

## QLS 301 Lubrication System



4197a99

810-55230-1

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- Explanation of symbols:**
- = explanation
  - \* = describes and action
  - = listing within a section

## Safety Instructions

### Appropriate Use

- Use QLS 301 only for the delivery of lubricants. The pump is designed for intermittent operation. QLS 301 is designed of supplying lubricant to a **maximum of 18 lube points per cycle**.
- Do not use QLS 301 with SSV block in bottom mounting position **for mobile applications. Don't install the pump in areas exposed to shock.**

### General safety Instructions

- Do not over pressurize reservoir when filling the pump. Refill QLS 301 pump with clean lubricant.
- Incorrect use may result in bearing damage caused by poor or over-lubrication.
- Each outlet used must be equipped with an appropriate check valve see page 4, Fig.3.
- 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.

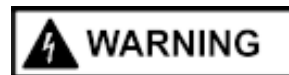
### Regulations for prevention of accidents

- 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

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

- QLS 301 must only operate with mounted or connected SSV divider blocks.
- Pump must be regularly refilled with clean lubricant.



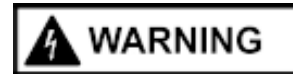
**For pumps with 120 VAC and 230 VAC, switch off the power supply before beginning maintenance or repair work.**

- QLS 301 operates automatically. However, a regular check (approximately every 2 weeks) should be made to ensure that lubricant is being dispensed from all lubricant points.
- Used or contaminated lubricants must be disposed of in accordance with local environmental regulations, see technical data sheets of lubricants.
- The manufacturer of the centralized lubrication system will not accept any liability for:
  - damage due to the use of greases which are not or are only conditionally pumpable in centralized lubrication systems.
  - damage caused by insufficient lubricant and irregular refilling of pump.
  - 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).

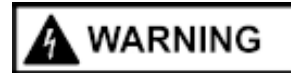
Subject to modifications

**Installation**

- Do not remove, modify or alter any safety equipment already installed on the machine.
- QLS 301 pump must be kept away from the sources of heat (see Operating Temperature Specification).
- Follow installation instructions of the OEM regarding minimum distances between the drilled holes and welding procedures.
- Use following recommendations to select an installation location:
  - Keep the feed lines as short as possible.
  - Provide access to fill, clean and visually monitor the pump operation.
- Installing QLS 301 pump with the reservoir upright is preferred, but pump may be installed with the reservoir in horizontal without affecting its operation.



- 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 lock out device for isolating and disconnecting the QLS 301. Before beginning the installation work, disconnect the electrical supply .



- 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**

**SSV Divider Block**

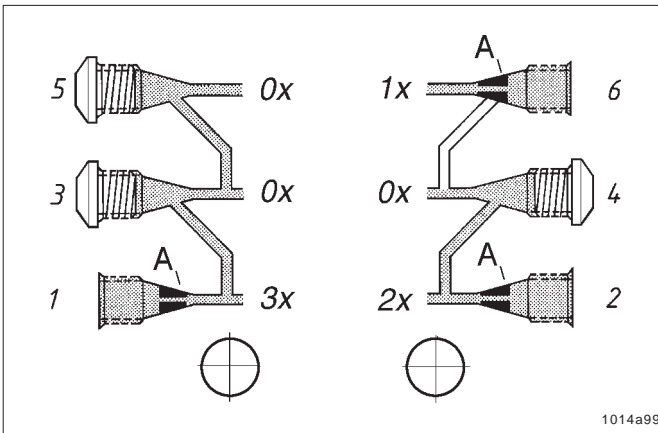


Fig.1 - Single double and tripple lubricant output  
x -Outlet quantity (single, double, etc.)  
1... 10 Outlet numbers  
A - Clamping ring (brass)

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

**Crossporting of the SSV divider blocks**

- The outlets of the SSV divider block can be combined to increase the amount of lubricant for a particular outlet. To do this, simply plug the unused outlets with the closure plug (see 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). For instance plugging outlets 5 and 3 will triple the amount of lubricant at outlet 1.



- **Do not plug outlet numbers 1 and 2** on SSV 8, 12 and 18 of pump models with SSV divider block installed on the bottom.

- \* Install a closure plug in each outlet port hole which is not required, see Fig. 1 or 4.



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

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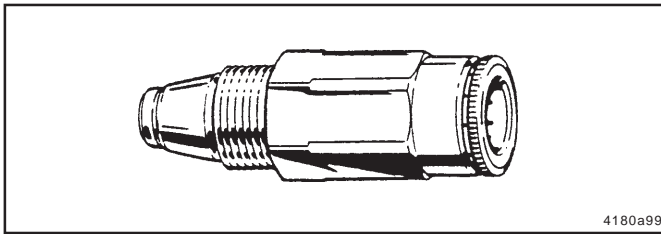


Fig. 3 - Check valve, push-in type

**Check valves**

- \* Install one complete check valve in each outlet port hole which will be used, see Fig. 1 and 4.
- \* For feedlines (dia. 6x1.5 mm, 1/4" I.D., provided in the accessory kits) use check valves with standard collar and knurled flange.

**Direct (internal) feedback feature**

- All pumps with the **back mouted SSV divider block**, starting from serial No. 998000100C/001 have the cabability to feed back unused lubricant from closed outlets directly to the reservoir internally (see R Fig. 4).  
*Note: The pumps with previous serial numbers have capabili-ty to feed back the lubricant directly to the reservoir only from even outlets. For instance on a SSV 6 divider block, the outlets 2, 4, 6 are closed.*
- \* To achieve this the outlet 2 should be closed with a closure plug (see Fig. 2). For instance (see Fig. 4) the lubricant from outlets 1, 2 and 4 will be internally feed back to the reservoir, outlet 3 will have double amount and outlet 6 will have single amount of lubricant.

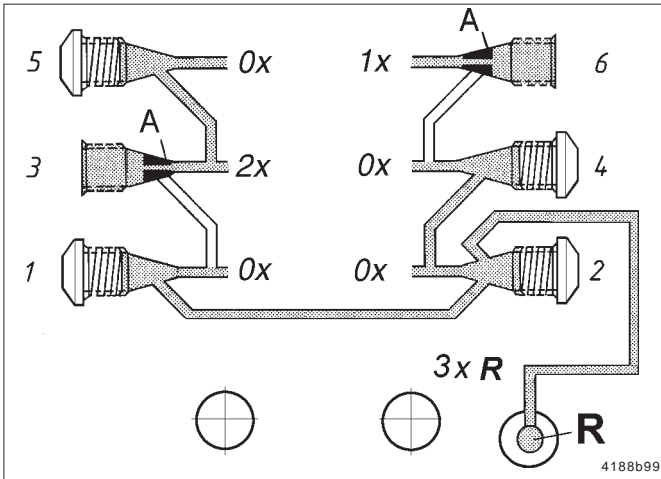


Fig. 4 - Internal feedback of supplied lubricant, only on back-side mounted SSV divider blocks

x -Outlet quantity (single, double, etc.)  
1... 10 Outlet numbers  
A - Clamping ring (brass)  
R - Return line borehole

**CAUTION**

- All pumps with the **back mouted SSV divider block**, starting from serial No. 998000100C/001 are assembled with outlet 2 plugged for direct feedback capability. To change the outlet 2 for bearing lubrication, replace closure plug with check valve (Fig. 3).
- On all pumps with previous serial numbers, **never close outlet 1.**

*Note: To feed back unneeded lubricant quantities from **bot-tom - side mounted** divider block to the reservoir, connect unneeded outlet via feedline to plug 5 (Fig. 14) for external return line.*

**Lubrication points**



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



Fig. 6 - Installation of Zerk-Locks with staking tool

**Installing Zerk-Locks onto grease fittings ( for inch size accessory kits only)**

- The Zerk-Lock fitting consists of the Zerk-Lock body, insert and a Quicklinc fitting.
- \* Place the Zerk-Lock body over the grease fitting and place the staking tool firmly against the Zerk-Lock insert. (Staking tool is included in the accessory kits, see page 8).
- \* Strike the tool sharply with a hammer until the Zerk-Lock insert partially crimps onto the grease fitting.

**Installing Quicklinc fittings into lube points (for metric size accessory kits only)**

- \* Remove hydraulic lube fittings from lube points and install appropriate Quicklinc-fittings into the bore holes of the lube points.

