# *Lubrication System QLS 301*


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**U.S. Patent-No. 6,244,387, German Registration Design No. 29923765.6**

**810-55230-1**

Subject to modifications

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# Table of Contents

# Introduction

## Explanation of Symbols Used

The following description standards are used in this manual:

**Safety Instructions**

Structure of safety instructions:

- Pictogram
- Signal word
- Danger text
  - Danger note
  - How to avoid danger

The following pictograms are used in this manual and are combined with the corresponding signal words:

| | | |
|---|---|---|
|  1013A94 |  4273a00 |  6001a02 |
| **- ATTENTION** | **- ATTENTION** | **- NOTE** |
| **- CAUTION** | **- CAUTION** | **- IMPORTANT** |
| **- WARNING** | **- WARNING** | |

The signal words give the seriousness of danger if the following text is not observed:

| | |
|---|---|
| **ATTENTION** | refers to faults or damages on machines. |
| **CAUTION** | refers to bad damages and possible injuries. |
| **WARNING** | refers to possible dangerous injuries. |
| **NOTE** | indicates improved operation of the device. |
| **IMPORTANT** | indicates special operating features of the device. |

**Example:**


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**ATTENTION!**

*When making use of other than the tested spare parts, serious damage may affect your device.*

*Therefore, for the operation of your device always use original spare parts made by Lincoln GmbH & Co. KG.*

Furthermore, you will find the following text symbols in this manual:

- Listing of applicable statements
  - Subpoint of applicable statements

1. Determination of the number or sequence of contents

➲ Procedural instruction

## User's Responsibility

To ensure the safe operation of the unit, the user is responsible for the following:

1. The pump / system shall be operated only for the intended use (see next chapter "Safety Instructions") and its design shall neither be modified nor transformed.
2. The pump / system shall be operated only if it is in a proper functioning condition and if it is operated in accordance with the maintenance requirements.
3. The operating personnel must be familiar with this Owner Manual and the safety instructions mentioned within and observe these carefully.

The correct installation and connection of tubes and hoses, if not specified by Lincoln GmbH & Co. KG, is the user's responsibility. Lincoln GmbH & Co. KG will gladly assist you with any questions pertaining to the installation.

## Environmental Protection

Waste (e.g. used oil, detergents, lubricants) must be disposed of in accordance with relevant environmental regulations.

## Service

The personnel responsible for the handling of the pump / system must be suitably qualified. If required, Lincoln GmbH & Co. KG offers you full service in the form of advice, on-site installation assistance, training, etc. We will be pleased to inform you about our possibilities to support you purposefully. In the event of inquiries pertaining to maintenance, repairs and spare parts, we require model specific data to enable us to clearly identify the components of your pump / system. Therefore, always indicate the part, model and series number of your pump / system.

## Glossary

| | | |
|---|---|---|
| Lubricating time | = | Operating time |
| Operating cycle | = | Lubrication cycle |

# Safety Instructions

## Appropriate Use

The lubrication system QLS 301 has been designed for initial and retrofit installation. It has been designed for:

1. the automatic lubrication of machines and systems
2. the automatic lubrication of commercial vehicles and construction machines
3. the automatic lubrication of hydraulically driven units and devices.

The lubrication system QLS 301 is able to deliver greases up to NLGI grade 2 or fluid greases of NLGI grade 000 or 00.

- Use the QLS 301 exclusively to supply lubricants.
- The QLS 301 is adequate for intermittent operation only.
- The QLS 301 is adequate for feeding max. 18 lube points per operating cycle.
- Do not use QLS 301 with bottom-mounted SSV metering device for mobile applications. Do not install the system with machines exposed to shock.

## Misuse

Any use of the QLS 301 that is not expressly mentioned in this User Manual will be regarded as misuse.
If the QLS 301 is used or operated in a different manner other than specified, any claim for warranty or liability will be null and void.


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**NOTE**

*If personal injury or material damage occurs as a result of inappropriate operation, e.g. if the safety instructions are ignored or resulting from an incorrect installation of the QLS 301, no claims or legal actions may be taken against Lincoln GmbH & Co. KG.*

## General Safety Instructions

- Lubrication systems QLS 301
  - are designed state-of-the-art.
  - can be assembled for safe operation.
  - must be regularly refilled with clean lubricant.
- Incorrect use may result in bearing damage caused by poor or over-lubrication.
- Do not over-pressurize reservoir when filling the pump. Refill QLS 301 pump with clean lubricant.
- Each outlet needed must be equipped with an appropriate check valve.


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**IMPORTANT**

*Do not paint the pump. Before painting a machine or commercial vehicle, remove or cover the pump completely.*

- Unauthorized modifications or changes to an installed system are not recommended and will void warranty. Any modifications must be subject to prior consultation with the manufacturer of the QLS 301.

## Regulations for Prevention of Accidents

To prevent accidents, observe all city, state and federal safety regulation of the country in which the product will be used.

## Operation, Repair and Maintenance


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**ATTENTION!**

*Malfunction because of dirt!*
*When executing any maintenance or repair works on the QLS 301, ensure absolute cleanliness.*


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**CAUTION!**

*Switch off the power supply before beginning maintenance or repair work.*

**Repair**

Repairs should only be performed by authorized personnel who are familiar with the instructions.

# Safety Instructions, continuation

## Operation, Repair and Maintenance, continuation

**Operation/Maintenance**

Lubrication systems QLS 301

- must operate with mounted pressure relief valve, only.
- must operate only with mounted or connected SSV divider blocks.
- must be regularly filled with clean and air-free lubricant.
- operates automatically. However, a regular check (approximately every 2 weeks) should be made to ensure that lubricant is being dispensed from all lubricant points.

**Operation with bayonet plug**

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**CAUTION!**

*If the protective-conductor terminal is not connected or interrupted, dangerous touch voltages may occur on the equipment!*

Protective measures to be applied for the appropriate operation with bayonet plugs:

"Functional extra-low voltage with safe isolation" / "Protective Extra-Low Voltage" (PELV)

Standards: EN60204 Part1:1992 / IEC 204-1:1992, modified DIN VDE 0100 Part 410 / IEC 364-4-41:1992
(see pages 15 to 19)

**Disposal**

Used or contaminated lubricants must be disposed of in accordance with local environmental regulations, see technical data sheets of lubricants.

**Exclusion of Liability**

The manufacturer of the centralized lubrication system will not accept any liability for:

- damage caused by insufficient lubricant and irregular refilling of pump
- damage due to the use of greases which are not or are only conditionally pumpable in centralized lubrication systems
- damage caused by the use of contaminated lubricants
- damage caused by inadequate disposal of used or contaminated lubricants
- damage caused by unauthorized modification of system components
- damage caused by the use of unapproved parts (voids the pump warranty)

## Installation

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**IMPORTANT**

*Do not remove, modify or alter any safety equipment already installed on the machine, the construction machine or the commercial vehicle.*

- If necessary, these devices may be removed temporarily during the installation of the pump.
- The devices must be properly put back in place after the installation of the pump.
- Use only original spare parts or spare parts authorized by Lincoln.
- Keep pump QLS 301 away from sources of heat (see Operating Temperature Specification, Technical Data).
- Provide access to fill, clean and visually monitor the pump operation.

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**IMPORTANT**

*Adhere to the installation instructions of the vehicle or machine manufacturer as regards all drilling and welding procedures. Observe the specified minimum distances between bores and upper/lower rim of the frame or between the bores.*

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**CAUTION!**

*The QLS 301 may only be installed by qualified personnel. The connection (N/L/PE) of the supply voltage must be made according to VDE 0100 and VDE 0160.*
*Install a protective and lockout device for isolating and disconnecting the QLS 301. Before beginning the installation work, disconnect the electrical supply.*

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**WARNING!**

*Failure to observe the safety instructions, e. g. touching electrically charged parts when the system is opened, or improper handling of the QLS 301 may* ***cause serious injury or death****.*
*If the values specified in the Technical Data are exceeded, the device may overheat. It may damage the QLS 301 and thus impair the electric safety.*

# Installation Instructions

## Pump

Use drilling template to mark and drill mounting holes of the QLS 301. Drilling template and mounting bolts are included in the package.

## SSV Metering Device

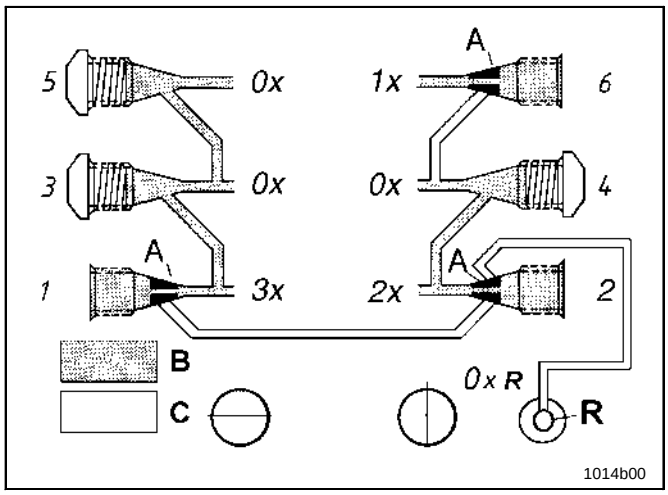


Fig. 1 Single double and triple lubricant output, on back-mounted metering devices

0x-3x Output (single, double, etc.)
1-6 Outlet numbers
A Clamping ring of the check valve
B Grease supply
C Enclosed grease
R Return to reservoir

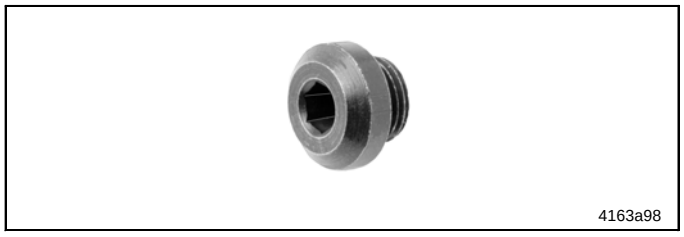


Fig. 2 Closure plug, also provided in the accessory kits

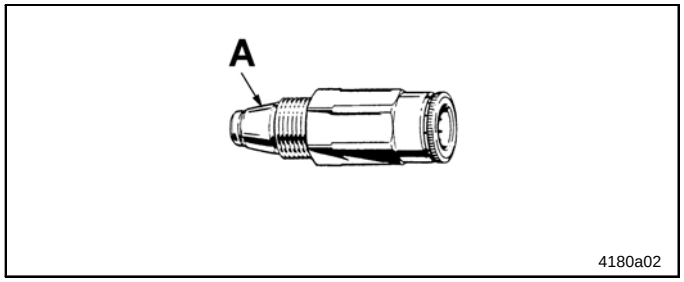


Fig. 3 Check valve, push-in type

A Clamping ring (brass)

### Adjusting the output by cross-porting of outlets

**Single Output**

A single output is the lubricant quantity fed to the lube point by a piston per stroke and outlet port. **It amounts to approximately 0.2 cm³,** see outlet 6, fig. 1.

**Double or Multiple Outputs**

- Outputs can be increased by simply plugging the unused outlet ports with closure plugs (fig. 2, provided in the accessory kit).
- Lubricant from a plugged outlet is redirected to the next outlet on the same side of the SSV divider block in descending numerical order (see fig.1).
- Example, see fig. 1:
  By closing
  - of outlet 4, outlet 2 receives the double quantity.
  - of outlets 5 and 3, outlet 1 receives the triple amount of lubricant. The connecting conduit from outlet line 1 to outlet line 2 and to the return line (R) is closed by clamping rings (A) of the check valve.
- Unused lubricant can be internally fed back to the reservoir, see paragraph ‘‘direct internal feed back feature”.


**NOTE**

***Do not plug outlets number 1 or 2*** *(horizontally positioned outlets) on bottom-mounted lubricant metering devices SSV 8, 12 and 18.*

***Do not plug outlets number 1 or 2*** *on externally mounted metering devices.*

**Closure plugs**

➲ Install a closure plug in each outlet port that is not required, see fig. 1 or 4.

- Closure plugs are used in fig. 1 and 4 as follows:
  - Fig. 1 outlets 3, 4 and 5
  - Fig. 4 (page 8) outlets 1, 2, 4 and 5

**Check valves**

➲ For feed lines (diameter 6x1.5 mm, 1/4” I.D., provided in the accessory kits) use check valves with standard collar and knurled flange.

➲ Install a check valve in each outlet port that is required, see fig. 1 or 4. Observe paragraph “Direct (internal) feedback feature” (see page 8).

- Check valves are used in fig. 1 and 4 as follows:
  - Fig. 1 outlets 1, 2 and 6
  - Fig. 4 (page 8) outlets 3 and 6

# Installation Instructions, continuation

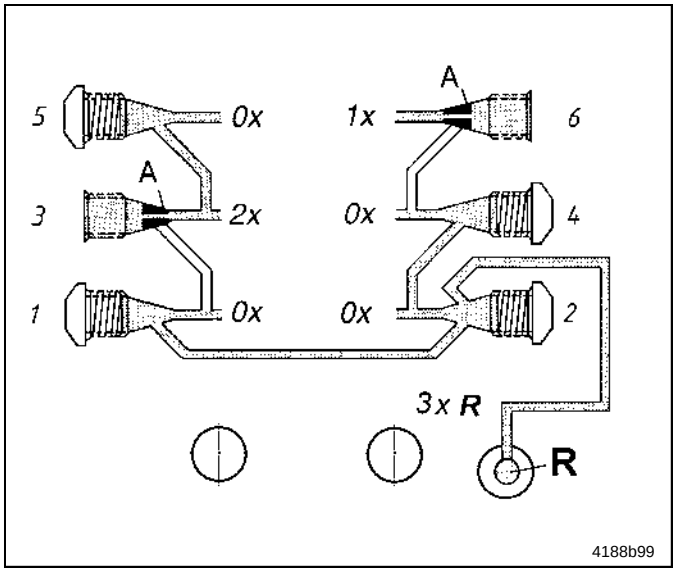


Fig. 4 Internal feedback of supplied lubricant, only on back-mounted SSV metering devices

| | |
|---|---|
| 0x-2x | Output (single, double, etc.) |
| 1-6 | Outlet numbers |
| A | Clamping ring of the check valve |
| B | Grease supply |
| C | Enclosed grease |
| R | Return-line bore |


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**NOTE**

*Maximum internal combination of outlets:*

*SSV 6 = 3*

*SSV 12 = 6*

*SSV 18 = 9*

*Further combinations are possible outside the metering device by means of a tee-piece only.*

### Direct (internal) feedback feature

- All pumps with **back-mounted SSV metering device** have the capability to feed back unused lubricant internally from closed outlets directly to the reservoir (see pos. R fig. 1, 4).
- This procedure will start automatically, if **outlet port 2** is plugged with a closure plug. All pumps have capability to feed back the lubricant directly to the reservoir **from even and odd outlets** via the passage from outlet 1 to outlet 2**.**
- When feeding back, always start with plugging the outlets **with the smallest outlet numbers**, e.g. 2, 4, 6... or 1, 3, 5... **plus outlet 2**. In fig. 4 the outputs of outlets 1, 2 and 4 (3xR) are fed back to the reservoir.
- The remaining outlets are to be used for the connection to the lube point or for increasing the lubricant output (double or triple), see fig.1.


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**CAUTION!**

*If **outlet 2** is connected to a lube point, then **never close outlet 1,** see clamping ring (A) in outlet 2, **fig. 1.***


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**NOTE**

To feed back unneeded lubricant quantities from **bottom-mounted metering devices** to the reservoir, connect unneeded outlet via the feed line to plug (pos. R, Fig 20, page 19) for external return line.

# Installation Instructions, continuation

## Lubrication Points

**Installing Quicklinc fittings into lube points**

Remove lubrication fitting from lube point and install appropriate Quicklinc fitting into the bore of the lube point.

## Installing Zerk-Lock onto Lube Fitting

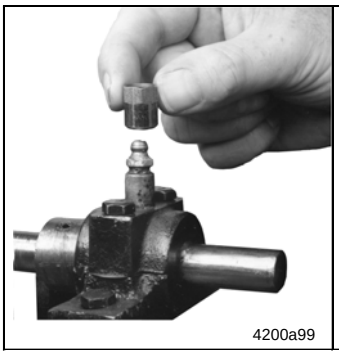


Fig. 5 Place the Zerk-Lock body over the filler fitting

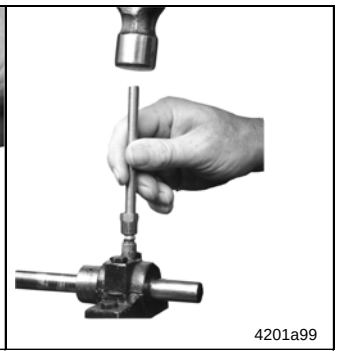


Fig. 6 Installation of Zerk-Locks with staking tool

The Zerk-Lock fitting consists of the Zerk-Lock body, insert and a Quicklinc fitting.

- Place the Zerk-Lock body over the lube fitting and place the staking tool firmly against the Zerk-Lock insert. (Staking tool is included in the accessory kits).
- Strike the tool sharply with a hammer until the Zerk-Lock insert partially crimps onto the grease fitting.

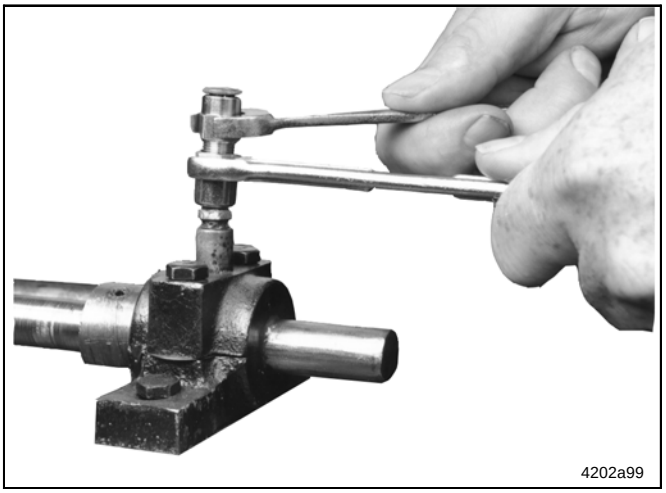


Fig. 7 Screwing Quicklinc fitting into the Zerk-Lock body

- Screw the Quicklinc fitting into the Zerk-Lock body and tighten until parts resist further tightening (about 1-1/2 turns).


