

Operating- and assembly manual

Grease lubrication pump

ALP81



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All information subject to technical changes.

Rev.	Change	Date / Author:	Date / Released:
02	Update	24.04.2025 / HB	24.04.2025 / JR

1 Declaration of incorporation



Declaration of incorporation for incomplete machinery (acc. to EC-directive 2006/42/EG)

The manufacturer: Lubmann GmbH
Kleiner Johannes 21
91257 Pegnitz, Germany

declares hereby, that the following partly completed machinery:

Type:	Grease lubrication pump
Part No.:	ALP81
	20xxxxxxx / 99xxxxx / 15xxxxxx

is complying with all essential requirements of the above-mentioned machinery directives (2006/42/EG): Annex I, article 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, and 1.5.1.

The following coordinated standards have been used:
DIN EN 809
DIN EN ISO 12100

The following other specifications and standards have been used:
VDE 0530

The protection targets of the directive for have been electric equipment 2014/35/EU observed according to the annex I, no. 1.5.1 of the machine directive.

The incomplete machine may only be put into service as soon as there has been stated that the machine, into which the incomplete machine shall be installed, responds to the determinations of the machine directive (2006/42/EG).

The special documentation that responds to the machine, has been prepared according to annex VII part B.

The manufacturer, documentation department, phone +49 9241 80 89 87 00,
email: info@lubmannmbh.de; obliges itself to pass on electronically the special documentation for partly completed machinery to individual national authorities upon request.

Pegnitz, 01.09.2022

ppa. Markus Kürzdörfer
General Manager
Lubmann GmbH

www.Lubmann-GmbH.de

Amtsgericht Bayreuth HRB-Nr. 7823 Steuernummer: DE316746274 Adresse: Kleiner Johannes 21, D-91257 Pegnitz Email: Info@lubmann.de

2 CE Certificate

Page 1 of 3

TÜV Rheinland (China) Ltd.
Member of TÜV Rheinland Group



Lubmann GmbH
Markus Kürzdörfer

Date : 11.06.2021
Our ref. : WYH 01
Your ref.: M.K.

Dr.-Alfred-Herrhausen-Allee 16
47228 Duisburg
Germany

Ref : AM Certificate of Conformity (Module A)

Type of Equipment : Centralized Lubrication System
Model Designation : See Certificate
Certificate No. : AM 50507162 0001
Report No. : 17705122 003

Dear Markus Kürzdörfer,

We herewith confirm that a sample of the above mentioned technical equipment has been tested and was found to be in accordance with the relevant requirements.

Enclosed please find your Certificate of Conformity.

We appreciate your kind support and would like to offer our assistance and continuous services in the future.

With kind regards,

Certification Body

Huajian Dong

Enclosure

证书的详细信息请登录www.certipedia.com查阅,或拨打我司客服热线800 999 3668 / 400 883 1300咨询

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莱茵检测认证服务(中国)有限公司

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C E R T I F I C A T E



of Conformity
EC Council Directive 2006/42/EC
Machinery

Registration No.: AM 50507162 0001

Report No.: 17705122 003

Holder: Lubmann GmbH
Dr.-Alfred-Herrhausen-Allee 16
47228 Duisburg
Germany

Product: Grease Pump
(Centralized Lubrication System)

Identification: Type Designation : ALP8xy (x=1, 2, 3. y=2)
ALP10xy (x=1, 2, 3. y=2, 4, 6, 8)
(LUBMANN)
Serial No. : Engineering sample

Remark: Refer to test report 17705122 003 for details.
See more module type designations in attachment 1.1

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. This is to certify that the tested sample is in conformity with all provision of Annex I of Council Directive 2006/42/EC, referred to as the Machinery Directive. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex II of the Directive.

Date 11.06.2021



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

CE The CE marking may be used if all relevant and effective EC Directives are complied with.



100033 © 04.08 TÜV, TÜV and TÜV are registered trademarks. Utilization and application requires prior approval



1.1

TÜV Rheinland
LGA Products GmbH
Tillystraße 2, 90431 Nürnberg

Attachment to
Registration No.: AM 50507162 0001
Report No.: 17705122 003

Manufacturer: Lubmann GmbH
Dr.-Alfred-Herrhausen-Allee 16
47228 Duisburg
Germany

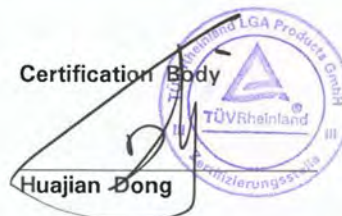
Scope:

Type Designation:
ALPA8xy (x=1. y=1, 2)
ALPA10xy (x=1. 2. y=2, 4, 6)
ALPA12xy (x=1. 2. y=4, 8, 10, 15, 20, 30)
ALPB10xy (x=1. 2. y=2, 4, 6)
ALPB12xy (x=1. 2. y=4, 8, 10, 15, 20, 30)
ALPB13xy (x=1. 2. y=15, 20, 30)
(LUBMANN)
Serial No.: Engineering sample

Remark: Refer to test report 17705122 003 for details.

Date: 2021-06-11

Certification Body



3 Imprint

Manufacturer

Lubmann GmbH
Add: Kleiner Johannes 21, 91257 Pegnitz, Germany
E-Mail: info@lubmann-gmbh.de
Website: www.lubmann-gmbh.de

Training courses

In order to provide a maximum of safety and economic viability, Lubmann GmbH carries out detailed training courses. It is recommended that the training courses are attended. For more information, please contact Lubmann GmbH.

Copyright

© Copyright Lubmann GmbH All rights reserved

Disclaimer

The manufacturer shall not be held responsible for damages caused by:

- Non appropriate use faulty assembly, operating, setting, maintenance, repair or accidents
- Use of inappropriate lubricants
- Improper or late response to malfunctions
- Unauthorized modifications of the product
- Intent or negligence
- Use of non-original Lubmann spare parts
- Faulty planning or layout of the centralized lubrication system

Liability for loss or damage resulting from the use of our products is limited to the maximum purchase price. Liability for consequential damages of whatever kind is excluded.

4 Explanation of symbols



Safety instructions which, if not complied with, may endanger persons, are marked specifically with the general hazard symbol!



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



General commandment!
Points out Special Information!

5 Warranty and extent of warranty

Inappropriate intervention will rule out your warranty claim!

Warranty regarding operational safety, reliability and performance of the progressive divider is only accepted by the manufacturer under the following conditions:

- Assembly, connection, setting, maintenance and repair are carried out by authorized and specialized staff.
- The limits stipulated in the technical data must never be exceeded
- Only original components or components approved by the manufacturer may be used for repair and maintenance work.

All guarantees and warranties expire for damages to the grease lubrication pump that are caused by operation with improper lubricants (e.g., piston wear, piston jamming, plugins, embrittled sealings).

Lubmann does not assume liability on damages caused by lubricants, even if these lubricants have been tested and released by laboratory tests, as damages caused by lubricants (e.g., by expired or improper stored lubricants, batch variations etc.) can not be retraced to their root cause in retrospect.

Contact: Lubmann GmbH, Kleiner Johannes 21, 91257 Pegnitz, Germany

6 Safety instructions

General information

Any safety-related faults must be eliminated without delay.

Below please find fundamental instructions to be complied with, regarding assembly, operation and maintenance. The mechanical and the competent specialists / staff of the operating company must read the Operating Instructions on all accounts prior to starting assembly, commissioning and maintenance. Moreover, the Operating Instructions must permanently be available on site.

Not only the safety instructions included under this item, but also the specific safety instructions appearing in other parts of this manual must be complied with.

General risk reference

All system components have been designed in view of operational safety and accident prevention according to the applicable provisions for the design of technical equipment.

Nevertheless, utilization thereof may result in risks for the user or third parties and/or technical equipment. Thus, the system may only be used in proper technical working within its intended fields of application and in compliance with the safety provisions and the Operating Instructions.

Personal

The staff in charge of operation, maintenance, inspection and assembly must be qualified accordingly for this work. The operating company must stipulate competences, responsibilities and the supervision of staff precisely. If the staff does not dispose of the appropriate knowledge, they must be trained and instructed. The operating company must ensure that the staff have understood the contents of the Operating Instructions.

Gefahr bei Nichtbeachtung der Sicherheitshinweise



Non-compliance with the safety information may put persons at risk and endanger the environment and/or the machine.

Non compliance with the safety instructions may rule out any claims for damages..

Non-compliance may lead, e. g. to the following dangers:

- Failure of important system functions,
- Failure of the specified maintenance and servicing methods,
- Endangering people due to electrical, mechanical and chemical effects,
- Endangering the environment due to leakages of dangerous materials.

Intended purpose

The pumps of the series ALP81 serve only for the supply of central lubrication systems at vehicles, systems and machines. Any use beyond this scope is regarded as being not in conformity with the intended purpose.

Assembly and maintenance

Observe for all assembly works at vehicles, systems and machines the valid local accident prevention regulations and safety instructions as well as the specifications for operation and maintenance.

All maintenance, inspection and assembly work may only be carried out by trained specialists. All work must only be carried out when the plant is at a standstill and while wearing appropriate protective clothing.

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



Media that endangers the environment must be disposed in accordance with pertinent official specifications.

Secure the system during maintenance and repair works, against intentional and unintentional reoperation.

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

Safety information for operators/operating staff

If hot or cold machine parts led to hazards, the customer must secure them from being touched.

The guards on moving or rotating parts must not be removed.



Drain leakages of dangerous materials in a way, that people or the environment are not endangered.

Comply with legal regulations.

Exclude any hazards by electric energy.

Unauthorized modification and spare part production



Modifications and alterations on the grease lubrication pump require the manufacturer's prior approval.

The use of non-original parts excludes liability for the resulting consequences.

Danger caused by the electrics



The units may be connected to the power supply exclusively by appropriately trained qualified personal in conformity with the local connection conditions and regulation (e. g. DIN, VDE)!

Improperly connected equipment may lead to serious personal injury and damage to property!

Danger caused by system pressure



The units might be under pressure. Make them pressure less before you start with repairs, changes or extensions.

Use of hydraulic hose lines

Installing hydraulic hose lines at the lubrication pump, the operator must observe respectively ensure the following items.



Checks for proper assembly and function must be carried out according to the regional valid guidelines.

Checks for a safe provisioning and use must be carried out according to the regional valid guidelines.

The check deadline must not be exceeded.

Exchange defect hydraulic hose lines immediately and professional.

Hydraulic hose lines subject to a wear process and must be exchanged regularly and according to the manufacturer's details.

Cleaning



The grease lubrication pump has an IP65 (according to DIN EN 60529) protection class!

It is not allowed to clean the Lubmann grease lubrication pumps of serie ALP81 with a high-pressure cleaner.

The high-pressure jets can allow water to penetrate the seals into the grease lubrication pump.

We do not provide a warranty when high-pressure cleaner are used!

Lubricant

The system has been designed for commercially available multi-purpose greases of NLGI class 2 for operation in summer and winter.

Use greases with high-pressure additives (EP greases).

Only use greases of the same saponification type.

Lubricants containing solid contents must not be used (lubricants like graphite or MoS₂ on request).



Observe the vehicle manufacturer's specifications, when you select the lubricant.

After the system has been shut down, check the lubricant for physical and chemical signs of aging to see whether it is still suitable for use.

After the system has been shut down: Check the lubricant for physical and chemical aging phenomena to see whether it is still suitable for use.

Observe the safety data sheet for the lubricant used.

Hazards to environment cause by lubricants

The lubricants which are recommended by the manufacturer of your vehicle, system or machine correspond in their composition to the common safety regulations. Mineral oils and greases are generally hazardous to ground water and their storage, processing and transport requires special precautions.

Inadmissible methods of operation



Operational security of the plant is only guaranteed if it is operated in accordance with the operating instructions. The limit values stated in the technical data must not be exceeded under any circumstances.