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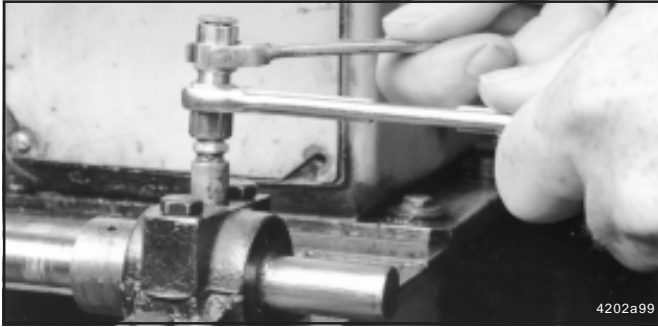


Fig. 7 - Screwing Quicklinc fitting into the Zerk-Lock body

**Connection of Feed Lines**



Fig. 8 Feed line installed in the Quicklinc fitting

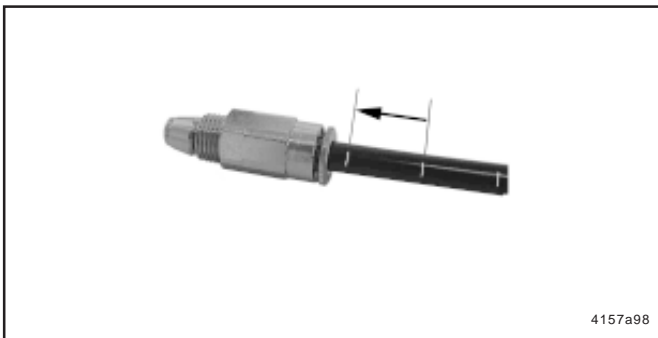


Fig. 9 - Feed line insert into the fitting up to the next white mark



Fig. 10 - Vent hole on reservoir

\* 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 grease fitting to insure the Zerk-Lock is firmly seated.

- Measure, cut and route the feedlines included in the kit. 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.
- 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.
- If the lines are not primed, prime all lubrication feed lines before connecting them to the Zerk-Locks.
- Connect feed lines (dia. 6x1.5 mm, 1/4") from the check valves directly to existing grease fittings using the Zerk-Lock fittings included with the accessory kit.

*Note: Push the end of the line firmly into the Quicklinc fitting until it is fully seated in the body. The primed feed lines are marked with white lines (Fig.8, 9) as an installation aid.*

- \* Cut the feed line off at one of the white lines before it is mounted.
- \* Then insert the feed line into the fitting up to the next white mark.
- \* This will ensure a correct installation of the feed line in the tube fitting.

**Filling of reservoir**

\* Fill the reservoir with clean suitable lubricant.

**CAUTION**

\* Expel all air from under follow plate. Make sure that the follower plate seal moves above the vent hole to ensure that all air pockets are vented.

**Setting of lubrication cycle time interval**

\* Set the lubrication cycle time interval (see page 13).

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### Electrical Connecting Diagrams



Electrical connection

- 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.

\* Connect the electric wires according to the following electrical connecting diagrams.

*Note: The protection IP6K9K (NEMA 4) is guaranteed when the socket (x1, x2) is tightened on housing cover with flat packing.*

#### Direct current (VDC)

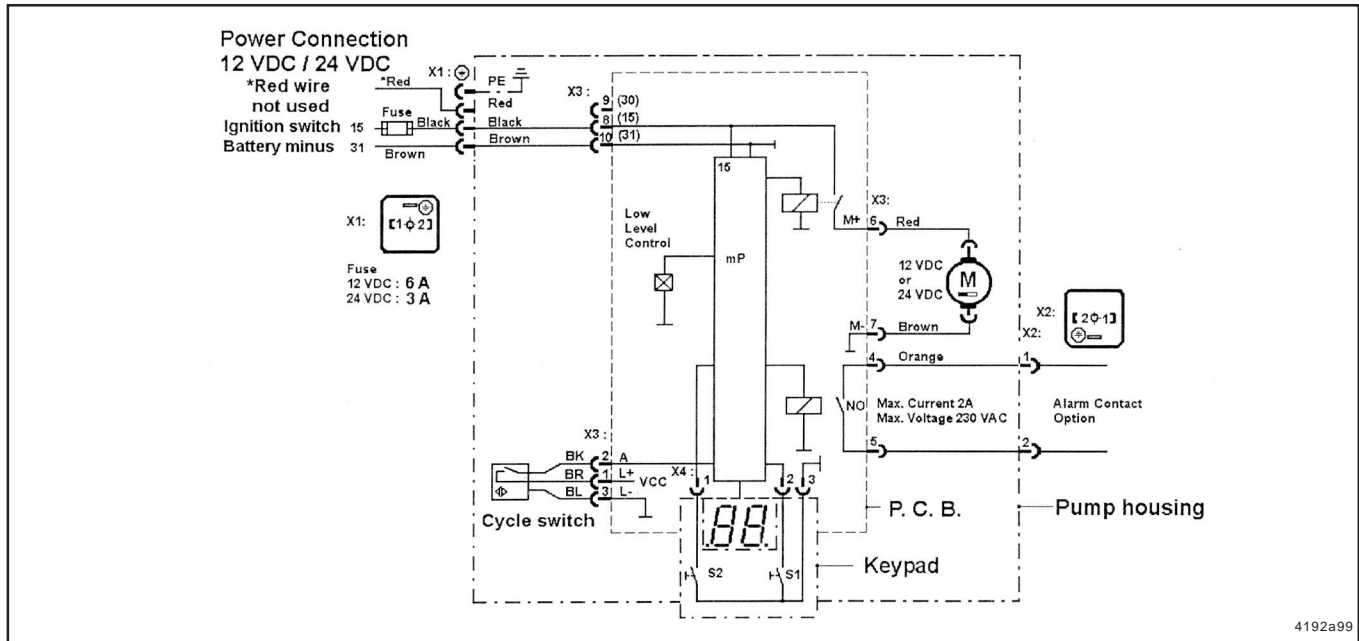


Fig. 11 - Electrical Connecting Diagram, direct current.

#### Alternate current (VAC)

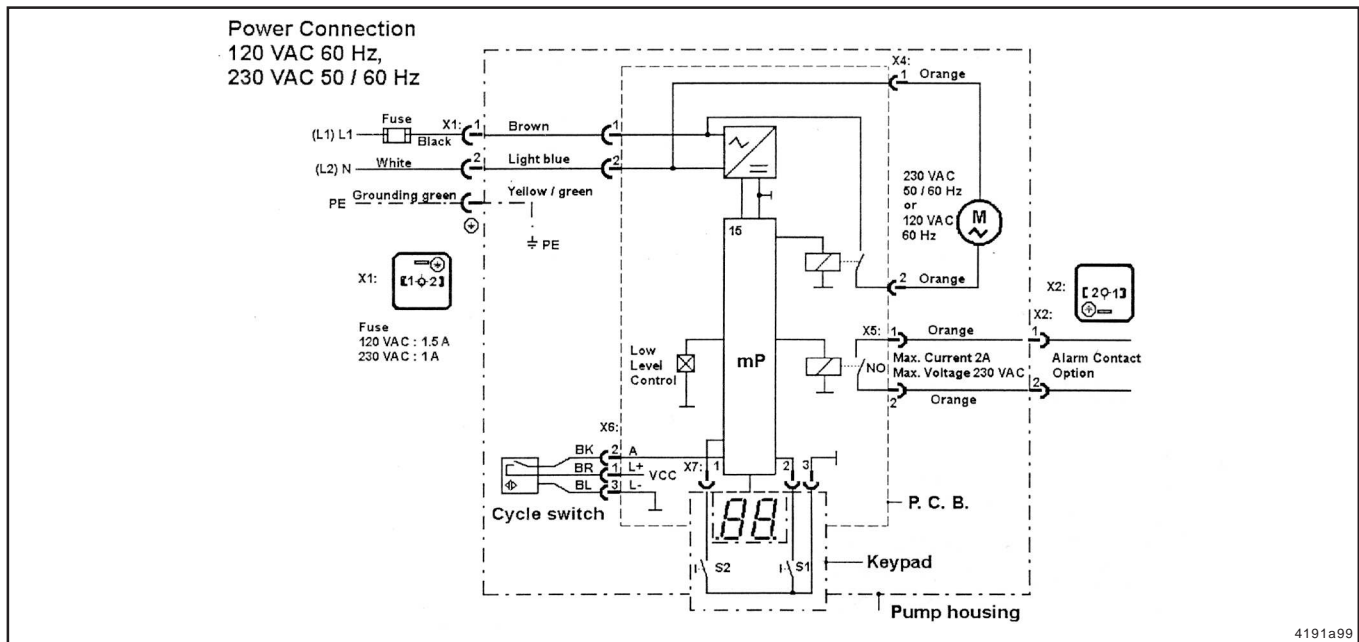


Fig. 12 - Electrical Connecting Diagram, alternate current.