**NOTE**

*Quicklinc hex. is 12 mm. Zerk-Lock body hex is 1/2 ''.*

- Move the Zerk-Lock and tube fitting from side to side on the lubrication fitting to insure the Zerk-Lock is firmly seated.

# Installation Instructions, continuation

## Connection of Feed Lines

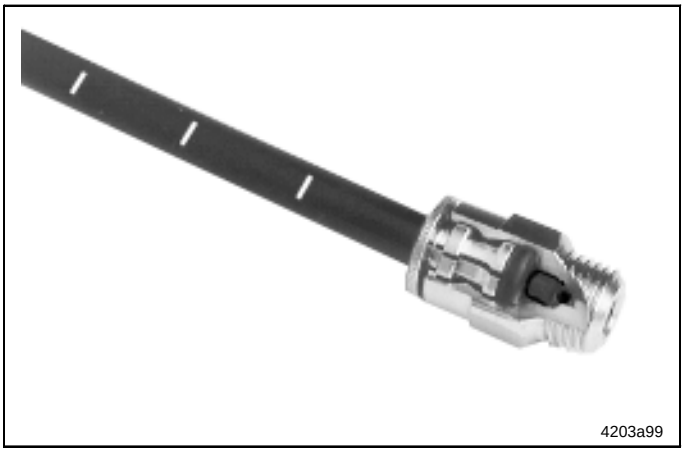


Fig. 8 Feed line installed in the Quicklinc fitting

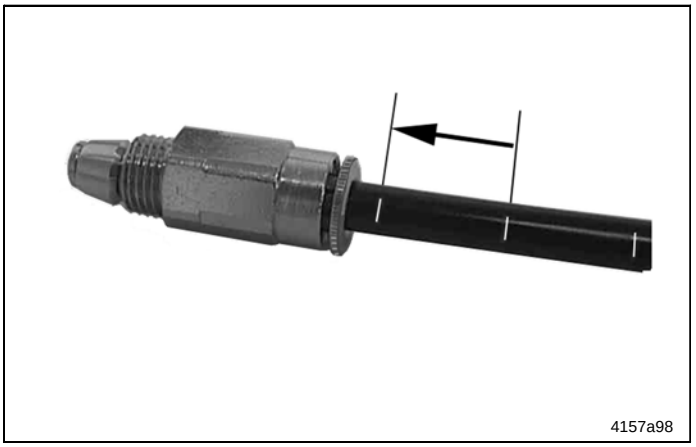


Fig. 9 Feed line insert into the fitting up to the next white mark

**Filling of reservoir**


Fig. 10 Vent hole on reservoir

➲ Measure, cut and route the feed lines included in the accessory kit.

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**NOTE**

*Avoid sharp bends of the plastic tubing and the moving parts of the machine that could damage the lubrication lines. Minimum bending radius is 50 mm (2 in).*

➲ Secure the lubrication lines to the machine using nylon ties, clamps or straps provided in the accessory kit.

➲ If the feed lines are not primed, prime all lubrication feed lines before connecting them to the lube point (by triggering additional lubrications or via the filler fitting, pos. 4, fig. 17 and 18, page 17).

➲ Connect the feed lines directly to the check valves of the metering device and to the Quicklinc fittings of the lube point.

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**NOTE**

*Push the ends of the feed line firmly into the Quicklinc fitting until it is fully seated in the body of the fitting. The primed feed lines are marked with white lines (fig. 9, 10) to facilitate installation.*

➲ Cut the pressure plastic tube off at one of the white lines before it is mounted.

➲ Then insert the plastic pressure tube into the fitting up to the next white mark.
This will ensure a correct installation of the pressure plastic tube in the threaded tube fitting.

➲ Fill the reservoir with suitable clean lubricant without air pockets.

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**WARNING!**

***Risk of bursting if the reservoir is overfilled.*** *When filling the reservoir by* ***means of pumps with a large delivery volume do not exceed the max. filling mark.***

**CAUTION!**

*Avoid inclusions of air in the lubricant below the follower plate. When filling the reservoir, the follower plate sealing lip overlaps the vent hole (see fig. 10) to ensure that all air pockets can be vented.*

# Selection Guide VDC

**Pump models** **P30100210113**

**Examples of part numbers** **P30162410153**

| | | P301 | 6 | 2 | 4 | 1 | 0 | 1 | 5 | 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Pump 301 for grease** | P301 | | | | | | | | | |
| **SSV Metering Device** | | | | | | | | | | |
| External, SSV 6, SSV 8 [1] | 0 | | | | | | | | | |
| External, SSV 12, SSV 18 [1] | 1 | | | | | | | | | |
| SSV 6 (back) | 3 | | | | | | | | | |
| SSV 8 (bottom) | 4 | | | | | | | | | |
| SSV 12 | 6 | | | | | | | | | |
| SSV 18 | 9 | | | | | | | | | |
| **SSV Metering Device Position, arrangement of the outlets** | | | | | | | | | | |
| Without / external metering device | 0 | | | | | | | | | |
| Back (vertical order of lines) | 1 | | | | | | | | | |
| Bottom [2] (horizontal order of lines) | 2 | | | | | | | | | |
| **Operating Voltage** | | | | | | | | | | |
| 12 VDC [3] | 2 | | | | | | | | | |
| 24 VDC [3] | 4 | | | | | | | | | |
| **Reservoir** | | | | | | | | | | |
| 1 liter reservoir with low-level control | 1 | | | | | | | | | |
| **Possible connections** | | | | | | | | | | |
| - 1A = 1 connector (square plug), left, power supply | 0 | | | | | | | | | |
| - 2A = 2 connectors (square plugs) 1 connector, left, power supply 1 connector, right, fault indication | 1 | | | | | | | | | |
| - 1A = 1 connector (bayonet plug), left, power supply; Fault indication | 2 | | | | | | | | | |
| **Type of Plug Connector** | | | | | | | | | | |
| * Square-type plug, acc. to DIN 43650 type of construction A (industrial application) | 1 | | | | | | | | | |
| ** Bayonet plug, DIN 72585-1, 4-core (mobile application, VDC) | 5 | | | | | | | | | |
| **Electrical Connectors** | | | | | | | | | | |
| With socket without cable * | 1 | | | | | | | | | |
| With socket and 10 m cable * | 5 | | | | | | | | | |
| With socket and 10 m cable ADR * | 6 | | | | | | | | | |
| With socket and 10 m cable ** | 7 | | | | | | | | | |
| With socket and 6 m cable, ADR ** | 8 | | | | | | | | | |
| **Control p. c. b.** | | | | | | | | | | |
| Terminal board without time control | 0 | | | | | | | | | |
| Control p.c.b. S3: NC contact or NO contact (programmable), monitored: - 1-5 cycles | 3 | | | | | | | | | |

*[1] Note: For external metering device application only use specific SSV metering devices... KNQLS.*

*[2] Note: Do not use QLS 301 with SSV metering device in bottom-mounting position for mobile applications. Do not install the pump in areas exposed to shock (see chapter "Safety Instruc-*

*[3] Note: Standard 12 and 24 VDC pump models for mobile applications can be supplied with 10-meter (30') electrical cable.*

**(Accessory kits see "Technical Data")**

# Selection Guide VAC

**Pump models** **P30100810113**

**Examples of part numbers** **P30162610113**

| | P301 | 6 | 2 | 6 | 1 | 0 | 1 | 1 | 3 |
|---|---|---|---|---|---|---|---|---|---|

**Pump 301 for grease** ..... P301

**SSV Metering Device**

External, SSV 6, SSV 8 [1] ..... 0
External, SSV 12, SSV 18 [1] ..... 1
SSV 6 (back) ..... 3
SSV 8 (bottom) ..... 4
SSV 12 ..... 6
SSV 18 ..... 9

[1] *Note: For external metering device application, use the specific metering device SSV ... KNQLS.*

**SSV Metering Device Position, arrangement of the outlets**

External metering device ..... 0
Back (vertical order of the lines) ..... 1
Bottom [2] (horizontal order of the lines) ..... 2

[2] *Note: Do not use QLS 301 with SSV metering device in bottom-mounting position for mobile applications. Do not install pump in areas exposed to shock (see "Safety Instructions").*

**Operating Voltage**

120 VAC [3] (only with control p.c.b.) ..... 6
230 VAC [3] (only with control p.c.b.) ..... 8

[3] *Note: Standard 120 and 230 VAC pump models for industry are supplied without electrical cable.*

**Reservoir**

1 liter reservoir with low-level control ..... 1

**Possibilities of connection**

- 1A = 1 connector (square plug), left, power supply 0
- 2A = 2 connectors (square plug)
  1 connector, left, power supply
  1 connector, right, fault indication ..... 1

**Type of Plug Connector**

* Square-type plug, acc. to DIN 43650 type of construction A 1

**Electrical Connectors**

With socket, without cable * ..... 1

**Control p.c.b.**

Control p.c.b. S3:
NC or NO contact (programmable), monitored
- 1 cycle with SSV 12, SSV 18
- 1 to 3 cycles with SSV 6, SSV 8 ..... 3

**(Accessory kits, see "Technical Data")**

Subject to modifications

# Electrical Connecting Diagrams

### Electrical connection


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**CAUTION!**

*Before starting, make sure that the electrical supply is off. The device may not be connected or disconnected when the power is on. The protective conductor must always be connected. Take care that this line section is undamaged and conforms to standards and the contacts are safe.*


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**ATTENTION!**

*Consider residual ripple of max. ±5 % to connect pumps with direct current version (in relation to the operating voltage acc. to DIN 41755).*


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**NOTE**

*The protection IP6K9K is guaranteed when the socket (X1:, X2:, see fig. 6 ff) is tightened on housing cover with flat packing.*

- ➲ Verify the connection and the type of construction of your QLS.
- ➲ Verify the configuration of your QLS 301:
  - Type of voltage (VDC / VAC)
  - Low-level control
  - Connection (square-type/ bayonet plug)
  - Metering device (internal/ external cycle switch)
- ➲ Connect the electrical wires according to the following electrical connecting diagrams (page 13 to 16).

### Operation with bayonet plug


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**ATTENTION!**

*If the protective-conductor terminal is not connected or interrupted, dangerous touch voltages may occur on the equipment!*

Protective measures to be applied for the appropriate operation with bayonet plugs:

"Functional extra-low voltage with safe isolation" / "Protective Extra-Low Voltage" (PELV)

Standards: EN60204 Part1:1992 / IEC 204-1:1992, modified DIN VDE 0100 Part 410 / IEC 364-4-41:1992
(see pages 15 and 16)

### Alternate current (AC)

with integrated control p.c.b. and **attached** metering device, alarm contact as normally open or normally closed contact (programmable):

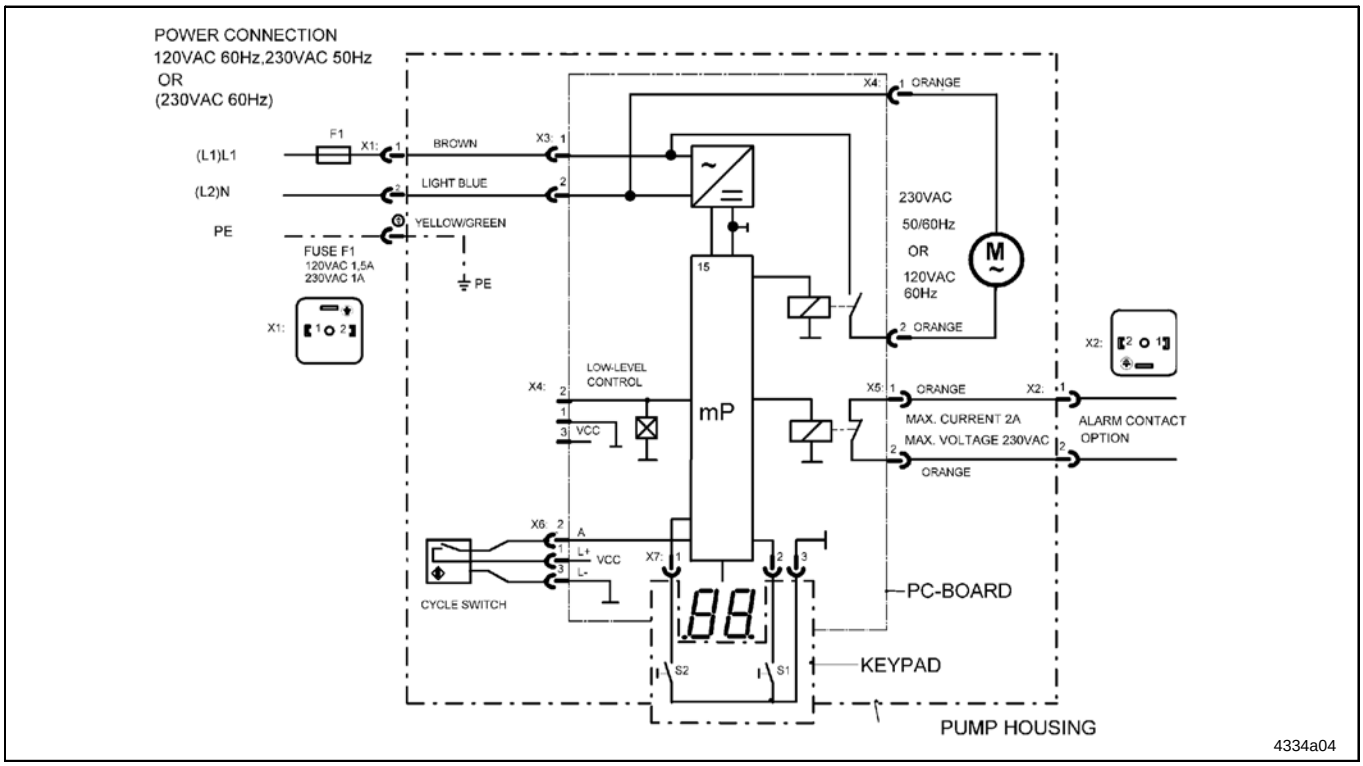


Fig. 11 Electrical connecting diagram for alternate current VAC with square-type plug, alarm contact as normally closed contact

Subject to modifications

# Electrical Connecting Diagrams, continuation

**Alternate current (AC)**

with integrated control p.c.b. and **external** metering device, alarm contact as normally open or normally closed contact (programmable):

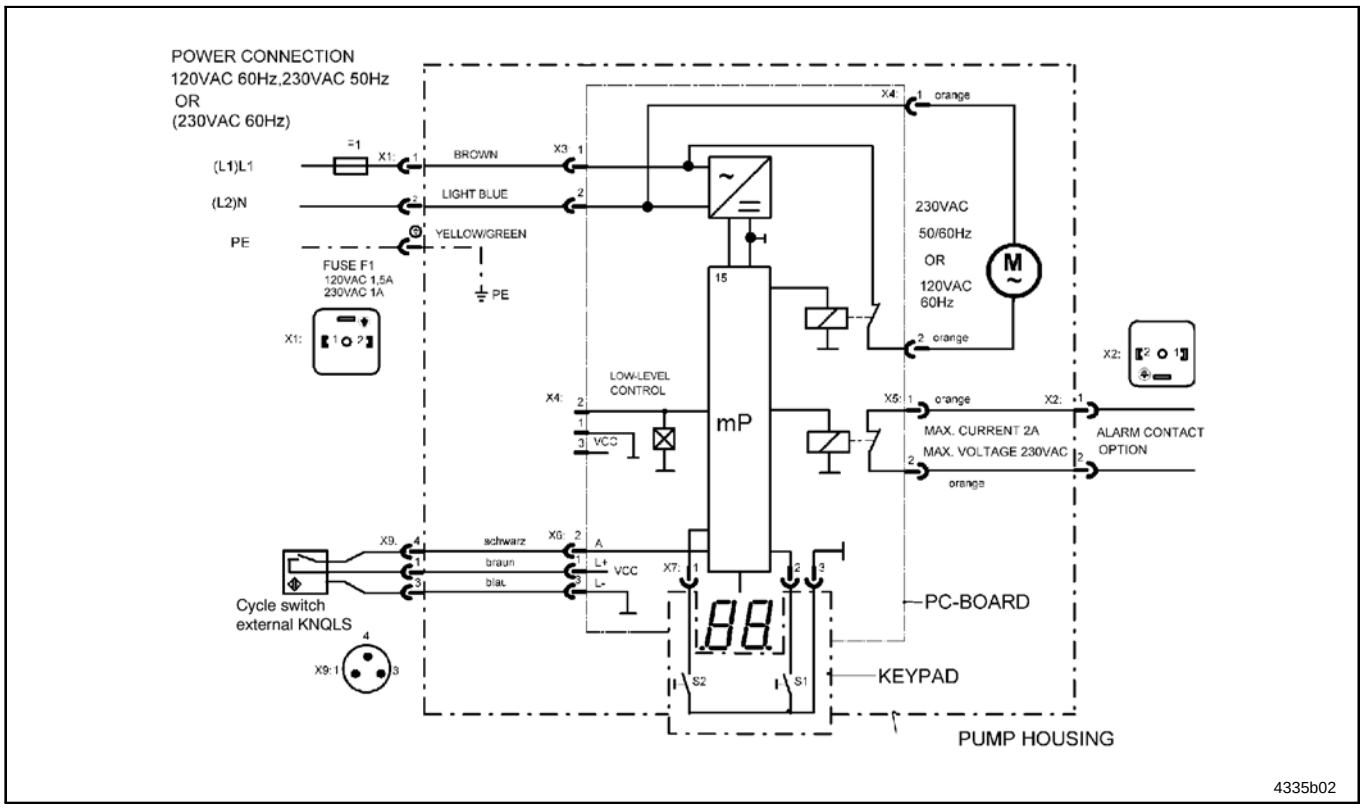


Fig. 12 Electrical connecting diagram for alternate current VAC with square-type plug, alarm contact as normally closed contact

# Electrical Connecting Diagrams, continuation

**Direct current (DC), square-type plug**

with integrated control p.c.b. and **attached** metering device, alarm contact as normally open or normally closed contact (programmable):

