

QLS 311 Lubrication System for Oil with integrated timer



4252a00

810-55241-1

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Explanation of symbols:

- = explanation
- * = describes an action
- = listing within a section

Safety Instructions

Appropriate Use

- Only use QLS 311 for the delivery of lubricants. The pump is designed for intermittent operation. QLS 311 is designed for supplying lubricant to a **maximum of 18 lube points per cycle**.
- Do not use QLS 311 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 311 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.).
- Don't paint pump. Before painting machine or commercial vehicle remove or completely cover the pump.
- 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 311.

Regulations for prevention of accidents

- To prevent accidents, observe all city, state and federal safety regulations 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 311 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 311 operates automatically. However, a regular check (approximately every 2 weeks) should be made to ensure that lubricant is being dispensed from all points.
- Used or contaminated lubricants must be disposed of in accordance with local environmental regulations, see technical data sheets of lubricants.
- The manufacturer 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 311 pump must be kept away from heat sources (see Operating Temperature Specification).
- Follow installation instructions from the OEM regarding minimum distances between the drilled holes and welded procedures.
- Use the 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 311 pump with the reservoir upright is preferred, but the pump may be installed with the reservoir in horizontal position without affecting its operation.



- The QLS 311 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 311. Before beginning the installation, disconnect the electrical supply .



- Failure to observe the safety instructions, i. e. touching electrically charged parts when the system is opened, or improper handling of the QLS 311 may **cause serious injury or death**.
- If the values specified in the Technical Data are exceeded, the device may overheat and damage the QLS 311 and thus impairing the electric system.

Installation Instructions

Pump

SSV Divider Block

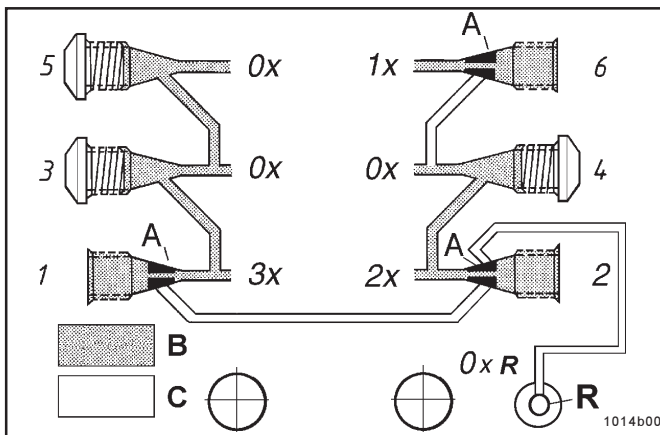


Fig.1 - Single double and triple lubricant output

- x - Outlet quantity (single, double, etc.)
- 1...6 Outlet numbers
- A - Clamping ring (brass)
- B - Oil supply
- C - Oil included
- R - Return

- Use drilling template to mark and drill mounting holes of the QLS 311. Drilling template and mounting bolts are included in the package of the QLS 311.

Important: In case of divider blocks mounted on the back, remove the check valve installed on outlet 2 for the transport of the QLS 311.

Crossporting of the SSV divider blocks

- A simple output is the quantity of lubricant supplied by the piston per stroke per outlet borehole to a lube point. **It amounts to approx. 0.2 cm³.**
- 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 to outlet 1. The connecting channel to outlet 2 is closed by means of the check valve's clamping ring (A).
- Lubricant quantities not needed may be returned to the reservoir (see Return to Reservoir).



Important: 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 (outlets in horizontal position).

- * 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

Subject to modifications

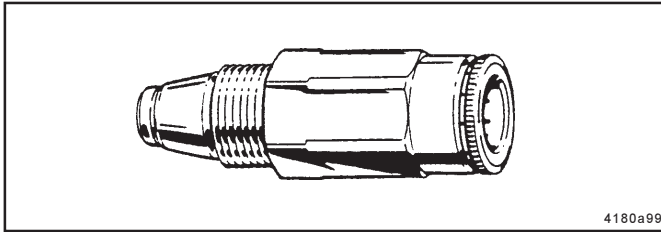


Fig. 3 - Check valve, push-in type

Check valves

Important: One complete check valve must be installed in each outlet port hole used, see Figs. 1 & 4 to avoid draining the oil reservoir.

* For feedlines (dia. 6x1.5 mm, (1/4") I.D., provided in the accessory kits) use check valves with standard collar and knurled flange.

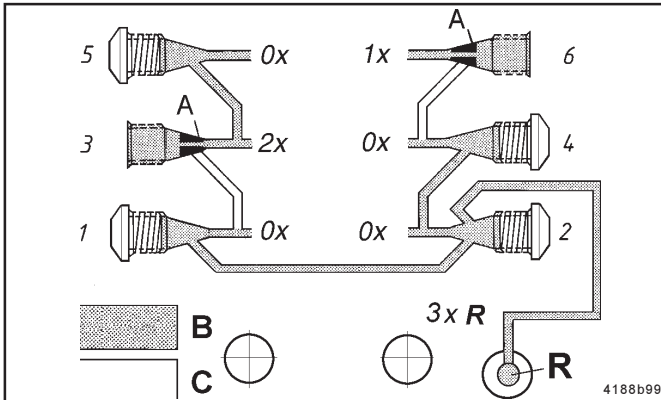


Fig. 4 - Internal feedback of supplied lubricant, only on backside mounted SSV divider blocks

X - Outlet quantity (single...)
 1...6 Outlet numbers
 A - Clamping ring (brass)
 B - Oil supply
 C - Oil included
 R - Return line borehole

Return of lubricant quantities

- All QLS pumps with the **back mounted SSV divider block** (vertical outlets) have the capability to return unused lubricant from the distributor block directly to the reservoir **internally**.
- To achieve this automatically, **outlet 2 has to be closed with a closure plug** (see Fig. 4). Lubricant quantities of pair and impair outlets are returnable via the connection of outlets 1 and 2.
- For returning, always start with the outlets with the lowest outlet numbers, i.e. 2, 4, 6... or 1, 3, 5... **plus outlet 2**. As shown in Fig. 4, the lubricant from outlets 1, 2 and 4 (3xR) will be internally returned to the reservoir.
- The remaining outlets are to be used for the connection to the lube point or to increase the lubricant quantity (double or triple).

CAUTION

Important: If outlet 2 is connected to a lube point, outlet 1 must not be closed, see Fig. 1.

Note: To return unneeded lubricant quantities from **bottom mounted divider blocks**, connect unneeded outlet via feedline to return plug 5 (Fig. 15) for **external** return.

Lubrication points

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.

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

- The Zerk-Lock fitting consists of the Zerk-Lock body, an 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.