7 Delivery, Returns and Storage

Transport

The grease lubrication pumps of the series ALP81 are packed commercially, according to the regulations of the recipient country and to the wish of the customer.

There are no limitations with respect to land, air or sea transport.

Store in a dry place at a temperature of -5° C to +35°C.

After receipt of the shipment, check the shipment for damage and completeness according to the shipping documents. Immediately report any transport damages to the forwarding agent. Keep the packaging material until any discrepancies are resolved. During in-house transport ensure safe handling.

Returns

Clean all parts and pack them properly (i.e., following the regulations of the recipient country) before returning them.

Protect the product against mechanical influences such as impacts.

There are no restrictions for land, sea or air transport.

Storage

Lubmann products are subject to the following storage conditions:

- dry, dust- and vibration-free in closed premises
- no corrosive, aggressive materials at the place of storage (e. g. UV rays, ozone)
- protect from environmental influences such as UV rays
- protected against pests and animals (insects, rodents, etc.)
- possibly in the original product packaging
- shielded from nearby sources of heat and coldness
- in case of high temperature fluctuations or high humidity take adequate measures (e. g. heater) to prevent the formation of condensation water

Storage conditions for parts filled with lubricant

The conditions mentioned in the following will have to be adhered to when storing products filled with lubricant.

Storage period of up to 6 months

The filled products can be used without having to take further measures.

Storage period from 6 to 18 months



1. Connect the pump electrically
2. Switch the grease lubrication pump on and let it run, e.g., by triggering an additional lubrication, until about 4 cm³ of lubricant will leak from each pump element
3. Switch the pump off and disconnect it from the electrical grid
4. Remove and dispose of leaked lubricant

Storage period exceeding 18 months



To avoid dysfunctions, consult the manufacturer before commissioning.
The general procedure to remove the old grease filling corresponds to that of a storage period from 6 to 18 months.

8 Shutdown and disposal

Temporary shutdown

Temporarily shut the system down by:

- Switching off the superior machine.
- Disconnecting the product from the power supply.

Final shutdown and disassembly

The final shutdown and disassembly of the product must be planned and carried out by the operator in a professional manner and in compliance with all regulations to be observed.

Disposal

- for Countries within the European Union

Disposal should be avoided or minimized wherever possible. Disposal of products contaminated with lubricant must be affected via licensed waste disposal contractor in accordance with environmental requirements and waste disposal regulations as well as local authority requirements.



The specific classification of the waste is in the waste producer's responsibility, as the European Waste Catalogue provides different waste disposal codes for the same type of waste but of different origin.

Electrical components have to be disposed of or recycled following WEEE directive 2012/19/EU.

Plastic or metal parts can be disposed of with the commercial waste.

- for Countries outside the European Union



The disposal must be done according to the valid national regulations and laws of the country where the product is used.

9 Accompanying documents

In addition to this manual, the following documents must be considered by the respective target audience:

- Operational instructions and release regulations for the pump used
- Safety data sheet for the lubricant used
- Project documentation
- Operating instructions for components installed during assembly of the central lubrication system
- Release regulations and regulations in the company

10 Technical Data

Motor:

Operating voltage:	12V DC ±10%	24V DC ±10%
Revolutions [rpm]:	20 ± 2	23 ± 2
Relative duty cycle:	30% ED S3 30 minutes	
Current consumption at +20°C:		
Idling:	1 A	0.6 A
Full load:	5 A	3 A
Fuse:	10 A	6 A



ATTENTION

The pump must be protected by a back-up fuse in front of the pump to avoid overvoltage damage!

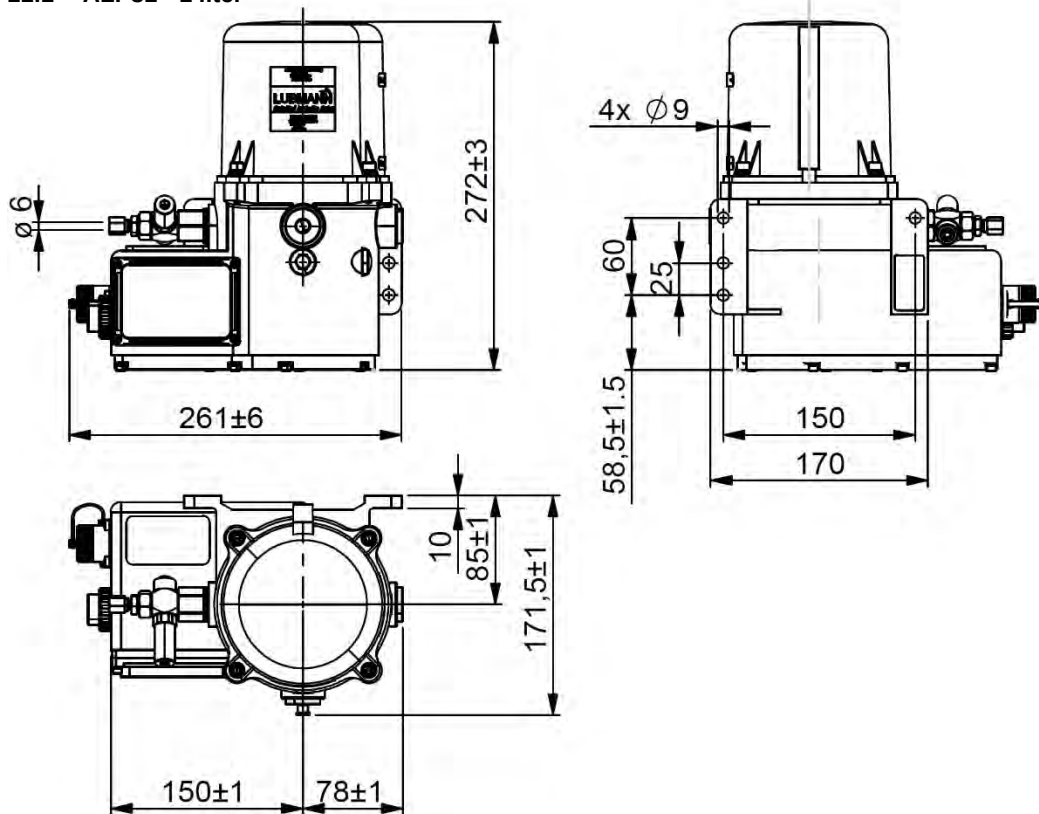
Grease lubrication pump:

Max. number of pump elements PE:	3
Max. operating pressure:	350 bar
Adjusting of pressure relief valve:	300 bar
Permissible operating temperature:	-35°C bis +70°C
Sound pressure level:	<70 dB
Reservoir size:	1 and 2 liter
Installation position:	Behälter Vertikal
Protection type:	IP65
Lubricant:	Grease up to NLGI-Cl.2 (no grease with solids) no oil

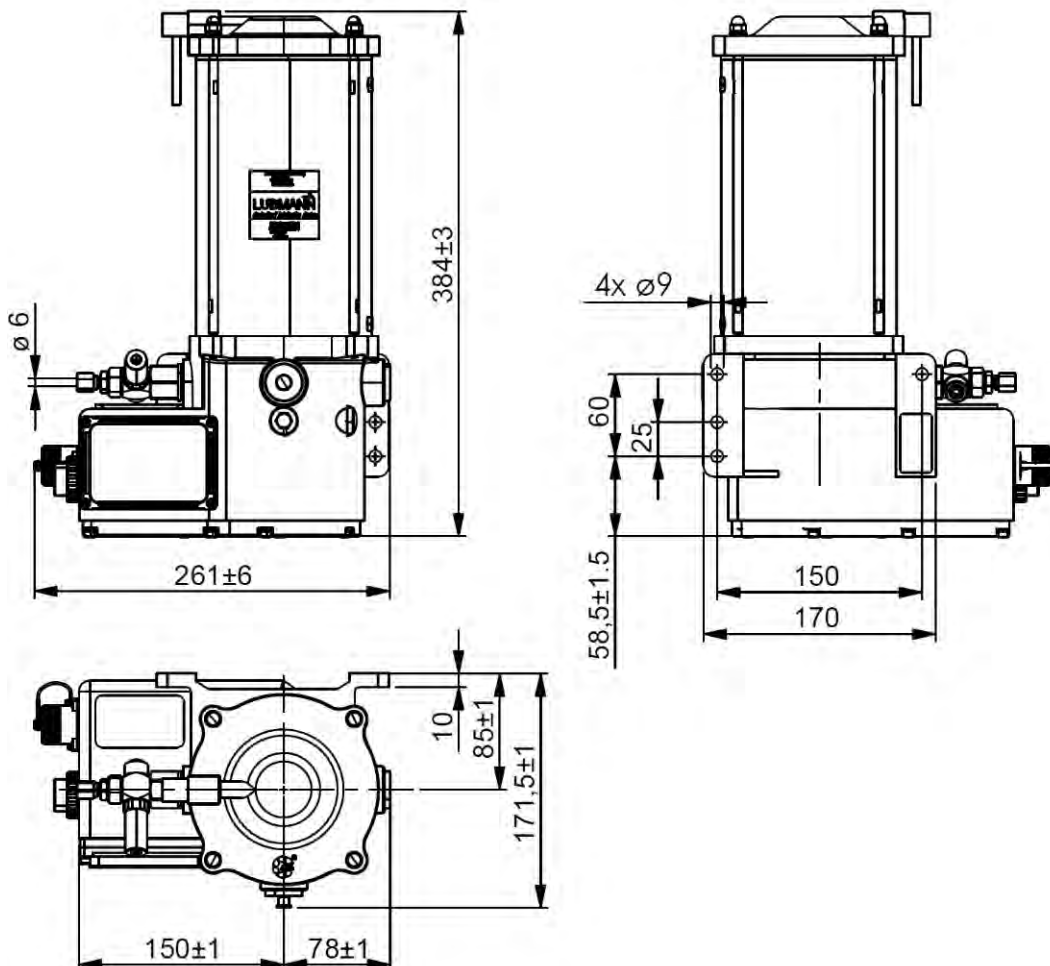


11 Installation dimensions

11.1 ALP81 - 1 liter



11.2 ALP81 - 2 liter

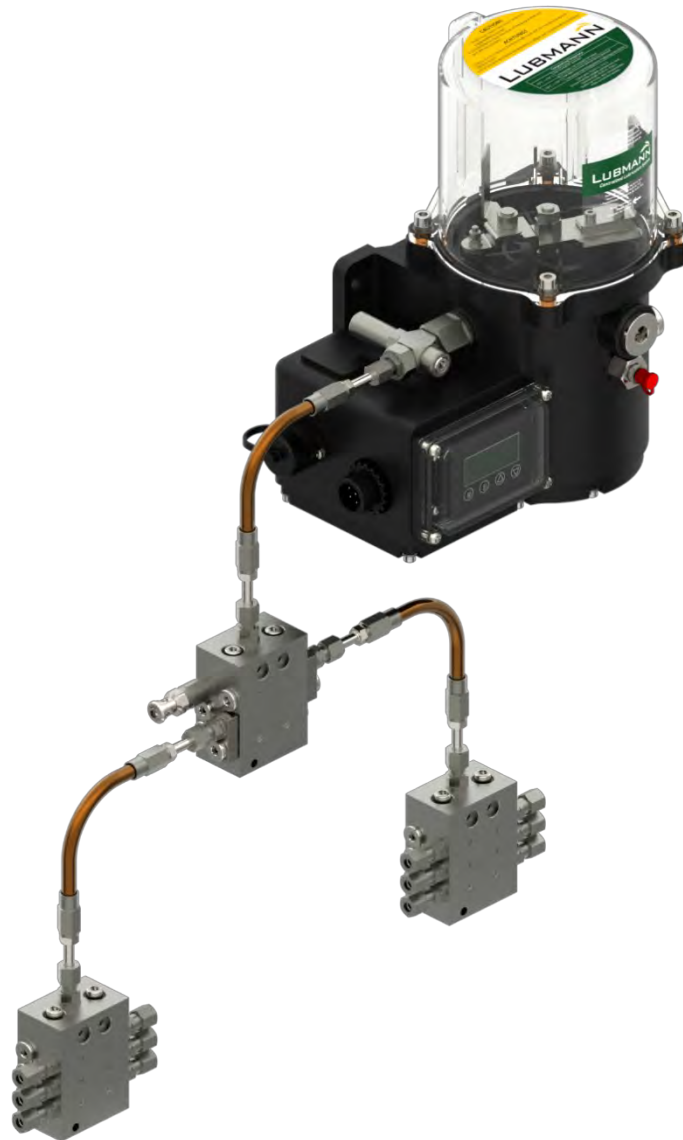


12 Overview and function

12.1 General

Lubmann grease lubrication pump type - ALP81 has been widely used in industries like wind power, mining, metallurgy, machine tools, textiles, food, ports, commercial vehicles, construction machinery, and heavy mechanical equipment, etc.