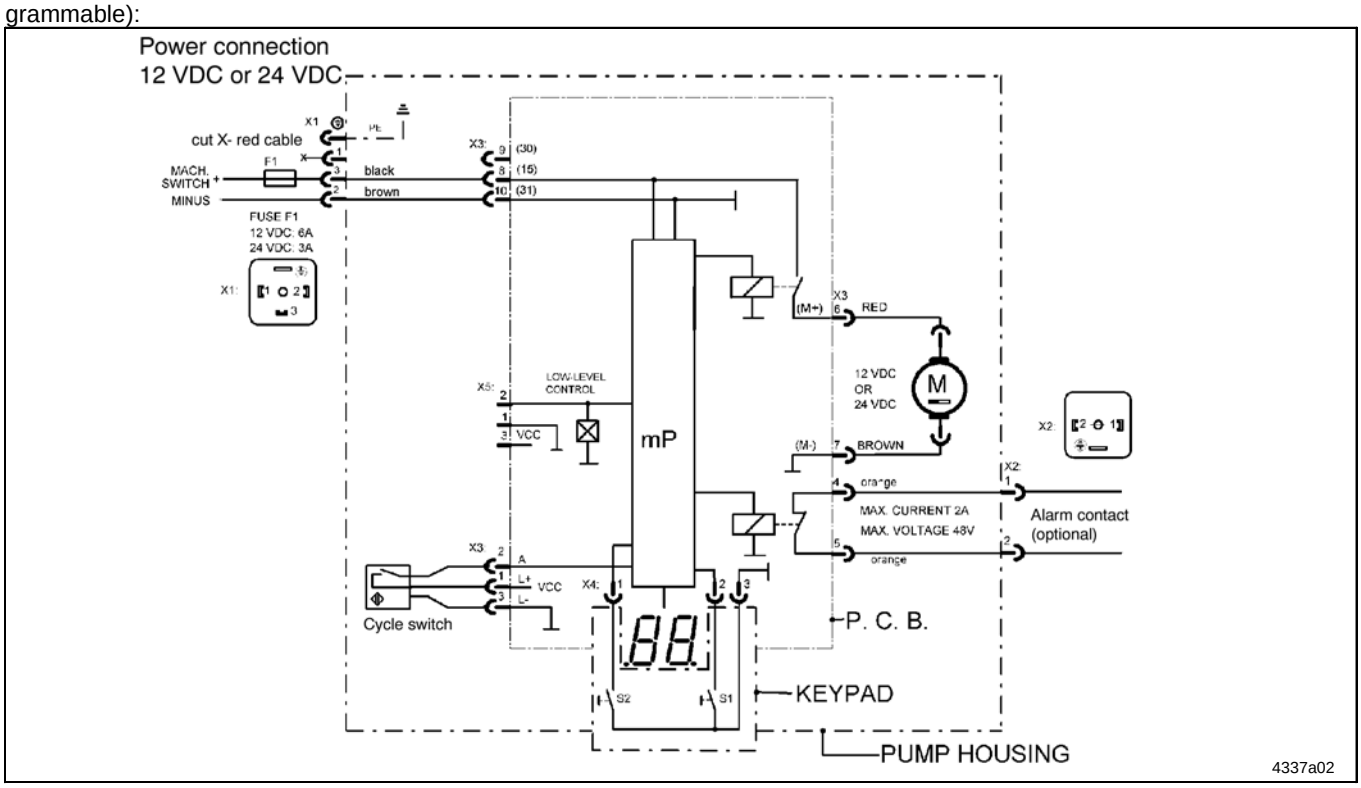


Fig. 13 Electrical connecting diagram for direct current VDC with square-type plug, alarm contact as normally closed contact

**Direct current (DC), square-type plug**

with integrated control p.c.b. and **external** metering device, alarm contact as normally open or normally closed contact (programmable):

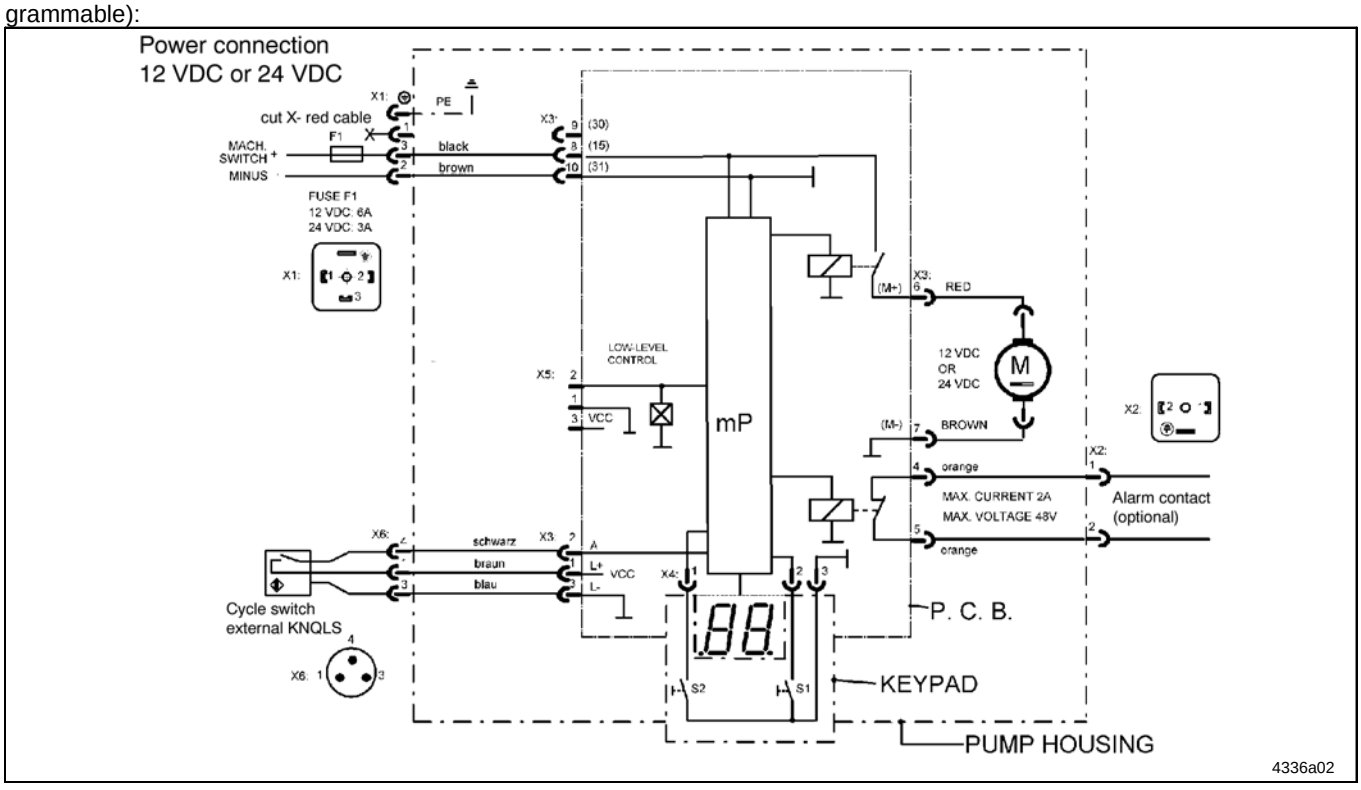


Fig. 14 Electrical connecting diagram for direct current VDC with square-type plug, alarm contact as normally closed contact

# Electrical Connecting Diagrams, continuation

**Direct Current (DC), bayonet plug**

with integrated control p.c.b. and **attached** metering device, alarm contact as normally open or normally closed contact (programmable):

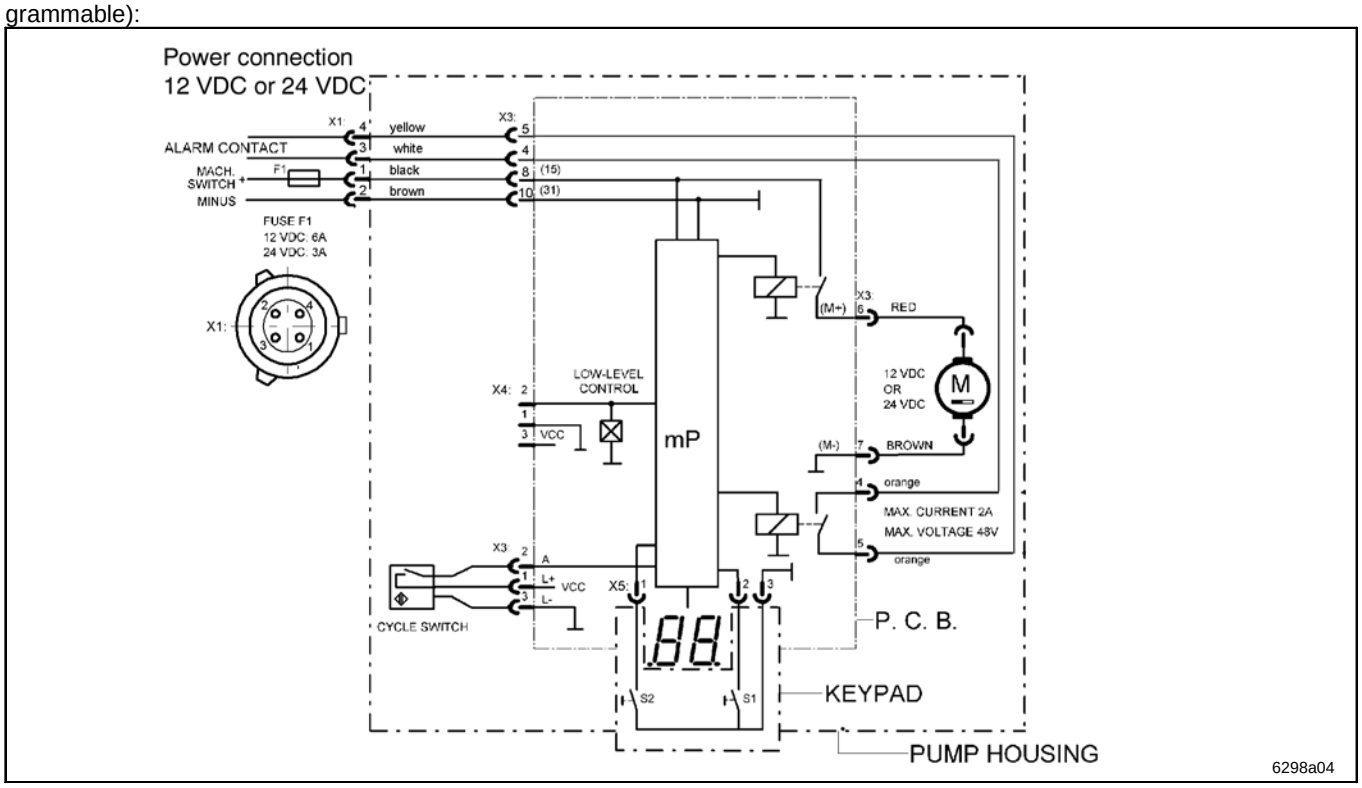


Fig. 15 Electrical connecting diagram for direct current VDC with bayonet plug, alarm contact as normally open contact

**Direct Current (DC), bayonet plug**

with integrated control p.c.b. and **external** metering device, alarm contact as normally open or normally closed contact (programmable):

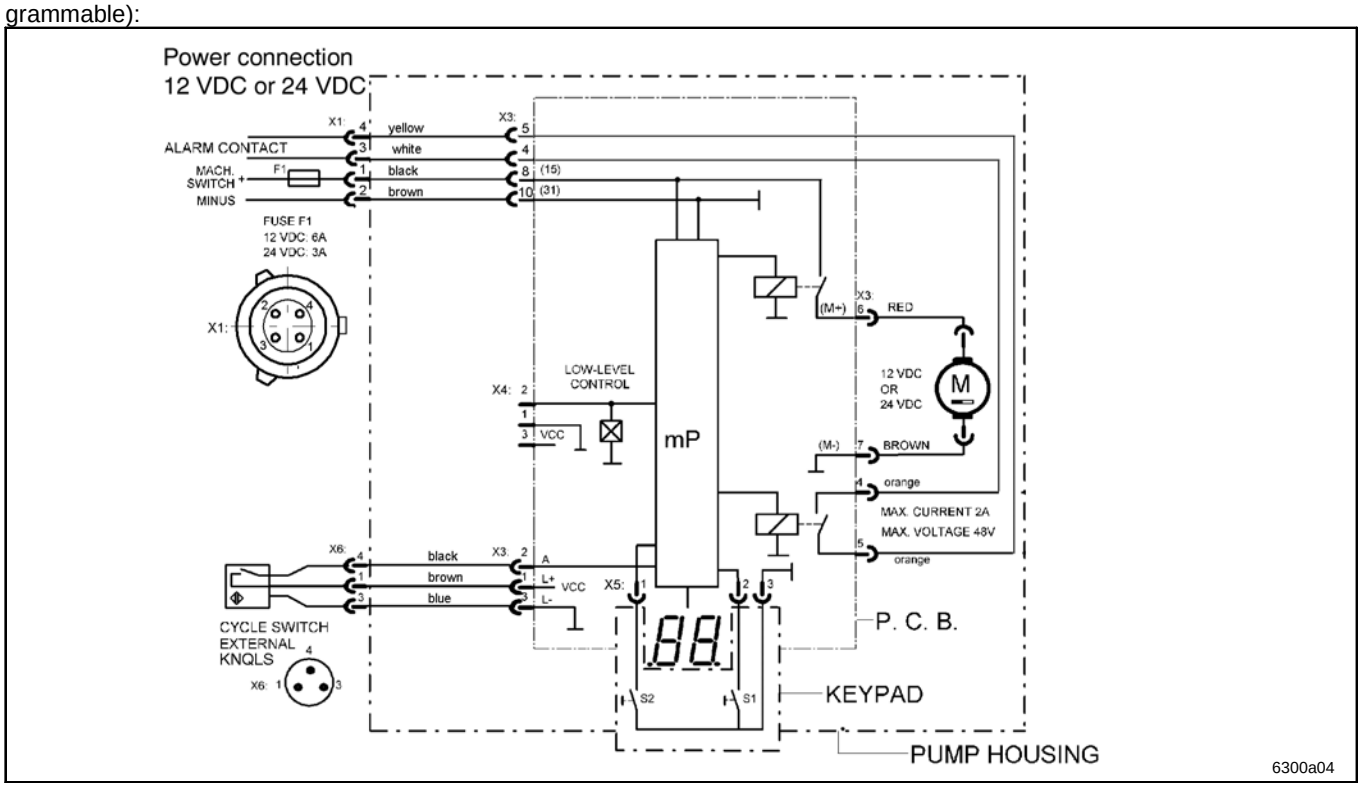


Fig. 16 Electrical connecting diagram for direct current VDC with bayonet plug, alarm contact as normally open contact

Subject to modifications

# Description

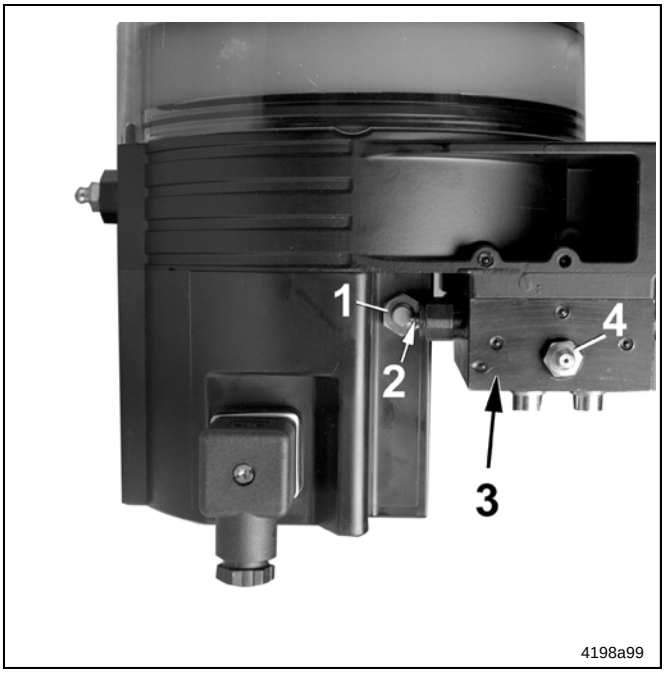


Fig. 17 QLS 301 with back position of the SSV metering device

1 Proximity switch
2 Control pin
3 SSV metering device
4 Nipple for external manual lubrication (1/8'')

- The QLS 301 is a complete compact lubrication system for a **maximum of 18 lubrication points per operating cycle**.
- The pump has three basic configurations:
  - SSV metering device back-mounted (see Fig. 19)
  - SSV metering device bottom-mounted (see Fig. 20)
  - Pump without SSV metering device attached respectively with external metering device KNQLS (see fig. 21)
- The pump with bottom-mounted SSV metering device has the capability of using steel tubing as lubrication lines if necessary.
- Standard lubrication lines are high-pressure plastic hoses included in the pump installation kit for pumps with attached SSV metering device.

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**NOTE**

*The function of the pump is independent of the SSV metering device's mounting position.*

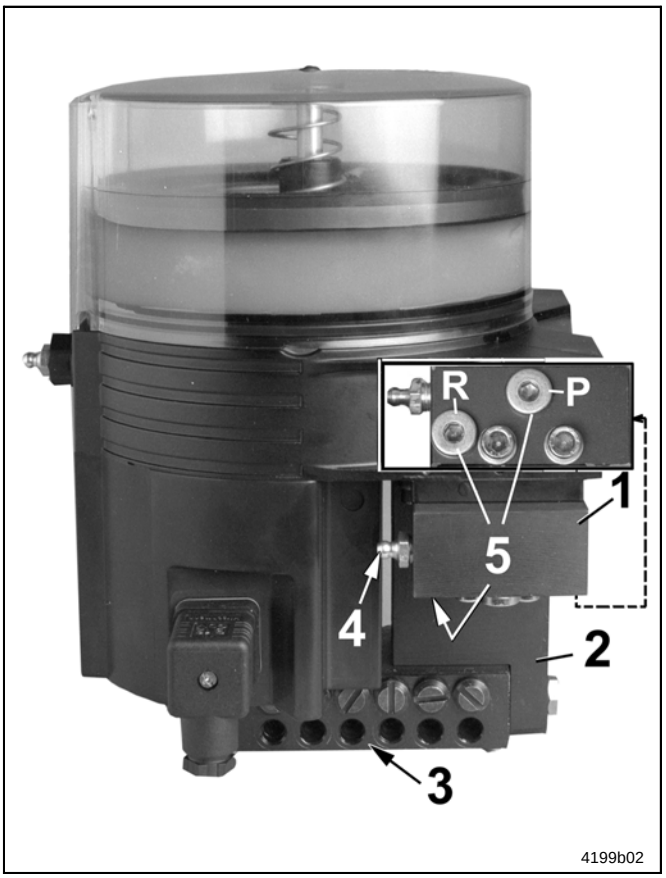


Fig. 18 QLS 301 with bottom position of the SSV metering device

- A signal from the pump timer starts the electric motor and the pumping element starts pumping the lubricant to the SSV metering device.
- When all lubrication points have received lubricant, an internal proximity switch (pos. 1, fig. 19, initiator) turns the motor off, completing one operating cycle.

