ON	Control signal unknown	Change the length of the input signal. See '5.6. Input signals'.

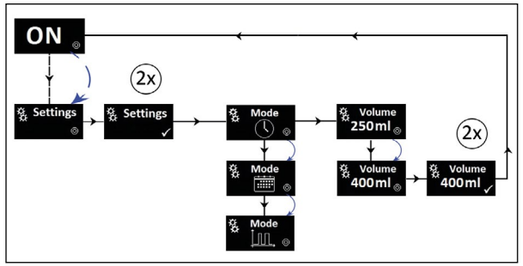
ⓘ LUB-V-OIL will not deliver any lubricant and does not process any control signals until all errors have been eliminated.

5.2 Actions with the activation and programming key

- Turn the activation and programming key to the OPEN position and remove it from the housing of LUB-V-OIL.
- Place the key on the action area on the front of LUB-V-OIL.
- Remove the key from the action area as long as the desired menu item is shown in the display.

5.3 Settings menu

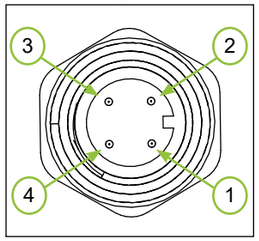
The Settings menu allows you to change the operating mode and the filling capacity of LUB-V-OIL. You can switch between hour mode, empty time mode and pulse mode.
Being in hour mode, you can change the pause time as well as the number of strokes per lubrication cycle.
Running empty time mode, you can change the emptying time in months as well as the number of strokes per lubrication cycle.



If you would like to change the operating mode, select the Settings menu and move the activation and programming key back to the action area when Mode is displayed.
The double circle appears and the three adjustable operating modes are shown alternately in the display.
When your desired operating mode is displayed, remove the activation and programming key from the action area.

ⓘ Settings made are saved even after the supply voltage is switched off.

5.4 PIN assignment



PIN	Assignment	Colour
1	+24 V DC	brown
2	input signal (pulse mode)	white
3	ground (GND)	blue
4	output signal	black

Type: M12x1 female connector; 4-pin, A-coded

5.5 Output signals - hour mode / empty time mode

The output signal at PIN 4 can be tapped for further processing (e.g. indicator light or external control). The maximum permissible current output must not exceed I_{max} < 20 mA. No inductive load (e.g. relay) may be connected!

Output signal (PIN 4)	Meaning
0,5 Hz-Square wave signal, permanent	Note E1 Empty oil reservoir LUB-V-OIL will not deliver any lubricant!
low, permanent	There is an error (E2, E3, E4). The error can be read on the display. LUB-V-OIL will not deliver any lubricant!
high, permanent	LUB-V-OIL is operating correctly or is switched off.

5.6 Input signals - external control (PLC)

To command LUB-V-OIL via an external controller (PLC) it is necessary to switch LUB-V-OIL to **pulse mode** in the Settings menu.
In pulse mode LUB-V-OIL operates as a pulse-controlled lubrication system only if unalterable input signals (high level) are transmitted from the PLC to LUB-V-OIL via PIN 2 in a defined sequence. LUB-V-OIL signals the respective status to the PLC via high/low levels which can be tapped off at PIN 4.

ⓘ To operate LUB-V-OIL via an external controller (PLC) in pulse mode a program corresponding to the communication protocol must be created in the PLC.

LUB-V-OIL provides the following unalterably defined control signals (input signals) which must be transmitted from the PLC to LUB-V-OIL via PIN 2 of the electrical M12x1 interface as high level (+24 V DC). The control signals must be generated as high level (+24 V) by the external controller (PLC) over certain times with a tolerance of +/- 25 ms.

Signal length in ms	Function
100 ms	1 stroke
900 ms	Filling function
1000 ms	Cancel Filling function
1600 ms	Status request
1700 ms	Acknowledge error (E2 and E3)

ⓘ LUB-V-OIL in pulse mode PUL only processes the control signals listed in the table up to a maximum length of 1700 ms. If a high level (+24 V DC) exceeds the defined tolerance level, LUB-V-OIL does not react.

ⓘ LUB-V-OIL continues to process the signal lengths used by devices between 2010 and 2022! (2 seconds: 1 stroke, 12 seconds: Filling function, 14 seconds: Acknowledge error)
The length of the first signal received determines which control signals it reacts to. A changeover is made by interrupting the voltage for a few seconds.

