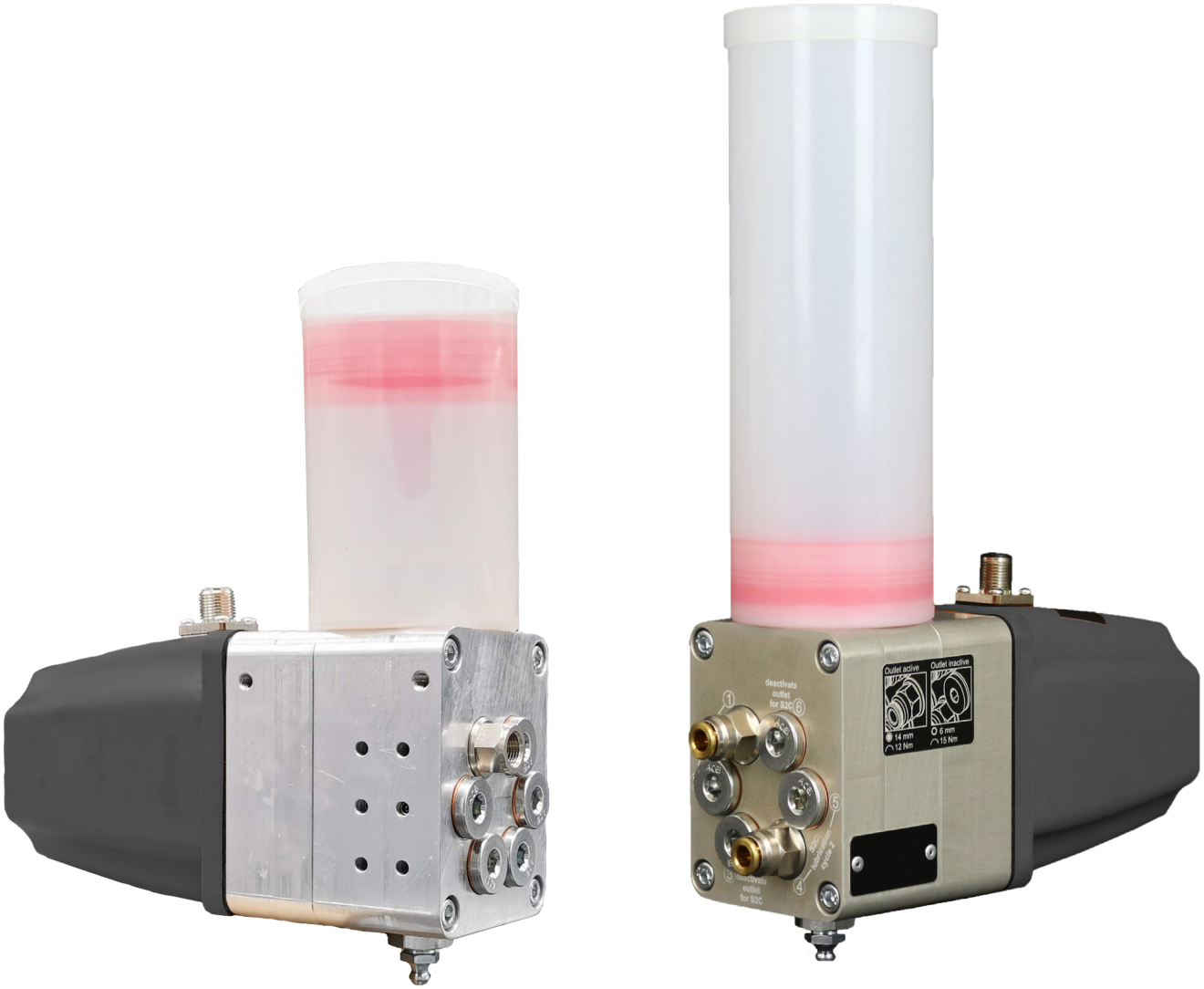
User manual

DLS-47x
DLS-47x-2C



Translation
With deliveries into the member states of the EU, the operating manual has to be translated in the language of the user's country.
In case of any discrepancy in the translated text, the original operating manual (German) is the reference to be used for clarification or the manufacturer to be contacted.

Content

1. Important note on this operating manual

This operating manual is part of the machine and has to be accessible to the operators and maintenance staff at any time. The safety instructions in the operating manual must be observed. If the machine is sold, the operating manual has to be included in the delivery.

In addition to this operation manual, always be careful to observe the laws and regulations being applicable in the country of use.

1.1 Users

This operating manual is directed to technically qualified users, who were trained and instructed for the operation of this machine.

1.2 Obligation for reading

As user and operator of the machine, you are obliged reading and understanding this operating manual, and in particular, the chapter „Safety regulations". It is your safety! In case of questions and doubt, please contact DLS Schmiersysteme GmbH.

1.3 In case of questions

DLS Schmiersysteme GmbH will support you in case of questions you cannot solve by consulting this operation manual. If such case arises, complete your question with a precise description of the situation.

1.4 Operating manual

1.4.1 Validity

This operating manual refers to the series type of the machines DLS-47x/-2C.
If sections of the operating manual refer to certain designs only, then special refer-ence is made to this.

1.4.2 Content and purpose

This operation manual contains the relevant information for the commissioning, operation and maintenance of the pump unit. It is designed to help you in using the pump unit properly, efficiently and safely.

1.4.3 Site

The operating manual has always to be available for the users at the workplace.

1.4.4 Meaning of the safety instructions and signs

Safety instructions

The pictograms and signal words for safety instructions, precautions and notes have the following meaning in this operating manual:

Danger!	Directly imminent danger, which may lead to severe body injuries.
Warning!	Possibly imminent situation, which may lead to severe body injuries.

Caution!	Possibly imminent situation, which may lead to light body injuries.
Caution!	Warning of material damage.

Note!	Possibly damaging situation, in which the product or an object in its environment could be damaged.
Important!	Notes on use as well as other useful information, which facilitate the use of the product according to its intended technical purpose.

Danger!	Directly imminent danger by electric power, which may lead to severe body injuries.

2. Identification

2.1 Product brand and type designation

Piston pump unit of the manufacturer DLS Schmiersysteme GmbH

Produkttyp: DLS-47x // DLS-47x-2C

2.2 Product version

Version from year of construction 2022

2.3 Product designation

The type plate is mounted on the side of the pump body and contains the following details:

Typ	(DLS-474)
No. <order number>	(z. B. 2022010101)
Year of construction	

2.4 Conformity

The pump unit complies with the requirements of the EC directive (2006/42/EC).
The pump unit complies with the requirements of the UKCA Safety Regulations 2008 No. 1597.
As for the declaration of conformity, see chapter 11.

*For better understanding, the designation DLS-47x/-2C is used for both pump variants

3. Product decription

3.1 Purpose

The pump unit DLS-47x/-2C is designed for the delivery of lube oils as of 150 mm²/s or for the delivery of lube greases from NLGI class 000 up to NLGI class 2 exclusively. Different viscosity classes are possible, but this requires careful verifycation. Therefore, please contact DLS Schmiersysteme GmbH if you wish to operate the unit with lubricants other than those described above.

3.2 Limitation of use

The range of use of the components of the pump unit is limited as follows:

Temperature range:	-20 ... +60 °C
Permitted discharge pressure:	max. 70 bar

The device can also be used at lower temperatures, but this requires careful verification in combination with the desired medium. Therefore, please contact DLS Schmiersysteme GmbH if you wish to operate the device in a temperature range other than that described above.

Depending on the version, these limits of use may be restricted further. Such further restrictions are dealt with in this operation manual later on. Besides, the unit's area of application is determined by the medium to be delivered. Hence, when determining the area of application, you also need to refer to the technical data sheets for the medium to be used.

3.3 Environmental conditions

Unit operation in an aggressive atmosphere (solvent vapours, acids, lyes, saltwater mist, etc.) may cause damage and/or corrosion of components and thus, failure of the installation as well as hazards by escaping lubricant!

Ambient temperature range

lower limit temperature:	- 20 °C
upper limit temperature:	+ 60 °C
relative humidity:	max. 70%

Noise level: <70 dB(A)

Physical environment

Use of the installation above 1000 m sea level after consultation with the manufacturer only.

3.4 Intended use

The unit is exclusively to be used for the supply of lubricating oils or greases in central lubricating installations. The intended use includes as well:

- Considering the safety instructions as well as safety regulations in this operating manual, and
- complying with the service and maintenance instructions in this operating manual.

Any other use or use beyond the intended one may result in severe damages of persons and objects.

Any supply of gases, liquefied gases, gases liquefied under pressure, vapours and fluids, whose steam pressure exceeds the normal atmospheric one (1013 hPA) by more than 0,5 bar with the admissible maximum temperature, highly flammable or explosive media as well as the supply of food are interdict.

Important! **Please consider the safety data sheets of the used sub-stances!**

The unit is designed for the direct lubrication of up to six lubrication points. Use the flow dividers to distribute the lubricant.

The unit is expressly not intended to supply a distribution system, especially not with main and secondary distributors.