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**NOTE**

*If the QLS 301 is not provided with an attached SSV metering device but with an external SSV KNQLS (see Fig. 19, page 18), the proximity switch (of the SSV KNQLS) switches the motor off.*

- If the operating cycle is not completed **within the maximum permissible time**, the flashing fault indication '' **Er** '' appears on the display of the membrane keypad (see Fig. 24, page 20). The QLS 301 does not start automatically anymore.

  Max. cycle time of the VDC-version ..... 25 minutes
  Max. cycle time of the VAC-version ..... 15 minutes

1 Connecting block
2 Manifold
3 SSV metering device
4 Nipple for external manual lubrication (1/8'')
5 Plug (1/8'') for
  P external pressure line
  R external return line

# Description, continuation

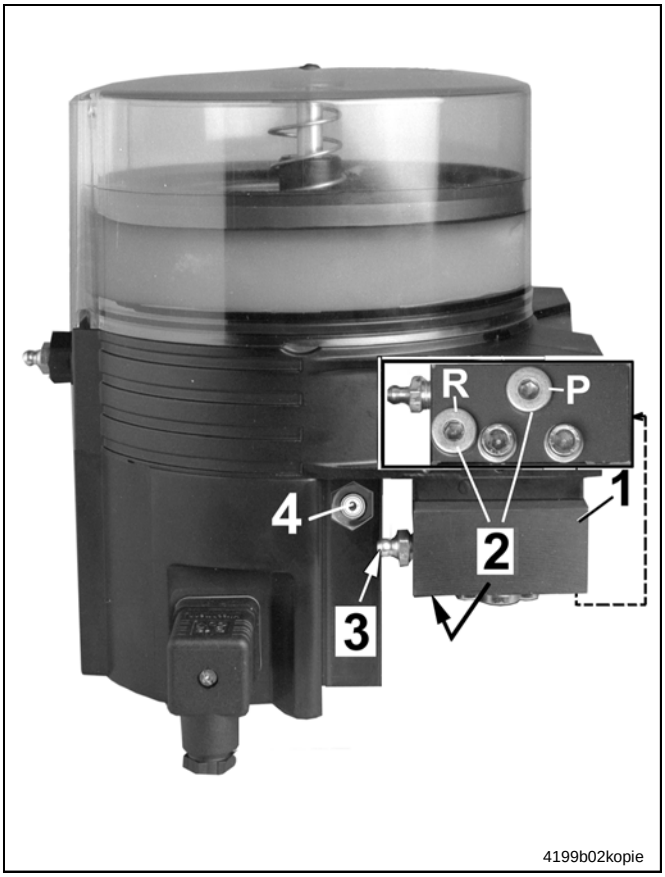


Fig. 19 QLS 301 without mounted SSV metering device with connection for external SSV metering device KN QLS

1 Connecting block
2 Closure plug
3 Nipple for emergency lubrication, R 1/8'
4 Connecting socket for SSV KN QLS
P For feed line to external SSV KN QLS
R Relief line connection

- An externally connected lubricant metering device SSV KN QLS is equipped with the same proximity switch as the normal QLS 301.
- The proximity switch is provided with a connecting cable of 2 m lengths and a connecting plug that must be connected to the socket of the QLS 301.
- The socket is integrated in the housing instead of the proximity switch and is connected to the control p.c.b.

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**NOTE**

The function of the QLS 301 is independent of the mounting position of the proximity switch.

There are available the following externally connectable metering devices SSV KN QLS:

| | |
|---|---|
| - SSV 6 KN QLS | 619-28945-1 |
| - SSV 8 KN QLS | 619-28946-1 |
| - SSV 10 KN QLS | 619-28949-1 |
| - SSV 12 KN QLS | 619-28950-1 |
| - SSV 14 KN QLS | 619-28951-1 |
| - SSV 16 KN QLS | 619-28952-1 |
| - SSV 18 KN QLS | 619-28953-1 |

# Operation

## Pump

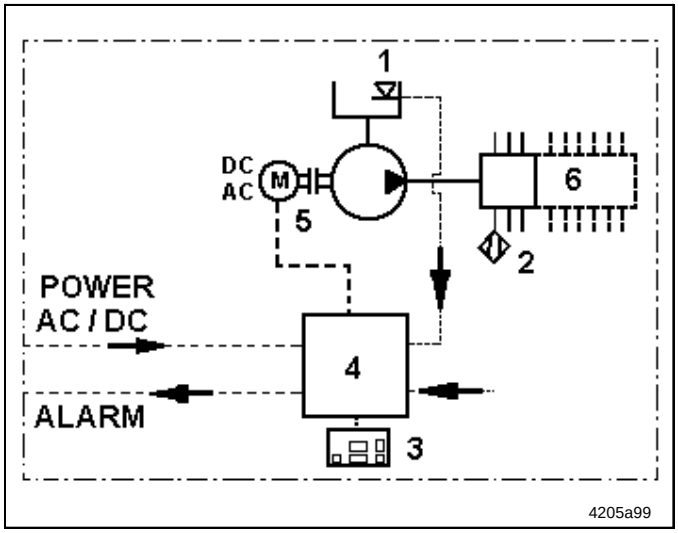


Fig. 20 QLS 301, schematic

- The QLS 301 operates according to operating cycles (pause and lubricating times).
- The pause time begins the cycle, and then the lubricating time occurs.
- A division of the lube points **(option)** via sub-metering devices and one main metering device (SSV 6, SSV 8) is possible only up to **max. 18 points per operating cycle**. In this case, set the number of cycles of the main metering device according to the number of lube points or the lubricant need to 1, 2, 3 or max. 5 cycles; see P3 on page 27.

1 Low-level control
2 Proximity switch
3 Keypad with display
4 Control unit
5 Pump unit
6 SSV 6, 8, 12, 18

## Pressure Relief Valve

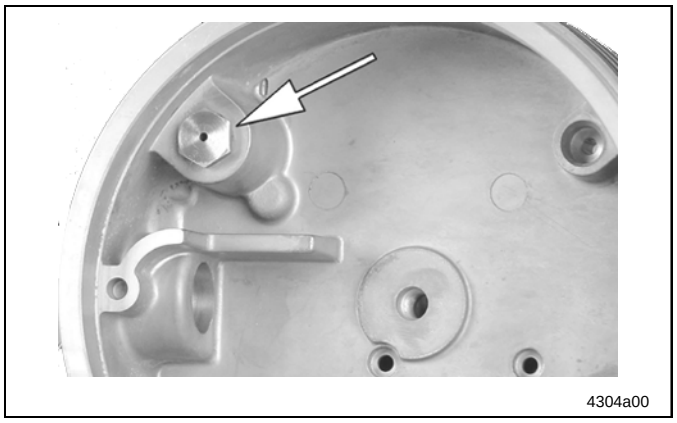


Fig. 21 Pressure relief valve (cartridge) in housing

- The QLS 301 is protected with a pressure relief valve (cartridge).
- The pressure relief valve limits the pressure build-up in the QLS 301. It opens at an overpressure of 205 bar (3000 psi).
- If the pressure relief valve is actuated, this indicates that the system is malfunctioning. The lubricant flows back into the reservoir (hardly visible from outside).
- When the monitoring time of 15 minutes (VAC version) respectively 25 minutes (VDC version) has elapsed, the pump switches off. On the display of the membrane keypad appears the flashing fault indication *** Er *,** see display mode below Setting and Operation of the QLS.

## Pump Display Window

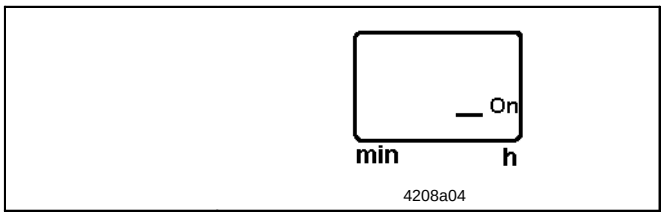


Fig. 22 Green segment display, pause time

- When switching the pump on, the segment in the display window is lit (pause time starts).

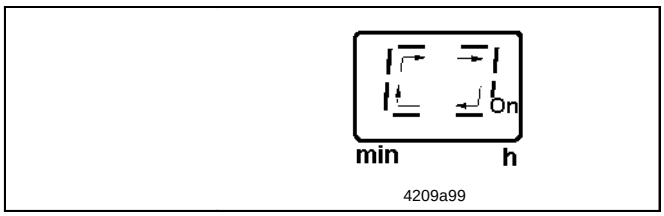


Fig. 23 Green rotating display, lubricating time

- Pump ”running” is indicated on the display by a rotating light movement of the green display (lubricating time).
- If the voltage supply is interrupted during the lubricating time, the times already expired are stored. When the power supply is switched on again, the lubricating time continues operating from the point where it had been interrupted.

# Operation, continuation

## Monitoring time/ malfunction

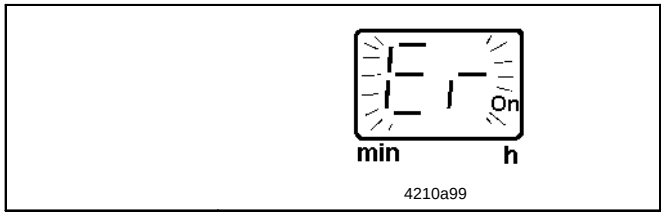


Fig. 24 Display of a fault indication

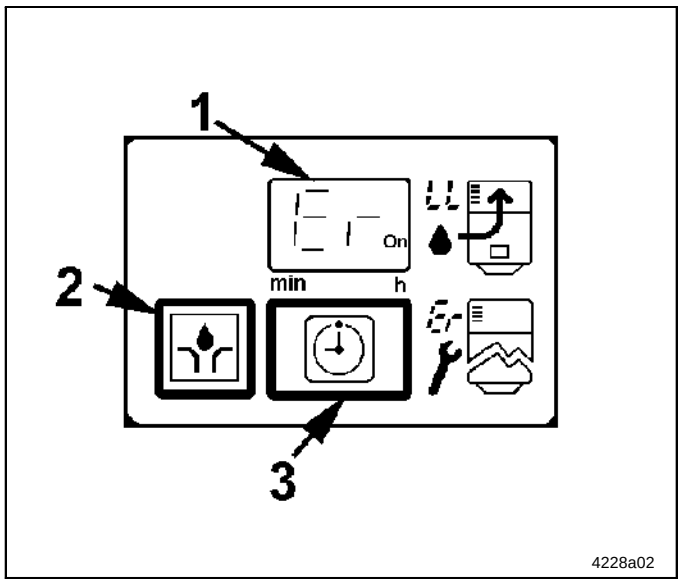


Fig. 25 Membrane keypad with fault indication and operator keys

1 Display window
2 Operator key
– operating mode: trigger additional lubrication
– programming mode: setting of times and metering device cycles – terminate programming
3 Operator key
– display mode: acknowledge receipt of flashing functional fault
- Operating mode: display of the set pause time and residual pause time
– programming mode: change to the different programming levels

- If the proximity switch (pos. 1, fig. 17, page 17) does not give any feedback after the pause time has elapsed or after triggering additional operating cycles within **15 minutes** (AC monitoring time) or **25 minutes** (DC monitoring time), the pump switches off immediately. The flashing fault indication *** Er *** (Error) appears on the display.

**IMPORTANT**

*If a **malfunction** is present, the pump does **not switch on automatically** any longer.*

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➲ In this case, switch on the pump by pressing the button for additional operating cycle (pos. 2, fig. 31).

➲ The fault can be confirmed (see pos. 3, Fig. 25). However, this is not obligatory.

**IMPORTANT**

*When confirming a fault indication, the flashing light changes into a permanent light or a signal horn can be temporarily switched off.*

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- When a malfunction is present, it can be cancelled only by initiating an additional operating cycle and if a proper operating cycle has been executed afterward.
- If the fault is still present after an additional operating cycle has been initiated, the fault indication **"Er"** is displayed again.
- The monitoring time starts in parallel to the lubricating time. It is firmly adjusted and amounts to 15 respectively 25 minutes.
- If the voltage supply is interrupted during the monitoring time (lubricating time), the monitoring time starts from the beginning after the pump is switched on again.

## Low-level indication

**Low-level indication**

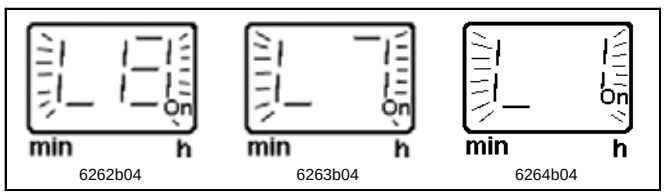
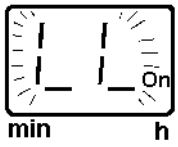



Fig. 26 Announcement of a low-level indication

- In the **display mode** the flashing display * L8 *, * L7 *, * L6 *, ... * L1 * announces **a low-level indication**.
- Right at the end appears the flashing display *** LL *** to indicate an unconfirmed low-level indication (see page 21, Fig. 27).

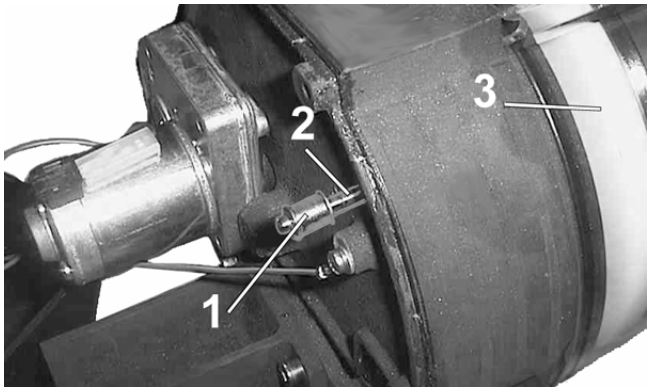
# Operation, continuation

## Low-level indication, continuation



4211a99

Fig. 27 Display of a low-level indication



4229a99

Fig. 28 Parts of the low-level indication

- The follower plate (3) (Fig. 28) of the reservoir moves the pin (pos. 2) with the solenoid (pos. 1) ahead of the sensor on the printed circuit board and initiates the low-level signal.
- In this case, the pump is not switched off immediately. The current operating cycle is completed. Upon expiration of the pause time, the pump cannot be started again automatically. The flashing display **"LL"** appears, see Fig. 27.

➲ Fill reservoir.

- As soon as the lubricant reservoir is filled up, the **"LL"** display is cancelled. The operating cycle resumes.

1 Solenoid
2 Pin
3 Follower plate

## Operator keys of the keypad

### Operator keys of the keypad in the operating mode


4222a99

Fig. 29 Pushbutton for additional operating cycle

- **Additional operating cycle**

➲ is triggered via the button (Fig. 30). Press the button for 2 seconds.

➲ can be initiated at any time, provided that the power supply is applied.

If a fault signal (malfunction) is present, it will be cancelled as soon as the system is operating properly, again.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**NOTE**

*An existing fault indication (flashing display) can be confirmed before triggering additional operating cycles. However, this is not obligatory (see Fig. 29).*

### Operator keys of the keypad in the programming mode


4222a99

Fig. 30 Key for resetting the pause time

- **Reset of the pause time**

➲ Setting of the pause time by
- single key activation for one hour/minute
- permanent activation for quick run

- **Setting of the monitoring relay**
Setting of the metering device circulations:
- The monitoring relay signalizes a functional fault on an external lamp via the optional connection "X2" (see connecting diagrams).
In case of the standard setting "normally open contact" the fault is indicated by a lamp with permanent light.
In case of the setting "normally closed contact" the fault is indicated by a lamp gone out.

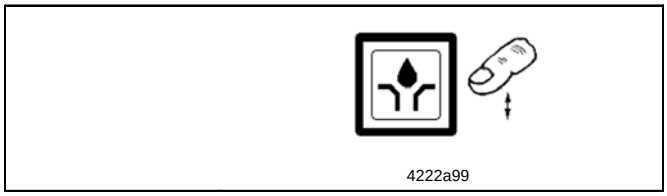
## Malfunction/low-level indication

- If both indications (fig. 24 and 27) occur at the same time, then both displays *** Er *** and *** LL*** will flash.

# Operation, continuation

## Operator keys of the keypad, continuation

**Operator keys of the keypad in the programming mode, continuation**




Continuation of fig. 30: Key for resetting the pause time and terminating the programming mode

➲ For VDC version …….. 1 to 5 cycles
For VAC version
- SSV 6 / SSV 8 ……... 1 to 3 cycles
- SSV 12 / SSV 18 ……..... 1 cycle

· **Start settings**

➲ Set: SP (Start with pause time)
SO (Start with lubricating time)

➲ Termination of the programming mode.

**Operator keys of the keypad in the display mode**

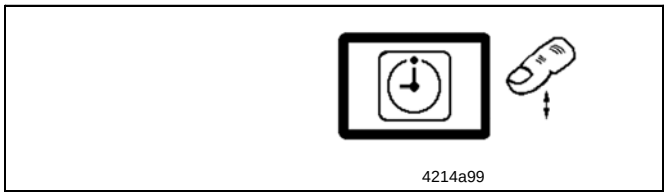



Fig. 31 Acknowledging receipt of a flashing fault indication

· **Acknowledging receipt of a malfunction**

➲ By pressing the key (fig. 31) the flashing ***Er*** changes into a permanent light.

· **Acknowledging receipt of the low-level indication**

➲ By pressing the key (fig. 31) the flashing ***LL*** changes into a permanent light.