Our Lubmann automatic lubrication system lubricates all lube points as required through progressive lubrication system. It can reduce the friction resistance, reduce contact wear and decrease the friction surface temperature. Meanwhile, it plays a supporting role of anti-rust, shock absorption and sealing of bearings and bolts.

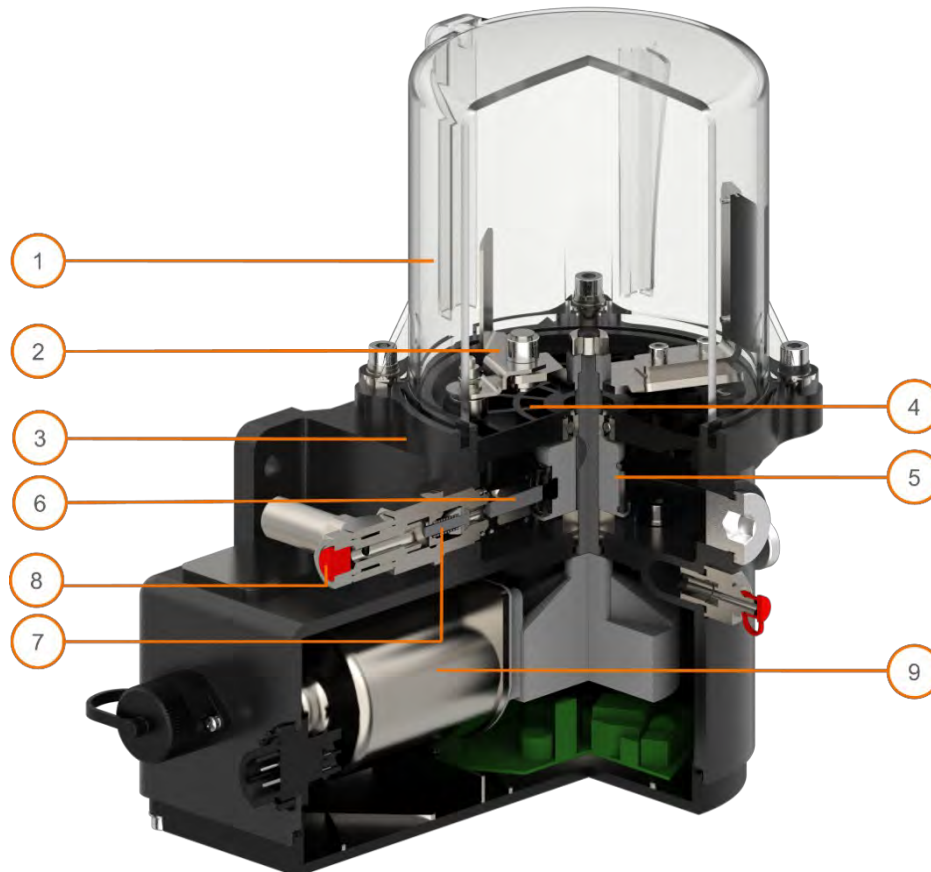


12.2 Functional description

The Lubmann grease lubrication pump ALP81 is electrically operated and has up to a max. 3 independently operating lubricant outlets, which can be engaged by bypasses. A separate pump element PE is required for each outlet. Three different delivery rates are available. This allows the grease quantity to be metered precisely for the requirements of the individual progressive distributor layouts.

These pumps enable the delivery of lubricants up to NLGI-Class 2 at a operating pressure of maximum 300 bar (adjusting of safety valve SV).

The ALP81 series pumps differ in reservoir size and control type. It can be controlled by the serial controller with and LED display, or externally by PLC, board computer or external controller from Lubmann.



- 1 Grease reservoir
- 2 Agitator blade (with stirring paddle, magnet and guide plate)
- 3 Pump body housing
- 4 Perforated base plate
- 5 Eccentric pressure disc
- 6 Delivery piston
- 7 Non return valve
- 8 Safety valve
- 9 Motor

A DC motor (9) continually operates eccentric pressure disc (5). This eccentricity effects the suction and pressure strokes of the delivery piston (6), whereby the integrated non-return valve (7) prevents the delivery media from being sucked back out of the main line.

The agitator blade (2) pushes the lubricant out of the grease reservoir (1) through a perforated base plate (4), which reduces any air bubbles, to the suction area in the pump body (3). A scarper on the agitator blade (2) enables a visual check of the lubricant volume still present in the transparent supply container (1).

The safety valve (8) is pre-set to 300 bar.

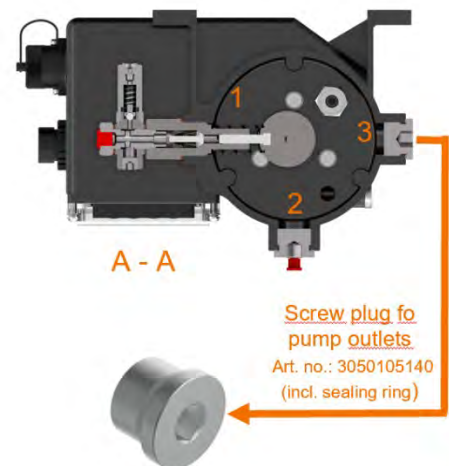
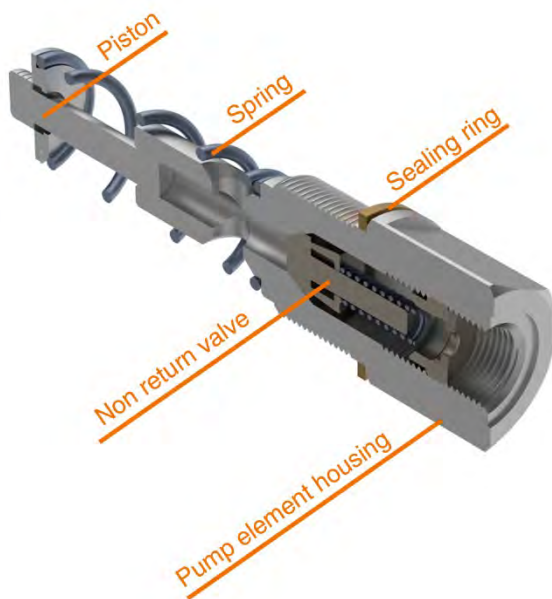
12.3 Pump element

ALP81 series grease lubrication pumps can be installed -max. 3 pump elements with safety valve type SV-C on the pump outlet position 1/2/3

or
max. 2 pump elements with type SV-A safety valve with bypass on the pump outlet position 1 and 3.

Pump elements can deliver the lubricant single with the flow rate range between 0,075 - 0,225 cm³/stroke or bridged with each other to achieve a higher flow rate till 0,675 cm³/stroke with SV-A safety valve

or
till 0,9 cm³/stroke with SV-C safety valve.



Technical data pump element PE (without DBV):

	Delivery rate (cm ³ / stroke)	Article number*	Screw-in thread	Connection thread
PE 1.5	0,075	2070011689*	M22x1.5	G 1/4
PE 2.5	0,125	2070011690*	M22x1.5	G 1/4
PE 4.5	0,225	2070011691*	M22x1.5	G 1/4

* Article number includes sealing ring, without safety valve

Functional description

On the vertical shaft of the geared DC motor an eccentric pressure disc with eccentric hole in the centre is mounted.

When the pump starts running the eccentric pressure disc will make a back-and-forth movement (X1, X2, X3). The piston of the pump element, which is mounted in the pump body, runs against the eccentric pressure disc.

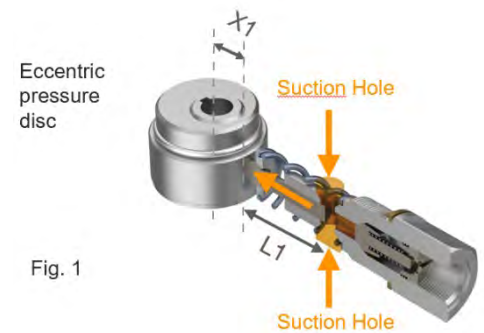


Fig. 1

When the EPD is moving away from the piston (Fig. 1) the spring on the pump element will push the piston against the EPD. In this suction stroke grease is sucked into the pump element through the 2 suction holes.

See the 2 arrows in (Fig. 1). The vertical shaft will continue rotating and the EPD will push the piston into the other direction (Fig. 2).

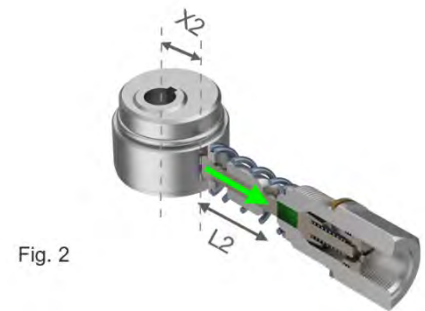


Fig. 2

In this pump stroke the piston will close the 2 suction holes and pushes the suctioned grease to the non-return valve (Fig. 3).

The pressure created by the piston and grease will open the non-return valve (Dia. 15.1-3) and the grease flows to the outlet of the pump element further into the lubrication system (Fig. 3).

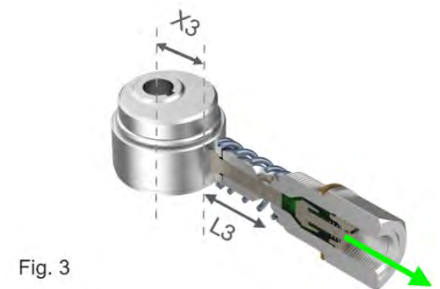


Fig. 3

Pump element installation and removal



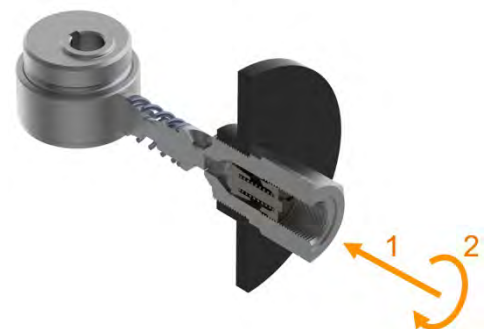
Only install or remove the pump element when pump power OFF!!!

1. Insert the pump element vertically into the pump outlet housing drilling.
2. Tighten the pump element clockwise.



Montieren Sie das Pumpenelement mit einem Anzugsdrehmoment von 43 ± 2 Nm.

3. To remove, reverse order description above.



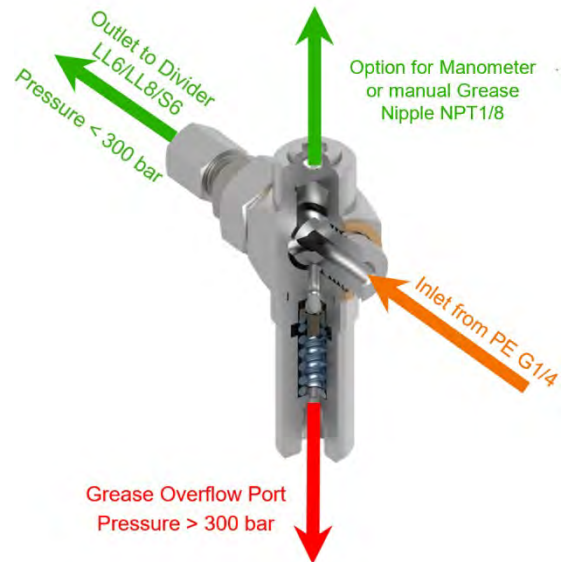
12.4 Safety valves

12.4.1 Safety valve SV-C

The safety valve SV-C is pre-set to 300 bar.