Due to the low flow rate, the use of the shortest possible lubricant lines is strongly recommended in order to avoid ageing of the lubricant in the lines.

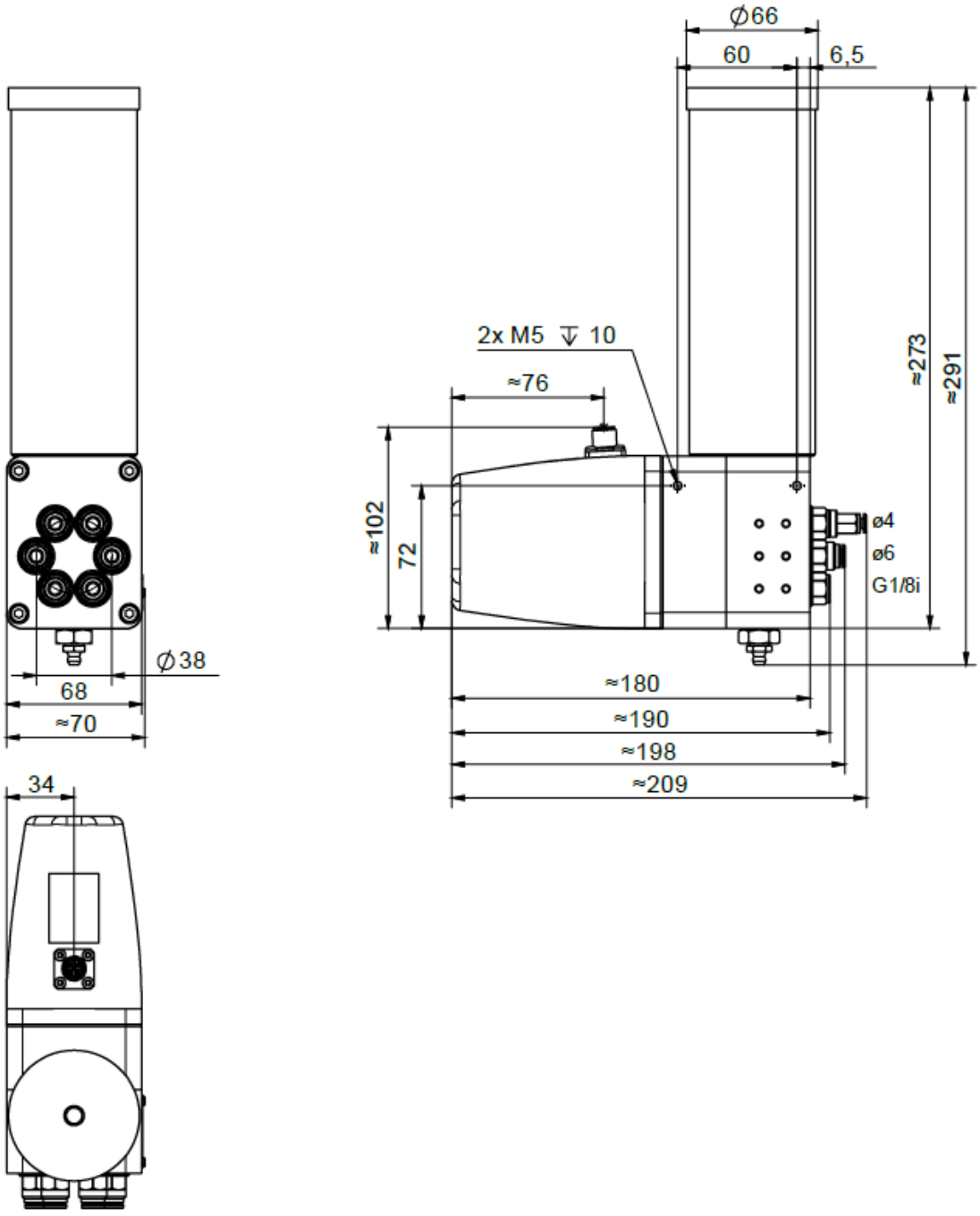
3.5 Technical data

3.5.1 Components

The unit consists of up to three assemblies the different versions of which may vary:

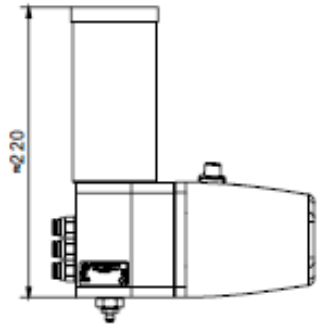
- Pump body with drive, function monitoring and level monitoring
- Reservoir
- Non-return valve cartridges (outlets)

3.5.2 Dimensions (in mm)

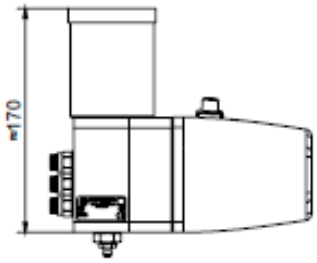


weight container						
	with container 380	with container 250	with container 125	with DIN 1284	with Lube-Shuttle	with System Reiner
weight in kg	ca. 1,6	ca 1,6	ca 1,6	ca 2,4	ca 2,0	ca 2,0

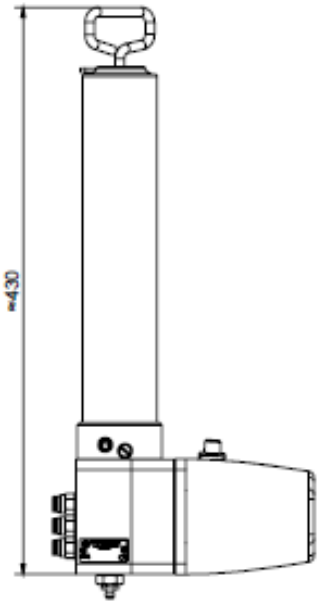
Container 250

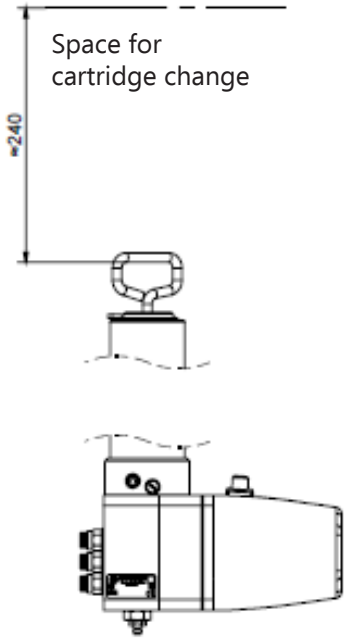


Container 125

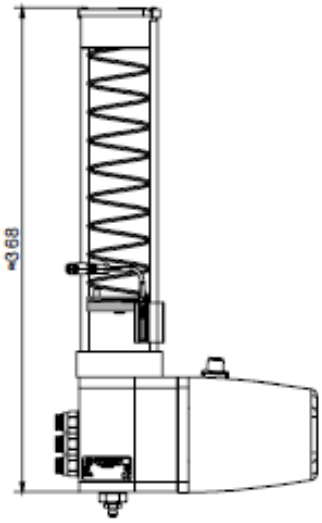


DIN 1284

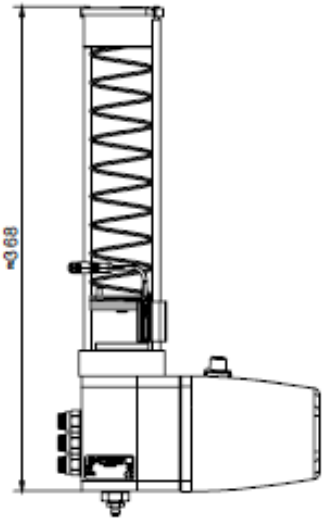




Lube-Shuttle



System Reiner



3.5.3 Technical data

In its basic version, the unit comprises the pump body with DC motor. The technical data of this unit is as follows:

• Unit:		DLS-47x/-2C
• Delivery volume per stroke and outlet:		40 mm^3
• Speed:		ca. 6 min-1
• Number of outlets:		1 ... 6
• Medium:		Grease NLGI-Klasse 000 ... 2
		Oil 150 ... 1900 mm^2/s
• Temperature range:		+10 ... +80 °C
• Material	Pump body:	Aluminium anodized
		galvanized steel
	Sealings:	FPM / NBR / HNBR
• Mounting position:		vertical
• Protection class:		DIN EN 60529 IP44
		(only with mounted reservoir)

Motor:

• Voltage:	24 VDC
• Current consumption:	max. 0,5 A

Level monitoring for reservoir 380, 250, 125:

• Voltage:	10 ... 30 VUC
• Switching current:	max. 0,25 A
• Switching capacity:	5 W/VA
• Switching function:	NC contact at min

Function monitoring:

• Voltage:	10 ... 30 VUC
• Switching current:	max. 0,5 A
• Switching capacity:	10 W/VA
• Switching function:	NO contact
	1 signal per revolution

Reservoir cartridge control button:

• Voltage:	0,1 ... 50 VUC
• Switching current:	max. 0,2 A
• Switching function:	NO contact
• Electrical connection of the pump:	Male M12x1, 5-pin

The level monitoring of the reservoirs Lube-Shuttle, System Reiner and DIN1284 are connected separately (see also technical data of the respective reservoir variant).