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### QLS 301 Selection Guide

**Pump models**

Examples of part numbers

P30100810111

P30162410151

P301 6 2 4 1 0 1 5 1

**Pump**

For grease.....P301

**SSV Divider Block**

- External, SSV 6, SSV 8\*\*.....0
- External, SSV 12, SSV 18\*\*.....1
- SSV 6 (back).....3
- SSV 8 (bottom).....4
- SSV 12.....6
- SSV 18.....9

**SSV Divider Block Position**

- None.....0
- Back.....1
- Bottom<sup>1</sup>.....2

**Operating Voltage**

- 12 VDC.....2
- 24 VDC.....4
- 120 VAC\*.....6
- 230 VAC\*.....8

**Reservoir/Low level control**

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

**Dry Contacts**

- None.....0
- Yes.....1

**Type of Plug Connector**

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

**Electrical Connectors**

- Without socket, without cable.....0
- With socket, without cable\*.....1
- With socket, with cable, 10 m.....5
- With socket, with ADR cable, 10 m.....6

**Control p. c. b.**

- None.....0
- Monitored, 1 cycle, SSV 12, SSV 18
- Monitored, 1, 2, 3 cycles, SSV 6, SSV 8.....1

**Example of an explained model number:**

**Pump model P30131810111**-Grease pump, SSV 6 block mounted on the back, 230 VAC, with low level and without dry contact.

\* Note: 1. Standard 12 and 24 VDC pump models are shipped with 10 meter (30') electrical cable.  
 2. Standard 120 and 230 VAC pump models are shipped without electrical cable (**electrical connection 1 only**)

\*\* Note: For external divider block application only use the specific divider blocks SSV ... KNQLS.  
 On pump models without divider block there is not possible to close cycles without changes on the p. c. b.

<sup>1</sup>Note: Do not use QLS 301 with SSV block in bottom mounting position for mobile applications. Don't install the pump in areas exposed to shock.

**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

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### Description of QLS 301

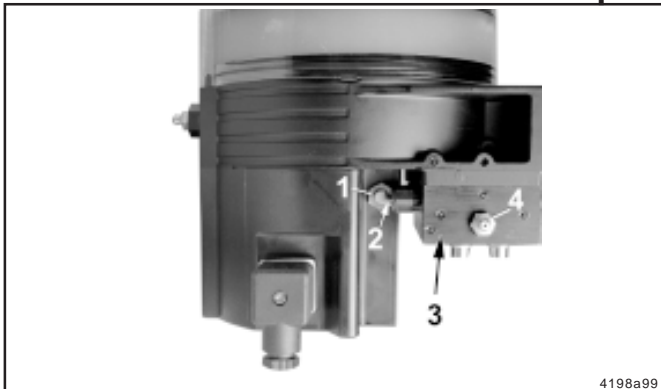


Fig. 13 - QLS 301 with back position of the SSV divider block

- |                      |   |
|----------------------|---|
| 1 - Proximity switch | 3 - SSV divider block                             |
| 2 - Control pin      | 4 - Nipple for external manual lubrication (1/8") |

- The QLS 301 is a complete compact lubrication system for **maximum of 18 lubrication points per cycle\***.

*\*Note: More than 18 lubrication points are possible for applications with limited lubrication requirements. Contact Lincoln Industrial Technical Service for additional information.*

- The pump has three basic configurations:
  - SSV divider block mounted on the back (see fig. 13)
  - SSV divider block mounted on the bottom (see fig. 14)
  - Pump without the SSV divider block attached.
- The pump with the SSV divider block mounted on the bottom has the capability of using steel tubing as lubrication lines if necessary.
- Standard lubrication lines are high pressure plastic tubing included in the pump installation kit for pumps with the SSV divider block attached.

*Note: Regardless of the SSV divider, mounting the operation of the pump is the same.*

- A signal from the pump timer starts the electric motor and pumping element starts pumping the lubricant to the SSV divider block.
- When all lubrication points have received lubricant, an internal proximity switch turns the motor off, completing one lubrication cycle.
- If pump does not complete the cycle within 15 minutes of operation, alarm message "Er" will be displayed as a flashing light in the keypad window.

- |                       |   |
|-----------------------|---|
| 1 - Connecting block  | 4 - Nipple for external manual lubrication (1/8")                       |
| 2 - Manifold          | 5 - Plug (1/8") for external return line (R) external pressure line (P) |
| 3 - SSV divider block |   |



Fig. 14 - QLS 301 with bottom position of the SSV divider block

### Operation of QLS 301

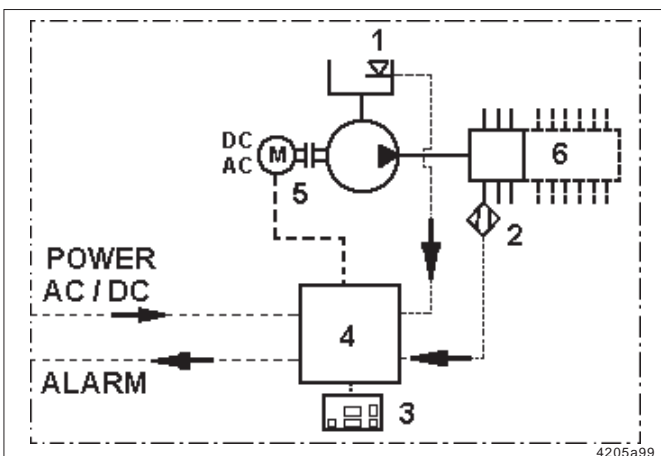


Fig. 15. - QLS 301 unit

- The QLS 301 operates according to lube cycles (pause and operating times).
- The pause time begins the cycle, then the operating time occurs.

- A division of the lube points (**option**) via secondary metering devices and one main divider block (SSV 6, SSV 8) is possible only up to **max. 18 points per cycle** (see \* Note). In this case, the number of the cycles of the main divider block must be set (see P 3 on page 13).

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

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**Pressure relief valve**

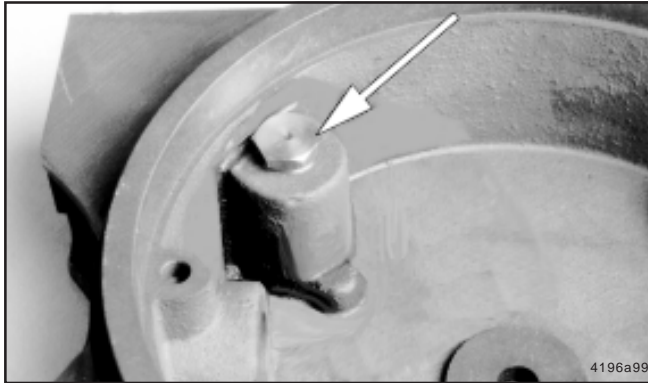


Fig. 16 - Pressure relief valve (cartridge) in housing

- 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 201 bar (3000 psi).
- If the pressure relief valve is actuated, this indicates that the system is malfunctioning. The lubricant flows back into the reservoir (not visible).
- Upon expiration of the monitoring time of 15 minutes, the pump switches off. The fault indication "Er" is displayed on the key pad of the pump. See "Display mode" under "Control unit".

**Pump Display Window**

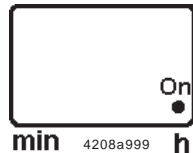


Fig. 17 - Green decimal point (pause time)

- Pump "On" is indicated on the display by an **illuminated decimal point** (pause time) (fig. 17).

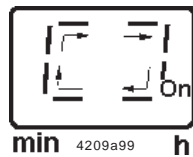


Fig. 18 - Green display (operating time)

- Pump "running" is indicated on the display by a **rotating light movement of the green display** (operating time)(fig. 18).
- If the voltage supply is interrupted during the operating time, the operating time starts again from the beginning after switching on.



Fig. 19 - Pushbutton for additional lubrication cycle

- **Additional lube cycle (Manual Lube)**
- is initiated via the button (Fig. 19). Press the button for 2 seconds.
- can be initiated at any time, provided that the power supply is applied.

*Note: If a malfunction is present (flashing display), first acknowledge this malfunction.*

- If a fault signal (malfunction) is present, it will be cancelled after the system is operating properly.

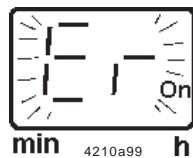


Fig. 20 - Display of a fault indication

**Monitoring time/malfunction**

- If the cycle is not complete within **15 minutes** (monitoring time) after expiration of the pause time, the pump immediately switches off.
- The fault indication "Er" (error) is displayed as a flashing light (fig. 20). At the same time, a potential free contact is available for the external fault indication (option).
- If a **malfunction** is present, the pump **no longer switches on automatically**.