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



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

Subject to modifications

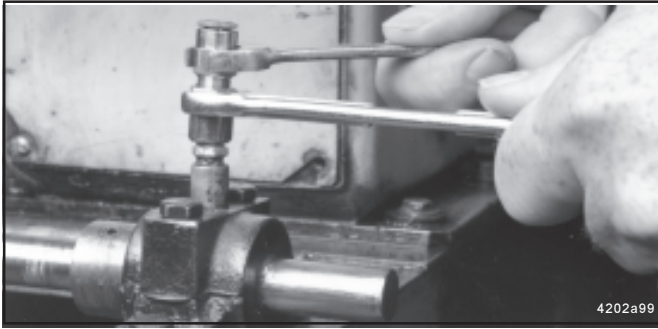


Fig. 7 - Screwing Quicklinc fitting into the Zerk-Lock body

- * Screw the Quicklinc fitting into the Zerk-Lock body and tighten until parts will not tighten further (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.

Connection of Feed Lines



Fig. 8 Feed line installed in the Quicklinc fitting

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

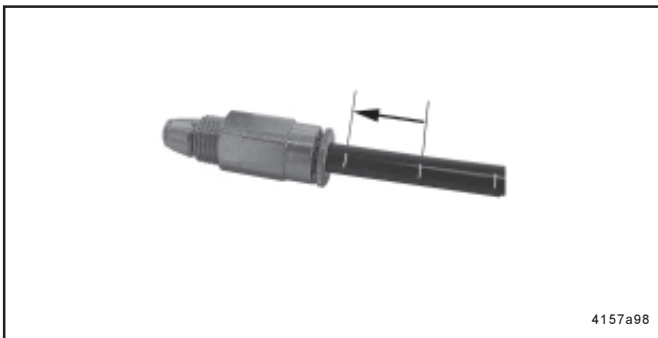


Fig. 9 - Feed line insert into the fitting up to the next white mark

- Note: Push the end of the line firmly into the Quicklinc fitting until it is fully seated in the body. The primed feed lines (dia. 6x1.5 mm) 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 (see Fig. 9).
 - * 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.

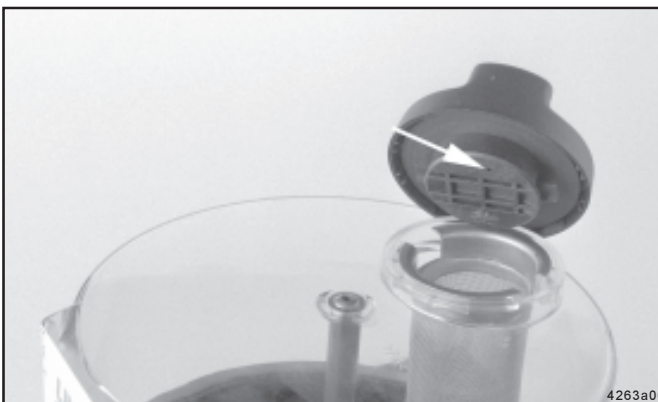


Fig. 10 - Vent hole on reservoir

Filling of reservoir

- * Fill the reservoir with a clean, suitable lubricant.

Setting of lubrication cycle time interval

- * Set the lubrication cycle time interval (see page 11 to 13).

Subject to modifications

QLS 311 Selection Guide

Pump models

Examples of part numbers

P31100810111
 P31162410151
 P311 6 2 4 1 0 1 5 1

- Pump**
- For oil.....311

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

- SSV Divider Block Position**
- None.....0
- Back.....1
- Bottom¹.....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**
- With socket, without cable*.....1
- With socket, with cable*.....5

- 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 P31131810111-oil pump, SSV 6 block back mounted only, 230 VAC, with low level and without dry contact.

- * Note: Pump models (120, 230 VAC) are shipped without electrical cord
 Pump models (12, 24 VDC) for mobil applications can be shipped with electrical cord
- ** Note: For external divider block application only use the specific divider blocks SSV ... KNQLS.
- ¹ Note: Do not use QLS 311 with SSV 8 bottom mounted only 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. 550-34010-1***
 SSV 12 part no. 550-34010-2***
 SSV 18 part no. 550-34010-3***

*** Lube fittings must be ordered separately

Subject to modifications

Electrical Connecting Diagrams



Electrical connection

- Before starting, make sure that the electrical supply is off. Do not connect or disconnect the device when the power is on. The protective conductor must always be connected. Check to ensure 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 (12, 24 VDC) with integrated printed circuit board and attached SSV divider block

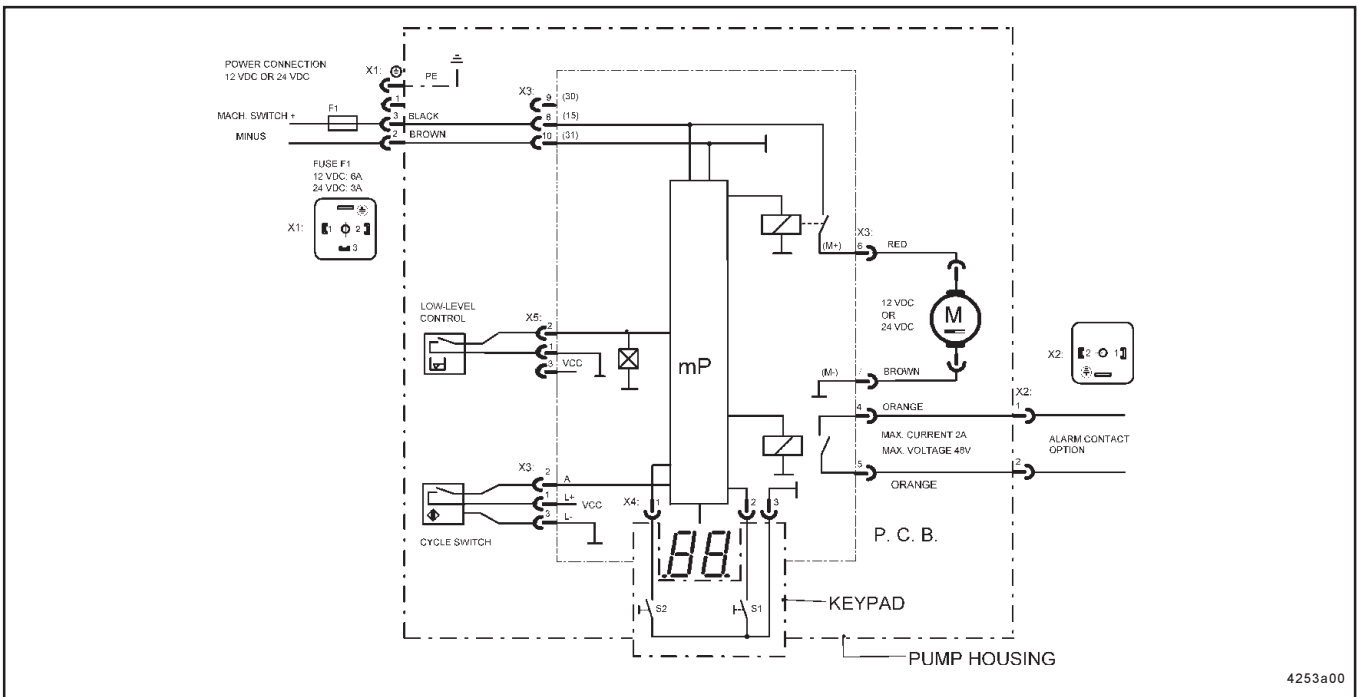


Fig. 11- Electrical Connecting Diagram, direct current

Direct current (12, 24 VDC) with integrated printed circuit board and external SSV divider block