When the system pressure is higher than the pre-set valve (300 bar), the safety valve opens, lubricant flows from the safety valve overflow port out.
Please observe the applicable environmental regulations.

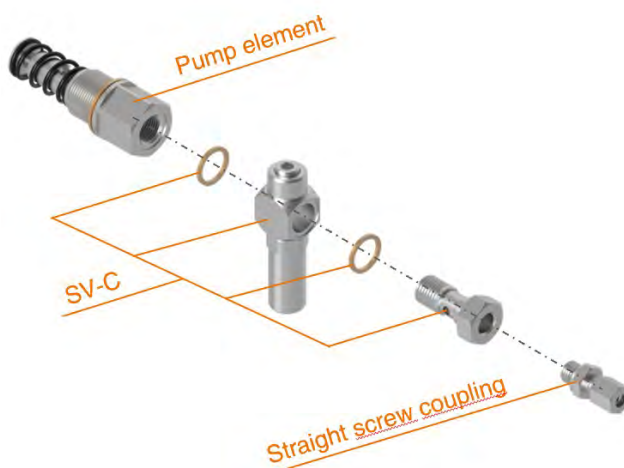
	Version	Article number
Safety valve SV-C- pre-set to 300 bar- G1/4-M10x1 (incl. flat washer)	/	2070011684
Straight screw coupling GE	D6LL	3050100890
	D8LL	3050104830
	D6S	9901900



You can find further screw connections in our accessories catalogue.

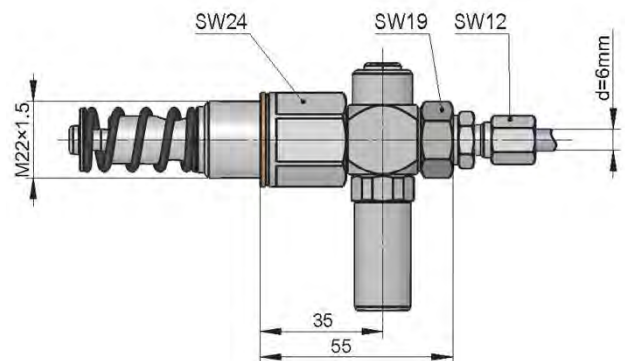


Install the safety valve with a tightening torque of 36 ± 2 Nm.



Exploded view

Pump element with SV-C safety valve
and straight screw coupling



Dimensions

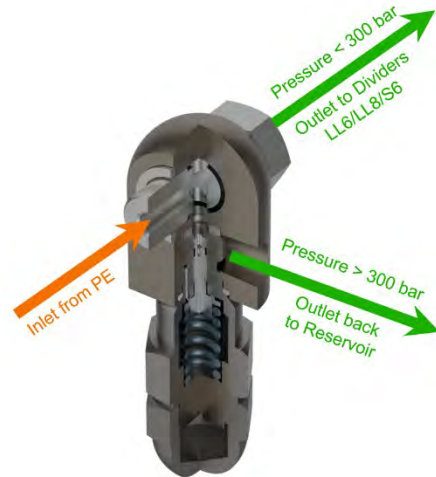
Safety valve with pump element

12.4.2 Safety valve SV-A – for bypass

The safety valve SV-A is pre-set to 300 bar.

When the system pressure is higher than the pre-set valve (300 bar), the safety valve opens, lubricant flows from the bypass of the safety valve and back to pump reservoir.

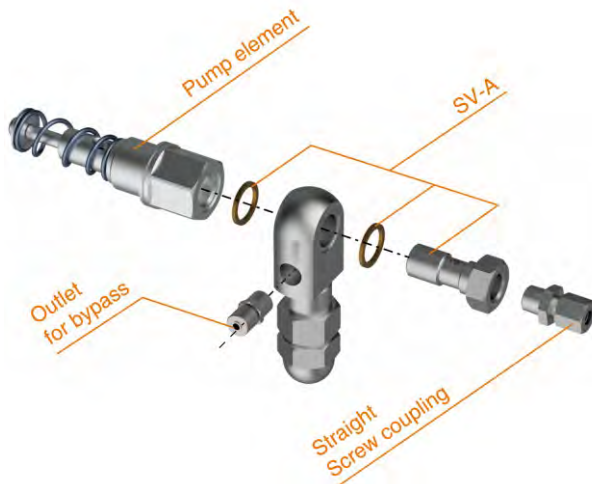
	Version	Article number
Safety valve SV-A-for bypass-pre-set to 300 bar-G1/4-M10x1 (incl. flat washer)	/	2011221370
Bypass	Single bypass	2011026280
	Dual bypass	2011026510
Straight screw coupling GE	D6LL	3050100890
	D8LL	3050104830
	D6S	9901900



You can find further screw connections in our accessories catalogue.

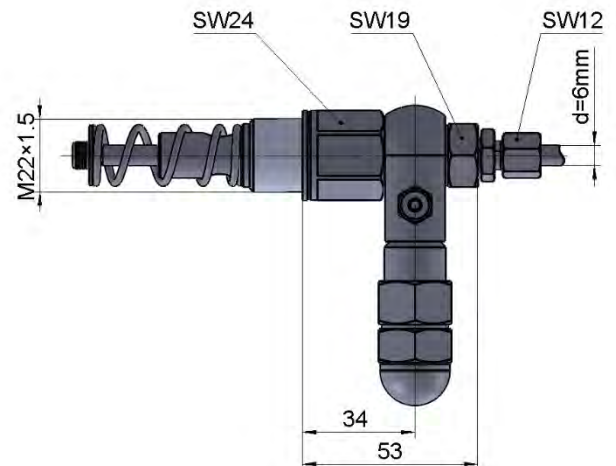


Install the safety valve with a tightening torque of 36 ± 2 Nm



Exploded view

Pump element with safety valve SV-A and straight screw coupling



Dimensions

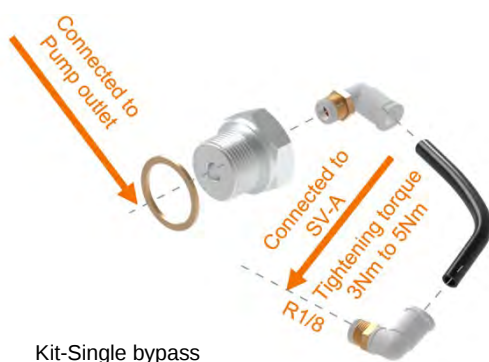
Safety valve with pump element

12.4.3 Bypass for safety valve SV-A

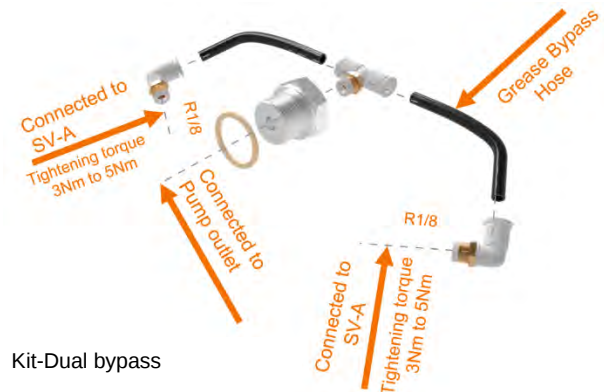
When the system pressure is higher than the pre-set 300 bar of the safety valve, the lubricant from the pump element can be returned to the grease reservoir via a bypass.

Two versions are available as complete kit sets.

	Article number	Remark
Kit-Single bypass for safety valve SV-A-M22x1,5	2011026280	Lubricant from a pump element is returned to the grease reservoir in case of overpressure.
Kit-Dual bypass for safety valve SV-A-M22x1,5	2011026510	Lubricant from two pump elements is returned to the grease reservoir in case of overpressure.

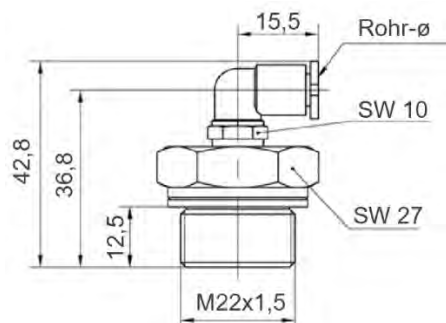


Kit-Single bypass

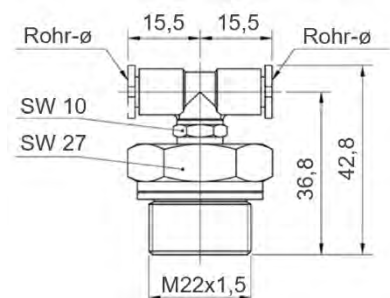


Kit-Dual bypass

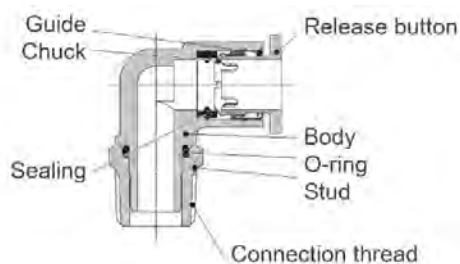
Dimensions of the connection fittings:



Connection fitting
from kit – single bypass



Connection fitting
from kit – dual bypass



Structure Elbow screw coupling-push in



Installation example:
Grease lubrication pump with SV-A installed and single bypass

12.5 Level monitoring min.

Functional principle of the intermittent low level signal

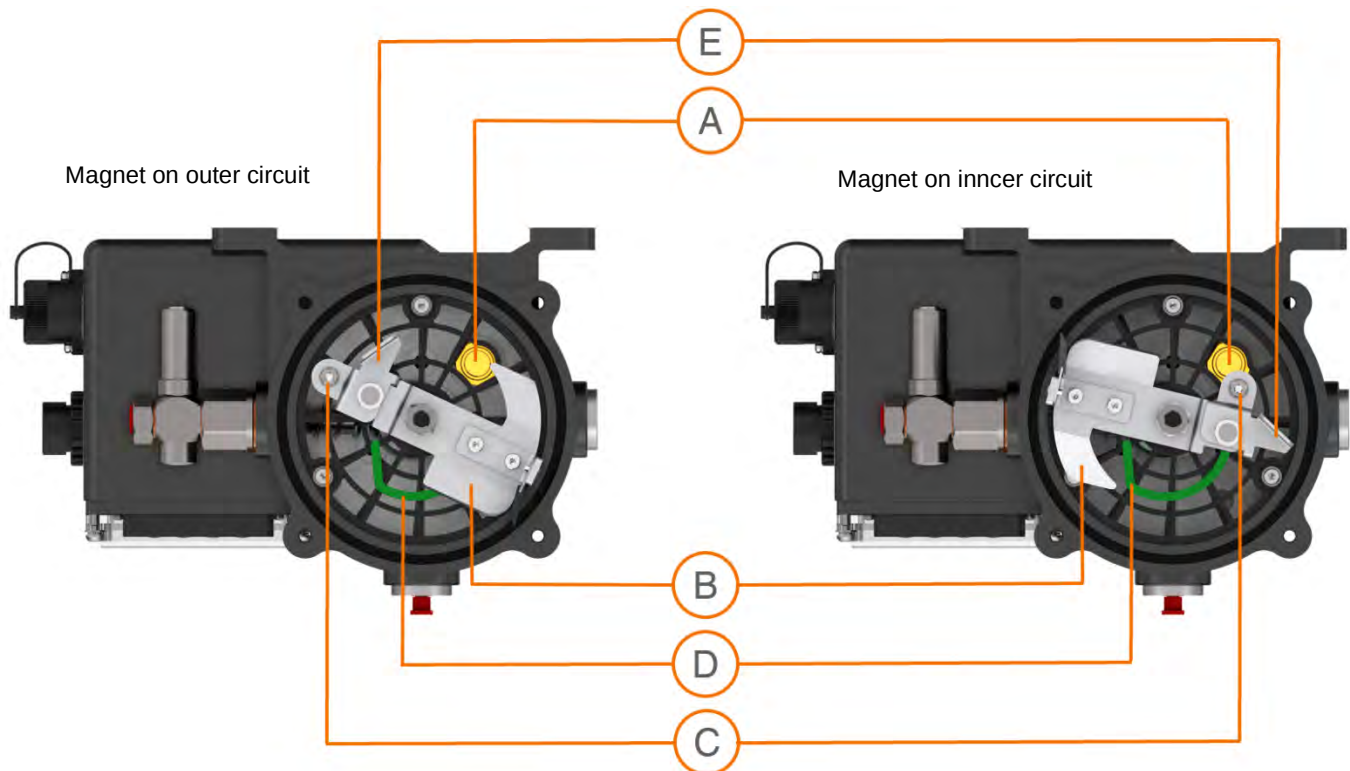
The intermittent empty signal operates contactlessly.