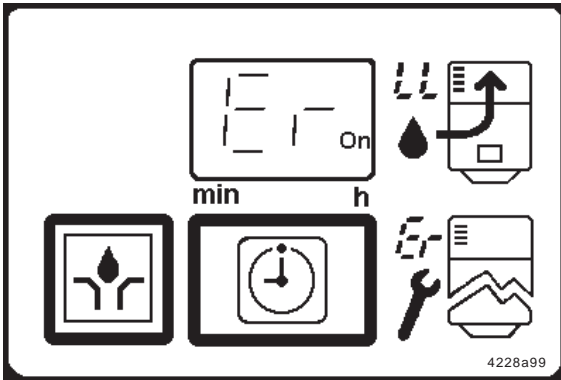


Fig. 21 - Keypad with showing a malfunction



Fig. 22 - Acknowledging the malfunction

**Models with Low-level control**

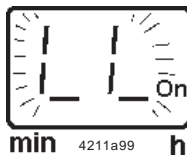


Fig. 23 - Display of a low-level control

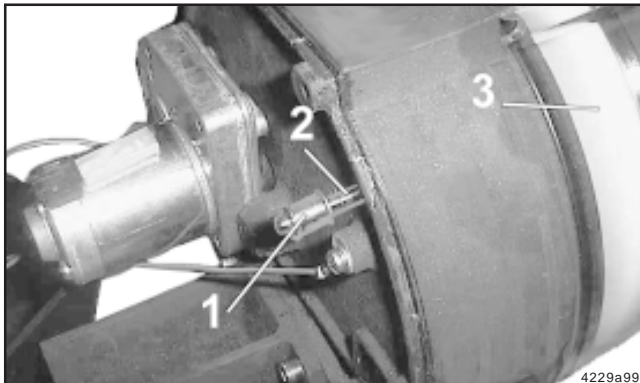


Fig. 24 - Parts of low level control  
1 - Magnet                                      3 - Follower plate  
2 - Pin

**Metering of the lubricant**

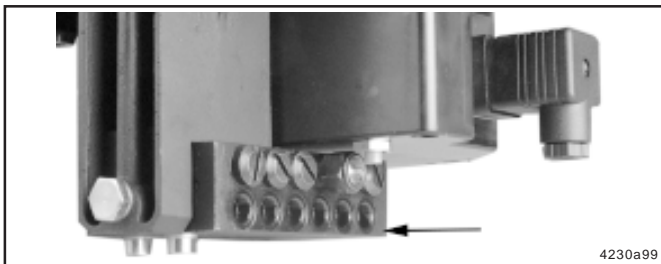


Fig. 25 -Bottom mounting position of divider block

- In this case, switch on the pump by pressing the button for additional lube cycle, see Fig. 18. Acknowledge the malfunction before doing so.
- When a malfunction is present, it can only be cancelled by initiating an additional lube cycle and after a proper lube cycle has been executed afterward.
- If the fault is still present after an additional lube cycle has been initiated, the fault indication “Er” is displayed again.
- The monitoring time starts at the same time as the operating time. It is a fixed time of 15 minutes.
- If the voltage supply is interrupted during the monitoring phase (operating time), the monitoring time starts from the beginning after the pump is switched on again.

**Acknowledging the malfunction**

- On pressing the button (Fig.22 ), the flashing display “Er” changes into a continuous light.

- When the reservoir is nearly empty the pump display shows “LL” (low level).
- The follower plate (3) (Fig. 24) of the reservoir moves the pin (2) with the magnet (3) 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 lube cycle is completed. Upon expiration of the pause time, the pump cannot be started again automatically. The flashing display “LL” is indicated.
- Before filling the reservoir, press the button Fig. 21 for acknowledging the low level indication.
- As soon as the lubricant reservoir is filled up, the “LL” display is cancelled. The lube cycle resumes.

**Acknowledging the low level indication**

- \* By pressing the button (Fig.22), the flashing display “LL” is changed into a continuous light.

**Malfunction/low level indication**

- If both indications occur at the same time, then both displays “Er” and “LL” will flash.

**Monitoring relay**

- The monitoring relay signals a low level condition or a malfunction. In both cases, the monitoring relay will pick up. The signal is available via a potential free contact. The monitoring relay is released upon acknowledgement of the fault. The flashing indication switches to continuous indication.

- The metering of the lubricant occurs via the integrated divider block (e. g. SSV 8, SSV 12 or SSV 18).

## Setting and operation of the QLS 301

- Three possible modes of operation and settings can be selected at the key pad:
  - **Display mode**
  - **Operating mode**
  - **Programming mode**

### Display mode

	<ul style="list-style-type: none"> <li>• As soon as voltage is applied to the pump, the key pad is automatically in "display mode". The <b>right-hand decimal point</b> is illuminated on the display.</li> <li>• Normally, the display is dark. Only the functions (decimal point, rotating segment display) or malfunctions (Er, LL) are displayed.</li> <li>• <b>In the display mode</b> <ul style="list-style-type: none"> <li>- The user receives information on functions and malfunctions.</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>- A test display is made when the voltage is applied, all segments and decimal points are illuminated for 2 seconds.</li> <li><i>Note: If *EP* is displayed after the display test, this indicates that the button or the key pad is defective.</i></li> </ul>
	<ul style="list-style-type: none"> <li>- The right-hand decimal point (On/h) indicates the available voltage supply during the pause time. As soon as another message is displayed, the decimal point turns off.</li> </ul>
	<ul style="list-style-type: none"> <li>- The operating time is displayed as a rotating segment.</li> </ul>
	<ul style="list-style-type: none"> <li>- "Er" is shown to indicate a malfunction</li> <li>- "LL" is shown to indicate low level (where applicable)</li> </ul>
	<ul style="list-style-type: none"> <li>- The flashing display is changed into a continuous light by pressing the button (<b>acknowledging</b>). To <b>acknowledge</b>, press the button only briefly.</li> <li>• Messages which have been acknowledged but have not yet been remedied flash again after the pump is switched off and on again.</li> </ul>

Fig. 26 - Display in display mode

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Operating mode

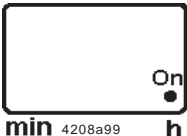
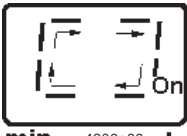
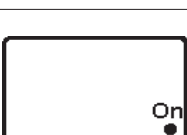

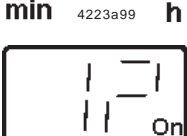
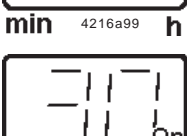
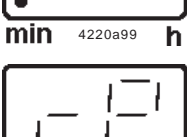
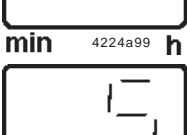

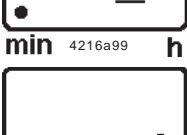

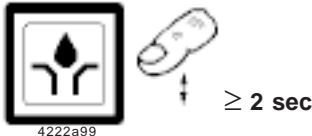

Display	press	
          	<p data-bbox="443 331 512 353">press</p>   <p data-bbox="347 1099 480 1122">after 2 sec.</p> <p data-bbox="347 1249 480 1272">after 2 sec.</p> <p data-bbox="347 1400 480 1422">after 2 sec.</p> <p data-bbox="347 1550 480 1572">after 2 sec.</p> <p data-bbox="347 1722 480 1744">after 2 sec.</p> <p data-bbox="347 1872 480 1895">after 60 sec.</p>	<p data-bbox="762 338 1417 421"><b>Important:</b>The operating mode is accessible only during the pause time, and cannot be operated during the running time (pump operating time).</p> <ul data-bbox="762 450 1374 510" style="list-style-type: none"> <li>• Precondition: when the voltage supply is applied, the decimal point On/h is lit.</li> </ul> <p data-bbox="762 539 1342 562"><b>Operating option: initiating an additional lube cycle</b></p> <p data-bbox="762 568 1406 651">* Press the button. The elapsed pause time is reset. The operating time starts. A rotating segment is visible on the display during the whole operation time.</p> <p data-bbox="762 696 1369 757"><b>Operating option: read information on how to set the pause time and remaining pause time.</b></p> <p data-bbox="762 869 975 891">* Press the button.</p> <p data-bbox="762 920 1417 1003"><i>Note: The following display sequence is shown twice and is cancelled after 60 seconds. The change of display occurs every two seconds. Example:</i></p> <p data-bbox="762 1032 1007 1160"><b>PP = 12h 30min</b>  <b>rP = 5 h 10 min</b>          “PP” (set pause time)          12 . (hours)</p> <p data-bbox="762 1234 970 1272">. 30 (minutes)</p> <p data-bbox="762 1384 1050 1422">“rP” (remain pause time)</p> <p data-bbox="762 1550 943 1588">5 . (hours)</p> <p data-bbox="762 1722 970 1760">. 10 (minutes)</p> <p data-bbox="762 1872 1107 1901">occurs after second sequence.</p>