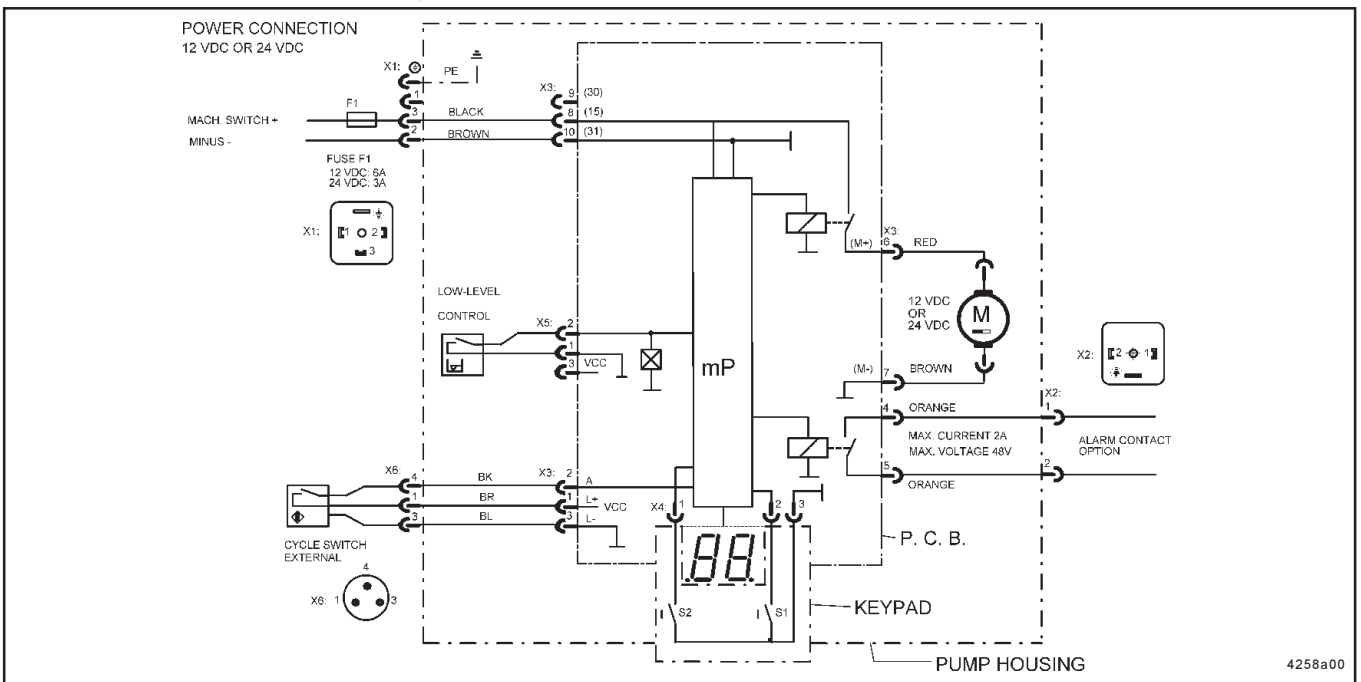


Fig. 12- Electrical Connecting Diagram, direct current

Subject to modifications

Alternate current (120, 230 VAC) with integrated printed circuit board and attached SSV divider block

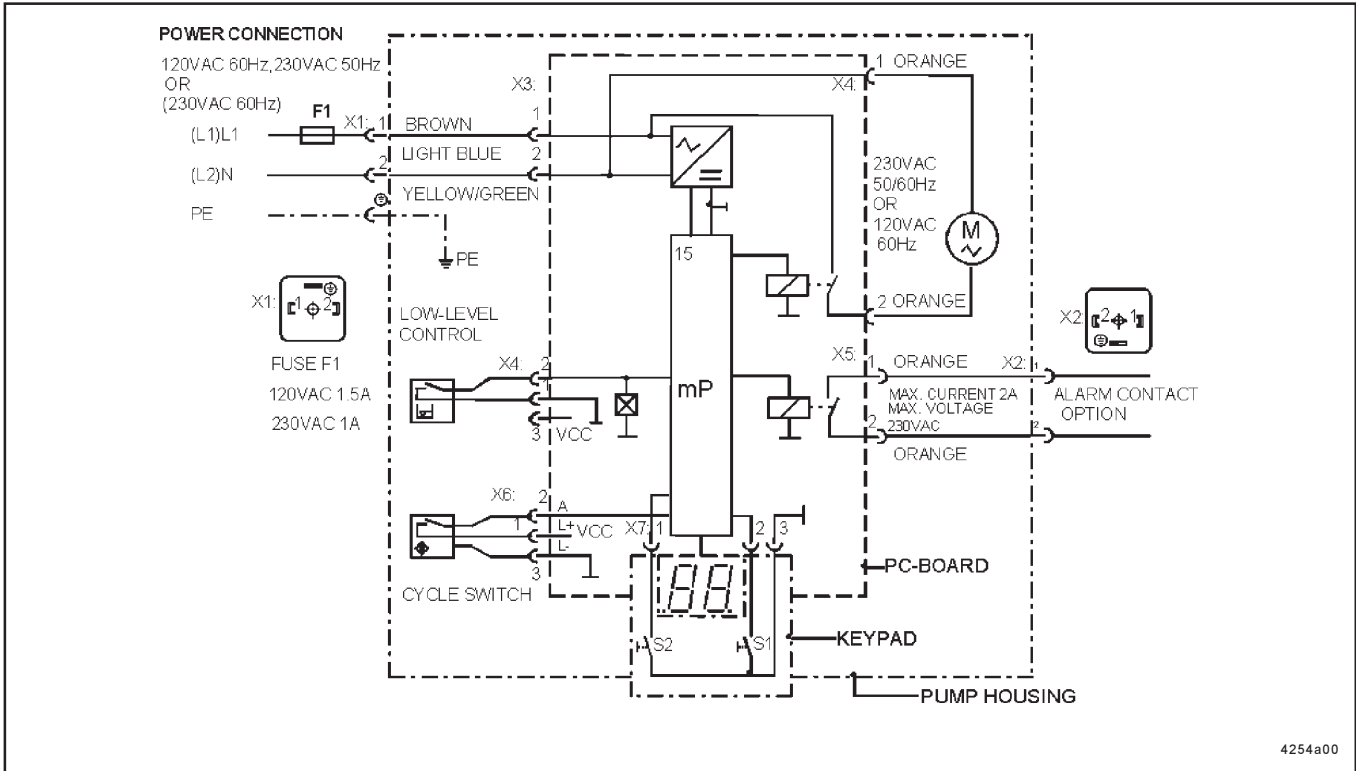


Fig. 13- Electrical Connecting Diagram, alternate current

Alternate current (120, 230 VAC) with integrated printed circuit board and external SSV divider block