If the reservoir is filled with a lubrication grease suitable for the intermittent low-level indication and the pump is operating, then the stirring paddle (E) is deflected by the resistance of the lubrication grease. Therefore, the magnet (C) connected to the stirring paddle (E) is moved on its inner circuit and trigger a pulse at the magnetic switch (A) with its magnetic field. A guide plate (D) positively guides the magnet (C) together with the pivoted stirring paddle (E) towards the outside during each revolution. As soon as the stirring paddle (E) leaves the guide plate (D), the lubricant's resistance pushes the guide plate together with the magnet (C) to the inside again.

As soon as the lubricant inside the reservoir has fallen to that level that the lubricant's resistance is no more sufficient to further deflect the stirring paddle (E), the magnet (C) remains on the outer circuit and don't trigger a pulse at the magnetic switch (A) with its magnetic field.

The magnetic switch (A) will send out a pulse signal every time it is triggered. If the magnet C slides across the magnetic switch A more than 5 times (including 5 times) continuously in an operating cycle, the integrated controller of the pump will consider that the amount of grease in the pump is sufficient.

If the magnet does not rotate at least five revolutions directly above the magnetic switch due to minimum fill level, an empty signal is output directly at the signal connection of the grease lubrication pump.



- A Magnet switch (yellow marked)
- B Agitator blade
- C Magnet
- D Guide plate (green marked)
- E Stirring paddle

13 Assembly

General information

Only qualified technical personnel may install the products described in these Instructions. During assembly pay attention to the following:



- Other units must not be damaged by the assembly
- The product must not be installed within the range of moving parts
- The product must be installed at an adequate distance from sources of heat and coldness
- Observe the product's IP degree of protection
- Adhere to safety distances and legal prescriptions on assembly and prevention of accidents
- Possible existing visual monitoring devices, e.g. pressure gauges, MIN/MAX markings or piston detectors, must be clearly visible
- Observe prescriptions in chapter Technical data regarding the installation position

Place of installation

Protect the product against humidity, dust and vibrations and install it in an easily accessible position to facilitate other installation and maintenance works.

Minimum assembly dimensions



Ensure sufficient space for maintenance work or for attachment of further components to build a centralized lubrication system to the pump by leaving a free space of at least 100 mm into each direction in addition to the stated dimensions.

**All the installation dimensions can be found in chapter "installations dimensions"*

Installation bores



Drill the mounting bores on non-loadbearing parts of the superior machine only. Fastening must not be done on two parts moving against one another. Please speak to the manufacturer and obtain approval for drilling.

Welding work



There is a risk of damage to the main machine and the grease lubrication pump. Please contact the manufacturer and obtain approval for any welding work you wish to perform.

Mount pump element and safety valve

Generally, a standard pump has a set of pump element and safety valve (SV-C) on the left side of the pump outlet.

To mounting an extra set of pump element and safety valve, please make sure the pump has been disconnected from the power supply.

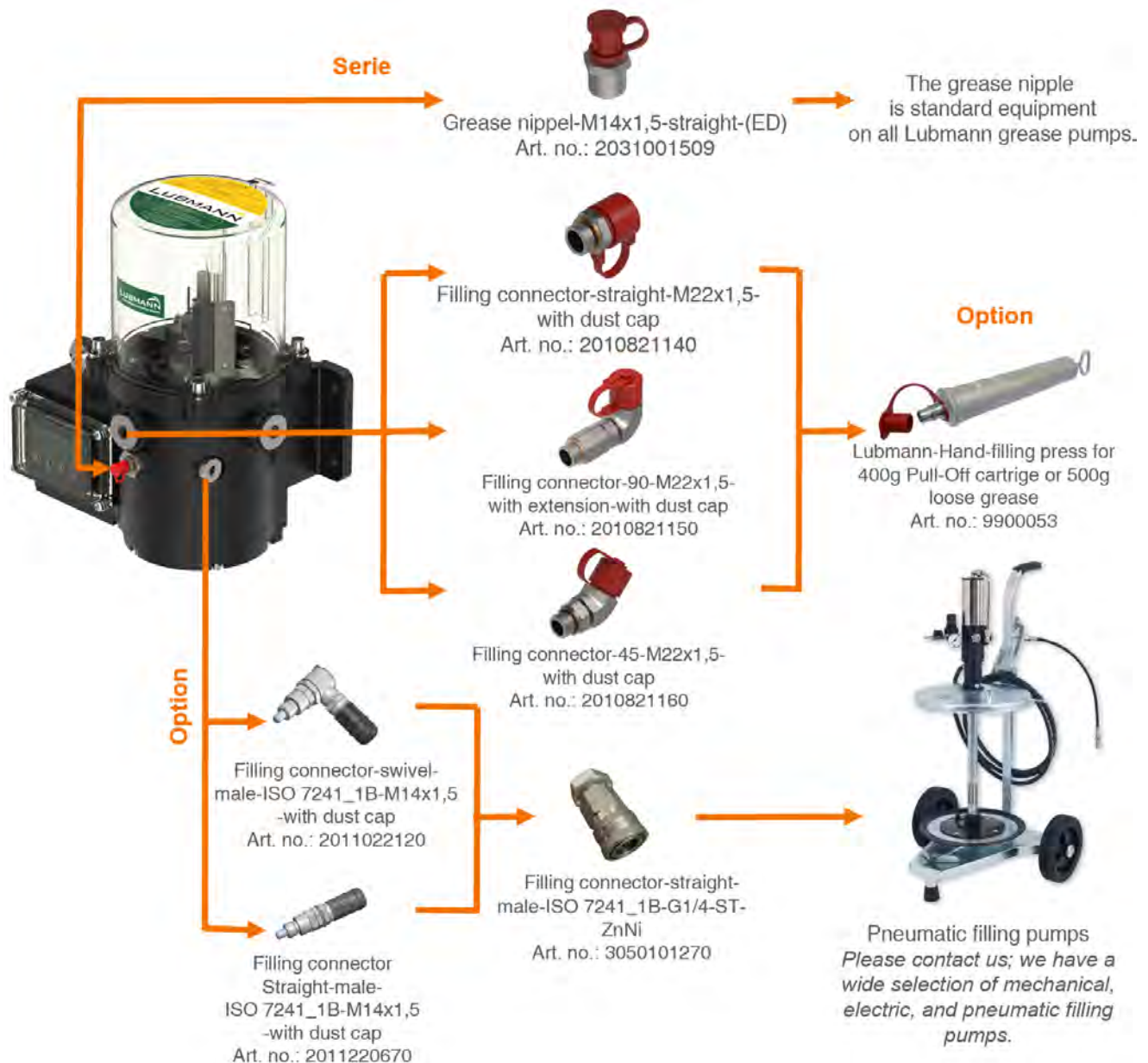


Tightening torque for pump element = 43 Nm $\pm$ 2 Nm

Tightening torque for safety valve = 36 Nm $\pm$ 2 Nm

14 Filling the grease reservoir

1. Use only EP-2 greases which are approved for the various operating temperatures.
2. The grease lubrication pump must be vertical while filling with lubricant.
3. When refilling, do not exceed the maximum fill level mark. Check the filling process and stop it before the maximum fill level is reached.
4. It is strictly forbidden to remove the top cover of the pump for filling lubricants.
5. Only fill in clean lubricants!
The service life of the pump elements highly depends on the quality of the used lubricants.



15 Electrical connection and control unit



Danger of electric shock!

Make sure to disconnect the product from the power supply before carrying out any works on electrical components.

Carry out the electrical connection according to the connection type of the pump.

Use the power cable according to the respective connection diagram as described in this manual. A back-up fuse must be used. See description on page 12.

If you don't require divider monitoring, screw the protective cap 3030502160 into the socket. This is the only way to maintain the protection class (IP class).

Work on electrical components may be performed only by qualified electricians. At a minimum, the following safety measures must be taken before any work on electrical components is done:



1. Disconnect
2. Secure against reconnection
3. Verify absence of voltage
4. Ground and short-circuit
5. Cover or barricade adjacent live parts

The electrical connection must be implemented in accordance with the specifications of the standards of the DIN VDE 0100 series or of the standards of the IEC 60364 series, respectively.



Connect the electrical cables or wirings without mechanical forces are transferred to the products. Connect plugs with the corresponding bushes and secure them against becoming loose.

The central lubrication pump must be secured with a suitable external fuse.

The electrical connection is established in accordance with the type of connection of the specific central lubrication pump.

15.1 Wiring diagram – without controller

Grease lubrication pump-ALP81 with 7-pin BYN connector – Level monitoring via an external indication light

The grease lubrication pump is supplied with 12/24V DC via the 7-pin BYN connector at position A.

Lubrication time and break time are not programmable.

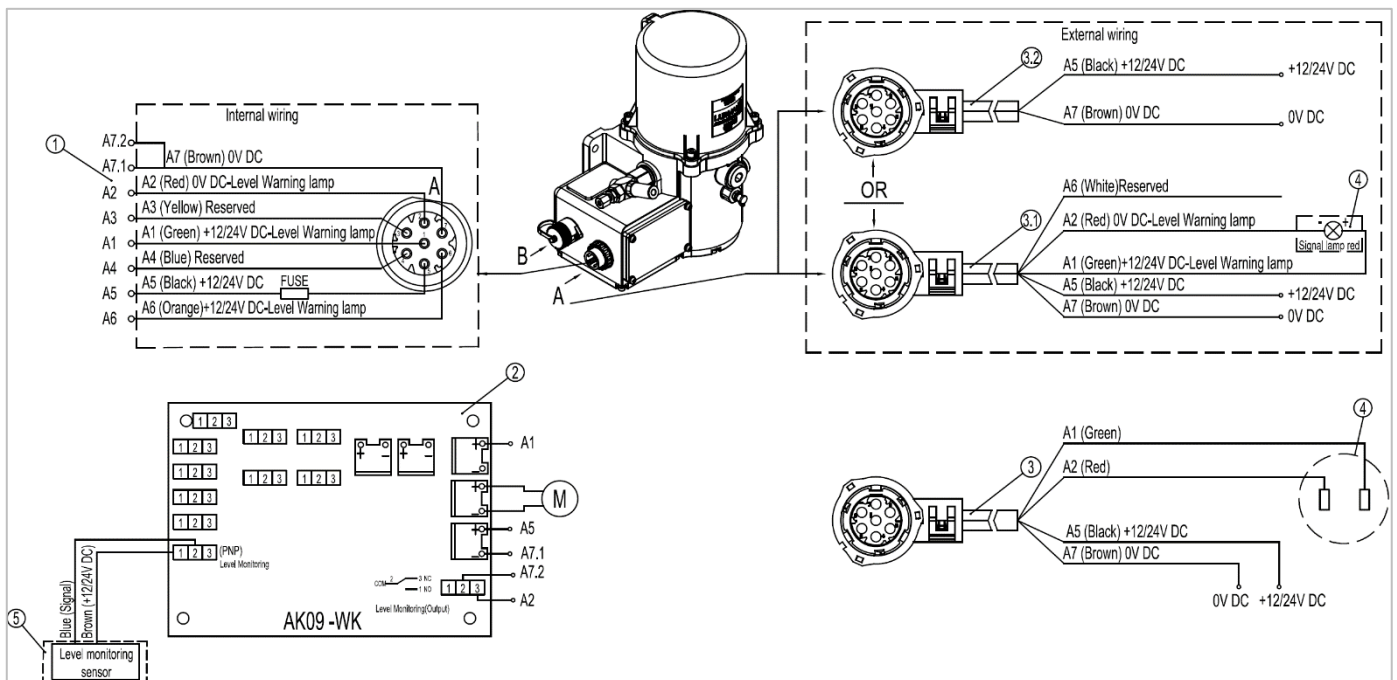
The grease level indication light turns on “red” when the pump gets an error signal for the grease level.