If inductive or capacitive loads are connected, suitable protection circuits are to be installed! (diode, RC-module, varistor)

Reservoir 380, 250, 125 with capacity 380 ml, 250 ml, 125 ml:

• Medium:	Grease NLGI-Klasse 000 ... 2
	Oil 150 ... 1900 mm^2/s
• Material:	Polyamid
• Weight:	ca. 0,1 kg
• Mounting position:	Grease: vertical
	Oil: vertical

Reservoir DIN 1284

• Medium:	Grease NLGI-Klasse 0 ... 2
	other NLGI-classes upon request
• Material:	St und Al
• Seals:	NBR / FPM
• Weight without cartridge:	ca. 0,9 kg
• Mounting position:	vertical

Level monitoring:

• Voltage:	10 ... 30 VUC
• Switching current:	max. 250 mA
• Connection type:	Male M8x1, 3-pin
• Protection class:	DIN EN 60529 IP67
• Switching function:	NC contact
• Connection diagram:	

Reservoir System Lube Shuttle /
Reservoir System Reiner:
(the following piston must be at least 25 mm away from the edge of the cartridge)

• Medium:	Grease NLGI-Klasse 0 ... 2
	other NLGI-classes upon request
• Material:	St, Al und PA
• Seals:	FPM
• Weight without cartridge:	ca. 0,5 kg
• Mounting position:	vertical
• for cartridges:	400 or 500 g
	Cartridges are not part of the scope of delivery!

Level monitoring:

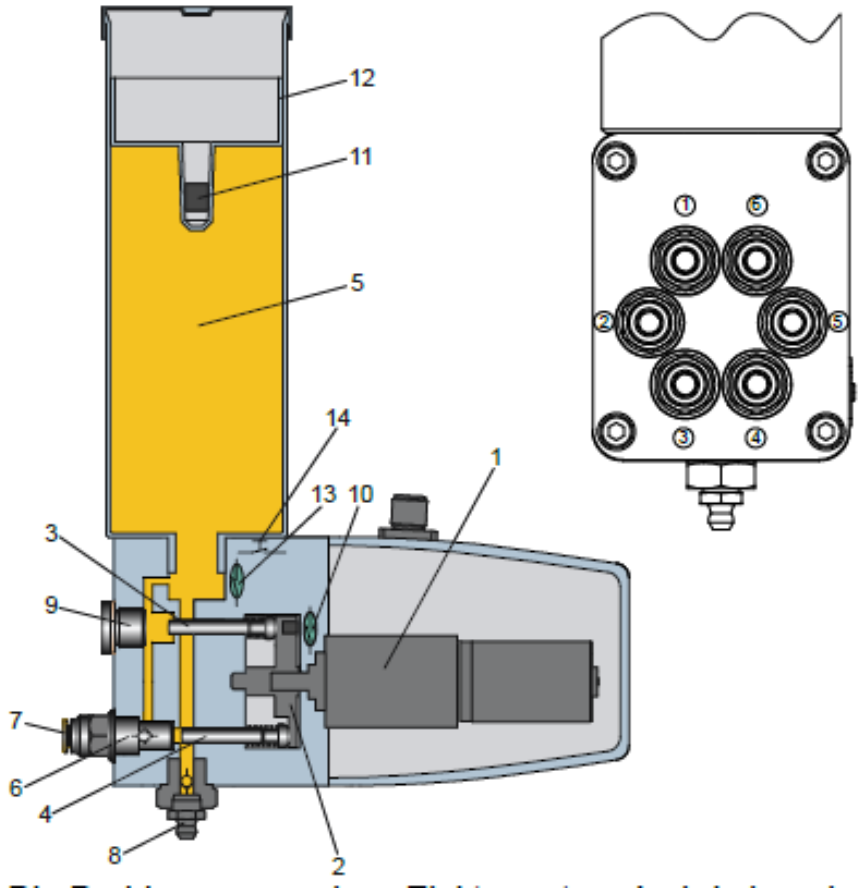
• Voltage:	10 ... 30 VUC
• Switching current::	max. 0,1 A
• Protection typ:	DIN EN 60529 IP67
• Connection type:	Cable with male M8x1, 3-pin
• Switching function:	NC contact
• Connection diagram:	

4. Functional description

4.1 Drive

The unit is driven by a DC motor, which is installed inside the pump.

4.2 Operation



The rotational movement of an electric motor **1** is converted via a swash plate **2** into a lifting movement of the delivery pistons **3** and **4**. In the suction position (piston **4**) the medium is drawn in from the reservoir **5**, in the pressure position (piston **3**) the medium is pumped towards the outlet.

At flow the medium flows through the integrated non-return valve **6** to the outlet. Lubricant lines can be connected with the push-in fitting **7**. An empty reservoir **5** can be refilled via the grease nipple **8**.

4.3 Outlets

Any number of non-return valve cartridges **6** or screw plugs **9** can be retrofitted to outlets. If a screw plug is used, the lubricant is pumped back into the suction line.

4.4 Function monitoring

A fixed Reed contact is located in the pump housing. The rotational movement of swash plate **2** is detected by a monitoring element **10**. A signal is emitted at each rotation. This signal can be evaluated by an external controller.

version: DLS-47x/-2C-2C
In standard mode (continuous actuation), the rotation time of the swash plate **2** is monitored. In addition, a signal is emitted when the rotation has been completed.
In dual-cycle mode (pulsed actuation), a pulsed signal is emitted after conveying has been completed, depending on the lubrication circuit.

4.5 Level monitoring

The position of the follower piston **11** or the float in the reservoir **5** is monitored via a further monitoring element **12**. The signal is emitted as long as the follower piston or the float is in the detection range of the monitoring element. When the reservoir is refilled, the empty signal disappears automatically.

With the S2C version, a pre-warning is issued in addition to the empty message.

4.6 Reservoir cartridge control

A pushbutton **13** integrated in the pump body serves as a control whether the cartridge is completely screwed in (only for reservoirs 380, 250, 125). If the button is not actuated, an error message is generated.

Only with standard version:
The error messages „Fill level min" and „Cartridge not screwed in" are generated as a common NC signal at pin 2.

4.7 „Smart 2 Cycle“ version

In the „Smart 2 Cycle“ version, the pump has two different operating modes. The selection is made depending on the actuation signal at pin 2. To operate the pump in dual-cycle mode, the corresponding signal length of the actuation must be selected. The number of input signals corresponds to the number of doses at the respective lubrication cycle. After successful conveyance at the actuated lubrication circuit, a specific output signal is output at pin 5.

When using a continuous signal for the control at pin 2, the pump is operated in standard operating mode. This means that the pump conveys at all outlets as long as the actuation signal is applied. A signal is emitted at pin 5 when delivery has taken place at all outlets. If the signal at pin 2 is removed, the pump ends the delivery process that has been started and continues until delivery has taken place at all outlets.

Attention:
If the pump is used in dual-cycle lubrication mode, outlets 3 and 6 have to be closed and cannot be used.

4.8 Overpressure shut-off (only S2C version)

The pump has an integrated overpressure shut-off. An integrated control system switches off the pump at a maximum of 120 bar to prevent the maximum permissible operating pressure from being harmfully exceeded. All pressurised parts up to the lubrication point must be dimensioned for this maximum pressure.

4.9 Level prewarning (only S2C version)

With the S2C version, a pre-warning is issued in addition to the empty message. The pre-warning is automatically reset when the reservoir is filled. For technical reasons, the level pre-warning is not possible for reservoirs Lube-Shuttle, System Reiner and DIN 1284.

4.10 Temperature monitoring (only S2C version)

With the S2C version, the ambient temperature of the pump is monitored. If the pump is activated outside the permissible operating temperatures, an alarm is emitted, as perfect conveyance is no longer guaranteed.

5. Safety instructions

5.1 Fundamental rule

The unit leaves the factory in faultless state and ensures high technical safety.

The unit represents the state-of-the-art as well as fulfils all the current safety and health protection regulations. Nevertheless, there is danger in case of maloperation or misuse:

- for body and life of the user or third parties
- for the pump unit or other user's objects
- for efficient use of the pump unit

5.2 Required users' skills

Persons, who operate the unit have to be authorised and trained for that job by the user. They must be able recognising and avoiding possible dangers. This includes also knowledge on accident prevention rules, first aid measures and local rescue equipment.

Only skilled technicians, who have been specifically trained for the product, are allowed inspecting, maintaining and repairing

Skilled electricians are the only ones permitted intervening in the electrical installation according to DIN VDE 1000-10.

5.3 Safety facilities

Mechanically, the unit is built intrinsically safe.

5.4 Accident prevention

For accident prevention, take the following measures:

- Prevent unauthorised persons from access to the pump unit.
- Keep foreign persons out of the danger areas and danger spots.
- Inform present foreign persons on residual hazards on a regular basis.