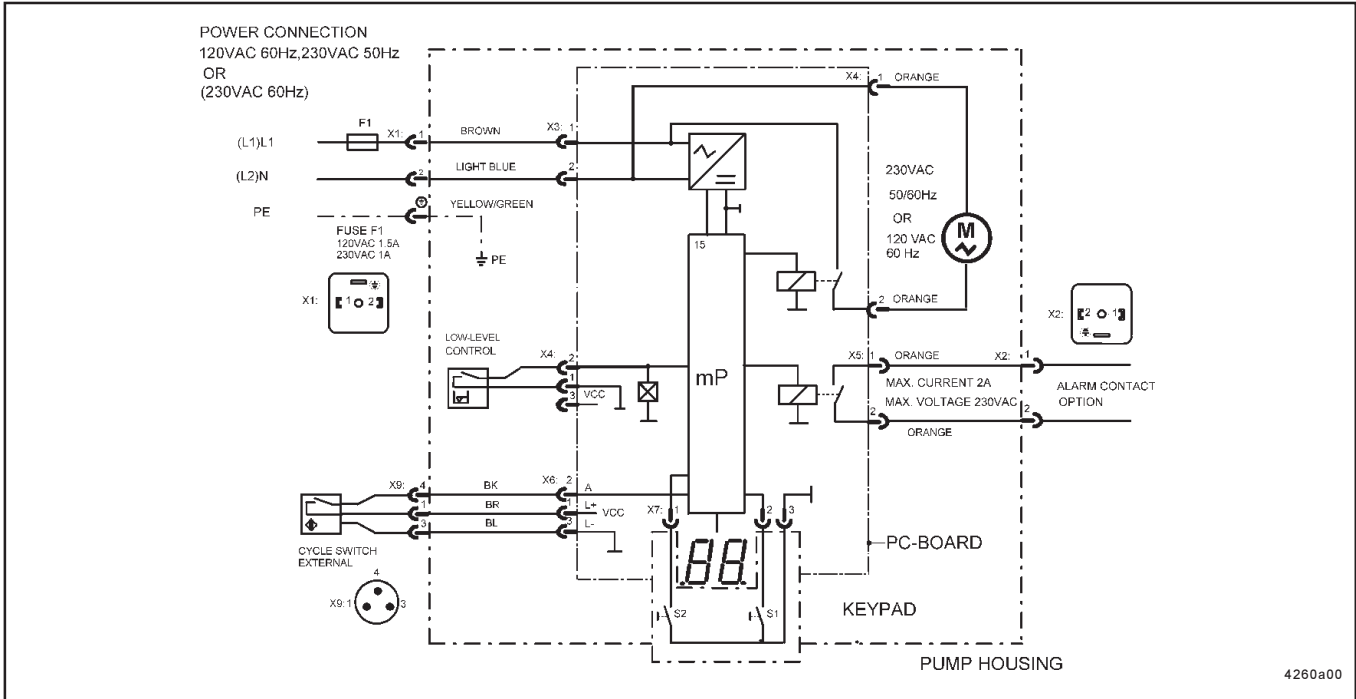


Fig. 14- Electrical Connecting Diagram, alternate current

Subject to modifications

Description of QLS 311



Fig. 15 - QLS 311 with back mounted SSV divider block

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

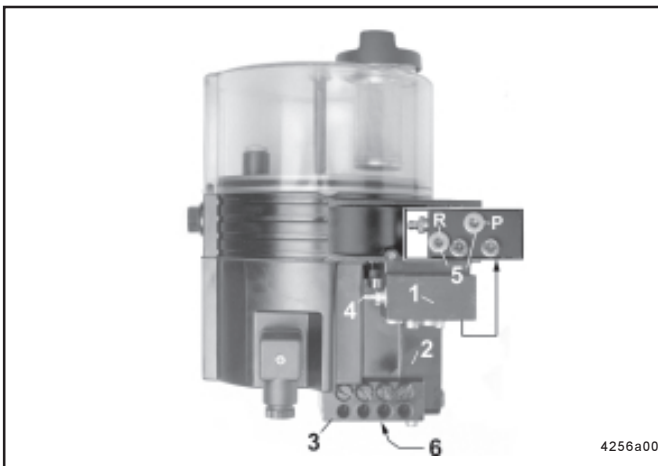


Fig. 16 - QLS 311 with bottom mounted SSV divider block

- The QLS 311 is a complete compact lubrication system for a 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. 15)
 - SSV divider block mounted on the bottom (see fig. 16)
 - 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 the 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, an alarm message "Er" will be displayed as a flashing light in the keypad window.

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

Operation of QLS 311

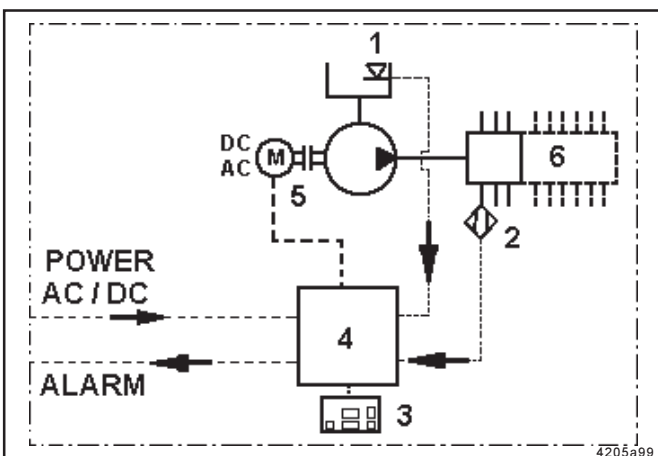


Fig. 174 - QLS 311 unit

- The QLS 311 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 a maximum of 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 14).