For the non-controller version ALP81 grease lubrication pump, it is not possible to monitor the divider status!

For more information about other solutions please contact us.

Wiring diagram LE10001011



Pos.	Qty.	Description	Article number
1A	1	Wire Kit-power supply-ALPB-ALP81_BYN-12VDC-Int.-0,3m-BYN_M_7P-5xP_JSTxH_F-2xP_JSTvH_F-7x0,5	2040120780
1B	1	Wire Kit-power supply-ALPB-ALP81_BYN-24VDC-Int.-0,3m-BYN_M_7P-5xP_JSTxH_F-2xP_JSTvH_F-7x0,5	2040120760
2A	1	Controller-AK09-WK-V2.0-12VDC-not programmable	15010743
2B	1	Controller-AK09-WK-V2.0-24VDC-not programmable	15010742
3.1A	1	Cable kit-power supply-12/24VDC-Ext.-7,5m-BYN_F_90_7P-5x1,0	2110012451
3.1B	1	Cable kit-power supply-12/24VDC-Ext.-5,0m-BYN_F_90_7P-5x1,0	2110012452
3.2A	1	Cable kit-power supply-12/24VDC-Ext.-7,5m-BYN_F_90_7P-2x1,0	2110012722
3.2B	1	Cable kit-power supply-12/24VDC-Ext.-5,0m-BYN_F_90_7P-2x1,0	2110012723
4A	1	Indication light-12VDC-red-M16	3030102940
4B	1	Indication light-24VDC-red-M16	3030102930
5	1	Sensor-min. level-ALP81-12/24VDC-M14x1,5-L63-2_wire-AL	2010821200

15.2 Wiring diagram – with controller

Grease lubrication pump-ALP81 with 7-pin BYN connector – System monitoring via an external illuminated push button

The grease lubrication pump is supplied with 12/24V DC via the 7-pin BYN connector at position A.

This connection ist standard.

An intermediate lubrication reset function is triggered by pressing an illuminated pushbutton, which is installed, for example, in the cabin.

During the lubrication time (grease lubrication pump in operation) – 3P, the optional illuminated pushbutton lights up green.

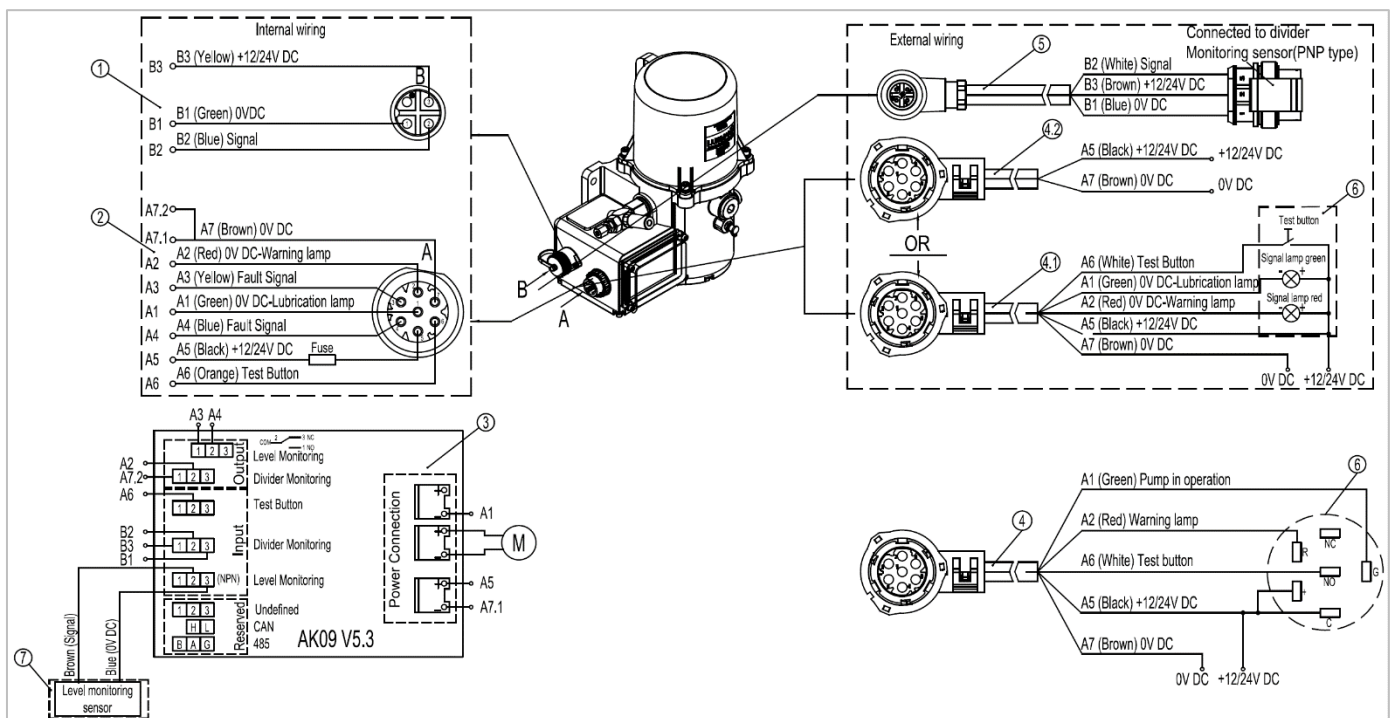
If the button lights up “red”, this indicates an error message EE.

The button lights up “yellow” if an error message is being reset but is still pending.

Via Pos. B the distributor monitoring 2P (proximity switch) is connected to the grease lubrication pump.

For more information about other solutions please contact us.

Wiring diagram LE10001012



Pos.	Qty.	Description	Article number
1	1	Wire Kit-divider monitoring-12/24VDC-Int.-0,3m-BD_F-4P-3xP_JSTxH_F-3x0,5	2010821300
2A	1	Wire Kit-power supply-ALPB-ALP81_BYN-12VDC-Int.-0,3m-BYN_M_7P-5xP_JSTxH_F-2xP_JSTvH_F-7x0,5	2040120780
2B	1	Wire Kit-power supply-ALPB-ALP81_BYN-24VDC-Int.-0,3m-BYN_M_7P-5xP_JSTxH_F-2xP_JSTvH_F-7x0,5	2040120760
3	1	Controller-ALP81-AK09-V5.3-12/24VDC-programmable (print board)-program code d-61	2040120350
4.1 A	1	Cable kit-power supply-12/24VDC-Ext.-7,5m-BYN_F_90_7P-5x1,0	2110012451
4.1 B	1	Cable kit-power supply-12/24VDC-Ext.-5,0m-BYN_F_90_7P-5x1,0	2110012452
4.2 A	1	Cable kit-power supply-12/24VDC-Ext.-7,5m-BYN_F_90_7P-2x1,0	2110012722
4.2 B	1	Cable kit-power supply-12/24VDC-Ext.-5,0m-BYN_F_90_7P-2x1,0	2110012723
5A	1	Cable kit-divider monitoring-12/24VDC-Ext.-7,5m-BD_M_90_4P-AMP_F_3P-3x0,5	2110012409
5B	1	Cable kit-divider monitoring-12/24VDC-Ext.-5,0m-BD_M_90_4P-AMP_F_3P-3x0,5	2110012410
6A	1	Illuminated push button-24VDC-red_green_yellow-M16	3030600350
6B	1	Illuminated push button-12VDC-red_green_yellow-M16	3030600340
7	1	Sensor-min. level-ALP81-12/24VDC-M14x1,5-L63-2_wire-AL	2010821200

15.3 Controller AK09 with LED Display AK06

The controller AK09 V5.3 is the integrated setting adjustable controller for grease lubrication pump ALP81 BYN series.

The AK06 LED – Monitor / Display Universal works only in combination with the AK09 Setting adjustable controller which can be programmed with different program codes depending on the version (d-61).

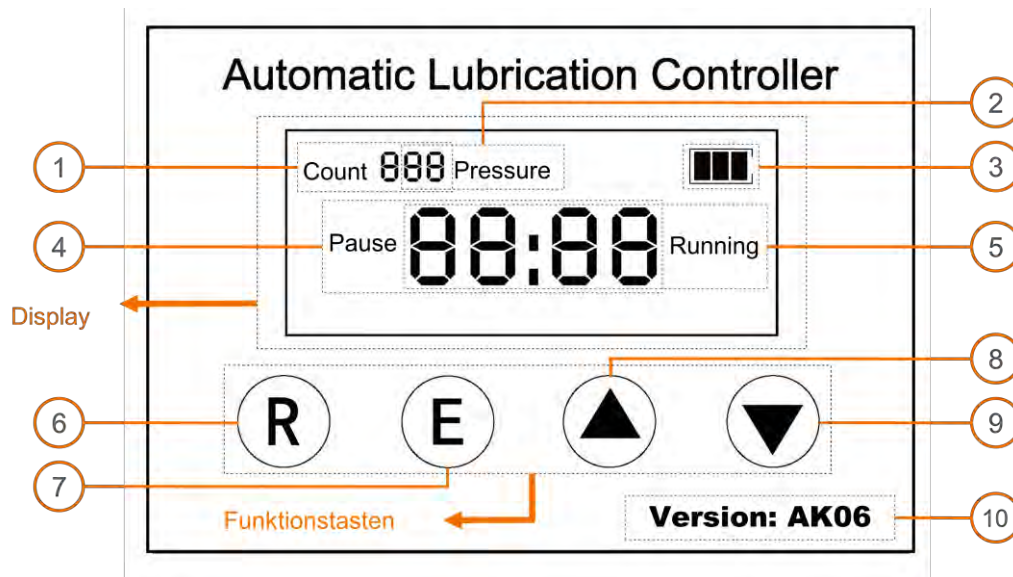
Main display shows system status like the number of finished lubrication cycles ①, (one complete lubrication cycle = 1 full pause time + 1 full lubrication time), divider monitoring status ②, grease level status ③, counting down pause time ④ and counting upwards lube time ⑤. If a failure is detected by the controller, the display shows the Error Code instead of pause time or lube time in main display area.

Error-Code:	Definition
EE-1	Low grease level or no grease in pump reservoir, pump is under risk of empty running.
EE-2	Divider monitoring - "failure," e.g., blocked lubrication point, overpressure between pump and main divider. Pressure relief valve opens at a pressure above 300 bar!



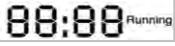
The AK09 has Fault Tolerance Program; the error code only starts during the second cycle after the controller gets a failure signal. After the failure has been fixed, the controller needs 2 cycles as well to reset the failure signal automatically!