Get yourself informed on the residual dangers in chapter „Residual hazards".

5.5 Residual risk

When using the unit properly and adhering to the maintenance and repair cycles and measures prescribed, there are no residual risks to persons and objects within the unit's area.

5.6 Incorrect applications

Any usage contrary hereto or going beyond the conventional one may cause serious personal and property damage.

Based on experience, possible inappropriate use includes, for example:

- Supply of highly flammable or explosive materials.
- Supply of media that can react with materials that are used for the manufacture of the pump unit.
- Supply of food.

5.7 General safety regulations and duties

Basically, the following safety regulations and duties are applicable to the use of the pump unit:

- The generally accepted rules for work safety need to be oserved. Besides, the basic regulations and rules on work safety and accident prevention being applicable to the place of use have to be followed.
- When using the unit inside vehicles, the generally accepted traffic law-related rules need to be observed.
- The user is obliged to observe the regulations pertaining to the use of working appliances.
- The unit must be operated in flawless and clean condition only.
- It is prohibited to remove, modify, bridge or bypass any and all protection, safety or monitoring facilities.
- The unit may only be modified or changed in the areas and functions provided for this purpose. The prescribed procedure must be followed.
- The operator should be notified of any fault or damage immediately.
- For repair, no others than original spare parts may be used.
- The operator is required to regularly check and maintain all protection, safety, and monitoring facilities.
- After every repair, the flawless condition of the unit must be ensured by means of a test run.

5.8 Exclusion of liability

If any damage to persons, objects, environment and/or assets occurs due to ignoring this operating manual, either by intension or not, DLS Schmiersysteme GmbH shall not be liable and every warranty claim will be refused. The abovementioned fits to every consequential damage, too.

6. Transportation, installation, commissioning and shut-down transport

6.1 Transportation

Transport the unit to its destination carefully and by using suitable aids.

6.2 Unpacking

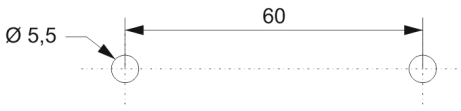
Lift the unit out of its packaging carefully and put it on a stable and plane base.

Note! The unit and the components attached in accordance with the scope of delivery may still contain residues of blue-dyed test oil.

6.3 Installation

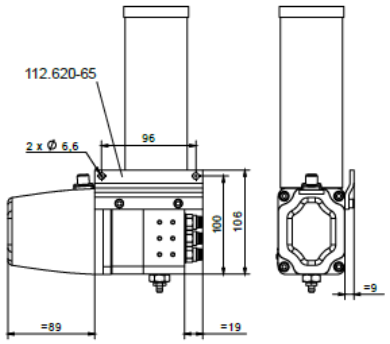
The unit is ready for wall-mounting. It is to be secured by means of two M5 screws at the both female threads of the pump body. The device is screwed from the rear side. For this purpose, through holes are required on the wall surface. The mounting surface must be sufficiently stable in order to be capable of carrying the pump unit's weight including the filled reservoir. Besides, it needs to be ensured that the mounting surface is plane.

Drill scheme:



Alternatively, the optional mounting plate can be used. The mounting plate has through holes. The plate can be attached to the pump body using the screws supplied. The pump can then be mounted to the wall from the front of the unit using two M6 screws.

Drill scheme:



When using oil as the delivery medium, an installation position in which the reservoir stands vertically is preferred in order to ensure air-free delivery of the medium.

6.4 Power supply and powering-up

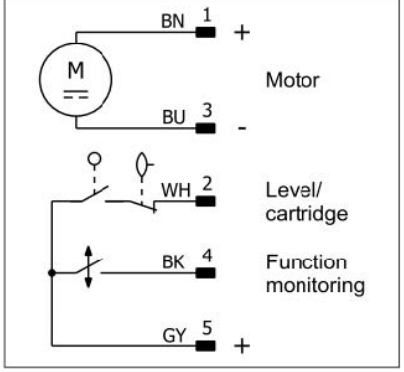
Important!	Compare the specification of the local voltage supply with the indicated technical data.

Important!	Lay the mains cable that it cannot be torn off acci-dentally.
Important!	Skilled electricians are the only ones permitted intervening in the electrical installation according to DIN VDE 1000-10.

Connect the unit to the voltage supply.
Check the electric connections for correct installation prior to commissioning.

Caution!	Intervening in the electric installation, there is danger of life!

Electrical connection diagram Standard version

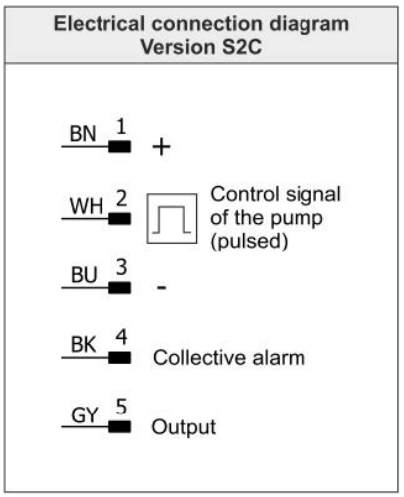


The pump needs about 10 seconds to convey at all outlets, regardless of the number of activated outlets.
The resulting electrical signal follows the pattern t_{on} = 1 s, t_{off} = 9 s.

If there is no signal from the function control after 15 seconds, the unit should be switched off and checked for safety reasons.

Version Smart 2 Cycle

Electrical connection diagram Version S2C



Control signal at PIN 2 during operation (no alarm -> Pin 4 = 1 or pulse 1 Hz)		
signal length	**function**	**operating mode**
300 ... 700 ms*	Conveying lubrication cycle 1	Smart 2 Cycle
800 ... 1200 ms*	Conveying lubrication cycle 2	
> 1500 ms	Conveying at all outlets, as long as the input signal is present. If the input signal is removed, the current conveying process is completed	Standard
*: number of input signals corresponds to the number of doses at the respective lubrication cycle		
Output at Pin 5		
signal length	**description**	**operating mode**
500 ms	Conveying lubrication cycle 1 occurs	Smart 2 Cycle
1000 ms	Conveying lubrication cycle 2 occurs	
1000 ms	Conveying at all outlets occurs	Standard
Alarm signal at Pin 4		
signal	**description**	
1 (continuous)	no alarm	
pulse 1 Hz	level perwarning	
0 (continuous)	alarm -> see error signal at Pin 5 In the event of a pending alarm, conveying is interrupted at the outlets. After the error has been corrected, the alarm can be acknowledged via a falling edge at pin. The alarm output is reset and the pump performs a reference run.	
Error signal at Pin 5 with frequency 1 Hz (alarm -> Pin 4 = 0)		
error	**number of signals per 30 s**	**description**
Level	1	Min switching point reached
Cartridge monitoring	2	Cartridge control is not actuated
Function	3	Function monitoring not carried out within necessary time
Maximum pressure	4	Maximum pressure of 80 bar exceeded on at least one outlet
Operating temperature	5	Pump outside the permissible operating temperature
Other errors	6	Internal error, unit defective

Examples for the evaluation of signals:

control signal (Pin 2)	alarm signal (Pin 4)	output (Pin 5)	description
operating mode S2C	1 (continuous)	Pulse 500 ms	1 lubrication cycle on lubrication circuit 1 completed
operating mode S2C	1 (continuous)	Pulse 1000 ms	1 lubrication cycle on lubrication circuit 2 completed
operating mode Standard	1 (continuous)	Pulse 1000 ms	1 lubrication cycle (conveying at all outlets)
both operating modes	0 (continuous)	Pulse	error signal according to table above

6.5 Commissioning

The unit's functionality has been checked in the factory. Hence, it is ready for operation and can be connected to a local voltage supply.

Important! Note the safety instructions contained in the „Power supply and switch-on" section. First fill lubricant and then start the pump unit, in every case (Minimum filling level, see chapter 4.4).

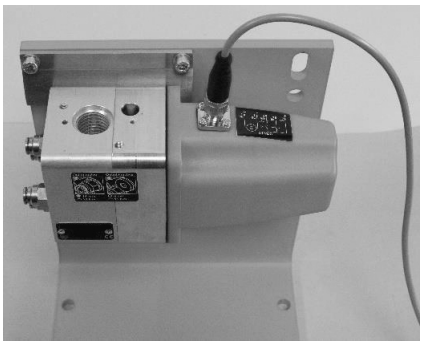
If the installation position is unfavourable, lubricant must escape from all open outlets after max. 30 minutes of continuous operation.