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

Subject to modifications

Pressure relief valve

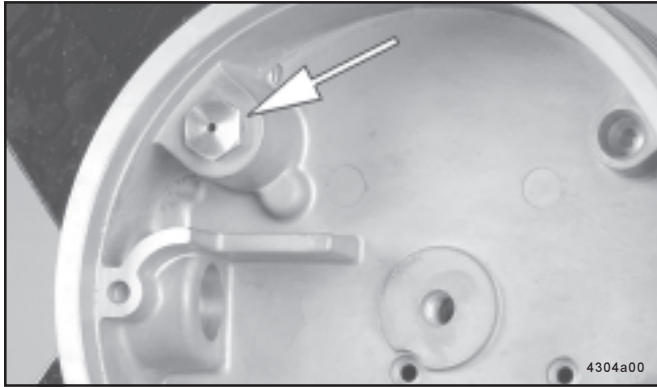


Fig. 18 - Pressure relief valve (cartridge) in housing

- The QLS 311 is protected with a pressure relief valve (cartridge).
- The pressure relief valve limits the pressure build-up in the QLS 311. It opens at an overpressure of 80 bar (1200 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

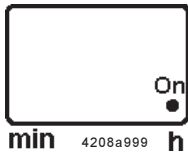


Fig. 19 - Green decimal point (pause time)

- Pump "On" is indicated on the display by an **illuminated decimal point** (pause time) (fig. 19).

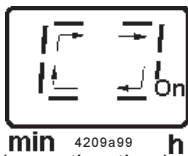


Fig. 20 - Green display (operating time)

- Pump "running" is indicated on the display by a **rotating light movement of the green display** (operating time) (Fig. 20).
- If the voltage supply is interrupted during the operating time, the operating time starts from the beginning after switching on.



Fig. 21 - Pushbutton for additional lubrication cycle

- **Additional lube cycle (Manual Lube)**
 - is initiated via the button (Fig. 21). Press the button for 2 seconds.
 - can be initiated at any time, provided that the power supply is on.

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.

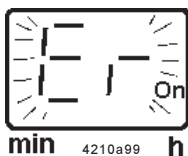


Fig. 22 - Display of a fault indication

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. 22). 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**.

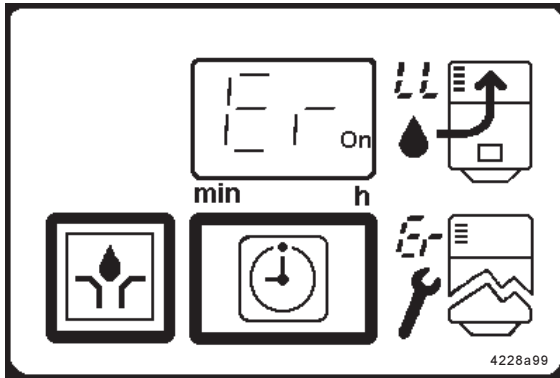


Fig. 23 - Keypad showing a malfunction



Fig. 24 - Acknowledging the malfunction

Models with Low-level control

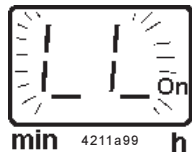


Fig. 25 - Display of a low-level control



Fig. 26 - Display for an acknowledged low level control

- In this case, switch on the pump by pressing the button for additional lube cycle, see Fig. 21. 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.24), the flashing display “Er” changes into a continuous light.

- When the reservoir is nearly empty the pump display shows “LL” (low level).

- 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. 24) to acknowledge 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.24), 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.

Setting and operation of the QLS 311

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

Display mode

<p>4206a99</p>	<ul style="list-style-type: none"> • As soon as voltage is applied to the pump, the key pad is automatically in "display mode". The right-hand decimal point is illuminated on the display. • Normally, the display is dark. Only the functions (decimal point, rotating segment display) or malfunctions (Er, LL) are displayed. • In the display mode <ul style="list-style-type: none"> - The user receives information on functions and malfunctions.
	<ul style="list-style-type: none"> - A test display is made when the voltage is applied, all segments and decimal points are illuminated for 2 seconds. <i>Note: If *EP* is displayed after the display test, this indicates that the button or the key pad is defective.</i>
	<ul style="list-style-type: none"> - 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.
	<ul style="list-style-type: none"> - The operating time is displayed as a rotating segment.
	<ul style="list-style-type: none"> - "Er" is shown to indicate a malfunction. - "LL" is shown to indicate low level (where applicable).
	<ul style="list-style-type: none"> - The flashing display is changed into a continuous light by pressing the button (acknowledging). To acknowledge, press the button briefly. • Messages which have been acknowledged but have not yet been remedied flash again after the pump is switched off and on again.

Fig. 27 - Display in display mode

Operating mode

Display	press	
		<p>Important: The operating mode is accessible only during the pause time, and cannot be operated during the running time (pump operating time).</p> <ul style="list-style-type: none"> • Precondition: when the voltage supply is applied, the decimal point On/h is lit. <p>Operating option: initiating an additional lube cycle * 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>Operating option: read information on how to set the pause time and remaining pause time.</p> <p>* Press the button.</p> <p><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>PP = 12h 30min rP = 5 h 10 min "PP" (set pause time) 12 . (hours)</p> <p>. 30 (minutes)</p> <p>"rP" (remain pause time)</p> <p>5 . (hours)</p> <p>. 10 (minutes)</p> <p>occurs after second sequence.</p>
	after 2 sec.	
	after 2 sec.	
	after 2 sec.	
	after 2 sec.	
	after 2 sec.	
	after 60 sec.	

Fig. 28 - Display in operating mode

Subject to modifications

Programming mode

<p>Display</p> <p>press</p> <p>press</p> <p>≥ 4 sec</p>	<p>* To access to the programming mode, press both buttons at the same time for between 4 seconds.</p> <p>Programming options - Pause time:</p> <p>P1 0 – 99 hours P2 0 – 59 minutes Min. pause time 20 minutes Max. pause time 99 hours 59 minutes</p>
	<p>Setting hours P1</p> <p>* Settings are made in one direction: 0, 1, 2, 3, 99 h Button pressed once.....increases by 1 hour Button pressed continuously.....quick sequence The fields "hour"and "minutes"are indicated by a decimal point on the right - hand for the hours and on the left - hand for the minutes.</p>
	<p>Setting minutes P2</p> <p>* Settings are made in one direction: 0, 1, 2, 3....59 minutes Button pressed once.....increases by 1 minute Button pressed continuously.....quick sequence</p> <p><i>Note: The minimum pause time begins at 20 minutes. When pause time is programmed less than 20 minutes , the display automatically shows .20. Precondition is that you have to complete the programming order in the following steps: setting of P1, P2, P3 and P-.</i></p>
	<p>Setting number of cycles P3 (Option)</p> <p>Important: Settings are only possible in connection with progressive divider block SSV 6 or SSV 8 (connected as a main divider block).</p> <p>* Press the button. The selection of "P3" (cycles) is displayed. * Factory setting.....1 cycle * Max.....3 cycles * Press the button and program the number of cycles (2, 3) in accordance with the desired dosage.</p>
	<p>Completing the programming</p> <p>* Press the button. "P-"is displayed.</p> <p>Important: In order to avoid a wrong programming, make sure to always carry out the programming order completely, i. e. setting of P1 (hours), P2 (minutes) , P3 (number of cycles) and P- (programming end).</p> <p>* Complete the programming by pressing the button, see fig. <i>Note: If the displayed button is not pressed within 30 seconds, programming mode remains in the previously set time.</i></p> <p>Important: After completion of the programming order, check the adjustment of the pause time in the operating mode, again (see page 12).</p>

Fig. 29 - 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 (every two weeks) whether the lubricant is being dispensed to all the lubrication points.
- Also check the feed lines for damage and replace them, if necessary.