15.3.1 Display and Function keys - Overview



15.3.2 Display und Function keys - Description

Pos.	Symbol	Description
1	Count 888	Cycles Counting: During the pause time 1P, POS. 1 shows the number of finished lubrication cycles. The value of Count adds 1 after a full lube time. E.g., Count 168 means the system finished 168 lubrication cycles.
2	88 Pressure	Divider Monitoring: During the running time 3P, 2 shows the impulse of the divider monitoring. OFF Pressure means controller is counting the detected impulse cycles from the divider monitoring. The Sign turns into ON Pressure after the preset value of impulse cycles from the divider has been detected. Main display turns into EE-2 , and you can hear an alarm for 30 seconds, if the controller has not detected the preset value of impulse cycles during the lube time.
	Grease level	Grease level – OK. There is sufficient lubricant in the grease reservoir. Grease level - warning. Pump works under the risk of low grease level. An immediate grease refilling is recommended here.

		 Grease level – low. Pump detected low grease level status. During the automatic cycle, the pump stops immediately no matter it reaches the preset running time or not. Error EE-1 will appear on the monitor until the pump is refilled. Push  to clear the warning alarm.
		Special conditions: If after the initial alarm, the pump is manually started by pressing the R button from the display, then the pump will do a complete greasing cycle according to the value set at 3P setting. The alarm for EE-1 will engage after the cycle finishes. If the pump is manually restarted using the test button, the consequence will be followed same as automatic cycle.
4		Pause Time: Special conditions: If after the initial alarm, the pump is manually started by pressing the R button from the display, then the pump will do a complete greasing cycle according to
5		Lube Time / Schmierzeit: During the system lube time, the main display shows e.g., 01:28 Running for the actual finished lube time – 1 minute and 28 seconds and the time continue counting
6		Reset button (Test button): Push  during the pause time, main display stops counting down the remained pause time immediately and starts a new cycle with preset lube time. Push  during the lube time, main display stops counting lube time immediately and starts a new cycle with preset pause time.
7		Enter button: For „Enter“ function, please check the details in parameter setting. Push  during the system warning or error alarm (EE-1 or EE-2) to clear the alarm.
8		Parameter setting “+”: In the menu up. Please check the details in parameter setting.
9		Parameter setting “-”: Please check the details in parameter setting. Click Down Arrow no matter during the pause time or lube time, can enter the status checking interface to check the following data: D-XX: Program Code of the pump (for ALP81 Pump regular program, XX=61) EE-X: Error Code in the last cycle X (X= 0, 1, 2) t XX: Environment Temperature is XX°C -XX: Total Cycles is XX
10	Version: AK06	Version LED- Displays: AK06 is the current version of our display. <i>*For further information on other Lubmann control units or external control units, please contact us.</i>

15.3.3 Parameter – Description

Parameter	Description	Setting areas	Factory setting
1P	Pause time	0 to 99 hrs and 0 to 59 mins Min. 1 min / Max. 99 hrs and 59 mins	2 h
2P	Divider monitoring Impulse cycles	0 to 99 impulses cycles 0 means system does not detect the	00
3P	Lube time	0 to 99 mins and 0 to 59 secs Min. 1 sec / Max. 99 mins and 59 secs	6 min
4P	Low temperatur setup	from -50 to 0 Celsius Degrees adjustable	-15

15.3.4 Parameter Setting after first connecting to power

For first time connecting the power on the pump, the display shows the program code “d-61” up like (Fig. 1) or other pump pre-set program code, depends on pump and software type.

The program code can NOT be changed! The controller has pre-set parameters which can be changed under needs by following the setup steps. Otherwise, the pump runs with the default pre-set parameter.

After program code “d-61” the controller shows 1P Pause Time and is counting down, system cycle is 0 (Fig. 2).



Fig. 1 Controller program code



Fig. 2 Pause time display after first power connection

15.3.5 Reset parameters using the control buttons

15.3.5.1 Setting Pause time (hours and minutes)

Press the Δ and ∇ buttons with two fingers for 4 seconds at the same time. After releasing the Δ and ∇ buttons (you will hear a tone), press $\bullet$ to enter parameter setting mode and begin setting 1P (pause time hourly parameter, Fig. 3).

Press Δ or ∇ button to adjust the 1P Pause Time value for hour (Fig. 3). Then press $\bullet$ button again to enter -1 (Pause Time minute parameter) setting. Press Δ or ∇ button to adjust the -1 value for minutes (Fig. 4).



Fig. 3 Setting 1P Pause time in hour



Fig. 4 Setting 1P Pause time in minute



1P and -1 can not set as 00 in the same time. If 1P is set as 00, -1 starts with 01.

15.3.5.2 Setting divider monitoring:

After completing the P1 setting, press the $\bullet$ button again to switch to the 2P divider monitoring setting until 2P is successfully set. Press the $\bullet$ button to save and exit the setting status (Fig. 5).



For system without divider monitoring sensor, set 2P always as 0.



Fig. 5 Setting 2P divider monitoring cycles

15.3.5.3 Setting lube time:

3P in minutes and -3 in seconds (the same way of setting the parameters we describe for 1P Pause Time and -1 setting) (Fig. 6 and Fig.7).



3P and -3 can not set as 00 at the same time. If 3P is set as 00, -3 starts with 01.



Fig. 6 Setting 3P Lube time in minute

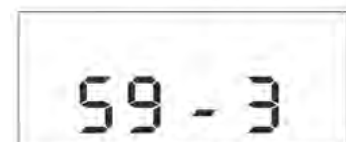


Fig. 7 Setting 3P Lube time in second

15.3.5.4 Setting low temperature:

Press **⏻** button to switch to 4P Low temperature setting.
With this parameter you can stop the pump working at low temperatures.
Pre-set temperature is – 15° C. Press **△** or **▽** button to adjust the 4P low temperature setup.
Press **⏻** button to confirm your new low temperature setting (Fig. 1).



System has a temperature sensor. In case the real temperature is under the pre-set value, the pump stops automatically to avoid the damage of motor.

Press **⏻** to exit the edit mode!

15.3.5.5 Display of controller during lubrication cycles

The control unit will automatically start with the 1P pause time!
The display will now show the newly set 1P pause time, e.g., Pause 10:28, i.e., the pause time is 10 hours and 28 minutes. The pause time will count down in hours and minutes until 00:00 (Fig. 2).

After the 1P pause time has ended, the 3P lubrication time begins counting up in minutes and seconds. For example, 01:28 Running indicates that you have set 1 minute and 28 seconds as the lubrication time. It counts up from 0 seconds to 1 minute and 28 seconds (Fig. 3).



Fig. 1 Setting 4P Low temperature



Fig. 2 Display pause time 1P counting down



Fig. 3 Display Lube time 3P counting up

15.3.5.6 Reset button - Start an intermediate lubrication

Push **R** during the pause time, main display stops counting down the remained pause time immediately and starts a new cycle with pre-set lube time (Fig. 1).

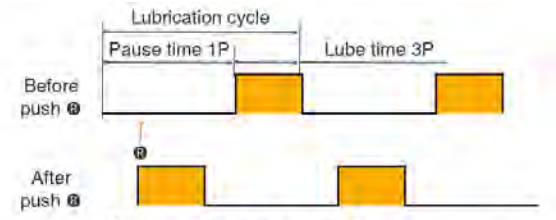


Fig. 1 Cycle changing when push **R** during pause time

Push **R** during the lube time, main display stops counting lube time immediately and starts a new cycle with pre-set pause time. (Fig. 2)

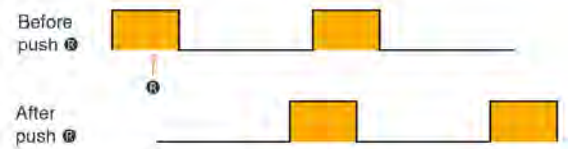


Fig. 2 Cycle changing when push **R** during lube time

Push **R** always means skipping the current pause/lube time and enter into a new lube/pause time.

15.3.6 Restart the controller after switching off the machine

In case power/machine is switched off during a lube time P1 or pause time P3 following happens:

Switching machine on during 1P Pause Time, the 1P Pause time is counting down from the rest pause time where the machine was switched off (Fig. 3).

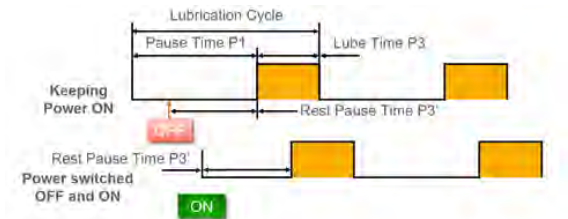


Fig. 3 Cycle changing when power switch ON and OFF during pause time

In case power / machine is switched off during a 3P Lubrication Time, the Lubrication time starts the full new Lubrication time which you setup (Fig. 4).

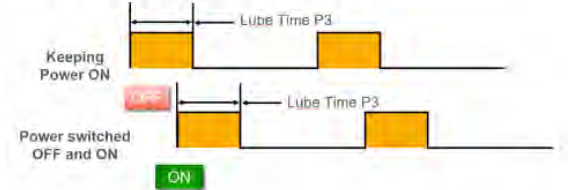


Fig. 4 Cycle changing when power switch ON and OFF during lube time

Divider monitoring 2P – Impulse cycles and monitoring

2P divider monitoring, must **NOT** be set as 0.

In case, the Detecting time T1, which is needed to detect the pre-set value of impulse cycles, is shorter than pre-set lube time 3P, Display turns from "OFF Pressure" to "ON Pressure" at the end of T1, Controller continues the rest lube time. After the lube time is finished, count of lubrication cycles +1. (Fig. 5).

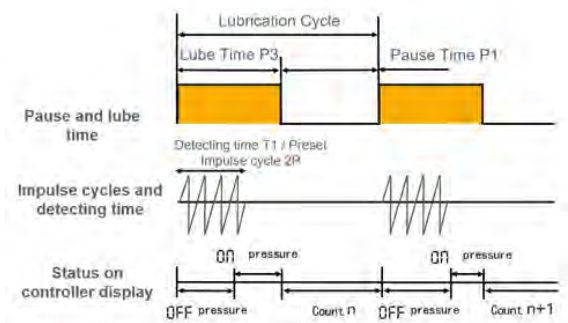


Fig. 5 $T1 < 3P$

In case the theoretical Detecting time T1, which is needed to detect the pre-set value of impulse cycles, is longer than pre-set lube time 3P, Display remains "OFF Pressure", and shows EE-2 error message in the end of 3P and lasts for 30 secs. Lubrication cycles will not be counted. (Fig. 6).

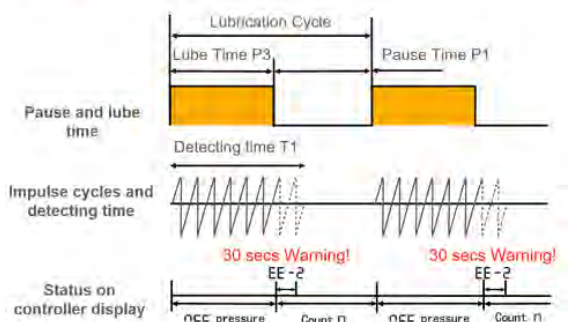


Fig. 6 $T1 > 3P$



For preset value of 3P - lube time less than 5 mins, the preset value of 2P less than 3 is recommended.

For preset value of 3P - lube time less than 10 mins, the preset value of 2P less than 5 is recommended.