**Operator keys of the keypad in the operating mode**

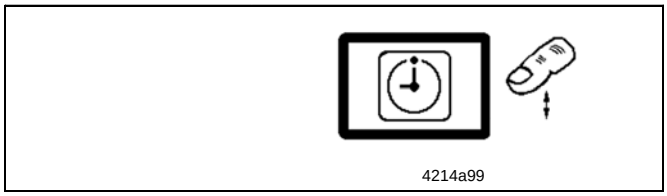



Fig. 32 Information regarding the set pause time and residual pause time

· **Display of information regarding the set pause time and residual pause time**

➲ Press key >2 seconds.

**Operator keys of the keypad in the programming mode**

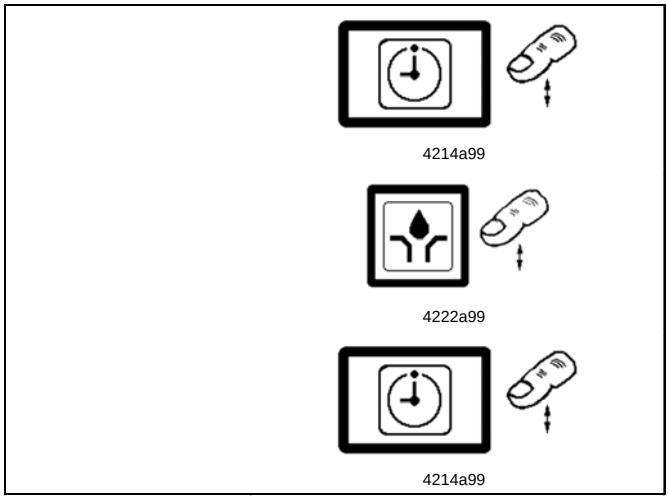



Fig. 33 Changing to the different programming levels

· **Changing to the different programming levels**

➲ Press keys to access the programming mode.

➲ Set parameters.

➲ Setting:
hours …….. P1
minutes …….. P2
metering device cycles …….. P3
outlet potential-free contact ……. P4
external display for functional faults of (NO) or (NC) contacts ..... P5
start with pause time or lubricating time …….. P6

➲ termination of programming

## Monitoring relay

- The monitoring relay signals a low-level indication or a malfunction (only in combination with optional connector X2, see electrical connection diagrams).
- In the first case the relay picks up (normally open contact).
- In the second case the relay releases (normally closed contact, broken-wire interlock).
- The signal is available via a potential-free contact.
- The monitoring relay is released upon acknowledgement of the fault.

# Setting and Operation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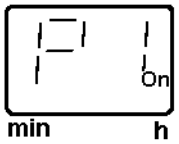
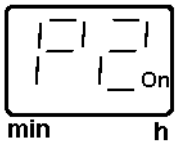
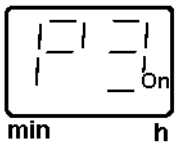
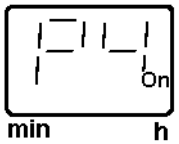
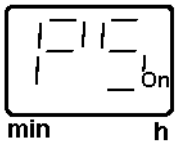
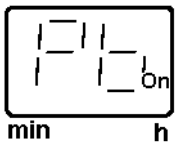
**NOTE**

*The following technical description includes information on the centralized lubrication systems QLS 301 after upgrading them with the following control printed circuit boards:*
*- for 12/24 VDC ... 236-14212-7*
*- for 120 VAC …… 236-10298-6*
*- for 230 VAC …… 236-10298-1*

## Factory Settings

| Programming steps | Factory setting | Description | Page |
|---|---|---|---|
|  min h 4215a99 | **6 h** | 6 hours Pause time | 7 |
|  min h 4217a99 | **0 min** | 0 minutes Pause time | 7 |
|  min h 4218a99 | **1 cycle** | Operating cycles:<br>1 cycle (metering device cycle) | 8 |
|  min h 6252b04 | **no** | Signal output of the fault relay:<br>no (normally open) Signalizing during the failure, e. g. low-level indication | 8 |
|  min h 6255b04 | **– –** | Differentiation fault indication (ER) / low-Level control (LL):<br>– – Permanent signal (no differentiation between ER and LL) | 9 |
|  min h 4299a00 | **SP** | Start phase:<br>SP Start with pause time | 10 |

Tab. 1 Programming steps P1 to P6

## Operator Keys

| Key | Function |
|---|---|
|  4222a99 | **Key for modifying the parameters in the programming step** |

Fig. 34

| Key | Function |
|---|---|
|  4214a99 | **Key for switching to the next programming step** |

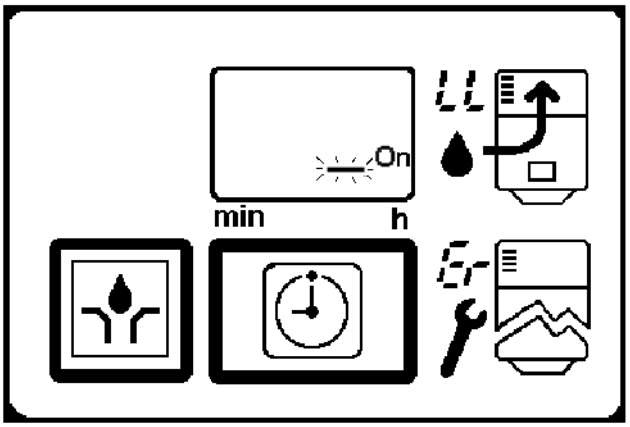
Fig. 35

# Setting and Operation, continuation

Three possible modes of operation and settings can be selected on the keypad.

- **Display mode**
- **Programming mode (page 26 ff)**
- **Operating mode (page 30 ff)**

## Display Mode




4206a04

- **In the display mode** the user receives information on functions and malfunctions of the QLS 301.
- As soon as voltage is applied to the pump, the keypad is automatically in **display mode**. The **segment** is illuminated on the display.
- Normally, the display is dark. Only the functions (segment, rotating segment display) or malfunctions (* **Er ***, * **LL ***) are displayed.

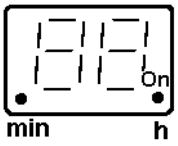
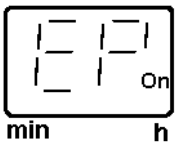
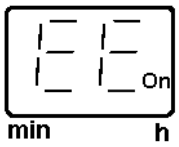
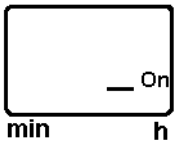
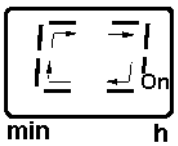
| Display | press |
|---|---|
|  4207a99 | 2 sec. |
|  4227a99 |  6574b05 |
|  4208a04 | |
|  4209a99 | |

Fig. 36 Display Mode (continuation next page)

- A test display is made when the voltage is applied, all segments and decimal points are illuminated for 2 seconds.

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**NOTE**

*If ***EP*** is displayed after the display test, there is a malfunction of the operating keys (see page 20).*
*If ***EE*** is displayed, this indicates an electromagnetic interference. In this case, individually set times are set back to the factory setting and must be programmed newly*

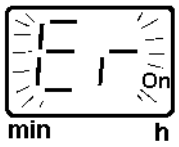
- **In the display mode** during the pause time there appears the right segment display (On). It is to display the readiness for operation (voltage supply). As soon as another message is displayed, the segment turns off.

- The lubricating time is displayed as a rotating segment.

# Setting and Operation, continuation

## Display Mode, continuation

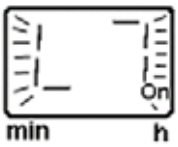
**Display** **press**



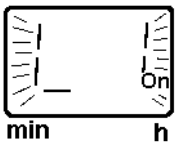

4210a99

- * **Er *** is shown to indicate a malfunction.


6262b04

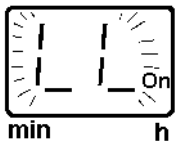



6263b04




6264b04

- **In the display mode**, a low level is announced by an intermittent display of *** L8 *, * L7 *, * L6 *, … * L1 ***.




4210a99

- Finally appears the intermittent display *** LL *** for a low-level indication that had not been confirmed.

< 2 sec.

4214a99

To acknowledge malfunctions

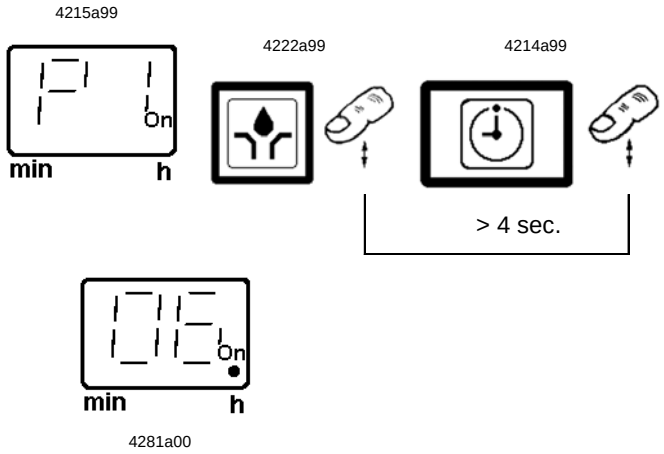
- The flashing display is changed into a continuous light by pressing the button **(acknowledging).** To **acknowledge**, press the button only briefly (< 2 sec.).
- Messages which have been acknowledged but have not yet been remedied flash again after the pump is switched off and on again.

Fig. 36 Display Mode

# Setting and Operation, continuation

## Programming Mode

**Display** **press**

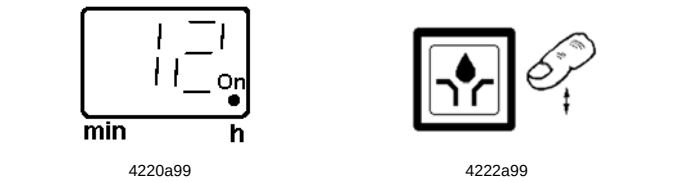



**Setting Pause Time P1 and P2**

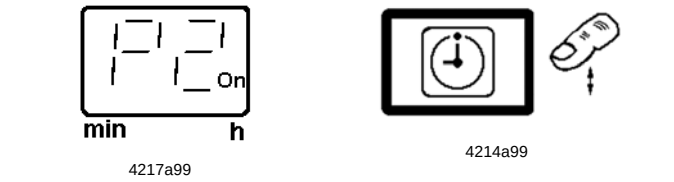
➲ To access the programming mode, **press both buttons** at the same time **> 4 seconds**, so that “P1” appears in the display.

| Programming options: | Pause time: |
|---|---|
| P1 | 0 - 59 hours |
| P2 | 0 - 59 minutes |
| Min. pause time DC | 4 minutes |
| Min. pause time AC | 20 minutes |
| Max. pause time DC/AC | 59 hours 59 minutes |

P1: Setting hours
When releasing the two buttons, the currently set value appears (here the factory-set value: 6 hours).
The field “hour“ is indicated by a **decimal point** on the **right-hand** side.

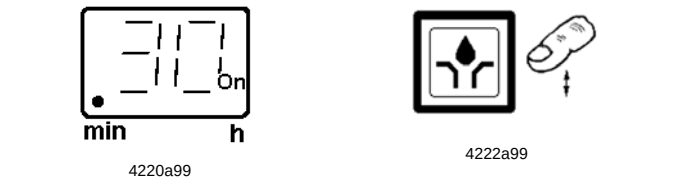



➲ Press button.
➲ Settings are made in one direction: 0, 1, 2, 3,....59 h
Button pressed once …..... increases by 1 hour
Button pressed continuously ..... quick sequence




P2: Setting minutes
➲ Press button, so that “P2“ appears in the display.


When releasing the button, the currently set value appears (her the factory-set value: 0 minutes).
The field “minute“ is indicated by a **decimal point** on the **left-hand** side.




➲ Press button.
➲ Settings are made in one direction: 0, 1, 2, 3, 4, .... 59 min
Button pressed once …..... increases by 1 minute
Button pressed continuously ..... quick sequence

Fig. 37 Programming Mode (continuation next page)


6001a02

**NOTE**

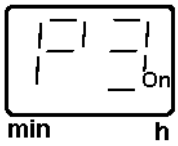
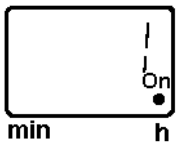
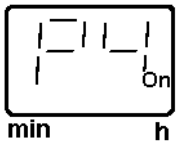
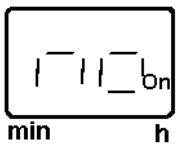
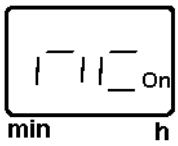
*The minimum pause time is 4 respectively 20 minutes. For settings < 4 respectively < 20 minutes (without input of hours) there automatically appears “**. 04**“ respectively “**. 20**“ in the display provided the programming sequence has been carried out completely.*

# Setting and Operation, continuation

## Programming Mode, continuation

**P3: Setting number of cycles**

If lube points are divided via sub-metering devices (SSV 6) and a main metering device (SSV 6, SSV 8), **never exceed a maximum of 18 (24) lube points**.

| Display | press |
|---|---|
|  4218a99 |  4214a99 |
|  4219a04 | |
|  4219a99 |  4222a99 |
|  6252b04 |  4214a99 |
|  6254b04 | |
|  6253b04 |  4222a99 |


6001a02

**IMPORTANT**

*Settings are only possible in connection with progressive metering device SSV 6 or SSV 8 KNQLS (connected as a main metering device) and a jumper attached at the p.c.b*

➲ Press button, so that “P3“ appears in the display.

Max. cycle time VDC …… 1 to 5
Max. cycle time VAC …… 1 to 3

When releasing the button, the currently set value appears (here the factory-set value: 1 cycle)

➲ Press button.
➲ Settings are made in one direction: 1, 2, 3, 4, 5


6001a02

**NOTE**

*For the <u>VDC version</u> all metering device cycle numbers are possible with SSV 6, SSV 8, SSV 12 and SSV 18.*
*For the <u>VAC version</u> depending on the type of SSV metering device the following cycle numbers are possible:*
*- with SSV 6 and SSV 8 …….. 1 to 3*
*- with SSV 12 and SSV 18 ..... 1*

**P4: Programming of the output signal on the monitoring relay for external fault indication (external fault contact)**

➲ Press button, so that “P4“ appears in the display.

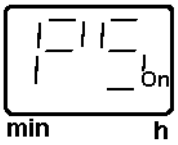
When releasing the button, the currently set value appears in the display (here the factory-set value “no“, **n**ormally **o**pen contact).

➲ Press button.
The external fault contact is modified by programming it as an “nc“ **n**ormally **c**losed contact.

Fig. 37 Programming Mode (continuation next page)

# Setting and Operation, continuation

## Programming Mode, continuation

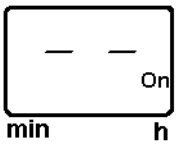



6255b04

4214a99

**P5: Program external display for empty reservoir or fault indications**

➲ Press button, so that “P5“ appears in the display.




6256b04

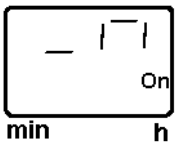
factory setting

When releasing the button, the display symbol “- -“ for permanent signal appears in the display.

6001a02

**NOTE**

*In this setting, a differentiation between low-level indication and fault indication is not possible.*

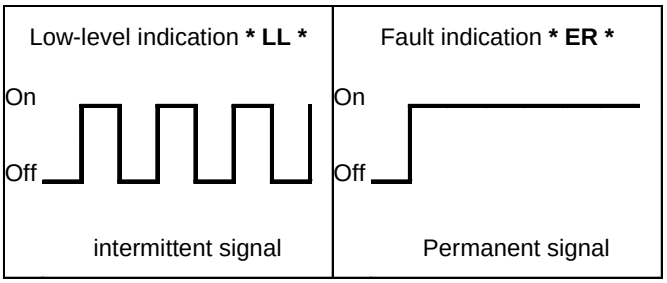



6257b04

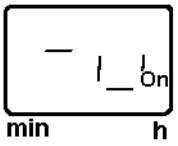
4222a99

The output signal on the monitoring relay for the external fault indication “**P4**“ is set as a normally open contact (**no**) (see page 30).

➲ Press key to change the external signal into an intermittent signal.




Then low-level indications appear as intermittent signals and malfunctions as permanent signals (On).

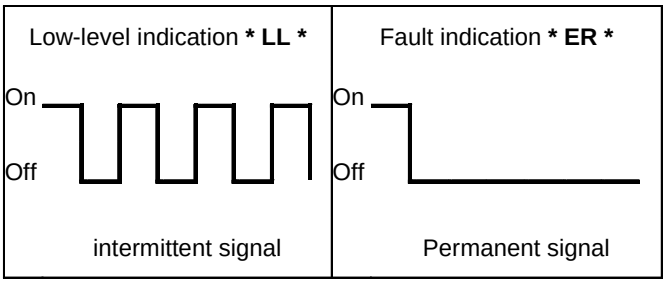



6258b04

4222a99

The output signal on the monitoring relay for the external fault indication “**P4**“ is set as a normally closed contact (**nc**) (see page 30).

➲ Press key to change the external signal into an intermittent signal.

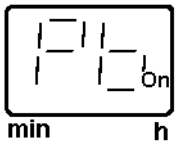



Then low-level indications appear as intermittent signals and malfunctions as permanent signals (Off).

Fig. 37 Programming Mode (continuation next page)

# Setting and Operation, continuation

## Programming Mode, continuation

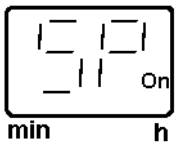



4299a00

4214a99

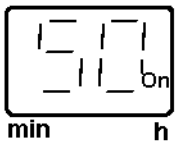
**P6: Program start phase**

➲ Press button, so that “P6“ appears in the display.




6259b04

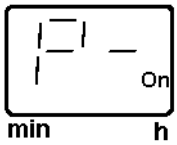
The pump is set as a standard with starting pause time **SP** (**S**tart **P**ause time).




6260b04

4222a99

➲ Press button.
The pump then starts after each switching on with the lubricating time **SO** (**S**tart **O**peration). After the first lubricating time the preset pause time is valid.




4221a99

4214a99

**Completing the programming**

➲ Press button. **„ P -“** is displayed.

6001a02

**IMPORTANT**

*In order to avoid a wrong program, make sure to always carry out the programming order completely, i. e. setting of P1 (hours), P2 (minutes), P3 (number of cycles), P4 (external contact), P5 (external display), P6 (start phase) and P- (Programming end).*

4222a99

- Press this key (additional lubrication) to complete the programming and to save the entered parameters.