To fill reservoir



Fig. 30 - Filling reservoir



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 system failure.

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 cover.

Important: The oil must be free from impurities and must not 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.

Repair



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

- For repair work on the QLS 311 only use 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

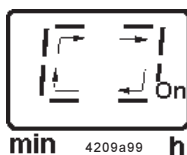


* Press push button to initiate a lubrication cycle.

Fig. 31 - Push button for an additional lubrication cycle

Troubleshooting

Pump of the QLS 311 system



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

<ul style="list-style-type: none"> Fault: pump motor doesn't run 	
<ul style="list-style-type: none"> Cause: Power supply interrupted. Green decimal point On/h on display is not lit. 	<ul style="list-style-type: none"> Remedy: * Check the voltage supply to the pump/fuses. If necessary, eliminate the fault or replace the fuses. * Check the feed line from the fuses to the plug of the pump and then to the printed circuit board.
<ul style="list-style-type: none"> Power supply from printed circuit board to motor interrupted. 	<ul style="list-style-type: none"> * Initiate an additional lube cycle. Check voltage supply from the printed circuit board to the motor.
<ul style="list-style-type: none"> Printed circuit board defective. 	<ul style="list-style-type: none"> * Replace printed circuit board.
<ul style="list-style-type: none"> Key pad or button is defective. "EP" display at the key pad flashes. 	<ul style="list-style-type: none"> * Replace housing with key pad.
<ul style="list-style-type: none"> Fault: pump does not deliver lubricant 	
<ul style="list-style-type: none"> Cause: Reservoir is almost empty. "LL" display at the key pad is flashing. Pump lost prime and "Er" display at the key pad is flashing. 	<ul style="list-style-type: none"> Remedy: * Fill the reservoir with clean grease. Let the pump run (initiate an additional lube cycle) until the lubricant shows at all lube points. <i>Note: According to the ambient temperature and/or sort of lubricant, the pump element needs no longer operation time in order to reach the full pump capacity. Therefore, initiate several additional lube cycles.</i>
<ul style="list-style-type: none"> Air pockets in lubricant. 	<ul style="list-style-type: none"> * Trigger an additional lubrication cycle. Lubricant must dispense without air bubbles.
<ul style="list-style-type: none"> Improper lubricant has been used. 	<ul style="list-style-type: none"> * Change the lubricant.
<ul style="list-style-type: none"> Suction hole of pump element clogged. 	<ul style="list-style-type: none"> * Remove pump element. Check suction hole for foreign particles. If there are any, remove them.
<ul style="list-style-type: none"> Pump piston is worn. 	<ul style="list-style-type: none"> * Replace pump element.
<ul style="list-style-type: none"> Check valve in pump element defective or clogged. 	<ul style="list-style-type: none"> * Replace pump element.
<ul style="list-style-type: none"> Fault: Pump either does not switch off at all or only after the monitoring time of 15 min. 	
<ul style="list-style-type: none"> 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.). 	<ul style="list-style-type: none"> Remedy: * Initiate an 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: <ul style="list-style-type: none"> * 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).

Subject to modifications

Troubleshooting, Continuation

<p>• Fault: Pump either does not switch off at all or only after the monitoring time of 15 min. (Continuation)</p>	
<p>• Cause:</p> <ul style="list-style-type: none"> Control pin is too long. 	<p>• Remedy:</p> <ul style="list-style-type: none"> * Check the length of control pin while it moves over the surface of the proximity switch (forward and backward movement). During the insert status, the end of the control pin should be located on the edge of the switch surface. Otherwise, the pin has to be shortened by approx. 1 mm (0.03 in).

Divider Block of the QLS 311

<p>• Fault: Blockage in the downstream progressive system, pump doesn't run</p>	
<p>• Cause:</p> <ul style="list-style-type: none"> Bearings, lines or divider block clogged. Mounting position of divider block : bottom <ul style="list-style-type: none"> - On divider block SSV 8,12 and 18 the outlet ports 1 and/ or 2 are closed. Mounting position of divider block: back-side, <ul style="list-style-type: none"> - On divider block SSV 6, 12 and SSV 18 the outlet 1 is closed and out let 2 is connected for bearing lubrication. <p>The fault can be identified as follows:</p> <ol style="list-style-type: none"> Fault indication "Er" flashing on the key pad display. The indicator pin mounted on the divider block piston does not move. 	<p>• Remedy:</p> <ul style="list-style-type: none"> * Determine the cause of the blockage as described in the following example and eliminate it: * Let the pump run (refer to "Initiating an additional lube cycle") * Disconnect all feed lines of the divider block one after the other. If oil shows under pressure (i. e. at outlet 3, Fig. 32) 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. <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"> * Check pressure relief valve (Fig.18). Replace it, if necessary.

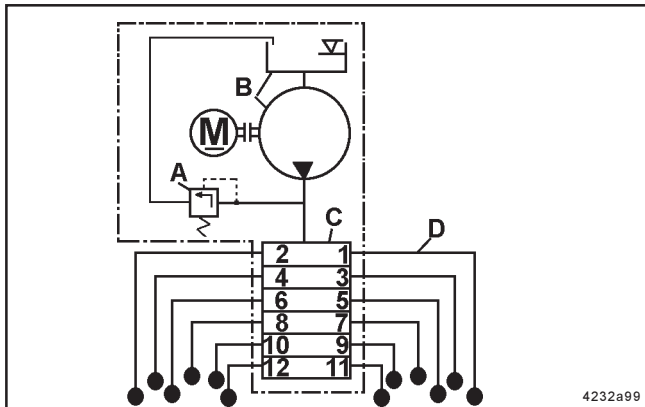


Fig. 32 - Example of a QLS 311

- A - pressure relief valve
- B - pump
- C - SSV 12 divider block
- D - feed lines

<p>• Fault: Blockage in the downstream progressive system (Continued)</p>	
<p>• Cause:</p> <ul style="list-style-type: none"> • Divider valve is blocked 	<p>• Remedy:</p> <ul style="list-style-type: none"> * Replace the divider block 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 \varnothing 6 mm, 0.24 in). <p>Important: 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.</p> <ul style="list-style-type: none"> * Thoroughly clean the divider block body in a grease desolving detergent and dry them out with compressed air. * Clean through the material passages (\varnothing 1.5 mm, 0.59 in) at the thread ends of the piston bore holes using of a pin. * Clean the divider block once more and dry it thoroughly. * Reassemble the divider block.
<p>• Fault: Differing lubricant amounts at the lubrication point</p>	
<p>• Cause:</p> <ul style="list-style-type: none"> • Lubricant metering is not correct. • Setting of the pause time is incorrect. 	<p>• Remedy:</p> <ul style="list-style-type: none"> * Check the lubricant metering according to the lubrication chart. * Check time setting.