Fig. 27 - Display in operating mode

Subject to modifications

**Programming mode**

<p><b>Display</b> <b>press</b> <b>press</b></p> <p>min 4215a99 h</p> <p>4222a99 ≥ 4 sec</p> <p>4214a99 ≥ 4 sec</p>	<p>* To access to the programming mode, <b>press both buttons</b> at the same time <sup>3</sup> <b>4 seconds</b>.</p> <p><b>Programming options - Pause time:</b></p> <p>P1 0 – 99 hours</p> <p>P2 0 – 59 minutes</p> <p>Min. pause time 20 minutes</p> <p>Max. pause time 99 hours 59 minutes</p>
<p>min 4216a99 h</p> <p>4222a99</p>	<p><b>Setting hours P1</b></p> <p>* Settings are made in one direction: 0, 1, 2, 3, ..... 99 h</p> <p>Button pressed once.....increases by 1 hour</p> <p>Button pressed continuously.....quick sequence</p> <p>The fields "hour"and "minutes"are indicated by a <b>decimal point on the right - hand</b> for the <b>hours</b> and on the <b>left - hand</b> for the <b>minutes</b>.</p>
<p>min 4217a99 h</p> <p>4214a99</p> <p>min 4220a99 h</p> <p>4222a99</p>	<p><b>Setting minutes P2</b></p> <p>* Settings are made in one direction: 0, 1, 2, 3....59 minutes</p> <p>Button pressed once.....increases by 1 minute</p> <p>Button pressed continuously.....quick sequence</p> <p><i>Note: The minimum pause time begins with 20 minutes. When pause times &lt; 20 minutes are programmed, the display automatically shows .20.</i></p>
<p>min 4218a99 h</p> <p>4214a99</p> <p>min 4219a99 h</p> <p>4222a99</p>	<p><b>Setting number of cycles P3 (Option)</b></p> <p><b>Important:</b> Settings are only possible in connection with <b>progressive divider block SSV 6 or SSV 8</b> (connected as a main divider block).</p> <p>* Press the button. The selection of "P3" (cycles) is displayed.</p> <p>* Factory setting.....1 cycle</p> <p>* Max.....3 cycles</p> <p>* Press the button and program the number of cycles (2, 3) in accordance with the desired dosage.</p>
<p>min 4221a99 h</p> <p>4214a99</p> <p>min 4208a99 h</p> <p>4222a99</p>	<p><b>Completing the programming</b></p> <p>* Press the button. "P-"is displayed.</p> <p>* There are two ways to complete the programming:</p> <ul style="list-style-type: none"> <li>- by pressing the button,</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>- if the button is not pressed within 30 seconds, programming mode is closed automatically.</li> </ul>

Fig. 28 - Display in programming mode

Subject to modifications



## 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.



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

*Note: Whenever work is performed on the centralized lubrication system, special attention should be paid to cleanliness. 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.**

- Fill the reservoir up to the "Max." mark via the filling nipple

**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, initiate additional lube 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 clear the hole located on the top of the reservoir. Small amount of grease should be expelled to ensure expelling of air from under the follower plate.

### To fill reservoir

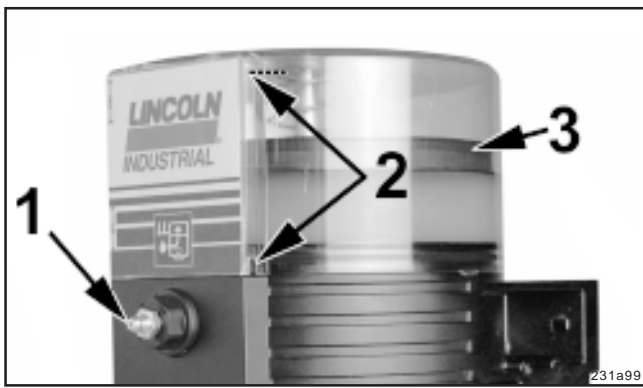


Fig.29 - Filling nipple for filling reservoir

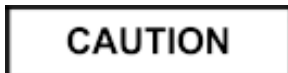
- 1 - Filling nipple
- 2 - Vent hole
- 3 - Follower plate

### Repair



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

- For repair work on the QLS 301 use only Lincoln Industrial original spare parts.
- Using non-Lincoln Industrial parts will void the pump warranty.



\* By operating the drive motor without the reservoir installed, there is a risk of injury by eccentric gear.

### Functional Test



- \* Press push button to initiate a lubrication cycle.

Fig. 30 - Push button for an additional lubrication cycle

## Troubleshooting

### Pump of the QLS 301 system



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

<ul style="list-style-type: none"> <li><b>Fault: pump motor doesn't run</b></li> </ul>	
<ul style="list-style-type: none"> <li><b>Cause:</b></li> <li>Power supply interrupted. Green decimal point On/h on display is not lit.</li> <li>Power supply from printed circuit board to motor interrupted. Electric motor defective.</li> <li>Printed circuit board defective.</li> <li>Key pad or button is defective. "EP" display at the key pad flashes.</li> </ul>	<ul style="list-style-type: none"> <li><b>Remedy:</b></li> <li>* Check the voltage supply to the pump/fuses. If necessary, eliminate the fault or replace the fuses.</li> <li>* Check the feed line from the fuses to the plug of the pump and then to the printed circuit board.</li> <li>* Initiate an additional lube cycle. Check voltage supply from the printed circuit board to the motor.</li> <li>* Replace printed circuit board.</li> <li>* Replace housing with key pad.</li> </ul>
<ul style="list-style-type: none"> <li><b>Fault: pump does not deliver lubricant</b></li> </ul>	
<ul style="list-style-type: none"> <li><b>Cause:</b></li> <li>Reservoir is almost empty. "LL" display at the key pad is flashing.</li> <li>Pump lost prime and "Er" display at the key pad is flashing.</li> <li>Air pockets in lubricant.</li> <li>Improper lubricant has been used.</li> <li>Suction hole of pump element clogged.</li> <li>Pump piston is worn.</li> <li>Check valve in pump element defective or clogged.</li> </ul>	<ul style="list-style-type: none"> <li><b>Remedy:</b></li> <li>* Fill up the reservoir with clean grease. Let the pump run (initiate an additional lube cycle) until the lubricant shows at all lube points.</li> <li><i>Note: Dependent on the ambient temperature and/or sort of lubricant output. Therefore, initiate several additional lube cycles.</i></li> <li>* Trigger an additional lubrication cycle. Lubricant must dispense without air bubbles.</li> <li>* Change the lubricant.</li> <li>* Remove pump element. Check suction hole for foreign particles. If there are any, remove them.</li> <li>* Replace pump element.</li> <li>* Replace pump element.</li> </ul>

Subject to modifications

Divider Block of the QLS 301

<p>• <b>Fault: Blockage in the downstream progressive system</b></p>	
<p>• <b>Cause:</b></p> <ul style="list-style-type: none"> <li>Bearings, lines or divider block clogged</li> <li>Mounting position of divider block : bottom                     <ul style="list-style-type: none"> <li>- In the case of the divider block SSV 8,12 and 18 the outlet ports 1 and/or 2 are closed.</li> </ul> </li> <li>Mounting position of divider block : back-side, until preserial no 9980006711/004 and serial no 998000099C/001                     <ul style="list-style-type: none"> <li>- In the case of the divider block SSV 6, 12 and SSV 18 the outlet 1 on the odd side is closed.</li> </ul> </li> </ul> <p>The fault can be identified as follows:</p> <ol style="list-style-type: none"> <li>Fault indication “Er” flashing on the key pad display.</li> <li>The indicator pin mounted on the divider block piston does not move.</li> </ol>	<p>• <b>Remedy:</b></p> <ul style="list-style-type: none"> <li>Determine the cause of the blockage as described in the following example and eliminate it.                     <ul style="list-style-type: none"> <li>* Let the pump run (refer to "Initiating an additional lube cycle")</li> <li>* Disconnect all feed lines of the divider block one after the other. If grease shows under pressure (i. e. at outlet 3, Fig. 31) the blockage is located in the line of outlet 3 or in the connected bearing point.</li> <li>* Pump through the blocked line or bearing point using a hand pump.</li> </ul> </li> </ul> <p><i>Note: To check the individual outlets, leave all outlet 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 divider blocks.</i></p> <ul style="list-style-type: none"> <li>* Check pressure relief valve (Fig.16). Replace it, if necessary.</li> </ul>
<p>Fig. 31 - Example of a QLS 301 <span style="float: right;">4232a99</span></p>	
<p>• Divider valve is blocked</p>	<ul style="list-style-type: none"> <li>* Replace the divider block or clean it as follows.                     <ul style="list-style-type: none"> <li>* Remove all threaded tube fittings.</li> <li>* Unscrew the piston closure plugs.</li> <li>* Remove the piston, if possible, with a soft mandrel (smaller than <math>\varnothing</math> 6 mm, 0.24 in).</li> </ul> </li> <li><b>Important:</b> The pistons are individually fitted in the bore holes of the divider block. After removing the pistons, mark them in order to reinstall them in the right direction and position. They may not be interchanged.</li> <li>* Thoroughly clean the divider block body in a grease-solving detergent and dry them out with compressed air.</li> <li>* Clean through the material passages (<math>\varnothing</math> 1.5 mm, 0.59 in) at the thread ends of the piston bore holes using of a pin.</li> <li>* Clean the divider block once more and dry it thoroughly.</li> <li>* Reassemble the divider block.</li> </ul>
<p>• <b>Fault:Differing lubricant amounts at the lubrication point</b></p>	
<p>• <b>Cause:</b></p> <ul style="list-style-type: none"> <li>Lubricant metering not correct.</li> <li>Setting of the pause time incorrect.</li> </ul>	<p>• <b>Remedy:</b></p> <ul style="list-style-type: none"> <li>* Check the lubricant metering acc. to the lubrication chart.</li> <li>* Check time setting.</li> </ul>