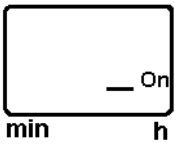
6001a02

**NOTE**

*If the button “additional lubrication” is not pressed within 30 seconds, the changed parameters are not saved and the previous programming remains valid.*

**IMPORTANT**

*After completion of the programming, check the parameter settings in the operating mode once again (see pages 33 ff).*




4208a99

Fig. 37 Programming Mode

# Setting and Operation, continuation

## Operating Mode

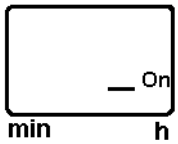
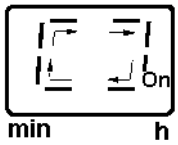
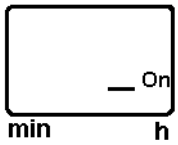
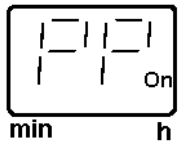
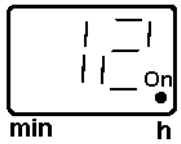
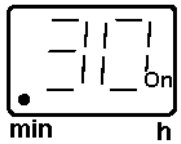
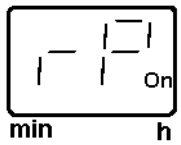
| Display | press |
|---|---|
|  4208a04 | |
|  4209a99 |  > 2 sec. 4222a99 |
|  4208a04 | |
|  4123a99 |  4214a99 |
|  4216a99 | after two sec. |
|  4220a99 | after two sec. |
|  4224a99 | after two sec. |

Fig. 38 Operating Mode (continuation next page)


6001a02

**IMPORTANT**

*The operating mode is accessible only during the pause time, and cannot be operated during the running time (pump lubricating time).*

- Precondition: When the voltage supply is applied, the segment (On) is lit.

**Operating option: Initiating an additional operating cycle**

➲ Press the button (> 2 sec.). The elapsed pause time is reset. The lubricating time starts. A rotating segment is visible on the display during the whole lubricating time.

**Operating option: Calling up of set parameters and data determined**

➲ Press the button.

**PP** (set pause time)


6001a02

**NOTE**

*The following display sequence is shown **once** and is cancelled after 40 seconds. The change of display occurs every two seconds. Example:*

**PP = 12h 30 min**
**rP = 5h 10 min**

**12 .** (hours)

**. 30** (minutes)

**rP** (remaining pause time)

Subject to modifications

# Setting and Operation, continuation

## Operating Mode, continuation

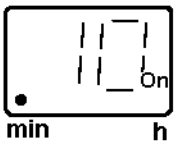
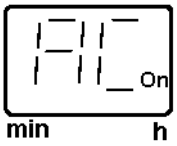
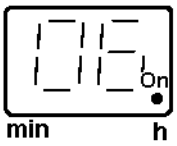
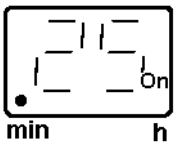
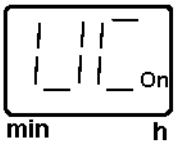
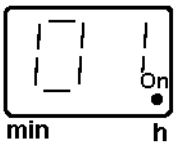
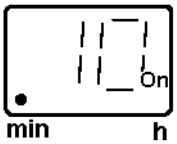
| | | |
|---|---|---|
|  4225a99 | after two sec. | **5 .** (hours) |
|  4226a99 | after two sec. | **. 10** (minutes) |
|  4277a00 | after two sec. | **AC** number of the automatically triggered operating cycles, countable up to 9999 cycles. Then counting starts from the beginning again.<br>Example **0625** cycles: |
|  4281a00 | after two sec. | **06.** Display for thousands and hundreds 06 as 600 |
|  4280a00 | after two sec. | **.25** Display for tens and ones |
|  4278a00 | after two sec. | **UC** Number of the manually triggered (by the user) additional operating cycles, countable up to 9999 cycles. Then counting starts from the beginning again.<br>Example **0110** cycles: |
|  4297a00 | after two sec. | **01.** Display for thousands and hundreds 01 as 100 |
|  4226a99 | after two sec. | **.10** Display for tens and ones |

Fig. 38 Operating Mode (continuation next page)

# Setting and Operation, continuation

## Operating Mode, continuation

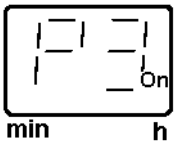
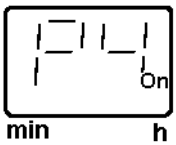
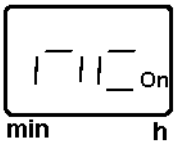
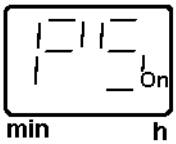
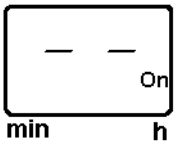
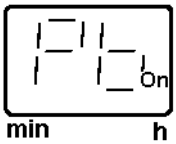
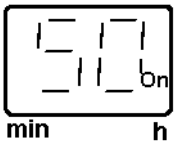
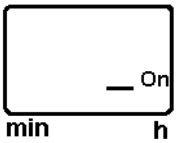
| | | |
|---|---|---|
|  4218a99 | after two sec. | P3: Number of metering device cycles |
|  4219a99 | after two sec. | Display of the metering device cycles |
|  6252b04 | after two sec. | P4: Programming of the output signal |
|  6253b04 | after two sec. | Display of the output signal “normally closed“ (nc) or “normally open“ (no) |
|  6255b04 | after two sec. | P5: Differentiation between low-level indication and fault indication (only external indication) |
|  6256b04 | after two sec. | Differentiation inactive |
|  4299a00 | after two sec. | P6: Programming of the start phase |
|  6260b04 | after two sec. | Display of the start phase with “start lubricating time“ (SO) or “start pause time“ (SP) |
|  4208a04 | after approx. 40 sec. | Termination of the operating mode |

Fig. 38 Operating Mode

# Maintenance, Repair and Tests

## Maintenance

- Maintenance is essentially limited to refilling the reservoir with clean lubricant as necessary. However, check regularly whether the lubricant is being dispensed to all the lubrication points.
- Also check the feed lines for damage and replace them, if necessary.


4273a00

**CAUTION!**

***Turn off the voltage supply for pumps 120 VAC and 230 VAC before servicing the pump.***


6001a02

**NOTE**

*Whenever work is performed on the centralized lubrication system, special attention should be paid to cleanness. Dirt will cause failure of the system.*

**IMPORTANT**

***To clean the system use petroleum spirit or petroleum. Do not use Tri, Per or similar solvents or polar or organic solvents such as alcohol, methanol, acetone, etc.***

**To fill reservoir**

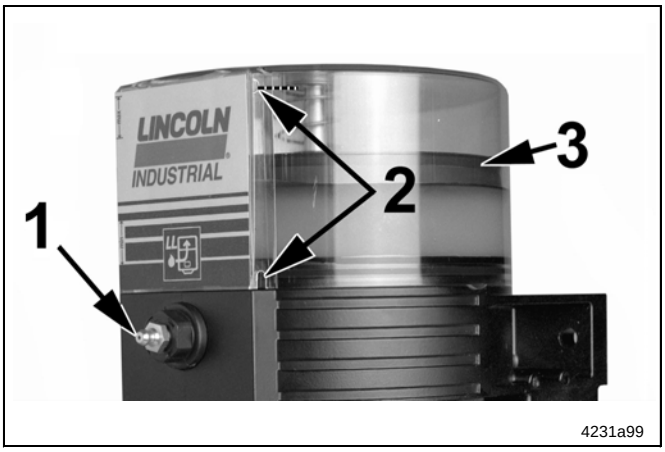



Fig. 39 Filling nipple for filling reservoir

1 Filling nipple
2 Vent hole
3 Follower plate

Fill the reservoir up to the ”Max.” mark via the filling nipple, see fig. 38.


6001a02

**IMPORTANT**

***The grease must be free from impurities and must not be liable to change its consistency over the course of time.***

**NOTE**

*If the reservoir has been completely emptied, the pump may require priming and a longer running time to reach the full lubricant output. Therefore, trigger additional operating cycles manually.*

**Filling of the empty reservoir**

- Make sure that all air has been expelled from under the follower plate after refilling the empty reservoir.
- The follower plate seal should contact the hole located on the top of the reservoir. Small amount of grease should be refilled to ensure expelling of air from under the follower plate.


1013A94

**CAUTION!**

***Risk of bursting if the reservoir is overfilled!***
***When filling the reservoir by means of pumps with a large delivery volume, do not exceed the max. filling mark.***

# Maintenance, Repair and Tests, continuation

## Repair

- For repair work on the QLS 301 use only original **Lincoln** spare parts.
- Using non-**Lincoln** parts voids the pump warranty.

4273a00

**CAUTION!**

***Switch off the voltage supply for pumps 120 VAC and 230 VAC before servicing the pump.***

1013A94

**CAUTION!**

*By operating the drive motor without the reservoir installed, there is a **risk of injury** by the eccentric gear.*
*Never use the lubrication system QLS 301 without installing the reservoir!*

## Functional Test

4222a99

Fig. 40 Pushbutton for additional operating cycle

➲ Press pushbutton > 2 sec. to trigger an operating cycle.

# Troubleshooting

## Pump of the QLS 301 system

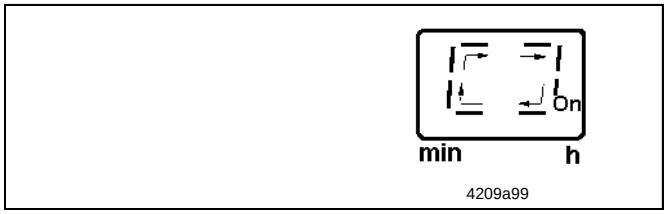



Fig. 41 Green rotating segment, lubricating time

- The green rotating display indicates that the pump operates properly.

| **Fault: Pump motor doesn't run** | |
|---|---|
| **Cause:** | **Remedy:** |
| · Power supply interrupted. Green decimal point On/h on display is not lit. |  4273a00<br>Warning!<br>*Disconnect the power supply before starting any maintenance or repair works.*<br>➲ Check the voltage supply to the pump/fuses. If necessary, eliminate the fault or replace the fuses.<br>➲ Check the feedline from the fuses to the plug of the pump and then to the printed circuit board. |
| · Power supply from printed circuit board to motor interrupted. Electric motor defective. | ➲ Trigger an additional operating cycle. Check voltage supply from the printed circuit board to the motor. |
| · Printed circuit board defective | ➲ Replace printed circuit board. |
| · Keypad or button is defective. **"EP"** display at the keypad flashes. | ➲ Replace housing with keypad. |

| **Fault: Pump does not deliver lubricant** | |
|---|---|
| **Cause:** | **Remedy:** |
| · Reservoir is almost empty. **"LL"** display at the keypad is flashing.<br>· Pump lost prime and **"Er"** display at the keypad is flashing. | ➲ Fill up the reservoir with clean grease. Let the pump run (initiate an additional operating cycle) until lubricant shows at all lube points.<br>  6001a02<br>NOte<br>*Dependent on the ambient temperature and/or sort of lubricant output. Therefore, trigger several additional operating cycles.* |
| · Air pockets in lubricant. | ➲ Trigger an additional operating cycle. Lubricant must dispense without air bubbles. |
| · Improper lubricant has been used. | ➲ Change the lubricant. |
| · Suction hole of pump element clogged. | ➲ Remove pump element. Check suction hole for foreign particles. If there are any, remove them. |
| · Pump piston is worn. | ➲ Replace pump element. |
| · Check valve in pump element defective or clogged. | ➲ Replace pump element. |

# Troubleshooting, continuation

**Fault: Pump either does not switch off at all or only after the monitoring time of 15 min.**

**Cause:**

- Proximity switch is not dampened, i.e. the control pin does not move within the switching range of the initiator, or the distance between the control pin and the initiator surface is more than 0.5 mm (0.02 in.).

**Remedy:**

➲ Trigger additional lubrication. Check whether the control pin moves centrically over the switching surface of the initiator. In case the adjustments do not correspond to the indications, the fixing position of the metering device has to be corrected.

➲ Check the distance.

- Between the control pin and the switching surface of the initiator (max. 0.5 mm; 0.02 in.)

In case the adjustments do not correspond to the indications, the fixing position of the proximity switch has to be corrected.

- Distances between the switching surface of the initiator and the upper edge of the fixing nut:
  When the metering device is mounted at the back: 16+ **/ –**0.2 mm (0.62+/-0.08 in.)
  When the metering device is mounted at the bottom: 12.7 +/-0.1 mm (0.5 +/-0.004 in.).

➲ Tightening torque of the nut: 1.5 NM (1.10 ft-lb.).

**Fault: Pump runs continuously**

**Cause:**

- Programming of pause time in step P1 was set to‘‘00”. Programming of further steps P2, P3, P4, P5, P6 and P- was not carried out.
  Pump starts running immediately. The proximity switch switches off the cycle for two minutes. Then, pump runs continuously.

**Remedy:**

➲ Switch off pump (power supply) by removing left-hand side socket from plug.

➲ Press both buttons of keypad:

4222a99 4214a99

**> 5 sec.**

➲ Switch on pump (power supply) by replugging left-hand side socket.

➲ Release both pushbuttons after approx. 5 seconds.

➲ The factory-set pause time of 6 hours is automatically reset.

➲ Afterwards new setting of pause time is possible.

**Fault: Fault indication * EE ***

**Cause:**

- Electromagnetic interferences have modified the customer’s time setting. All values have been set back to the factory setting.

**Remedy:**

➲ Eliminate electromagnetic interferences.

➲ Repeat individual programming (see as of page 26).

# Troubleshooting, continuation

## SSV metering device

**Fault: Blockage in the downstream progressive system**

**Cause:**

- Bearings, lines or metering device clogged
- Mounting position of metering device: bottom
  - In the case of metering devices SSV 8,12 and 18, the outlets 1 and/or 2 are closed.
- Mounting position of metering device: back
  - In the case of metering devices SSV 6, 12 and SSV 18, outlet 1 is closed and outlet 2 is connected to a lube point.
    The fault can be identified as follows:
    a) Fault indication **"Er"** flashing on the keypad display.
    b) The indicator pin at the metering device piston does not move.

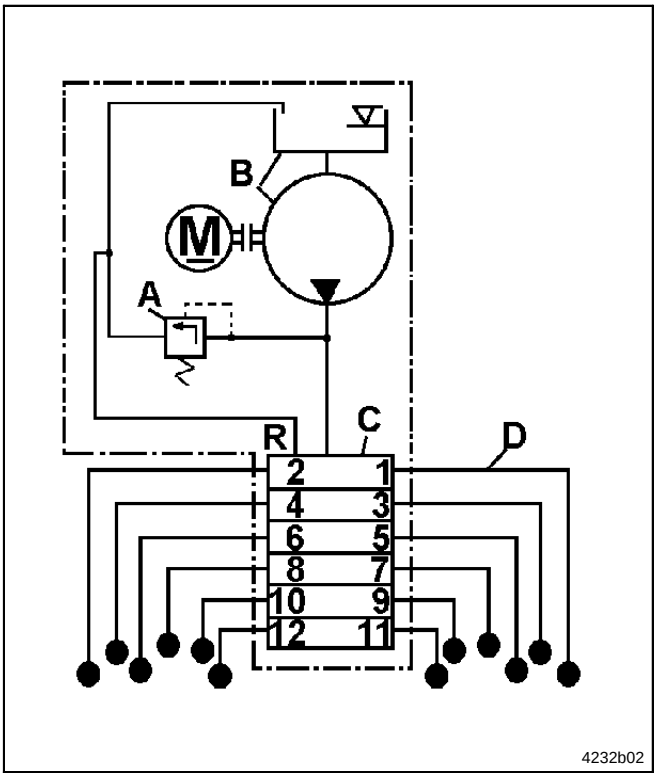



Fig. 43 Example of a QLS 301

A pressure relief valve
B pump
C SSV 12 metering device
D feed lines
R return line

**Remedy:**

- Determine the cause of the blockage as described in the following example and eliminate it.

➲ Let the pump run (refer to "trigger additional operating cycles").

➲ Disconnect all feed lines (pos. D) of the metering device one after the other. If grease shows under pressure the blockage is located in the line of outlet 3 or in the connected bearing point.

➲ Pump through the blocked line or bearing point using a hand pump.


6001a02

**NOTE**

To check the individual outlets, leave all outlets disconnected for a while, since only one piston stroke is executed with each motor revolution. Several strokes are required for a full cycle of all metering devices.

➲ Check pressure relief valve (fig. 21, page 19). Replace it, if necessary.

# Troubleshooting, continuation

**Fault: Blockage in the downstream progressive system, continuation**

**Cause:**

- Metering device is blocked

**Remedy:**

➲ Replace the metering device or clean it as follows:

- Remove all threaded tube fittings.
- Unscrew the piston closure plugs.
- Remove the piston, if possible, with a soft mandrel (smaller than ø 6 mm, 0.24 in).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**IMPORTANT**

*The pistons are individually fit in the bores of the metering device. After removing the pistons, mark them in order to reinstall them in the right direction and position. They may not be interchanged.*

- Thoroughly clean the metering device body in a grease-dissolving detergent and dry it with compressed air.
- Clean through the material passages (ø 1.5 mm, 0.59 in) at the thread ends of the piston bores using a pin.
- Clean the metering device once more and dry it thoroughly.
- Reassemble the metering device.

**Fault: Differing lubricant amounts at the lubrication point**

**Cause:**

- Lubricant metering not correct.
- Setting of the pause time incorrect.

**Remedy:**

➲ Check the lubricant metering acc. to the lubrication chart.

➲ Check time setting.

# Technical Data

### QLS 301, GENERAL

Operating temperature..... -25° C to 70° C (-10° F to 160° F)
Maximum operating pressure of
pump model without metering device..... 205 bar (3,000 psig)
Number of outlets..... 6, 8, 12, 18
Output per outlet and cycle ..... approx. 0.2 cm²
Reservoir capacity .....1 l
Lubricant ..... up to NLGI 2 grease
Weight (average) ..... 5.7 kg. (12.5 lbs.)
Protection..... IP6K 9K acc. to DIN 40050 T9
Reverse polarity protection:
The operating voltage inlets are protected against reverse polarity.