Technical Data

QLS 311, general

Operating temperature -25° C to 70° C (-10° F to 160° F)
 Maximum operating pressure
 pump model without divider block 80 bar (1,200 psig)
 Number of outlets 6, 8, 12 or 18
 Output per outlet and cycle approx.0.2 cm³ (0.012 in³)
 Reservoir capacity 1.0 L (61 in³)
 Lubricant..... mineral oil of at least 40 mm²/s(cSt) at 40 °C
 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 120VAC/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 s of 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 AC

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

Relay for Malfunction DC

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

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

Lines

Steel tube (dia. 6x1.0 mm; 1/4 in.)

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 311

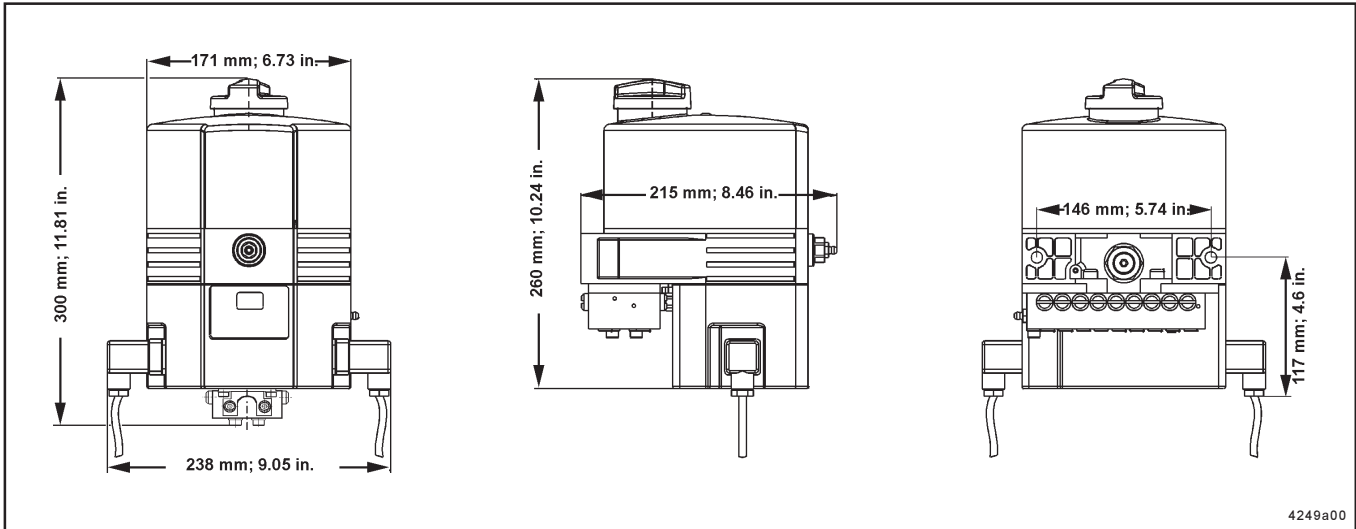


Fig.33- Dimensions of QLS 311

SSV Divider Blocks

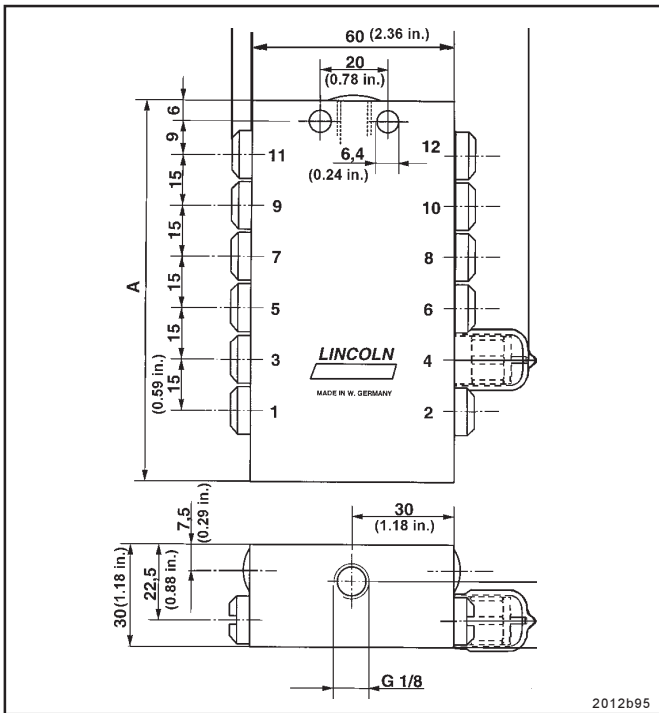


Fig.34- Dimensions of bottom mounted SSV Divider Blocks

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

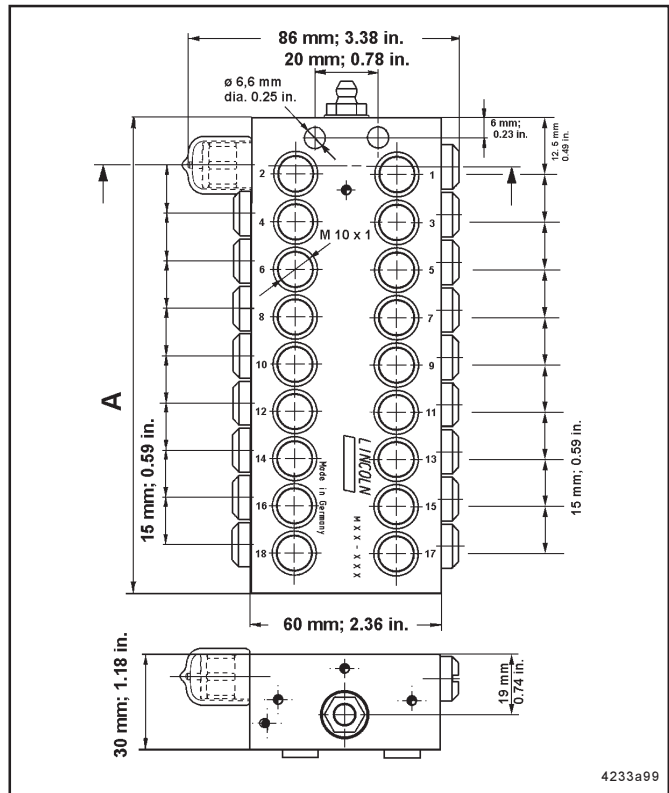


Fig.35- Dimensions of back mounted SSV Divider Blocks

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

Subject to modifications

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