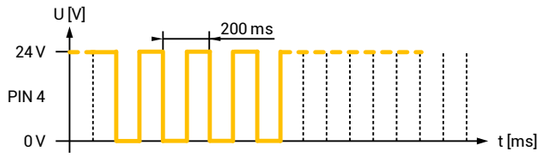
Control signal 100 ms

Immediately after the control signal drops the motor run of LUB-V-OIL starts and 0.15 ml lubricant is conveyed to the outlet. At the end of a lubrication stroke, LUB-V-OIL sends a output signal to PIN 4, which provides information about the past lubrication stroke as well as other states of LUB-V-OIL for evaluation at a PLC or other external control.

ⓘ At the earliest >500 milliseconds after the end of the output signal, a possible next control signal can be sent from the external control (PLC).

5.7 Output signals - external control (PLC)

During the transmission of the output signal, the signaling for information transmission changes several times from a high level to a low level and back again. The output signal is sent with a frequency of f = 5 Hz. After sending an output signal, a high level is permanently present at PIN 4.
The following graphic shows an example of an output signal.



Information about the status of LUB-V-OIL and about the past motor run can be evaluated via an evaluation of the number of edge changes of the output signal. For the evaluation of the edge changes, the rising edge must always be counted. The counted number of edge changes corresponds to a one-to-one state of LUB-V-OIL.

Number of edge changes	Information
1	Filling function canceled
2	Past lubrication stroke OK
3	Past lubrication stroke OK, oil reservoir soon empty
4	Overpressure (Error E2) at outlet 1
5	Overpressure (Error E2) at outlet 2 (if present)
12	Oil reservoir empty (Note E1)
14	Over-/undervoltage (Error E3)
15	Internal device error (Error E4)
16	Inadmissible, undefined control signal received

LUBRICUS

Quick start guide LUB-V-OIL

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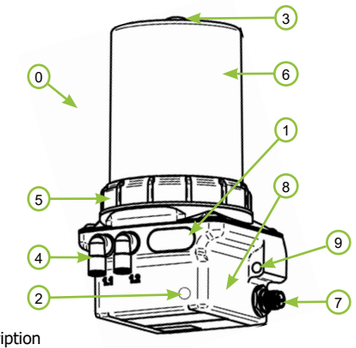
GRUETZNER AUTOMATIC LUBRICATION

1. Overview LUB-V-OIL



No.	Description
0	Lubricus V OIL (LUB-V-OIL)
1	OLED display
2	Action area (for actions with the activation and programming key)
3	Activation and programming key
4	Lubricant outlet(s) (different versions available)
5	Retaining ring
6	Housing
7	M12x1 electrical interface
8	Nameplate with designation, CE mark and serial number
9	Clearance hole for assembly

2. Technical data

Housing			
Mounting options		holes for screw M6	
Mounting position		upright	
Operating temperature		-15 to +60*	°C
Lubricant and hydraulic			
Lubricant outlets		1 / 2 (depending on model)	
Max. Pressure		70 bar / 1015 psi (-10%/+15%)	
Oil reservoir volume		400	ml
Grease delivery	per stroke	0.15	ml
Electrics			
Operating voltage (DC)		24 (+/- 5%)	V
Protection		0,75 (slow blow)	A
Protection class		IP 54	

* The stated value is down to the individual application and may extensively differ in some cases (depending on the lubricant and further conditions).

NOTE

With the OIL version of the Lubricus, neither the retaining ring nor the oil reservoir must be removed, as this may cause the unit to leak.

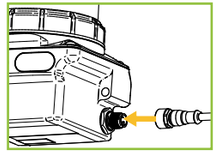
3. Commissioning

Mechanical fastening

Fix LUB-V-OIL mechanically. Pay particular attention to the maximum tightening torques permissible!

Electrical connection

To connect LUB-V-OIL with an external power supply system add a proper connecting cable to the electrical interface on the side of LUB-V-OIL. (Fig. 3)



DANGER

Damaged or flawed electrical connections or unlicensed hot components lead to heavy injuries or even death.

Power on

Execute Filling function

Bleeding of the pump during initial commissioning.

Hydraulic connection

Connect the equipment hydraulically to LUB-V-OIL. When you connect tubes to LUB-V-OIL make sure that tubes and connectors are installed tightly, cleanly and correctly.

The tube length shall not exceed 5 meters, the inner tube diameter shall not be lower than 4 mm. Make sure that the end of the tube is cut straight. Insert the prefilled tube or tubes into the tube connectors of the lubrication system until they stop.

