supplying 1 lubrication point:

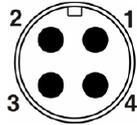
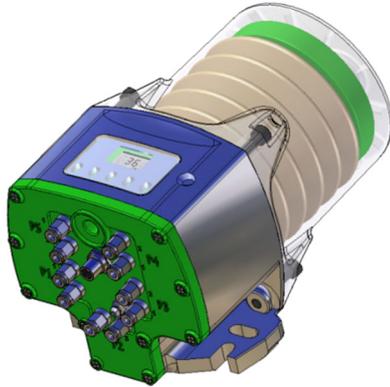
Allowed amount of lubricant for 1 lubrication point =
max. 10,000 cm³ at 50 bar back pressure



4 outlets supplying 1 lubrication point:

Allowed amount of lubricant for 1 lubrication point =
max. 20,000 cm³ at 50 bar back pressure

8) Communication interface (M12x1 connector) Lubricus M



Connector PIN assignment M 12 x 1

- PIN 1: Input voltage + 24 VDC (+/- 5%), stabilized operating voltage 24 VDC, color brown
- PIN 2: Input pulse signal to activate pump unit, color white
- PIN 3: Ground (GND), color blue
- PIN 4: Output Signal, color black

Details (all data refer to 24 VDC):

Peak current I_{max} (during pump operation), approx. 350 mA, typically < 200 mA, Standby current (standby mode) < 50 mA, typically 20 mA

The outlet signal (PIN4) can be charged with max. 100mA

The peak current increases by the sampled output current: for example 350 mA + 100 mA = 450 mA

Output signal (PIN 4): High (24VDC) = OK, LOW (0 V) = Error

Warning: The exit is not short-circuit proof.

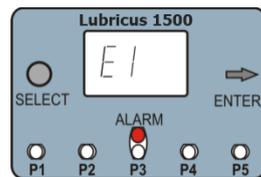
A time delay fuse 1A is normally required.

9) Errors, Messages

Malfunions will be recognized by the Lubricus electronics and shown on the display.

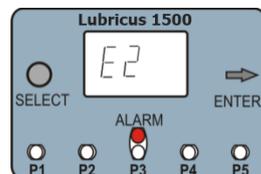
- General:** Display on the control panel + LED
- Mode time control:** Details appear on the control panel and activated pump units flashing in sequence (indicated by a green LED).
- Mode pulse control:** Details appear on the control panel and installed pump units flashing in sequence (indicated by a green LED).

9.1 Error message E1: Level indicator (output signal PIN 4 = Low (0 V))



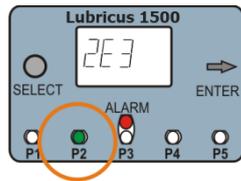
- Display: ALARM LED, Display E1
- Cause: Lubricant cartridge is empty or missing. Pumping is stopped!
- Remedy: Replace lubricant cartridge

9.2 Error message E2: Red locking pin is missing (output signal PIN 4 = Low (0 V))



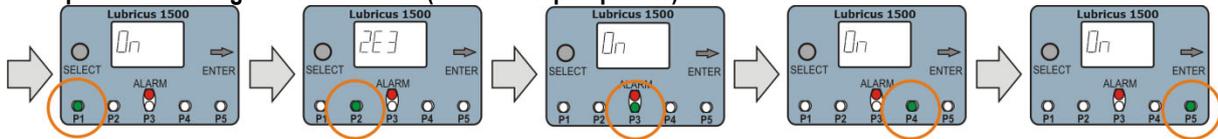
- Display: ALARM LED, Display E2
- Cause: Red locking pin is missing. Pumping of all pump bodies is stopped
- Remedy: Put in the locking pin at the bottom of the housing. The error message is cleared automatically. Pump will continue to run as per active program.

9.3 Error message E3: Pump unit works too slowly (output signal PIN 4 = Low (0 V))

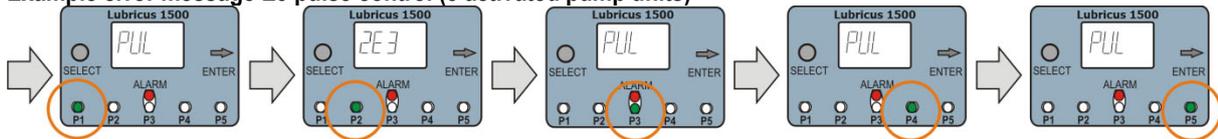


Display: ALARM (red LED) is flashing, Display: Number of pump unit + E3 = 2E3
Cause: Low-voltage, pump unit does not work in specified time. Pumping is stopped!
Remedy: Eliminate cause, delete error in the program Pro with Clr. Pump will continue to run.