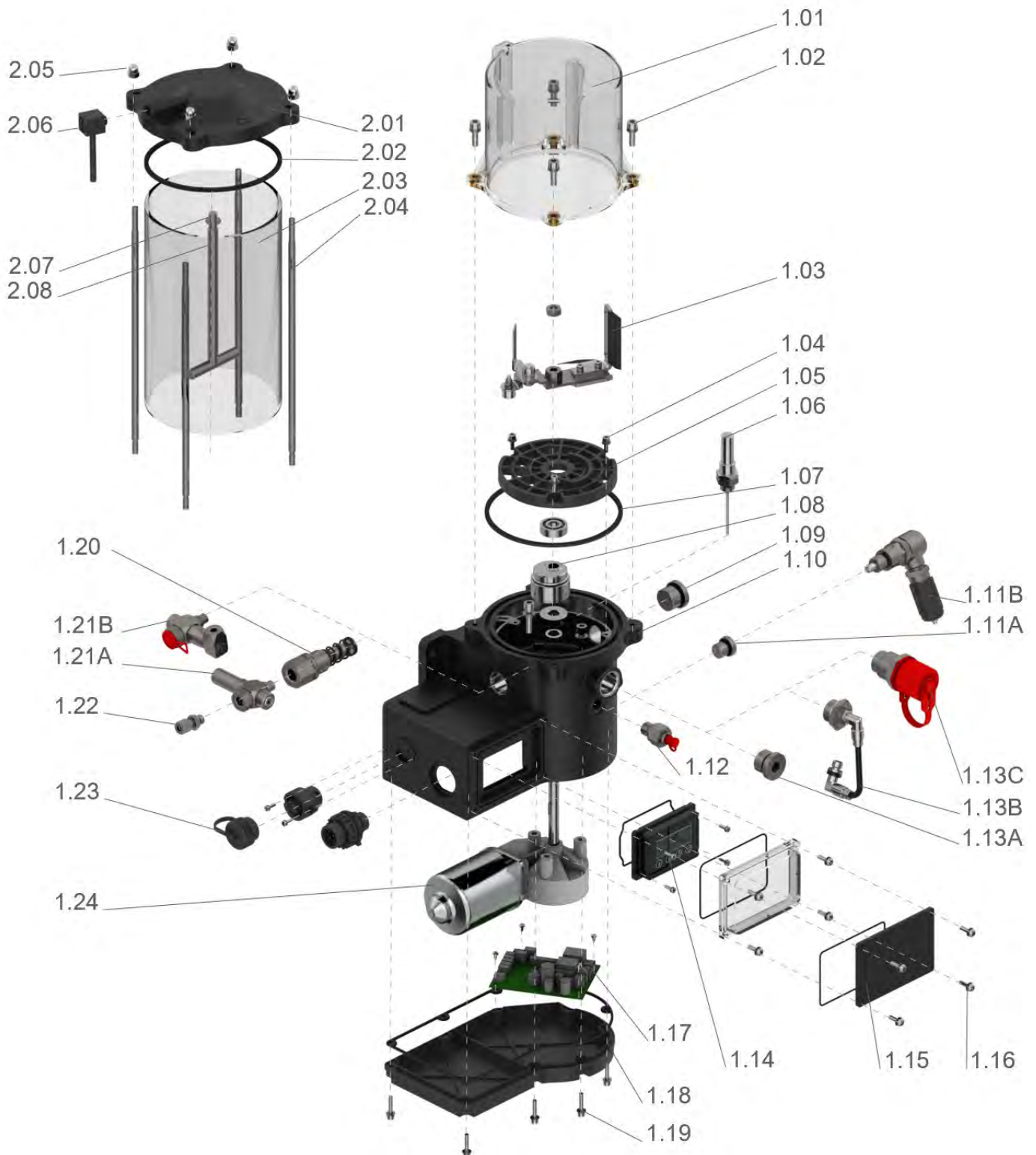
The volume of grease for each greasing point only decided by 3P - lube time, not by 2P - impulse cycles..

16 Trouble shooting

Fault	Possible cause	Solution
Grease lubrication pump not running / blocked	Spannungsversorgung unterbrochen Fettschmierpumpe unterbrochen Anschlusskabel unterbrochen / defekt Motor / Fettschmierpumpe defekt Sicherung defekt Internes Steuergerät defekt	Power supply interrupted. Grease lubrication pump interrupted. Connection cable interrupted/defective. Motor/grease lubrication pump defective. Fuse defective. Internal control unit defective.
Grease lubrication pump is running but does not deliver or delivers too little lubricant	Grease lubrication pump is empty Clogged or crushed lubricant line Leaking screw connection Pause time setting too high or lubrication time too low Pump element flow rate too low Pump element clogged/defective Unsuitable lubricant Check valve defective Pressure relief valve defective Air trapped in the lubricant/pump body	Refill lubricant Replace lubrication line Tighten or replace screw connection Adjust control parameters Adjust pump element size Replace pump element Use a suitable lubricant for the grease lubrication pump and operating temperature Replace check valve in the outlet screw connection Replace pressure relief valve Start the grease lubrication pump until lubricant flows out of the pump outlet without bubbles

17 Spare part

17.1 Spare parts drawing



17.2 Spare parts list

POS	Anz.	Article number	
1.01	1	15010424	Grease reservoir-transparent-ALP81-D120-H125-1L
1.02	4	3040103380	Hexagon socket head cap screw-M6x20-8.8-ST-ZnNi-with flat washer and spring washer
1.03	1	15010419	Kit-agitator blade with stirring paddle, magnet and guide plate-ALP81-D120
1.04	1	3040102910	Hexagon socket head cap screw-M4x14-A2-SS-with flat washer and spring washer
1.05	1	15010422	Perforated base plate-ALP81-D111,5x12-PA
1.06A	0-1	2010821200	Sensor-min. level-ALP81-12/24VDC-M14x1,5-L63-2_wire-AL
1.07	1	3021000187	Sealing ring-grease reservoir bottom-ALP81-D120-128,5x3-NBR
1.08	1	2031001570	Eccentric pressure disc-EDS-D37
1.09	1	3050105140	Screw plug-M22x1,5-(ED)-ST-ZnNi
1.10	1	15010736	Pump body housing for grease lubrication pump-ALP81-230x160x135-Al-black painted
1.11A	0-1	3050105820	Screw plug-M14x1,5-(ED)-ST-ZnNi
1.11B	0-1	2011022120	Filling connector-swivel-male-ISO 7241_1B-M14x1,5-with dust cap
1.11C	0-1	2011220670	Filling connector-straight-male-ISO 7241_1B-M14x1,5-with dust cap
1.12	1	2031001509	Grease nipple-M14x1,5-straight-(ED)
1.13A	0-1	3050105140	Screw plug-M22x1,5-(ED)-ST-ZnNi
1.13B	0-1	2011026280	Kit-Single bypass for safety valve SV-A-M22x1,5
1.13C-1	0-1	2010821140	Filling connector-straight-M22x1,5-with dust cap-for Hand filling press
1.13C-2	0-1	2010821150	Filling connector-90-M22x1,5-with extension-with dust cap-for Hand filling press
1.13C-3	0-1	2010821160	Filling connector-45-M22x1,5-with dust cap-for Hand filling press
1.14A	0-1	2011223180	LED-Display-AK06-(only display without controller)
1.14B	0-1	15010721	LED-Display-AK06-transparent protective cover-100x68x15
1.15	1	15010724	Blind plate-fit for without LED-Display-AK06-100x68x4
1.14-1 1.15-1	1	15010722	Sealing ring-AK06-85x57x1,8-NBR
1.14-2 1.15-2	4	15010723	Cross recessed cheese head screw-M4x14-A2-SS-with flat washer and spring washer
1.16	4	3040101630	Cross recessed cheese head screw-M3x6-A2-SS
1.17A	0-1	2040120350	Controller-ALP81-AK09-V5.3-12/24VDC-programmable (print board)-program code d-61
1.17B	0-1	15010743	Controller-AK09-WK-V2.0-12VDC-not programmable
1.17C	0-1	15010742	Controller-AK09-WK-V2.0-24VDC-not programmable
1.18-1	1	3020101170	Pump body cover-ALP81-205x130x20
1.18-2	1	3020200470	Sealing ring-pump body cover bottom-ALP81-202x132x2-NBR
1.19	8	3040104370	Hexagon socket head cap screw-M4x20-A2-SS-with flat washer and spring washer
1.20A	0-1	2070011689	Pump element-PE-1,5-0,075 cm3/stroke-M22x1,5-G1/4
1.20B	0-1	2070011690	Pump element-PE-2,5-0,125 cm3/stroke-M22x1,5-G1/4
1.20C	0-1	2070011691	Pump element-PE-4,5-0,225 cm3/stroke-M22x1,5-G1/4
1.21A	0-1	2070011684	Safety valve SV-C-preset to 300 bar-G1/4-M10x1
1.21B	0-1	2011221370	Safety valve SV-A-for bypass-preset to 300 bar-G1/4-M10x1
1.22	1	3050100890	Straight screw coupling-GE-D6LL-M10x1 (SW14-ED)-ST-ZnNi
1.23	1	3030502160	Protective cap divider monitoring at pump body-BD-4 pin-IP67-black
1.23 *			For article numbers for cable kits, see chapter wiring diagrams
1.24A	0-1	3010404000	Direct current motor-12V/DC-CNLW
1.24B	0-1	3010404170	Direct current motor-24V/DC-CNLW
2.00	1	2031001617	Kit-grease reservoir attached to pump body-ALP81-D120-H210-2L-(full package)
2.01	1	2010430190	Top cover-ALP81-D120-2L-Al-black painted
2.02	2	3020200200	Z-sealing ring-grease reservoir top-ALP81-D120-128x3,0-NBR
2.03	1	2010830100	Grease reservoir-transparent-ALP81-D120-H206-2L
2.04	4	3010402391	Tie-rod for grease reservoir-ALP81-2L-D7-M6-L236-ST-ZnNi
2.05-1	4	3040101080	Flat washer-D11,7x2,6x1,5-(M6)-A2-SS
2.05-2	4	3040101090	Spring washer-9,5x6,3x1,75-(M6)-A2-SS
2.05-3	4	3040102200	Hexagon acorn nut-DIN_1587-M6-6-A2-SS
2.06	1	2090121660	Kit-ventilation-grease reservoir-ALPB_ALP81(2L)
2.07	1	3040102510	Low hexagon nut-DIN_EN_ISO_4035-M8-A2-SS
2.08	1	3010106150	T-rod for grease distribution at reservoir-ALP81-D120-2L-D10-L162-ST-ZnNi

18 Order key

ALP81 **1** - **2** . **PE** **2.5C** - **0** - **0** . **2** . **0** . **1** . **0000**

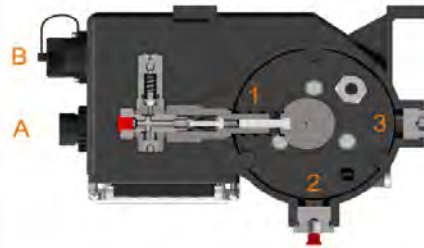
Size of grease reservoir (liter)	
1L D130	1
2L D130	2

Power supply	
12V	1
24V	2

Pump outlet M22x1.5 configuration - Pos. 1/2/3			
	Pos. 1	Pos. 2	Pos. 3
Screw plug	0	0	0
PE 1.5 without bypass	1.5C	1.5C	1.5C
PE 1.5 with bypass	1.5A	1.5A	1.5A
PE 2.5 without bypass	2.5C	2.5C	2.5C
PE 2.5 with bypass	2.5A	2.5A	2.5A
PE 4.5 without bypass	4.5C	4.5C	4.5C
PE 4.5 with bypass	4.5A	4.5A	4.5A
Hand press adapter straight		HP	HP
Hand press adapter 45°		HP45	HP45
Hand press adapter 90°		HP90	HP90
Bypass inlet *	BP	BP	BP
Customised setting	X	X	X

Standard: PE at position 1

* For pump elements with a safety valve with bypass, a bypass inlet must be provided at the nearest outlet.



Pos. A - Power connection	
without power cable	0
with cable kit-power supply BYN 5/7 Pin, 7,5 m	2
Customized version	X

Pos. B - Divider monitoring connector (Signal input)	
with protective cap divider monitoring	0
Customized version	X

Controller	
without controller	0
with integrated controller AK06	1
Customized version	X

Special models	
Standard version	0000
Customized version	XXXX