Subject to modifications

## Technical Data

### QLS 301, general

Operating temperature ..... -25° C to 70° C (-10° F to 160° F)  
 Maximum operating pressure  
 pump model without divider block ..... 205 bar (3,000 psig)  
 Number of outlets ..... 6, 8, 12 or 18  
 Output per outlet and cycle ..... approx. 0.2 cm<sup>3</sup> (0.012 in<sup>3</sup>)  
 Reservoir capacity ..... 1.0 L (61 in<sup>3</sup>)  
 Lubricant ..... up to NLGI 2 Grease  
 Weight (average) ..... 5.7 kg. (12.5 lbs)  
 Protection ..... IP6K9K (NEMA 4)  
 Reverse polarity protection:  
 The operating voltage inlets are protected against reverse polarity

### Electrical Data AC (Alternate Current)

Operating voltage ..... 120/60 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 DIN 41755

*Note: The pump motor is suitable for intermittent operation only*

- The printed circuit boards **for Direct Current DC:**
  - are EMV regulation for on-road vehicles acc. EN 40839 parts 1, 3 and 4
  - the vehicle guide line 95/245/EC

### Time setting

Factory setting  
 Pause time ..... 6 hours/cycle  
 Lubrication cycle time ..... 20 min. to 100 hrs  
 ..... increment 1 minute  
 Numbers of cycles, general ..... 1  
 with SSV 6, 8 divider block ..... 1, 2 or 3 cycles are possible  
 Timer memory ..... indefinite over EEPROM

### Relay for Malfunction

Potential-free outlet for malfunction/low level option  
 Switching voltage ..... max. 230 VAC/125 VDC  
 Switching current (resistive) ..... 2 A  
 Switching capacity ..... 460 VA/80 W

*Note: All datas are depending on operating voltage, ambient temperature and max. operating pressure.*

### Lines

#### Plastic tube (dia. 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)

#### Divider block, accessories

Closure plug (piston) in divider block ..... 18 Nm (13.5 lb-ft)  
 Closure plug (outlets) in divider block ..... 15 Nm (11.0 lb-ft)

#### Outlet fitting in divider block

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 divider block ..... 18 Nm (13.5 lb-ft)  
 Mounting of the divider block ..... 10 Nm (8.0 lb-ft)

Dimensions

QLS 301

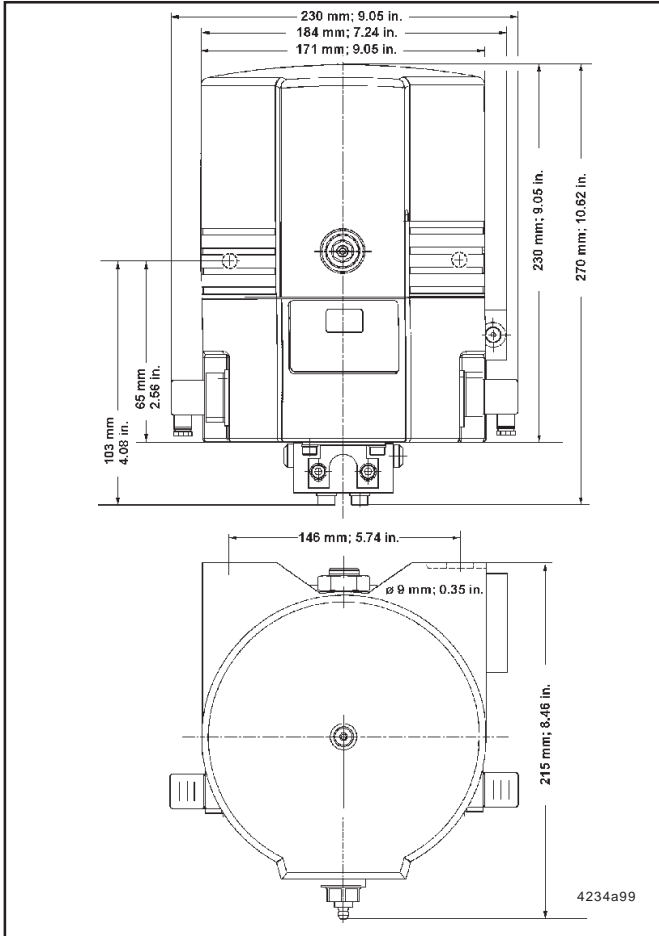


Fig.32- Dimensions of QLS 301

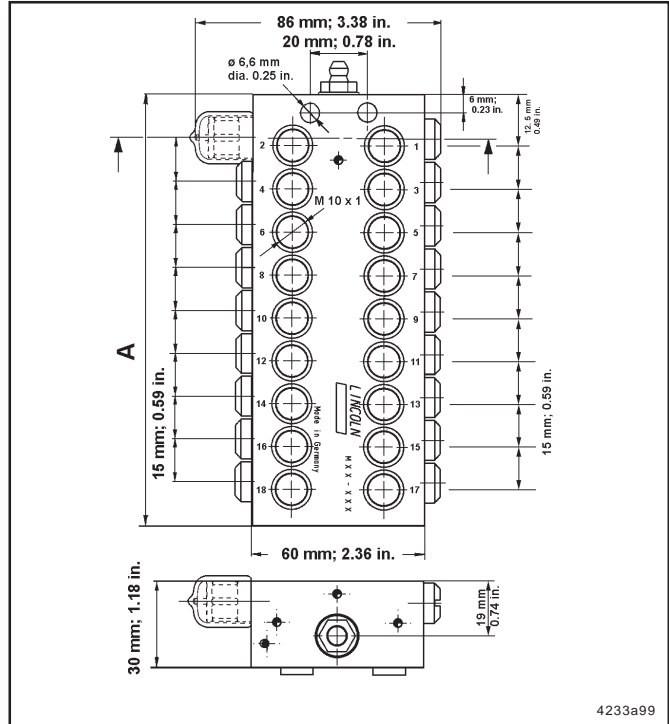


Fig.34- Dimensions of back mounted SSV Divider Blocks

Number of Outlets	Dimensions A in mm (in.)
6	60 (2.36)
12	105 (4.13)
18	150 (5.90)