6.5.1 Assistance with initial filling (Cartridge size 125, 250 and 380 cc)

The unit is delivered pre-assembled. The cartridge is not mounted

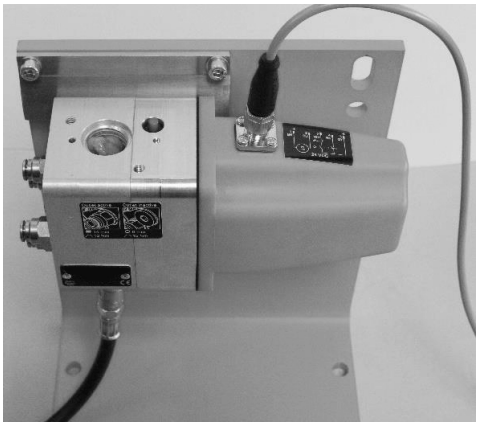
Hint: **When filling the pump with grease for the first time, it is recommended to fill it with gear oil up to half of the cartridge thread before mounting the cartridge, which ensures faster and better venting. After filling with oil, the pump can easily be tilted in all directions to remove any air pockets in the pump body. When selecting the gear oil, care must be taken to ensure good compatibility with the lubricant used.**

The following procedure is recommended in order to be able to fill the unit as air-free as possible without prior oil filling:

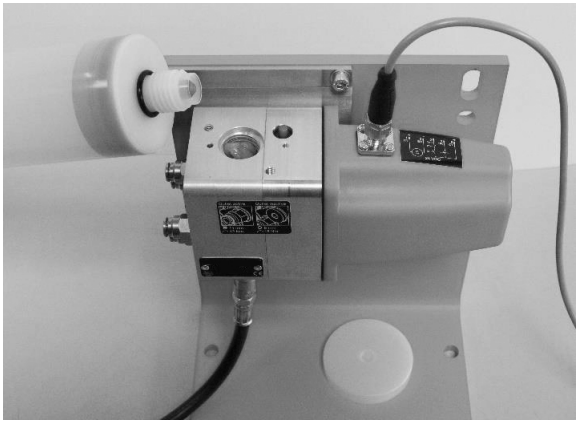


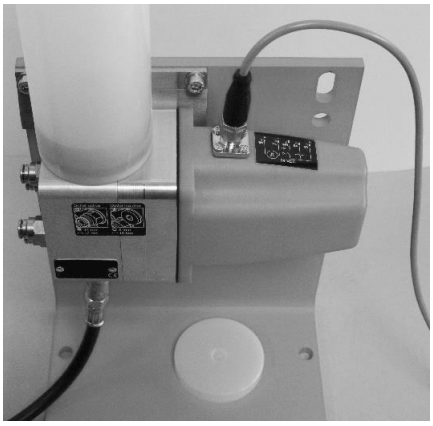
1. Fix the unit without cartridge in vertical mounting position. If possible, place a drip tray or similar under the unit to prevent environmental pollution.

2. Fill the unit via the filling connection until the cartridge thread on the top of the pump is approximately half full

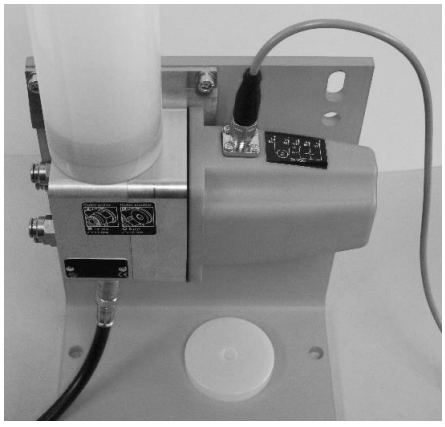


3. For the next steps, the lid should be removed from the cartridge. Then screw the empty cartridge into the pump body. The O-ring 18,0x3,5 for cartridge sealing must be located in the thread run-out of the res-ervoir. The cartridge must be tightened firmly to ensure a sealing effect between the cartridge and the pump. During the screwing-in process, the air trapped in the cartridge pushes the follower piston slightly upwards.

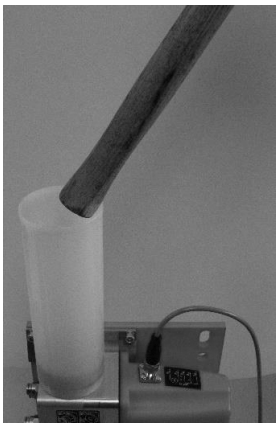


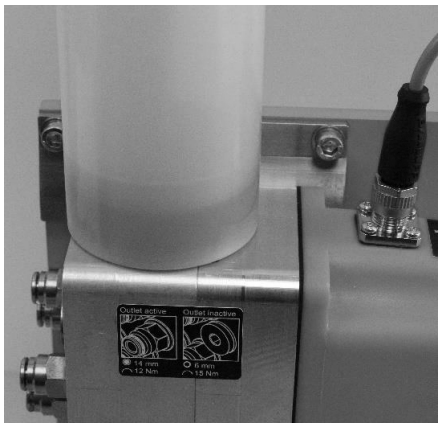


4. Slowly continue to fill the unit via the filling connection until the filling height of the medium in the cartridge is approx. 0,5 cm.



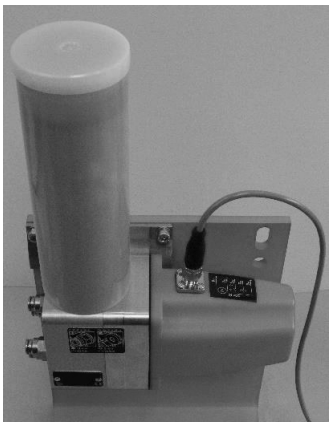
Then, using a longer, non-sharp-edged tool (e. g. a hammer handle), press on the follower piston from above so that the air can below the follower piston can escape along the follower piston.





For better ventilation when using oil, the unit should be actuated during the entire filling process and fixed with the outlets inclined upwards.

5.Slowly continue to fill the unit via the filling connection until the desired filling level is reached. During the filling process, depending on the viscosity, medium may escape at the outlets. Closing the outlets with plugs prevents this. When the filling level has been reached, the lid can be put back on the cartridge.



6. When using oil as a lubrication medium, the unit can also be turned over after the filling process (only for use with follower piston), so that the tank points downwards and the outlets point slightly upwards at an angle. Then actuate the unit until the medium emerges bubble-free.

Note: **If the initial filling of the pump is not carried out properly, it may take up to one hour for the pump to automatically vent, depending on the medium, if the pump is permanently actuated.**

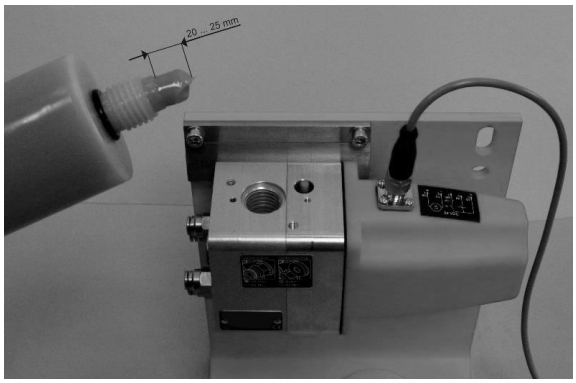
During all subsequent filling processes, the medium itself should be filled as air-free as possible. This includes that the filling unit has been vented up to the cou-pling before connection to the unit.

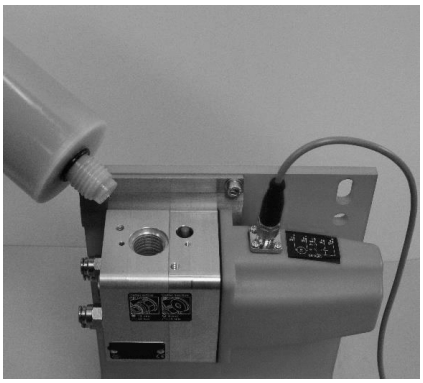
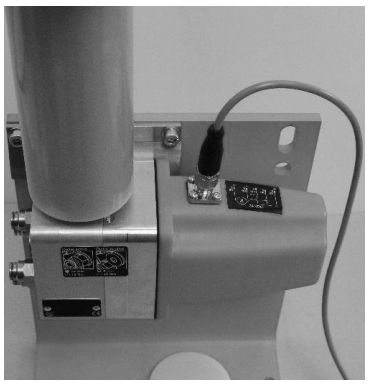
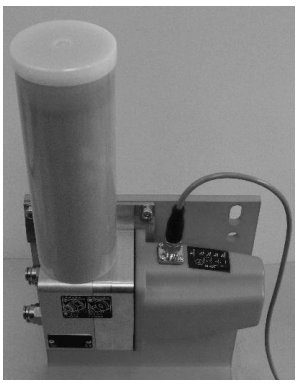
Caution!	**When refilling the cartridges with follower pistons, the lid should be removed from the cartridge, as the lid can be lifted off in an uncontrolled manner when the cartridge is filled with a large volume flow due to the resulting overpressure.**

6.5.2 Assistance for using the cartridges as exchangeable (Cartridgesize 125, 250 and 380 cc)

When using the cartridge variants 380, 250 and 125 as exchangeable cartridges, the following must be observed when exchanging an empty cartridge for a full cartridge:

1. Removing the empty container by unscrewing the cartridge.
2. With the cartridge already filled, press out the medium at the connection thread of the cartridge container by approx. 20 to 25 mm by applying slight pressure to the follower piston so that no air is trapped in the thread during assembly.