### ELECTRICAL DATA AC (ALTERNATE CURRENT)

Operating voltage..... 120 VAC/60 Hz +/- 10 %
Operating current .....1,0 A
Operating voltage..... 230 VAC; 50/60 Hz +/- 10 %
Operating current .....0.5 A

### ELECTRICAL DATA DC (DIRECT CURRENT)

Operating voltage..... 12 V, - 20%/+ 30 %
Operating current .....2,0 A
Operating voltage..... 24 V, - 20%/+ 30 %
Operating current .....1.0 A
Residual ripple in relation
to the operating voltage ..... ± 5% acc. to DIN41755


6001a02

**NOTE**

*The pump motor is suitable for intermittent operation only.*

- In addition to the EMV directive, **DC systems** also comply with the following guidelines and standards:
  - vehicle guideline 95/245/EC
  - EMV regulation for on-road vehicles acc. EN 40839 parts 1, 3 and 4

### TIME SETTING

Range of pause time ..... increment 1 minute
- VDC ..... 4 minutes to 60 hours
- VAC ..... 20 minutes to 60 hours

Factory setting
Pause time.....6 hours/cycle

Numbers of operating cycles
- VDC ..... 1 to 5 cycles
- VAC SSV 6 / SSV 8..... 1 to 3 cycles
  SSV 12 / SSV 18 ..... 1 cycle

Timer memory..... indefinite over EEPROM

### RELAY FOR MALFUNCTION AC (OPTION)

Potential-free outlet for malfunction/low-level option
Switching voltage..... max. 230 VAC/ 125 VDC
Switching current..... max. (resistive) 2 A
Switching capacity.....max. 100 VA/80 W

### RELAY FOR MALFUNCTION DC (OPTION)

Potential-free outlet for malfunction/low level option
Switching voltage..... max. 48 VAC/ VDC
Switching current..... max. (resistive) 2 A
Switching capacity.....max. 100 VA/80 W


6001a02

**NOTE**

*All data depends on operating voltage, ambient temperature and max. operating pressure.*

### LINES

**Plastic tube (ø 6x1,5 mm;1/4 in.)**
Min. bending radius .....50 cm (2 in.)
Bursting pressure
at 20° C ( 70°F) .....approx. 210 bar (3050 psi )
Min. temperature .....-25° C (-10°F)

### TIGHTENING TORQUES

**Pump**
Electric motor to housing.....3 NM (2.5 lb.-ft)
Pump element in housing.....25 NM ( 19.0 lb.-ft)

**Metering device, accessories**
Closure plug (piston) in metering device .....18 NM (13.5 lb.-ft)
Closure plug (outlets) in metering device ....15 NM (11.0 lb.-ft)
Outlet fitting in metering device
- screw-type .....17 NM (12.5 lb.-ft)
- push-in type.....12 NM (9.0 lb.-ft)

Compression nut onto outlet fitting, screw-type:
- plastic tube .....10 NM (7.5 lb.-ft)
- steel tube.....11 NM (8.0 lb.-ft)

Indicator pin in metering device .....18 NM (13.5 lb.-ft)
Mounting of the metering device.....10 NM (8.0 lb.-ft)

### ACCESSORY KITS:

**Inch-Size Kits:**
SSV 6/8 part no. 550-36971-1
SSV 12 part no. 550-36971-2
SSV 18 part no. 550-36971-3

**Metric Size Kits:**
SSV 6/8 part no. 550-36970-1***
SSV 12 part no. 550-36970-2***
SSV 18 part no. 550-36970-3***

*** ***Lube fittings must be ordered separately***

# Dimensions

**Pump and SSV metering devices**

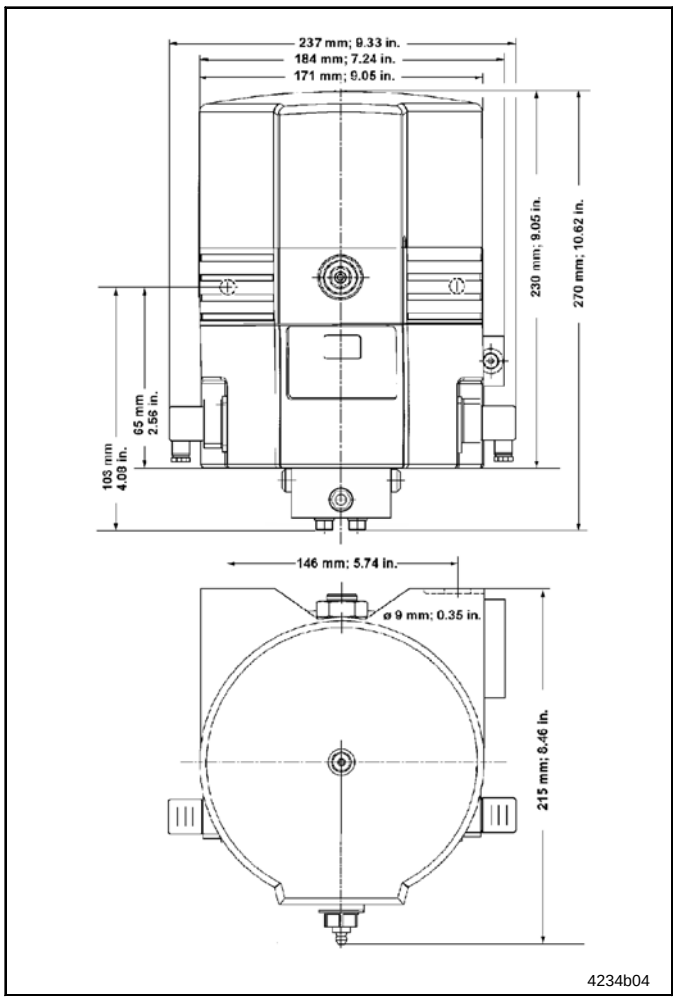


Fig. 44 Dimension of QLS 301

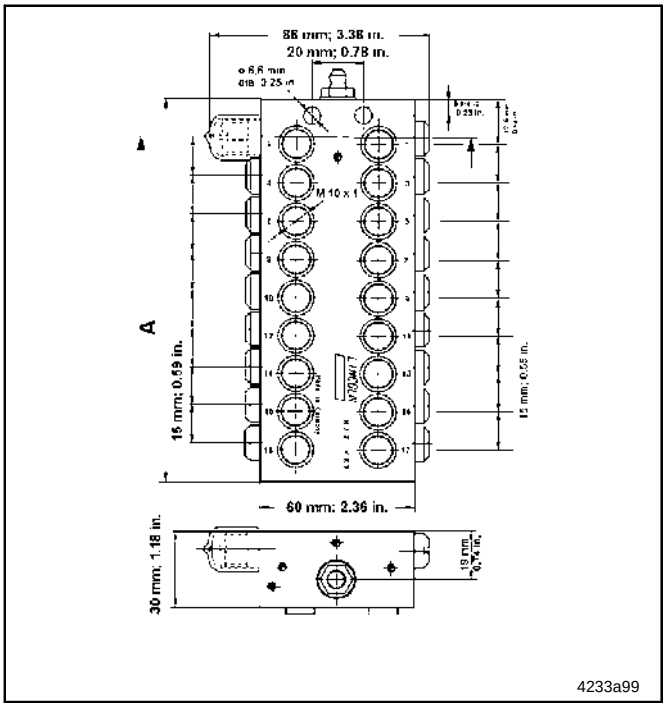


Fig. 45 Dimensions of back-mounted SSV metering device

| Number of outlets | Dimension A in mm |
|---|---|
| 6 | 60 |
| 12 | 105 |
| 18 | 150 |

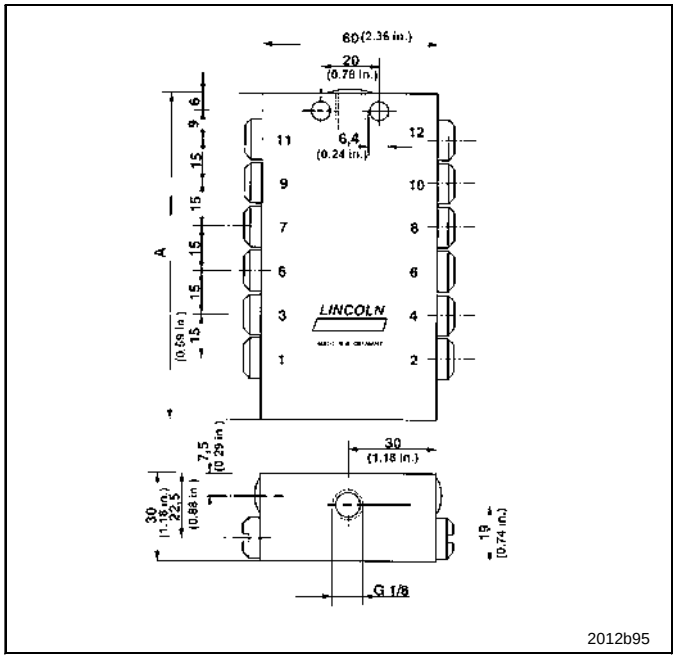


Fig. 46 Dimension of bottom-mounted SSV metering device

| Number of outlets | Dimension A in mm |
|---|---|
| 6 | 75 |
| 12 | 105 |
| 18 | 150 |

# Service Parts

## Version with bayonet plug

**(VDC application only)**

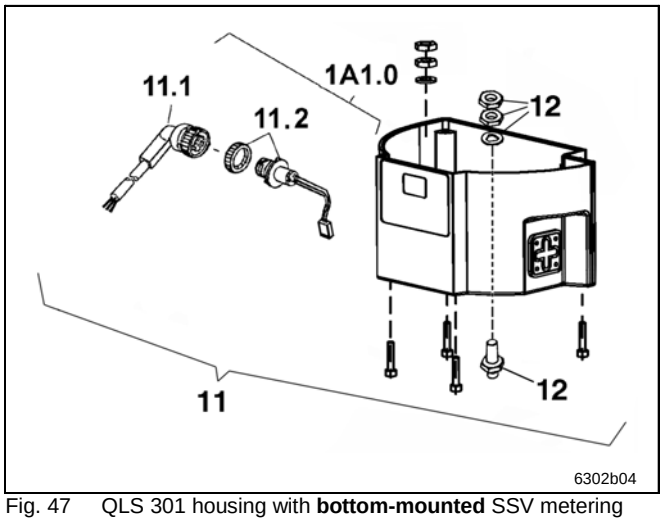


Fig. 47 QLS 301 housing with **bottom-mounted** SSV metering device and bayonet plug (replacement of pos. 11, Fig. 49)

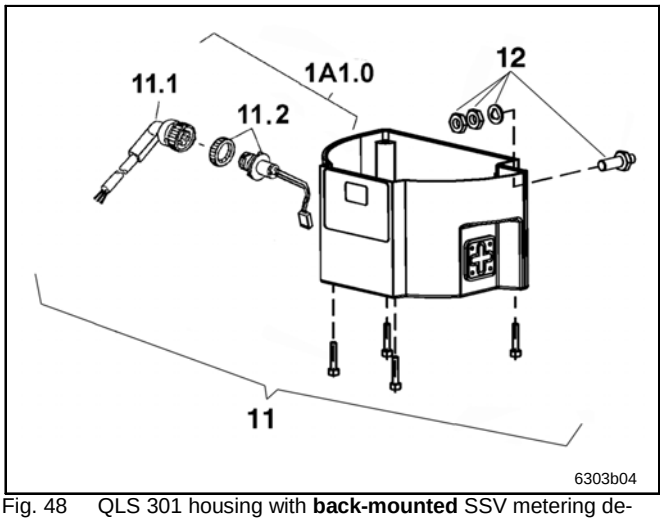


Fig. 48 QLS 301 housing with **back-mounted** SSV metering device and bayonet plug (replacement of pos. 11, Fig. 50)

**Parts list for <u>bottom-mounted and back-mounted</u> SSV lubricant metering devices with bayonet plug**

| Pos. | Description | Kit | Single Part | Qty | Part No. |
|---|---|---|---|---|---|
| 11 | Housing cover for VDC, plug 1A1 | x | | 1 | 550-34179-3 |
| 11.1 | Socket with 6 m cable for bayonet plug or | x | | 1 | 664-34045-1 |
| | Socket with 6 m cable for bayonet plug ADR | x | | 1 | 664-34045-3 |
| 11.2 | Bayonet plug | | x | 1 | 664-34045-2 |
| 12 | Proximity switch | x | | 1 | 550-36980-1 |

Tab. 2 Parts list, QLS 301 with bayonet plug to table 3 and 4 (instead of square-type plug, pages 43 and 45)

# Service Parts, continuation

## QLS 301 with bottom-mounted SSV metering device and square-type plug

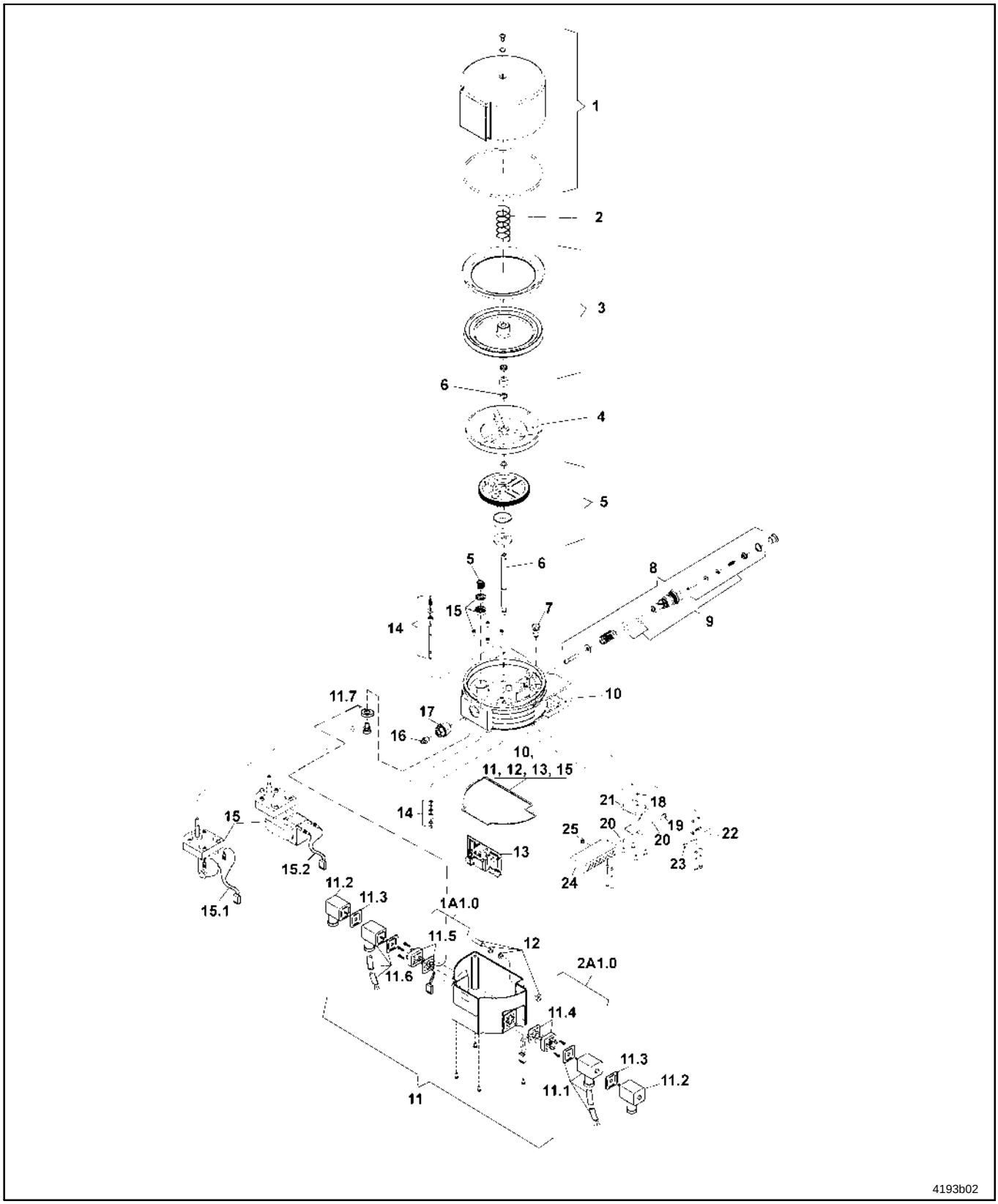


Fig. 49 QLS 301 with bottom-mounted SSV metering device and square-type plug

# Service Parts, continuation

## Parts list for bottom-mounted SSV metering device and square-type plug

| Pos. | Description | Kit | Single part | Qty | Part No. |
|---|---|---|---|---|---|
| 1 | Reservoir | x | | 1 | 550-36979-2 |
| 2 | Spring DA 28x1,6x106 | | x | 1 | 218-14172-6 |
| 3 | Follower plate | x | | 1 | 550-36979-3 |
| 4 | Intermediate bottom | x | | 1 | 450-24749-1 |
| 5 | Eccentric gear | x | | 1 | 550-36979-4 |
| 6 | Shaft | x | | 1 | 550-36979-1 |
| 7 | Pressure relief valve, cartridge | | x | 1 | 235-14343-1 |
| 8 | Pump element, assy. ø 6 mm | | x | 1 | 650-28856-1 |
| 9 | Sealing parts for pump element | x | | 1 | 550-36979-5 |
| 10 | Housing with low level control | x | | 1 | 550-36981-3 |