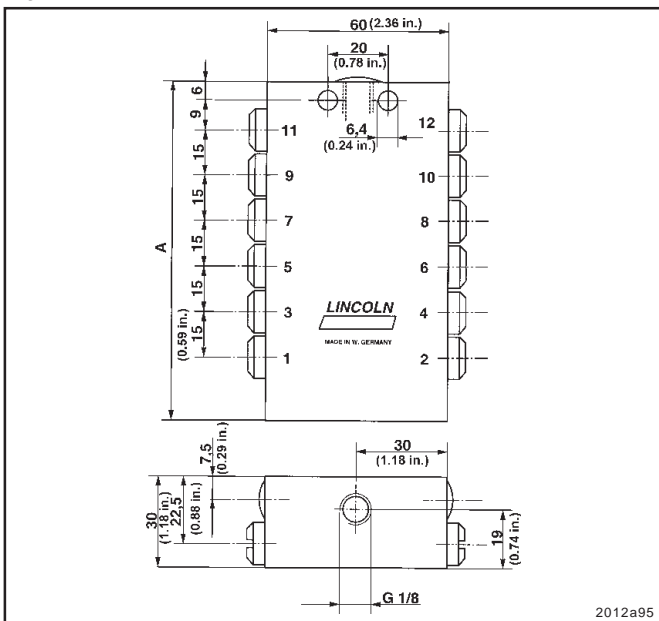


Fig.33- Dimensions of bottom mounted SSV Divider Blocks

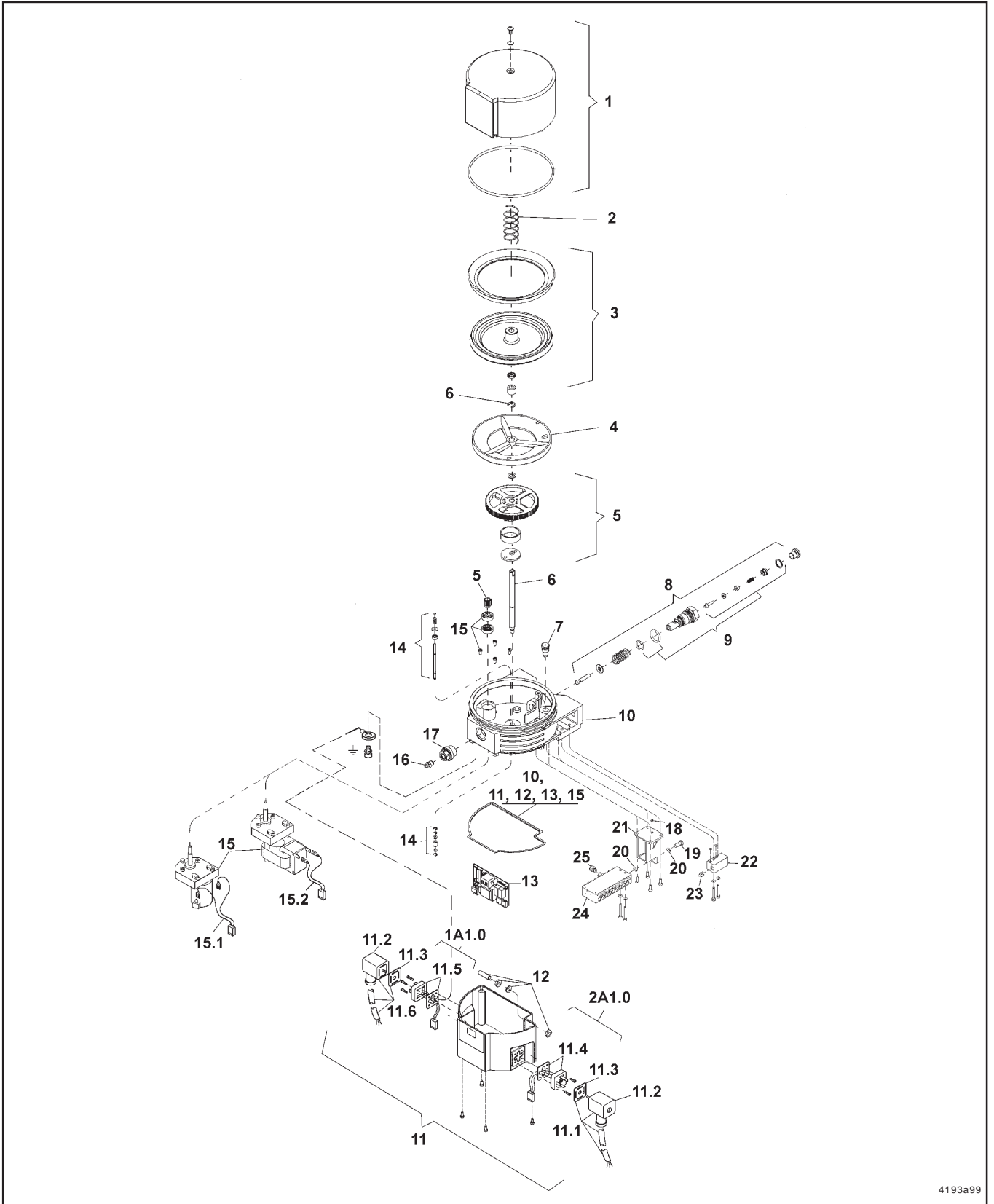
Number of Outlets	Dimensions A in mm (in.)
8	75 (2.95)
12	105 (4.13)
18	150 (5.90)

Subject to modifications



**Service Parts for the QLS 301**

QLS 301 with bottom mounted SSV Divider Block



Subject to modifications

Fig 35 - QLS 301 with bottom mounted SSV Divider Block

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Parts list

Pos.	Designation	Kit	Part	Qty	Part no.	Pos.	Designation	Kit	Part	Qty	Part no.
1	Reservoir	x		1	550-36979-2		12/24 VDC	x		1	550-36983-2
2	Spring for follower plate		x	1	218-14172-6		120 VAC	x		1	550-36983-4
3	Follower plate	x		1	550-36979-3	14	230 VAC	x		1	550-36983-6
4	Intermediate bottom	x		1	450-24749-1	15	Low level control	x		1	550-36979-9
5	Eccentric gear	x		1	550-36979-4		Motor, 12 VDC	x		1	550-36982-1
6	Shaft	x		1	550-36979-1		Motor, 24 VDC	x		1	550-36982-1
7	Pressure relief valve		x	1	235-14343-1		Motor, 120 VAC	x		1	550-36982-1
8	Pump element, assy dia. 6 mm		x	1	650-28856-1		Motor, 230 VAC	x		1	550-36982-1
9	Sealing parts for pump element	x		1	550-36979-5	15.1	Motor connection VDC	x		1	664-36968-2
10	Housing with low level control	x		1	550-36981-3	15.2	Motor connection VAC	x		1	664-36968-1
	Housing without low level control	x		1	550-36981-4	16	Hydraulic lube fitting, STAR 1/8 cyl.		x	1	251-14040-1
11	Housing cover with low level control for direct current VDC, plug 1A1.0	x		1	550-36984-1	17	Adapter M 22x1.5 (o) x 1/8 in.(i)		x	1	304-19619-1
	Housing cover with low level control for alternate current VAC, plug 1+2A1.0	x		1	550-36984-2	18	O-ring dia. 5 x1.5 mm		x	1	219-12222-2
	Housing cover with low level control for alternate current VAC, plug 1+2 A1.0	x		1	550-36984-4	19	Banjo bold		x	1	226-13777-2
11.1	Socket 2 with 10 m cable, for remote control	x		1	664-36078-8	20	Sealing ring, aluminium		x	2	226-13780-1
11.2	Socket, black GMD-3011		x	2	236-13277-9	21	Manifold		x	1	550-36979-6
11.3	Flat packing		x	2	236-13294-3	22	Connecting block		x	1	550-36979-7
11.4	Appliance plug 2, for remote control, VDC		x	1	664-36968-6	23	Hydraulic lube fitting, STAR 1/8 cyl.		x	1	251-14040-1
	Appliance plug 2, for remote control, VAC		x	1	664-36968-5	24	SSV divider block				
11.5	Appliance plug 1, for power supply, VDC		x	1	664-36968-4		SSV 8 - K		x	1	619-37586-1
	Appliance plug 1, for power supply, VAC		x	1	664-36968-3		SSV 12 - K		x	1	619-37587-1
11.6	Socket 1 with 10 m cable, for power supply		x	1	664-36078-7		SSV 18 - K		x	1	619-37588-1
12	Proximity switch		x	1	550-36980-1	25	Piston plug with sealing for control pin		x	1	519-32123-1
13	Printed circuit board for 1 cycle						Sealing kit for QLS 301			1	550-36978-8
	12/24 VDC		x	1	550-36983-1						
	120 VAC		x	1	550-36983-3						
	230 VAC		x	1	550-36983-5						