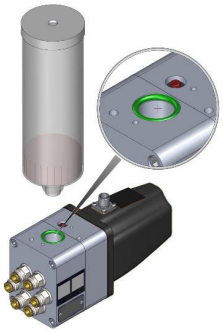




3. Then position the cartridge and screw it on tightly. Ensure that the O-ring is correctly seated.

6.5.3 Proposed technical modifications and conversions

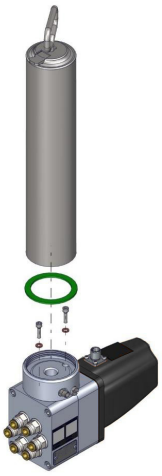
6.5.3.1 Assembly of the reservoir types 380, 250, 125

The reservoir is mounted by screwing in the cartridge.



6.5.3.2 Assembly of the reservoir DIN 1284

Mounting the reservoir DIN 1284 using the two cylinder screws supplied. Make sure that the O-ring 19,0x3,0 for sealing the reservoir is located in the sinking. Furthermore, it must be ensured that the copper sealing rings supplied are inserted under the cylinder screws. The tightening torque is 6 (0/+2) Nm.



6.5.3.3 Assembly of the reservoirs Lube-Shuttle / System Reiner

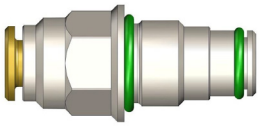
Assembly of reservoirs Lube-Shuttle / System Reiner by means of two cylinder screws supplied. Make sure that the O-ring 19,0x3,0 for sealing the reservoir is located in the sinking. The tightening torque is 6 (0/+2) Nm.

6.5.3.4 Foreign reservoir

If foreign reservoirs are used, the customer is responsible for the sealing between reservoir and pump.

6.5.3.5 Mounting of the non-return valve cartridges

1. Check that the non-return valve cartridge is complete before screwing it in.



Important: There must be two O-rings on the outside of the cartridge

2. Screw in the non-return valve car-tridge. Tighten with 12 Nm.

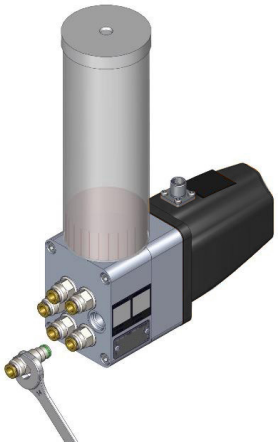
Note: The force must be applied at AF 14 of the non-return valve cartridge (especially for the version with plug-in connection for ø4). When using the non-return valve car-tridge with threa-ded connection G1/8, the AF 14 must be countered when screwing the pipe fitting into the installed non-return valve cartridge.

3. Connect lubricant lines

6.5.3.6 Closing an outlet

1. Remove any existing lubricant lines.

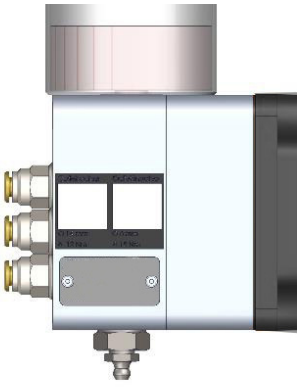
2. Unscrew the non-return valve cartridge using an open-ended or ring spanner AF 14.
Note: A possibly screwed-in pipe fitting can remain in the non-return valve cartridge and does not have to be removed beforehand.

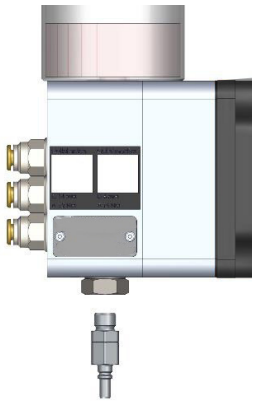
3. Screw in and tighten the screw plug with sealing ring with 15 Nm.

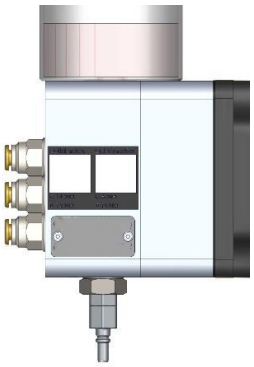

6.5.3.7 Conversion from conical grease nipple to sealing nipple „B“

1. Unscrew the conical grease nipple on the hexagonal head.



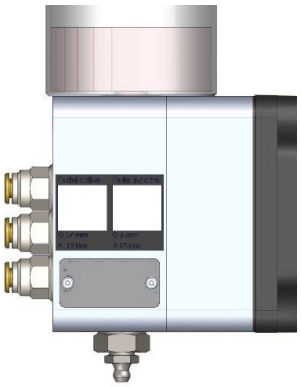

2. Screw in sealing nipple „B“ with the sealing ring underneath.

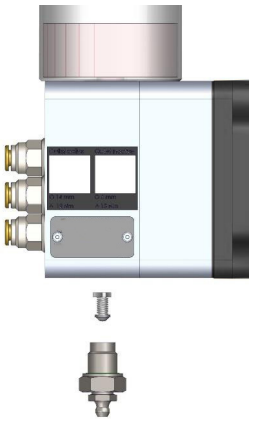


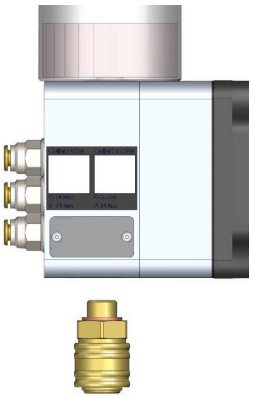


6.5.3.8 Conversion from conical grease nipple to locking coupling „C“

1. Unscrew the conical grease nipple including the connecting piece at the hexagon.
2. Remove non-return valve (non-return valve consists of valve star, spring and cone with sealing disc and metal disc).
3. Screw in the locking coupling „C“ with the sealing ring underneath.







Commissioning procedure:
a) Filling the unit with lubricant

The units may be operated with clean oil or grease from origi-nal packages only!

with cartridge reservoir 380, 250 and 125 ml:
Fill the lubricant into the reservoir via the grease nipple (or the optional filling connection) on the bottom of the unit. To do this, connect your filling device to the conical grease nipple or filling connection and start the filling process. The filling process must be stopped manually when the upper edge of the following piston is about 10 mm away from the upper edge of the cartridge reservoir. The venting process may be shortened if the filling is performed while the unit is running.

with cartridge reservoir according to DIN 1284:

Replacement of the cartridge:
Unscrew reservoir and pull back piston bar up to stop. Then insert both sides opened grease cartridge into reservoir, and screw reservoir on. Screw reservoir on and push the piston bar back in again completely.

b) Bleeding the unit
In order to ensure a steady delivery, the unit and pipes needs to be vented. To this effect, the electric magnet is to be activated as often until the lubricant comes out free of air at all outlets.

c) Bleeding lube lines

The lube point lines must be clean and free of any obstruc-tion!

Connect the lines leading to the lubricating points to the unit. Switch on and off the unit that many times until the lubricant emerges free of air from the lines. This operation can be shortened by ascending the tubes towards the outlet.