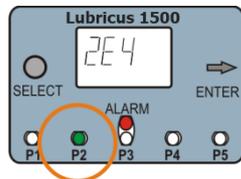
Example error message E3 time control (5 activated pump units)



Example error message E3 pulse control (5 activated pump units)

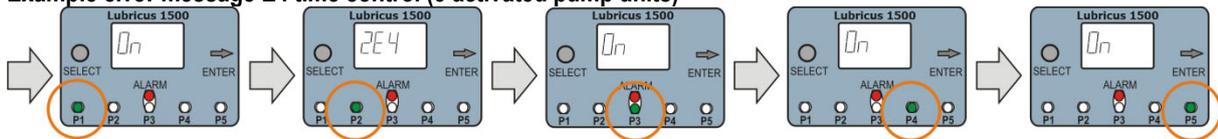


9.4 Error message E4: Internal electrical fault (output signal PIN 4 = Low (0 V))

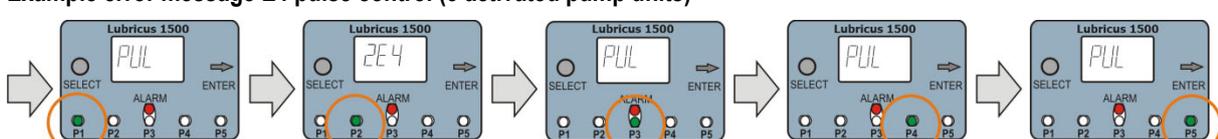


Display: ALARM (red LED) is flashing, Display: Number of pump unit + E4 = 2E4
Cause: Internal electrical fault. Pumping is stopped!
Remedy: Delete error in the program Pro with Clr. Pump will continue to run. After another error message E4 send the pump for repair.

Example error message E4 time control (5 activated pump units)



Example error message E4 pulse control (5 activated pump units)

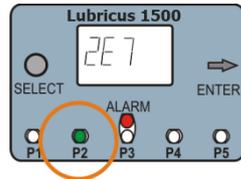


9.5 Error message E7: Back pressure too high/over-current (output signal PIN 4 = Low (0 V))

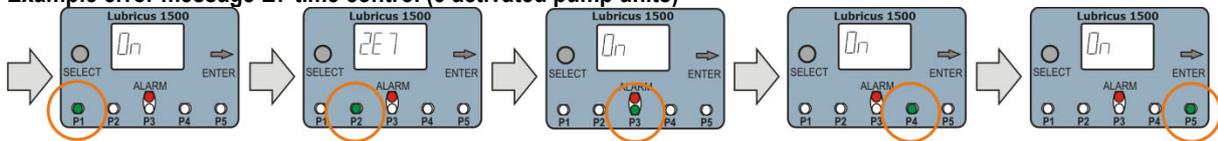
Display: ALARM (red LED) is flashing, Display: Number of pump unit + E7 = 2E7

Cause: Back pressure was measured 3 x too high. The lubrication point could be clogged, the tube length could be too long or the grease is too stiff or has hardened. Pumping is stopped!

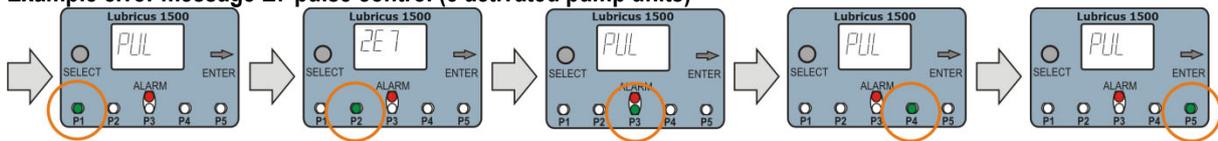
Remedy: Delete error in the program Pro with Clr. Pump will continue to run. After another error message E4 send the pump for repair.