With square-type plug (pos. 11, fig. 49, page 42):

| | | | | | |
|---|---|---|---|---|---|
| 11 | Housing cover with low level control | | | | |
| | and VDC, plug 1A1 | x | | 1 | 550-34179-3 |
| | or VDC, plug 2A1 | x | | 1 | 550-36984-2 |
| | Housing cover with low level control | | | | |
| | and VAC, plug 1A1 | x | | 1 | 550-36984-3 |
| | or VAC, plug 2A1 | x | | 1 | 550-36984-4 |
| 11.1 | Socket 2 with 10 m cable, for remote control | x | | 1 | 664-36078-9 |
| 11.2 | Socket, black GMD-3011 | | x | 2 | 236-13277-9 |
| 11.3 | Flat packing | | x | 2 | 236-13294-3 |
| 11.4 | Appliance plug 2 , for remote control, VDC | | x | 1 | 664-36968-6 |
| | Appliance plug 2 , for remote control, VAC | | x | 1 | 664-36968-5 |
| 11.5 | Appliance plug 1, for power supply, VDC | | x | 1 | 664-36968-4 |
| | Appliance plug 1, for power supply, VAC | | x | 1 | 664-36968-3 |
| 11.6 | Socket 1 with 10 m cable, for power supply | | x | 1 | 664-36078-7 |
| 11.7 | Screw with washer assy. | | x | 1 | 201-14434-1 |

| Pos. | Description | Kit | Single part | Qty | Part No. |
|---|---|---|---|---|---|
| 12 | Proximity switch | x | | 1 | 550-36980-1 |
| 13 | p.c.b. for 1-5 cycles | | | | |
| | 12/24 VDC | x | | 1 | 550-36983-7 |
| | p.c.b. for 1 cycle | | | | |
| | 120 VAC | x | | 1 | 550-34199-1 |
| | 230 VAC | x | | 1 | 550-34199-3 |
| | p.c.b. for 3 cycles | | | | |
| | 120 VAC | x | | 1 | 550-34199-2 |
| | 230 VAC | x | | 1 | 550-34199-4 |
| 14 | Low-level control | x | | 1 | 550-36979-9 |
| 15 | Motor, 12 VDC | x | | 1 | 550-36982-1 |
| | Motor, 24 VDC | x | | 1 | 550-36982-2 |
| | Motor, 120 VAC | x | | 1 | 550-36982-3 |
| | Motor, 230 VAC | x | | 1 | 550-36982-4 |
| 15.1 | Motor connection VDC | | x | 1 | 664-36968-2 |
| 15.2 | Motor connection VAC | | x | 1 | 664-36968-1 |
| 16 | Hydraulic lube fitting, ST AR 1/8 | | x | 1 | 251-14040-1 |
| 17 | Adapter M 22x1,5 (a) x G 1/8 in.(i) | | x | 1 | 304-19619-1 |
| 18 | O-Ring ø 5 x1, 5 mm | | x | 3 | 219-12222-2 |
| 19 | Banjo bold | | x | 1 | 226-13777-2 |
| 20 | Sealing ring alumi-num | | x | 2 | 226-13780-1 |
| 21 | Manifold | x | | 1 | 550-36979-6 |
| 22 | Connecting block | x | | 1 | 550-36979-7 |
| 23 | Hydraulic lube fitting, ST AR 1/8 | | x | 1 | 251-14040-1 |
| 24 | SSV metering device | | | | |
| | SSV 8 - K | x | | 1 | 619-37586-1 |
| | SSV 12 - K | x | | 1 | 619-37587-1 |
| | SSV 18 - K | x | | 1 | 619-37588-1 |
| 25 | Piston plug with sealing for control pin | | x | 1 | 519-32123-1 |
| | Sealing kit for QLS 301 | | x | 1 | 550-36979-8 |

# Service Parts, continuation

## QLS 301 with back-mounted SSV metering device and square-type plug

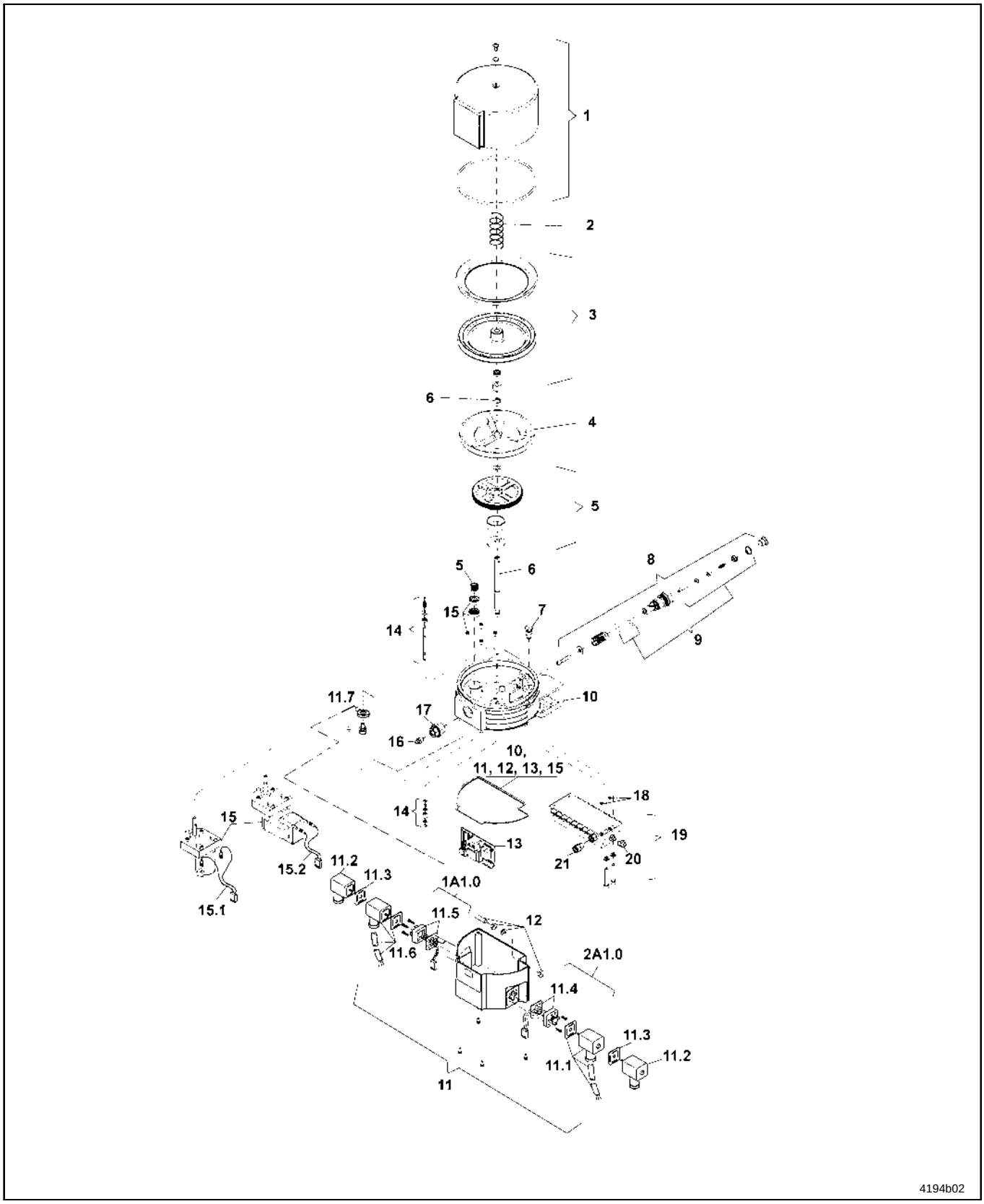


Fig. 50 QLS 301 with back-mounted SSV metering device and square-type plug

# Service Parts, continuation

## Parts List for back-mounted SSV metering device and square-type plug

| Pos. | Description | Kit | Single Part | Qty | Part No. |
|---|---|---|---|---|---|
| 1 | Reservoir | x | | 1 | 550-36979-2 |
| 2 | Spring DA 28x1,6x106 | | x | 1 | 218-14172-6 |
| 3 | Follower plate | x | | 1 | 550-36979-3 |
| 4 | Intermediate bottom | x | | 1 | 450-24749-1 |
| 5 | Eccentric gear | x | | 1 | 550-36979-4 |
| 6 | Shaft | x | | 1 | 550-36979-1 |
| 7 | Pressure relief valve, cartridge | | x | 1 | 235-14343-1 |
| 8 | Pump element, assy. ø 6 mm | | x | 1 | 650-28856-1 |
| 9 | Sealing parts for pump element | x | | 1 | 550-36979-5 |
| 10 | Housing with low-level control | x | | 1 | 550-36981-3 |

With square-type plug (pos. 11, fig. 50, page 44):

| | | | | | |
|---|---|---|---|---|---|
| 11 | Housing cover with low level control | | | | |
| | and VDC, plug 1A1 | x | | 1 | 550-34179-3 |
| | or VDC, plug 2A1 | x | | 1 | 550-36984-2 |
| | Housing cover with low level control | | | | |
| | and VAC, plug 1A1 | x | | 1 | 550-36984-3 |
| | or VAC, plug 2A1 | x | | 1 | 550-36984-4 |
| 11.1 | Socket 2 with 10 m cable, for remote control | x | | 1 | 664-36078-9 |
| 11.2 | Socket, black GMD-3011 | | x | 2 | 236-13277-9 |
| 11.3 | Flat packing | | x | 2 | 236-13294-3 |
| 11.4 | Appliance plug 2, for remote control, VDC | | x | 1 | 664-36968-6 |
| | Appliance plug 2, for remote control, VAC | | x | 1 | 664-36968-5 |
| 11.5 | Appliance plug 1, for power supply, VDC | | x | 1 | 664-36968-4 |
| | Appliance plug 1, for power supply, VAC | | x | 1 | 664-36968-3 |
| 11.6 | Socket 1 with 10 m cable, for power supply | | x | 1 | 664-36078-7 |
| 11.7 | Screw with washer assy. | | x | 1 | 201-14434-1 |
| 12 | Proximity switch | x | | 1 | 550-36980-1 |
| 13 | p.c.b. for 1-5 cycles | | | | |
| | 12/24 VDC | x | | 1 | 550-36983-7 |
| | p.c.b. for 1 cycle | | | | |
| | 120 VAC | x | | 1 | 550-34199-1 |
| | 230 VAC | x | | 1 | 550-34199-3 |
| | p.c.b. for 3 cycles | | | | |
| | 120 VAC | x | | 1 | 550-34199-2 |
| | 230 VAC | x | | 1 | 550-34199-4 |
| 14 | Low-level control | x | | 1 | 550-36979-9 |
| 15 | Motor, 12 VDC | x | | 1 | 550-36982-1 |
| | Motor, 24 VDC | x | | 1 | 550-36982-2 |
| | Motor, 120 VAC | x | | 1 | 550-36982-3 |
| | Motor, 230 VAC | x | | 1 | 550-36982-4 |
| 15.1 | Motor connection VDC | | x | 1 | 664-36968-2 |
| 15.2 | Motor connection VAC | | x | 1 | 664-36968-1 |
| 16 | Hydraulic lube fitting, ST AR 1/8 | | x | 1 | 251-14040-1 |
| 17 | Adapter M 22x1,5 (a) x G 1/8 in.(i) | | x | 1 | 304-19619-1 |
| 18 | O-Ring ø 5 x1, 5 mm | | x | 3 | 219-12222-2 |
| 19 | SSV metering device | | | | |
| | SSV 6 - K | x | | 1 | 619-37589-1 |
| | SSV 12 - K | x | | 1 | 619-37590-1 |
| | SSV 18 - K | x | | 1 | 619-37591-1 |
| 20 | Hydraulic lube fitting, ST AR 1/8 | | x | 1 | 251-14040-1 |
| 21 | Piston plug with sealing for control pin | | x | 1 | 519-32123-1 |
| | Sealing kit for QLS 301 | | | 1 | 550-36979-8 |

# Option for metric fittings (not included in the accessory kits)

**SSV Connecting tube fitting, screw-type and push-in type**

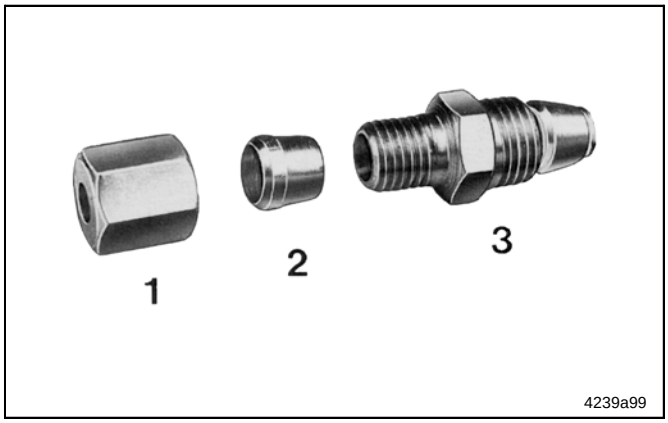


Fig. 51 Screw-type check valve

1 Ferrule nut
2 Cutting ring
3 Valve body with sealing and ferrule

**Connection of the pressure plastic tube or the high-pressure hose**

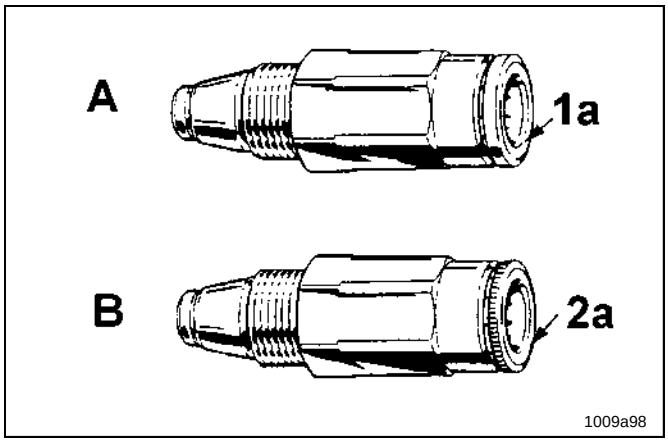


Fig. 52 Different types of check valves

- For high-pressure hose (ø 4.1 x 2.3 mm) use check valve A, fig. 52, with reinforced collets 1a and smooth flange (part no. 226-14091-4)
- For pressure plastic tube (ø 6 x 1.5 mm) use check valve B, fig. 52, with standard collets 2a and knurled flange (part no. 226-14091-2)

A Check valve with reinforced collets
B Check valve with standard collets
1a Smooth flange
2a Knurled flange

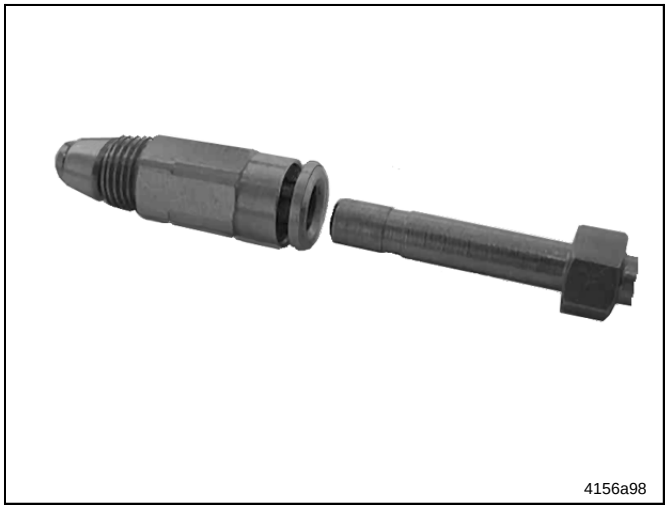


Fig. 53 Check valve with reinforced collets and high-pressure hose


6001a02

**NOTE**

*On construction machines or agricultural machines use high-pressure hoses as feed lines. In such cases, the check valves of the sub-metering devices must have a reinforced collets and a smooth flange.*


6001a02

**IMPORTANT**

*Connect only high-pressure hoses (ø 4.1 x 2.3 mm) with threaded sleeve and hose stud to the check valves with reinforced collets.*

## Option for metric fittings (not included in the accessory kits), continuation

**Mounting of the threaded sleeves and hose studs onto the high-pressure hose**

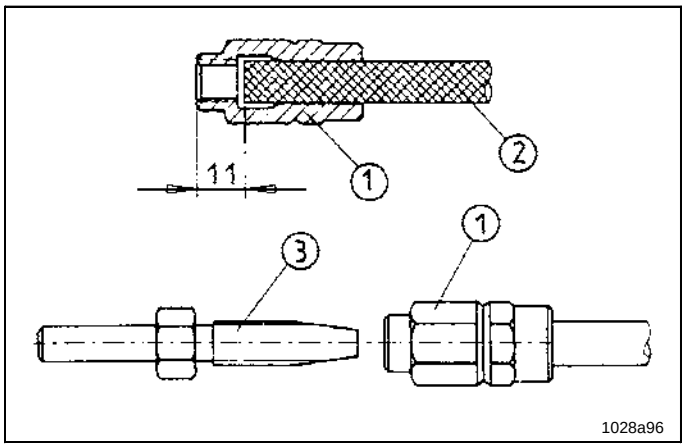


Fig. 54 Pre-assembly of the threaded sleeves and hose studs onto the main line

- Screw threaded sleeve (1, fig. 54) counterclockwise onto the high-pressure hose (2) until the illustrated dimension of 11mm is reached. Then screw the hose stud (3) into the threaded sleeve (1).

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**IMPORTANT**

*Oil parts 1 and 3 well before screwing them together.*

1 Threaded sleeve
2 Main line
3 Hose stud

## EC Declaration of Conformity as defined by Machinery Directive 98/37/EC, Annex II A

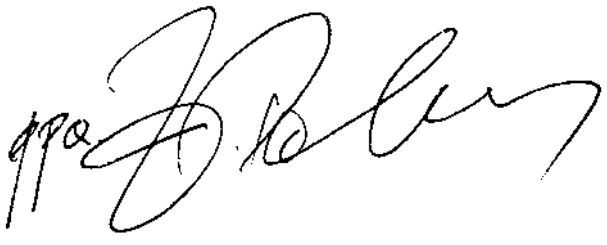
This is to declare that the design of the

### QLS 301 lubrication system

in the version supplied by us, complies with the provisions of the directive 98/37/EC – including all modifications of this directive valid at the time of the declaration.

**Applied harmonized standards in particular:**

| | |
|---|---|
| **EN 12100-1** | Safety of machinery part 1<br>Basic terminology, methodology |
| **EN 12100-2** | Safety of machinery part 2<br>Technical principles and specifications |
| **EN 809** | Pumps and pump units for liquids<br>Safety requirements |
| **EN 60204-1** | Safety of machinery<br>Electrical equipment of machines<br>Part 1: General requirements |



**Walldorf, 10.08.2004, Dr. Ing. Z. Paluncic**

## EC Declaration of Conformity according EMC Directive 2004/108/EC

We declare that the model of the

### QLS 301 lubrication system

in the version supplied by us, complies with the provisions of above-mentioned directive.

**Applied harmonized standards in particular:**

| | |
|---|---|
| **EN 55011** | Specifications, limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medial (ISM) radio-frequency equipment |
| **EN 50081-1** | Electromagnetic compatibility<br>Generic emission standard<br>Part 1: residential, commercial and light industry |
| **EN 50082-2** | Electromagnetic compatibility<br>Generic immunity standard<br>Part 2: industrial environment |

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