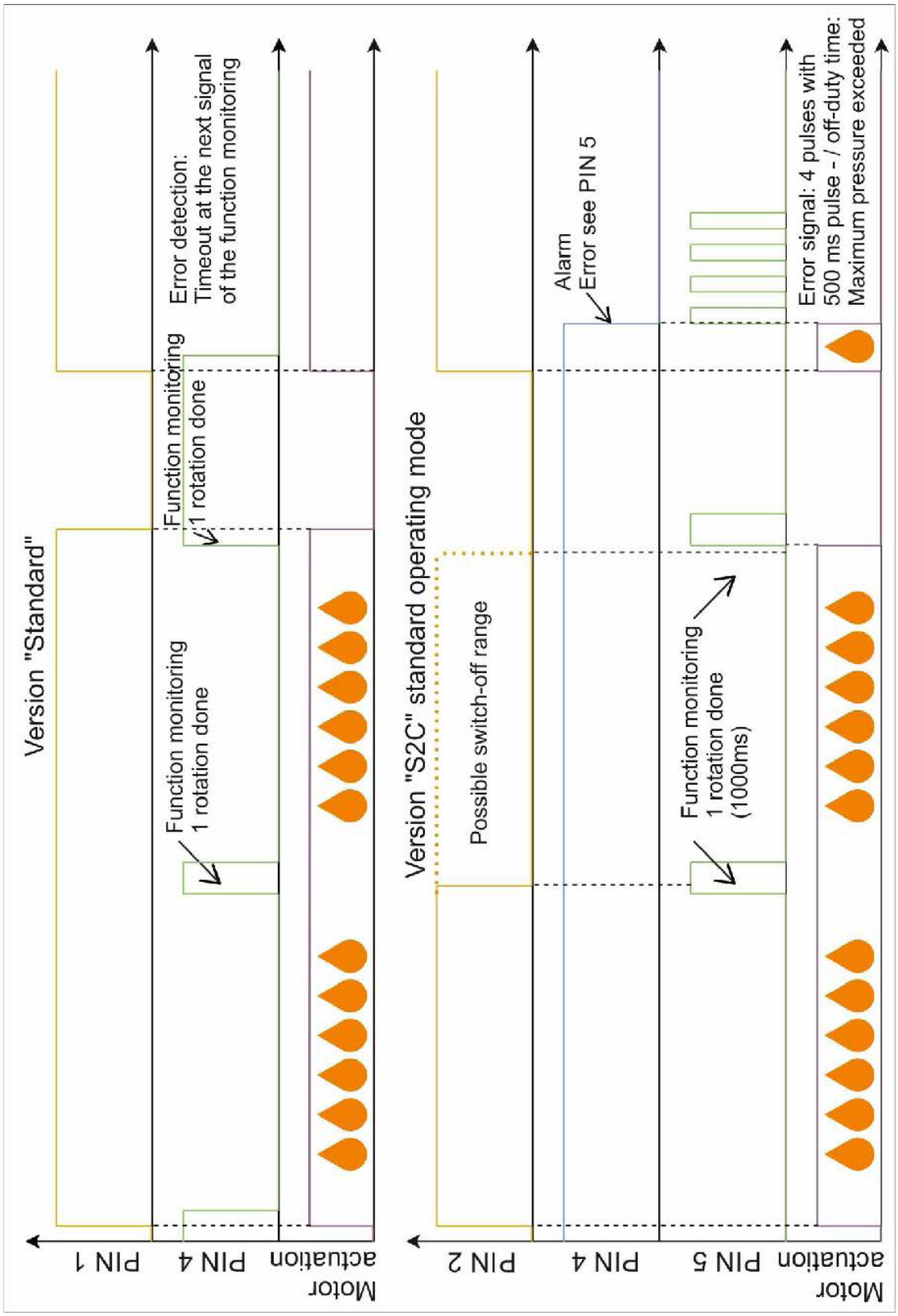
6.6 Shutdown

The unit is shut down when switched off and disconnected from the external power supply.

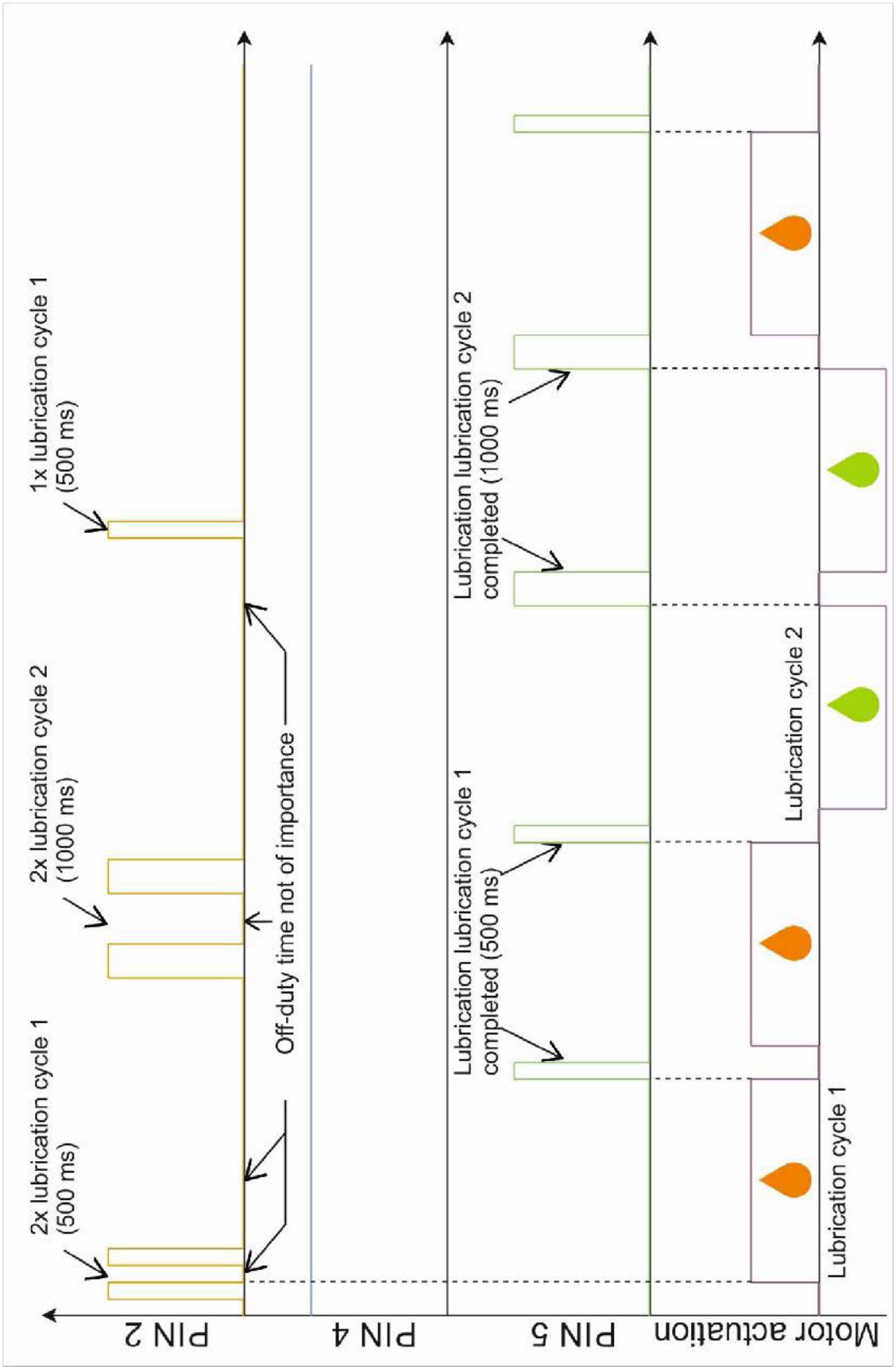
Skilled electricians are the only ones permitted intervening into the electrical installation according to DIN VDE 1000-10.

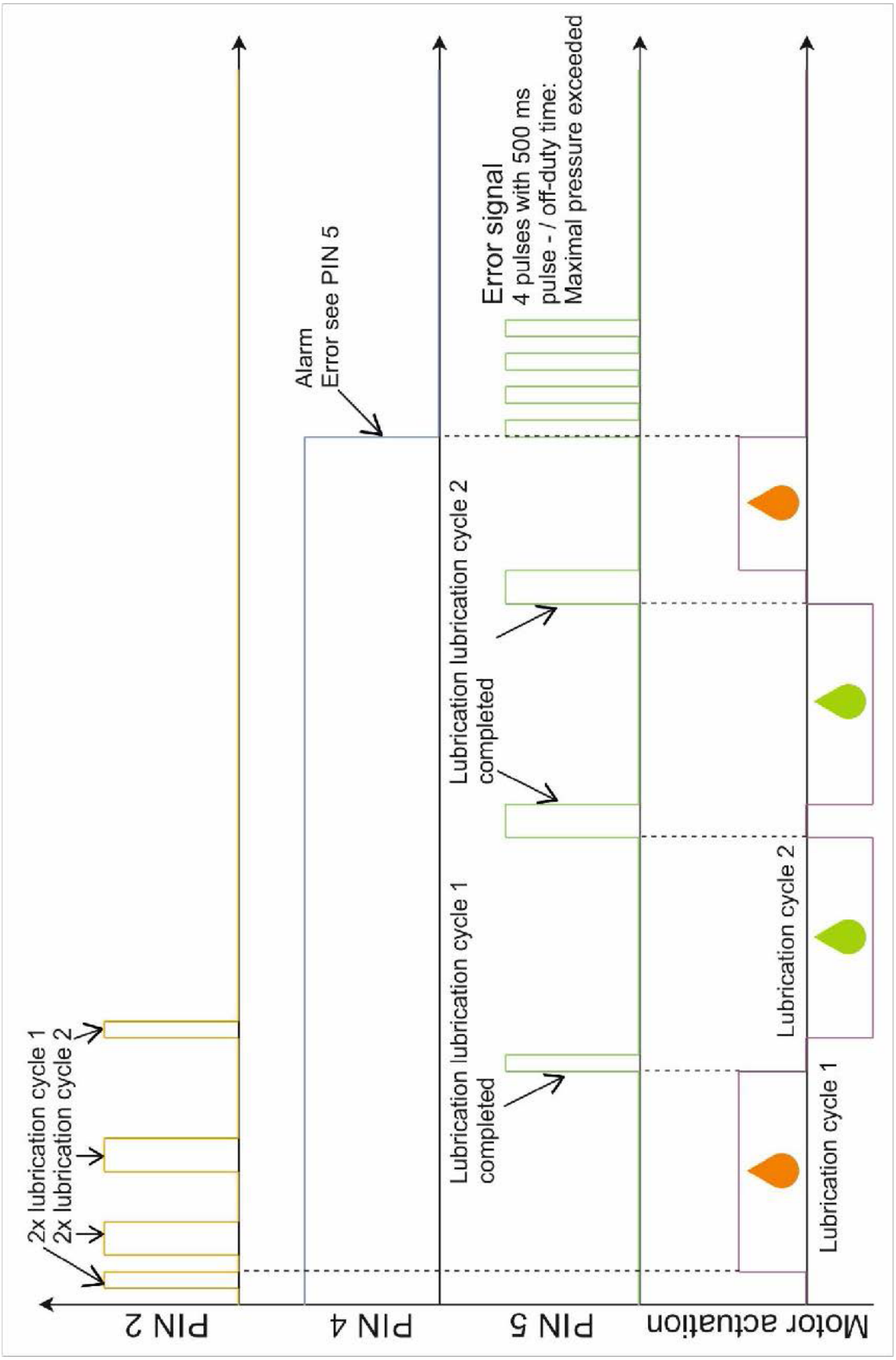
7. Operation

7.1 Exemplary actuation for standard operating mode



7.2 Exemplary actuation for dual-cycle lubrication operating mode




PIN 2
PIN 4
PIN 5
Motor actuation
2x lubrication cycle 1
2x lubrication cycle 2
Alarm
Error see PIN 5
Error signal
4 pulses with 500 ms
pulse - / off-duty time:
Maximal pressure exceeded
Lubrication lubrication cycle 1
completed
Lubrication lubrication cycle 2
completed
Lubrication cycle 1
Lubrication cycle 2