Example error message E7 time control (5 activated pump units)

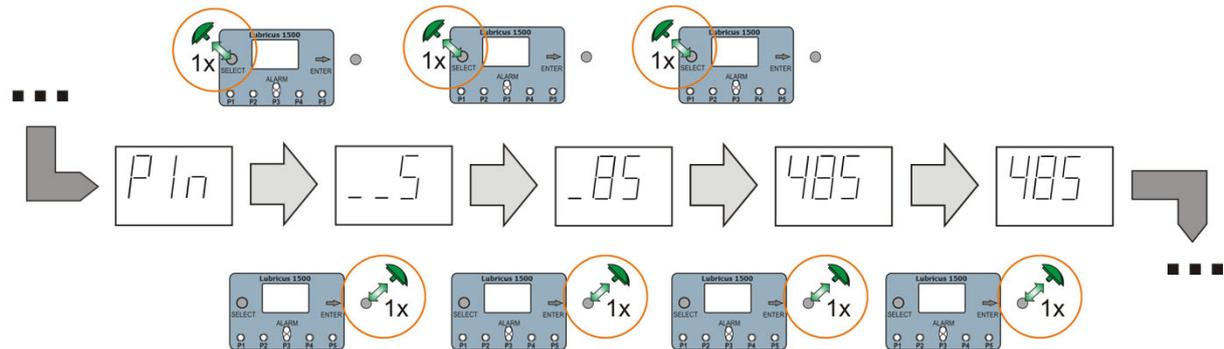


Example error message E7 pulse control (5 activated pump units)



10) Master PIN: 485

The Master PIN – 4 – 8 – 5 - can be entered to access the Pro program.



11) Service: Lubricus M

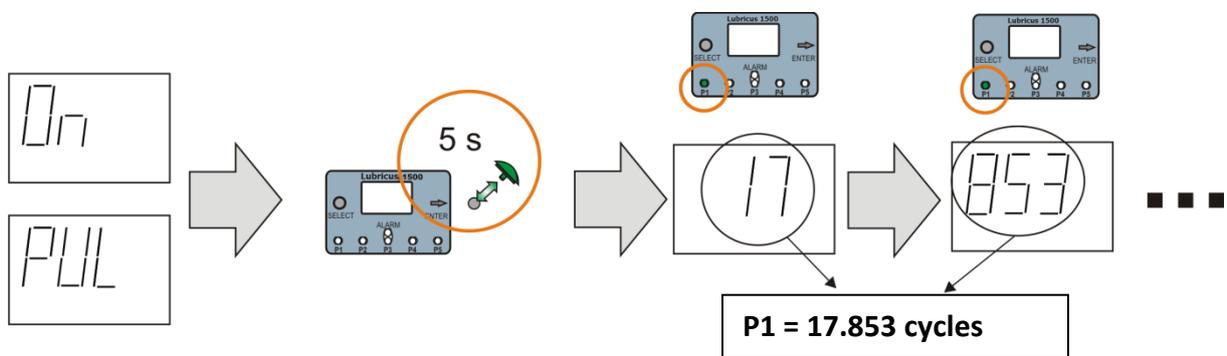
Lubricus M ist is designed for minimum quantity lubrication.

A service for the verification of the performance of Lubricus M recommended. Service interval is 65,000 cycles per pump unit. 65,000 cycles correspond to 10.000 cm³ lubricant.

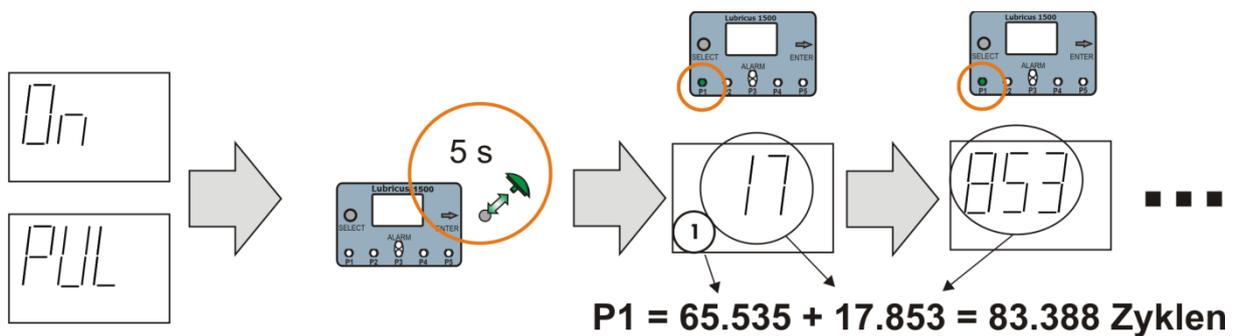
11.1 Readout of the device memory

The number of cycles can be determined by reading the device memory:

Touch for 5s the operating pad (ENTER) with the programming key. Then remove the programming key. The display shows in sequence the number of cycles for every installed pump unit. The cycles are counted to 65,535.