Printed circuit board for max. 3 cycles

Subject to modifications

**QLS 301 with back mounted SSV Divider Block**

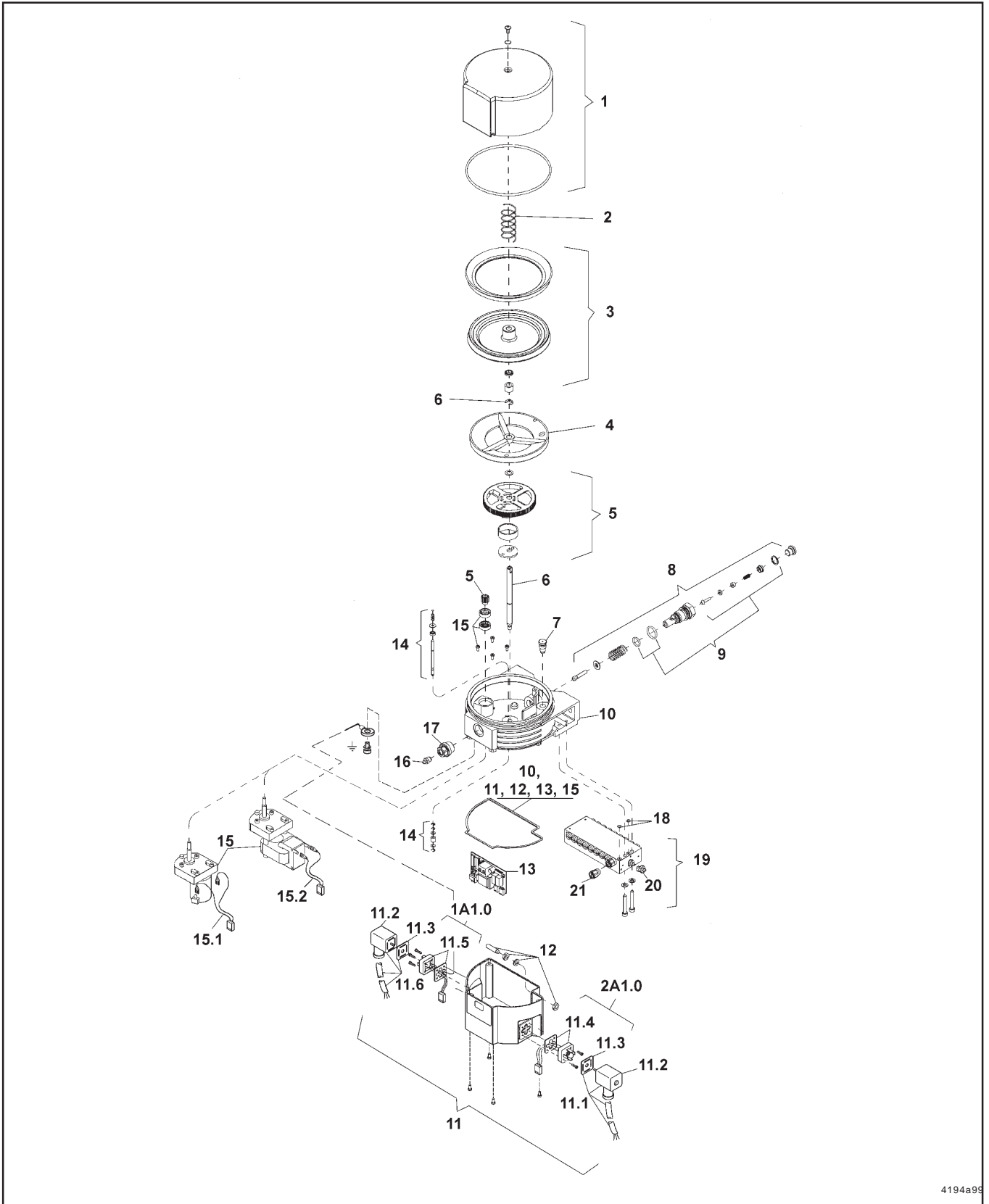


Fig 36 - QLS 301 with back mounted SSV Divider Block

Subject to modifications

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Pos.	Designation	Kit	Part	Qty	Part no.	Pos.	Designation	Kit	Part	Qty	Part no.
1	Reservoir	x		1	550-36979-2	11.5	Appliance plug 1, for power supply <sup>l</sup> , VDC	x		1	664-36968-4
2	Spring for follower plate		x	1	218-14172-6		Appliance plug 1, for power supply, VAC	x		1	664-36968-3
3	Follower plate	x		1	550-36979-3	11.6	Socket 1 with 10 m cable, for power supply		x	1	664-36078-7
4	Intermediate bottom	x		1	450-24749-1	12	Proximity switch	x		1	550-36980-1
5	Eccentric gear	x		1	550-36979-4	13	Printed circuit board for 1 cycle 12/24 VDC		x	1	550-36983-1
6	Shaft	x		1	550-36979-1		120 VAC		x	1	550-36983-3
7	Pressure relief valve		x	1	235-14343-1		230 VAC		x	1	550-36983-5
8	Pump element, assy dia. 6 mm		x	1	650-28856-1		Printed circuit board for max. 3 cycles 12/24 VDC		x	1	550-36983-2
9	Sealing parts for pump element	x		1	550-36979-5		120 VAC		x	1	550-36983-4
10	Housing with low level control	x		1	550-36981-1		230 VAC		x	1	550-36983-6
	Housing without low level control	x		1	550-36981-2	14	Low level control	x		1	550-36979-9
11	Housing cover with low level control for direct current VDC, plug 1A1.0	x		1	550-36984-1	15	Motor, 12 VDC	x		1	550-36982-1
	for direct current VDC, plug 1+2A1.0	x		1	550-36984-2		Motor, 24 VDC	x		1	550-36982-1
	Housing cover with low level control for alternate current VAC, plug 1A1.0	x		1	550-36984-3		Motor, 120 VAC	x		1	550-36982-1
	for alternate current VAC, plug 1+2A1.0	x		1	550-36984-4		Motor, 230 VAC	x		1	550-36982-1
11.1	Socket 2 with 10 m cable, for remote control	x		1	664-36078-8	15.1	Motor connection VDC	x		1	664-36968-2
11.2	Socket, black GMD-3011		x	2	236-13277-9	15.2	Motor connection VAC	x		1	664-36968-1
11.3	Flat packing		x	2	236-13294-3	16	Hydraulic lube fitting, ST AR 1/8 cyl.		x	1	251-14040-1
11.4	Appliance plug 2, for remote control, VDC	x		1	664-36968-6	17	Adapter M 22x1.5 (o) x 1/8 in.(i)		x	1	304-19619-1
	Appliance plug 2, for remote control, VAC	x		1	664-36968-5	18	O-ring dia. 5 x1.5 mm		x	2	219-12222-2
						19	SSV divider block SSV V 6 - K		x	1	619-37589-1
							SSV V 12 - K		x	1	619-37590-1
							SSV V 18 - K		x	1	619-37591-1
						20	Hydraulic lube fitting, ST AR 1/8 cyl.		x	1	251-14040-1
						21	Piston plug with sealing for control pin		x	1	519-32123-1
							Sealing kit for QLS 301			1	550-36978-8

**Optional for metric fittings (not provided in the accessory kits)**

**Tube fittings, Screw-type or Push-in type for SSV Outlets**

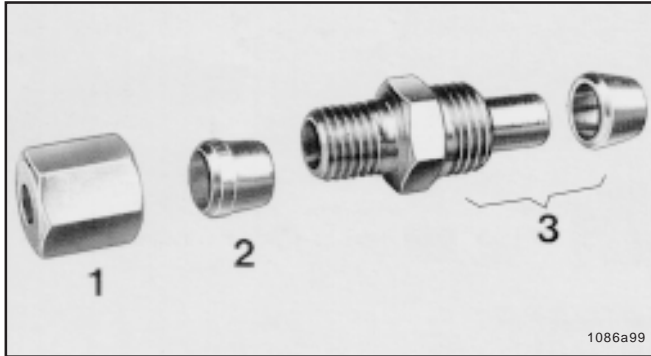


Fig. 37 - Check valve, screw-type (option) for steel and plastic tubes

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

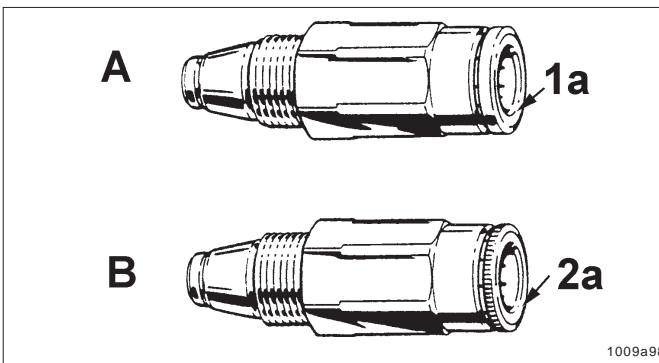


Fig. 38 - Different types of check valves, push-in type

- For high-pressure plastic hose (option, dia. 8.6x2.3mm) use check valves type A with reinforced collar and smooth flange.

- A - Check valve with reinforced collar
- B - Check valve with knurled collar
- 1a - Reinforced collar
- 2a - Knurled collar



Fig. 39 - Check valves with reinforced collar and hose stud

*Note: On construction machines or agricultural machines use high pressure plastic hoses. In such cases the check valves of the divider blocks must have a reinforced collar and a smooth flange.*

**Important:** Connect only high-pressure plastic hoses (ø 8.6x2.3 mm) with threaded sleeve and hose studs to the check valves with reinforced collars.

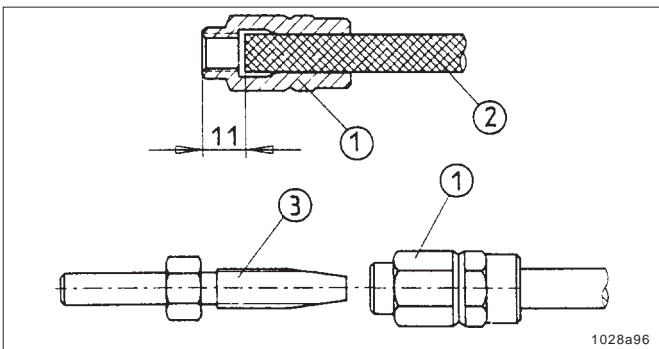


Fig. 40 -Preassembly of the threaded sleeves and hose studs on the high - pressure plastic hose

**Fitting the threaded sleeves and hose studs on the high- pressure plastic hose**

- Screw the threaded sleeve (item 1 Fig. 40) counterclockwise onto the high-pressure plastic hose (2) until the illustrated dimension of 11 mm is reached. Then screw the hose stud (3) into the threaded sleeve (1).

**Important:** Oil parts before screwing the parts 1 and 3 together.

- 1 - Threaded sleeve
- 2 - High-pressure plastic hose
- 3 - Hose stud

Subject to modifications



**Declaration of conformity as defined by machinery directive 89/392/EEC 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 91/368/EEC

*Applied harmonized standards in particular*

- EN 292 - 1** Safety of machinery part 1  
Basic terminology, methodology
- EN 292 - 2** Safety of machinery part 2  
Technical principles and specifications
- EN 809** Pumps and pump units for liquids  
Safety requirements
- EN 60204-1** Safety of machinery  
Electrical equipment of machines  
Part 1: General requirements

**Declaration of conformity according EMV directive 89/336 EWG**

We declare that the model of the

**Centralized Lubrication System QLS 301**

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

*Applied harmonized standards in particular*

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

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