7.3 Troubleshooting, fault remedy

Fault	Root cause	Remedy
No lubricant delivery	DC motor doesn't work.	Check electric connections. Check the fuse.
	Reservoir is empty.	Refill lubricant.
	Air in the lubricant lines.	Fill the lines with lubricant.
	Lubricant not suited for the application.	Exchange the lubricant of the whole system.
	Leaking line system.	Seal the leaking spot.
	Unit blockade.	Have the unit repaired.
No response from „Monitoring empty"	Electric connection interrupted.	Check the electric connection to the monitoring device.
No response from „Monitoring function"	Unit overloaded.	Switch off the unit by disconnecting the power supply and check the lines from the unit to the lubrication point for blockages.
	Electric connection interrupted.	Check the electric connection to the monitoring unit.

Output error signals at pin 5 see chapter 6.4

If the above-mentioned troubleshooting and the corresponding remedies do not lead to the pump functioning without a fault, please contact DLS Schmiersysteme GmbH.

7.3 Refilling the reservoir

The reservoir can be refilled via the grease nipple (or the optional filling connection) on the bottom of the unit. See chapter 6.5.1 for assistance.

Caution! When refilling the cartridge reservoirs with follower pistons, the lid should be removed from the reservoir, as the lid can be lifted off in an uncontrolled manner when the reservoir is filled with a large volume flow due to the resulting overpressure.

7.4 Switching off

The unit is switched off by disconnecting it from the power supply.

8. Cleaning, servicing, fault remedy, and repair

Note! Servicing and repair work may only be performed by technically skilled personnel with product-specific training, basic mechanical training, and professional experience.

Important! For cleaning, servicing or repair, always discon-nect the unit from the power supply and secure it against restarting.

Important! While work is being carried out on the system, secure the system against being switched on again.

All servicing and repair work on the electric facilities may only be done by skilled electricians in accordance with DIN VDE 1000-10.

8.1 Cleaning

Important! Do not clean the unit with high-pressure cleaner or com-pressed air.

Important! Using solvent-containing detergents, there is danger of damaging the reservoir.

Clean the unit with commercial detergents. Before starting cleaning, make sure that the detergent does not attack the materials built-in the unit.

8.2 Servicing

Warning! Danger of injury, if the safety and protective installations have to be removed, modified, bridged or bypassed for maintenance or repair work. Observe the dangerous spots described especially in the chapter “Safety instructions” and take proper precautions to prevent injuries.

Important! Stick also to the maintenance instructions in the operating manuals of the single components attached in the appendix.

8.3 Inspection chart

Description	Interval
Check the presence and functionality of the safety facilities	daily
Check the lube lines and connections for mechanical integrity and leakage.	monthly
Check the units and components for mechanical integrity and leakage.	weekly
Check the filling level of the pump unit.	weekly

8.4 Repair

For repairs, turn to DLS Schmiersysteme GmbH, please.

8.5 Accessories

Designation	Part.-No.	Use for
Mounting plate	not yet assig-ned	alternative mounting option (see chapter 6.3).
Screw plug with sealing ring	not yet assig-ned	Closing unused outlets.
Non-return valve cartridge G1/8i	not yet assig-ned	Activate additional (previously closed) outlet; for use with pipe fittings (tapered, cylindrical with sealing edge or soft seal).
Non-return valve cartridge ø4	not yet assig-ned	Activate additional (previously closed) outlet; for use with polyamide tube ø4.
Non-return valve cartridge ø6	not yet assig-ned	Activate additional (previously closed) outlet; for use with polyamide tube ø6.
Locking coupling G1/8a	not yet assig-ned	Filling via the optional sealing nipple „B".
Suction & pressure sprayer with tube and plug-in nipple	not yet assig-ned	Filling with oil via the optional closure coupling.
Y-connector ø6	not yet assig-ned	Combining separate outlets with tube ø6.
Connection cable M12x1, 5-pin length 5 m	not yet assig-ned	Connection of the unit for power supply and signal transmission of function monitoring and level control.
Connection cable M8x1, 3-pin straight, length 5 m	not yet assig-ned	Connection of level control for Lube-Shuttle or System Reiner (also possible for DIN 1284).
Connection cable M8x1, 3-pin 90°, length 5 m	not yet assig-ned	Connection of level control for DIN 1284 (also possible for Lube-Shuttle or System Reiner).

9. Return to factory

The safety and health of our staff, the ordinance on hazardous materials (the german GefStoffV), the regulations pertaining to the safety at the places of work, and the regulations governing the disposal of waste oils necessitate the completion of the „RMA"-form for all products that are to be returned to us. Without submission of the fully completed form, no return shipment can be accepted and processed.

To ensure speedy handling, you are kindly requested to send a copy of the fully completed RMA-form to us in advance. The original must be attached to the freight documents.

For damage assessment and in order to be able to perform the repair quickly and economically, we furthermore need a detailed description of the complaint and conditions of use.

Cost estimates will be made on explicit request and with charge only.
In case of repair order placement or acquisition of a new product instead of repair, the incurred costs will not be charged. Respectively charged costs will be settled.

If, due to the cost estimate, you do not want any repair, we will send the product back unfranked and in dismantled condition, if necessary.

For product shipment, the following should be ensured:

- The product must be discharged and clean.
- All openings must be closed.
- The product must be packed safely and marked completely.
- The RMA-form must be attached.

The RMA-form can be found here: www.dls-schmiersysteme.de

10. Disposal

When disposing the piston pump unit and its components, observe the actually current national laws and provisions of the user's country!

11. Note on the REACH regulation (1907/2006)

According to the REACH regulation (Art. 33) we are obliged to inform you if a delivered article contains more than 0,1% of a substance on the SVHC candidate list. The reference value is the smallest article of a composite article.

DLS Schmiersysteme GmbH products may contain aluminium and/or brass components which contain more than 0,1% lead (EC Number: 231-100-4, CAS Number: 7439-92-1). Since lead is firmly bound as an alloy component and therefore no exposure is to be expected, no additional information on safe use is necessary.
Should you require further information, please send us your request to mail@dls-schmiersysteme.com

12. Declaration of conformity

EG-Konformitätserklärung
nach 2006/42/EG, Anhang II, Nr.1 A
EC Declaration of Conformity
according to 2006/42/EC, Annex II, No.1 A
Déclaration de conformité CE
selon la directive 2006/42/CE, annexe II, n° 1 A

Hiermit erklären wir, dass das Produkt / die Produkte	We hereby declare that the product / the products	Nous déclarons par la présente que le produit / les produits
	GMK	
mit allen einschlägigen Bestimmungen der EG-Maschinenrichtlinie 2006/42/EG in Übereinstimmung ist. Die Maschine ist auch in Übereinstimmung mit allen einschlägigen Bestimmungen der folgenden EG-Richtlinien:	fulfils all relevant provisions of Directive 2006/42/EC. The machinery is also in compliance with all relevant provisions of the following EC-directives:	satisfait à l'ensemble des dispositions pertinentes de la directive 2006/42/CE relative aux machines. Cette machine satisfait également à toutes les dispositions pertinentes des directives CE suivantes :
	2014/30/EU	
Angewandte Normen:	Standards applied:	Normes appliquées:
	DIN EN ISO 12100:2011 **DIN EN 60204-1:2019** **DIN EN ISO 4413: 2011**	
	Herr Stefan Tiederle EUGEN WOERNER GmbH & Co. KG Hafenstraße 2 DE-97877 Wertheim	
ist bevollmächtigt, die technischen Unterlagen zusammenzustellen.	is authorised to compile the technical file.	est autorisé(e) à constituer la documentation technique.

Wertheim, den 01.03.2022

Alexander Kärcher
Geschäftsführer / Managing Director / Directeur gérant