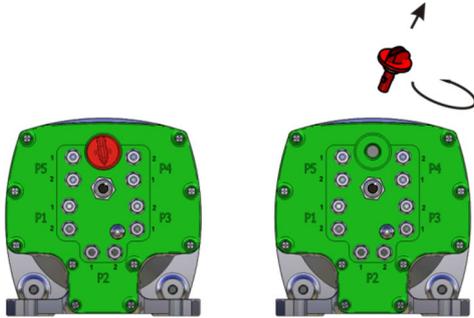
Thereafter an overflow occurs. Number 1 appears in the display. The cycles are counted again, starting with number 1. 65.535 must be added to the displayed number. A service of the pump unit is strongly recommended in order to ensure the performance of Lubricus M.



The only other service required is the change of grease cartridge.

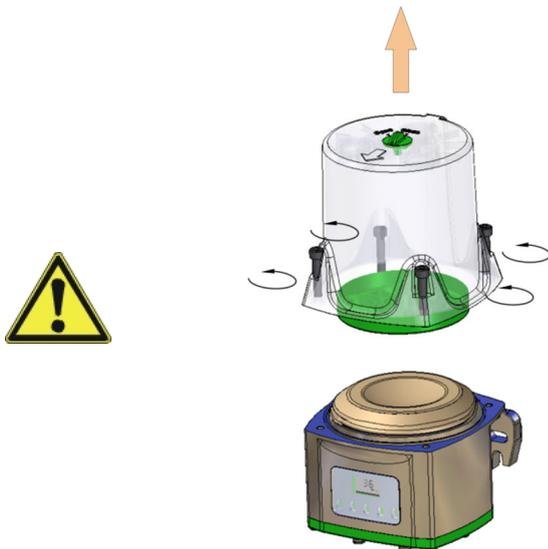
11.2 Service: Lubricus M – replacement of grease cartridge

1. Observe the safety instructions
2. Remove red locking pin (bottom of the housing)



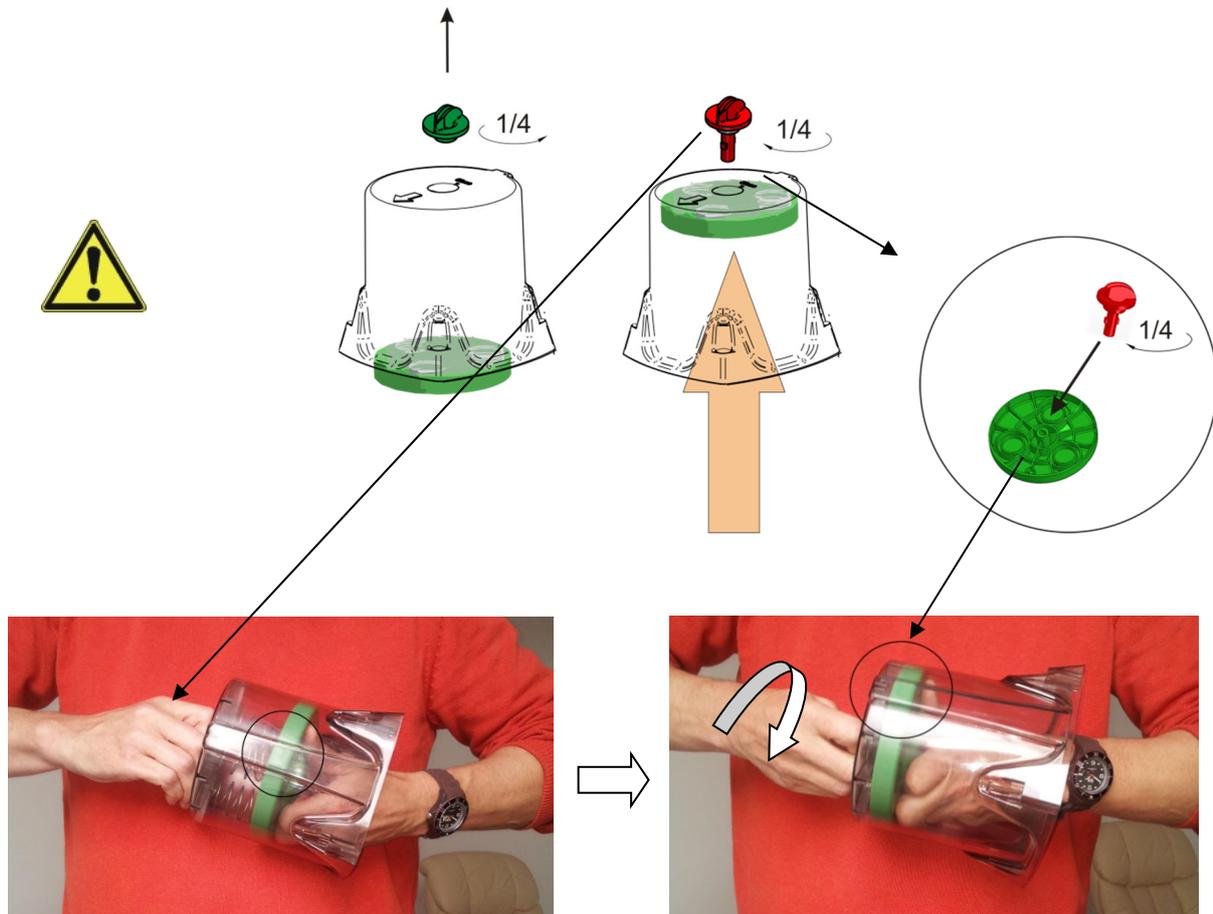
3. Remove transparent cover:

Attention: The internal components of the transparent cover are spring-loaded.

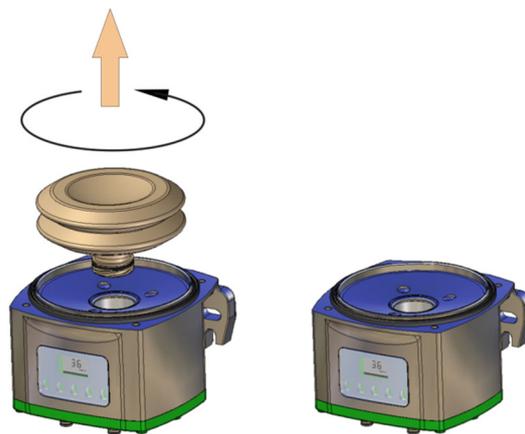


4. Remove the green actuation magnet and lock press plate with red locking pin.

Attention: The internal components of the transparent cover are spring-loaded.



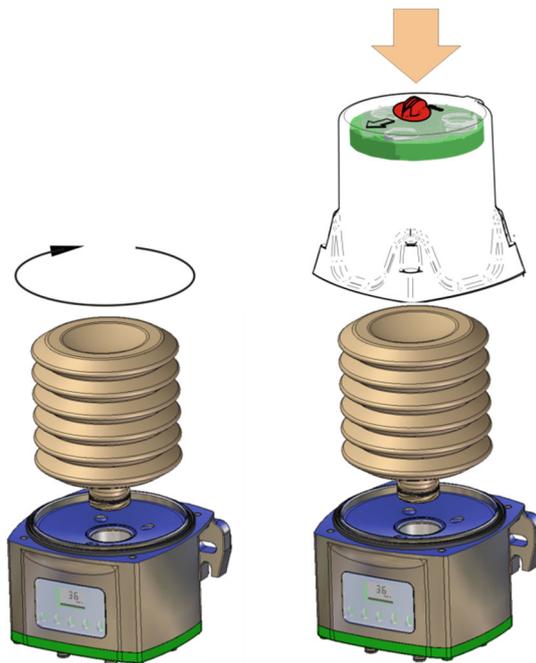
5. Remove grease cartridge



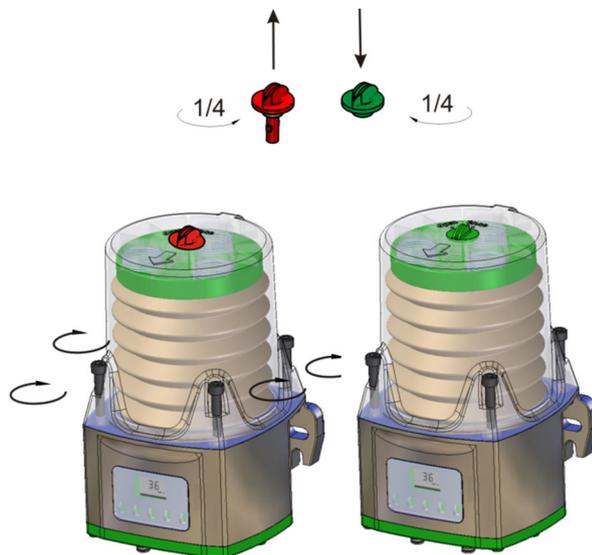
6. Remove protection from the new cartridge