ⓘ Ideally, use tubes prefilled with the appropriate lubricant.

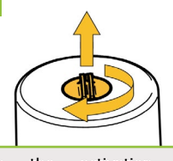
Check settings on LUB-V-OIL

Check the required values for the lubrication point and adjust the settings of LUB-V-OIL if necessary.

Factory settings: operating mode=hour mode.

4. Filling

1



Turn the activation and programming key counterclockwise and remove it.

2

Fill the oil reservoir with oil through the opening where the activation and programming key was.
Then place the magnetic key back in place.

5. Operation and settings

Three operating modes can be selected.

The **hour mode** allows setting the number of strokes per cycle (strokes) within a pause time (Pause) in hours. Pause times between 1...240 hour(s) and strokes per cycle between 1...30 can be set.

The **empty time mode** allows the emptying time of the oil reservoir to be set in months (months) and the number of strokes per cycle (strokes). Emptying times between 1...36 month(s) and strokes per cycle between 1...30 can be set.

Additionally, LUB-V-OIL can be embedded into a programmable logic controller (PLC) which sends orders and controls LUB-V-OIL in **pulse mode**.

Default settings: hour mode

Pause = 3 The pause time between the start of two cycles is 3 hours.
strokes = 1 The number of strokes per cycle is one (1).

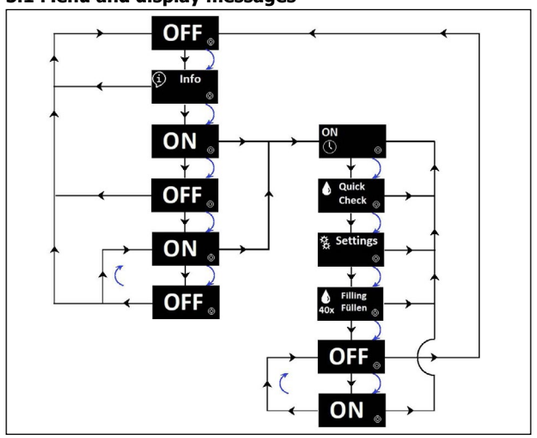
Default settings: empty time mode

months = 12 The empty time of the oil reservoir is 12 months.
strokes = 1 The number of strokes per cycle is one (1).

Default settings: pulse mode

Pulse mode enables embedding LUB-V-OIL in an external control (PLC) to command and control the device.

5.1 Menu and display messages



The graphic above illustrates the unchangeable basic flowchart of the LUB-V-OIL menu navigation as well as the options for branching to submenus.

ⓘ LUB-V-OIL can be switched on and off at several points in the menu navigation.

ⓘ The Info menu provides you with an informative overview of the current LUB-V-OIL settings.

ⓘ The Settings menu allows you to change the operating mode, make changes to the LUB-V-OIL settings - and thus to its dispensing behavior and to adjust the filling capacity.

ⓘ See the table on page 5 for more information on the menu and the sub-items and functions.

Display	Meaning
Selection of the operating mode in the Settings menu	
Mode	Operating mode: **hour mode**
Mode	Operating mode: **empty time mode**
Mode	Operating mode: **pulse mode**
Selection of the settings in the Settings menu	
Pause 3 [h]	Adjustable setting of **pause time** (hour mode only)
Monate months 36	Adjustable setting of **emptying time** (empty time mode only)
Hübe strokes 1	Adjustable setting of **number of strokes** (hour mode and empty time mode only)
Volume 400 ml	Adjustable setting of **filling capacity**
Quick-Check / Filling	
Quick Check	Back pressure check by special dispensing
Filling 40x Füllen	Bleeding of the pump for example, during initial commissioning
1.1 1.2 50 max. bar bar	During Quick Check/Filling, the current back pressure at the outlet is displayed in bar.
20x STOP	Cancel Quick Check/Filling
Displays in the Info menu	
Software N41	Firmware version of LUB-V-OIL
002700	Number of executed strokes

Errors		Remedy
0%	Note E1 (empty cartridge)	Refill the oil reservoir. No need to acknowledge the error.
X p >70 bar	Error E2 (overpressure)	Check lubrication point and eliminate the cause. Acknowledge error.
X	Error E3 (over-/ undervoltage)	Check the power supply. Acknowledge error.
X Gerätefehler Device error	Error E4 (device error)	Disassemble LUB-V-OIL and return it to the manufacturer with a description of the fault.