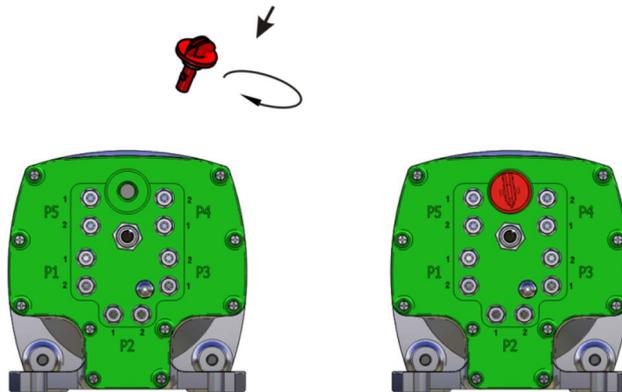
7. Place the cartridge on the inlet, install the prepared transparent cover



8. Complete the installation of the housing by tightening the screws to a torque of 5 Nm, remove the locking pin, reinstall actuation magnet.



9. Reinstall locking pin: **Attention: Pump will not function until the locking pin is installed!**



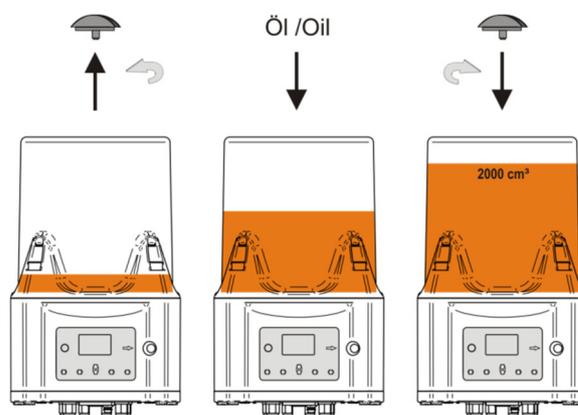
 **Attention: Pump will not function until locking pin is installed!**

10. The error message is cleared automatically
11. Fill if required (see section FIL)
12. Pump will continue to run as per active program

11.3 Service: Lubricus M – filling with oil

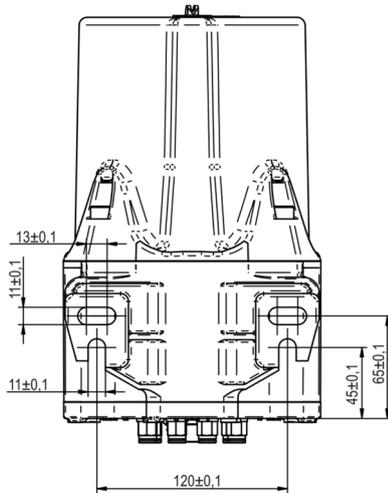
Storage/volume Lubricus M (with oil): 2000 cm³ oil reservoir

1. Observe the safety instructions
2. Remove the programming key (turn clock wise to OPEN)
3. Fill Oil
4. Reinstall programming key (turn counter clockwise to CLOSE)
5. The error message is cleared automatically
6. Fill if required (see section FIL)
7. Pump will continue to run as per active program



12) Mounting Lubricus M

2 screws (not supplied) Ø 10mm (for example, M10x80 or longer) are required to install your Lubricus M.



13) Technical data Lubricus M

Lubrication volume:	1500cm ³ grease cartridge
Lubricant type:	grease up to NLGI 2
Functional principle:	Piston pump
Dose volume per stroke:	0,15 cm ³
Number of outlets:	max. 10
Connection:	high pressure tube Ø 6mm
Operating pressure:	max. 70 bar, 1.000 psi
Operating voltage:	24 VDC
Operating temperature:	-20°C up to +70°C
Dimensions, max., W x H x D	Width x height x depth, 160 x 255 x 165 mm (without tube fitting)
Weight without lubricant:	approx. 4000g
Integrated controller:	Microelectronic
Pressure monitoring:	Integrated, electronic
Level monitoring:	Integrated, dry reed contact
Connector:	M12x1, 4-pole
Protection class:	IP 54
Progressive distributor control:	Suitable
Material housing:	Aluminium

14) Disposal

Please note!

When changing lubricants, the waste disposal instructions of the lubricant manufacturer must be observed! Regional applicable laws and regulations are to be observed when disposing of the Lubricus Lubrication System. See your applicable national/regional disposal guidelines for more information.



Emptied cartridges contain lubrication residue!

Please dispose of together with other oleaginous waste!

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Fax: +49-911-277 399 99