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

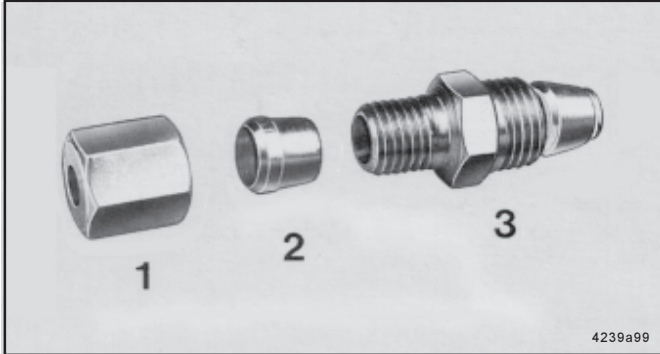


Fig. 36 - Check valve, screw-type (option) for steel and plastic tubes

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

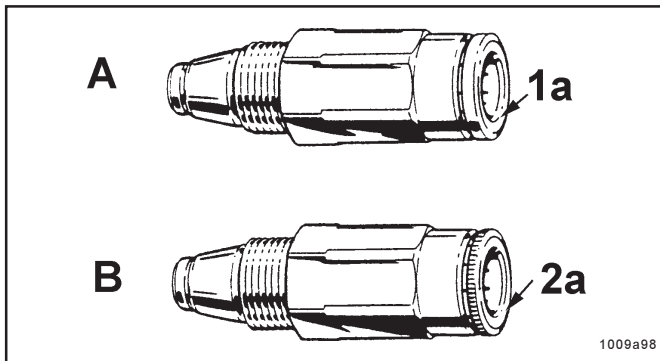


Fig. 37 - Different types of check valves, push-in type

- 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. 38 - Check valves with reinforced collar and hose stud

Note: Use high pressure plastic hoses on construction machines or agricultural machines . 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.

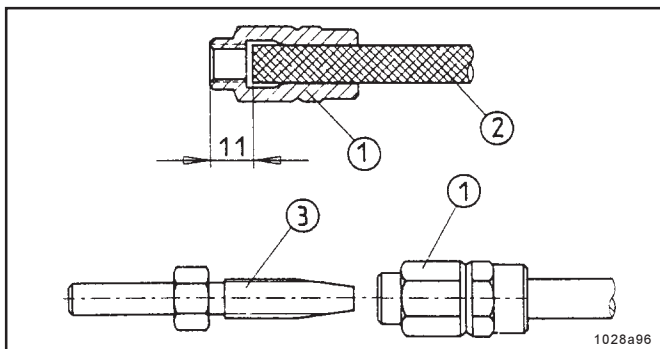


Fig. 39 -Preassembly of the threaded sleeves and hose studs on the high-pressure plastic hose

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

- Screw the threaded sleeve (item 1 Fig. 39) counterclockwise onto the high-pressure plastic hose (2) until the illustrated dimension of 11 mm (0.43 in.) is reached. Then screw the hose stud (3) into the threaded sleeve (1).

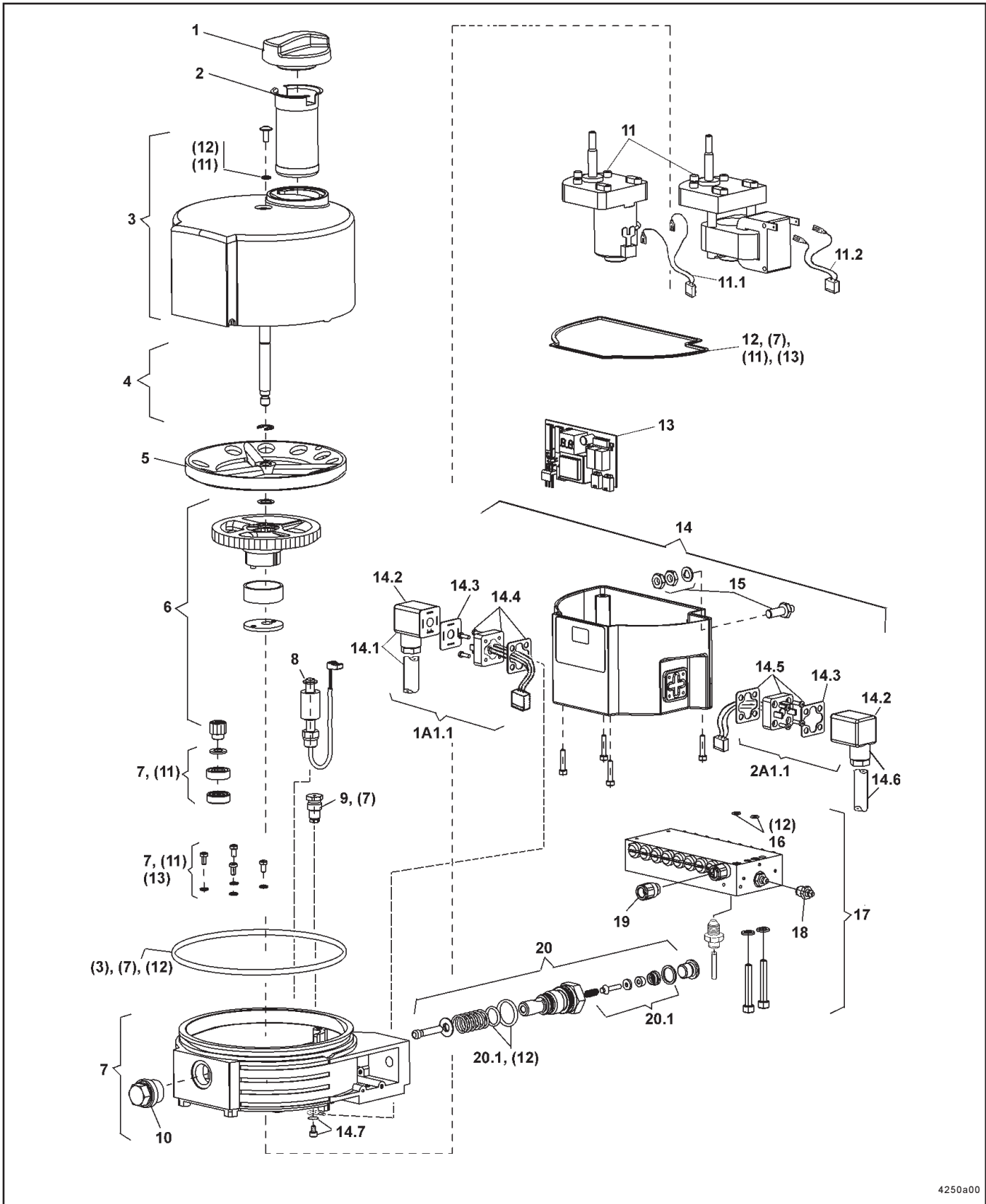
Important: Oil parts before screwing the parts 1 and 3 together.

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

Subject to modifications

Service Parts for the QLS 311

QLS 311 with back mounted SSV Divider Block



4250a00

Fig. 40 - QLS 311 with back mounted SSV Divider Block

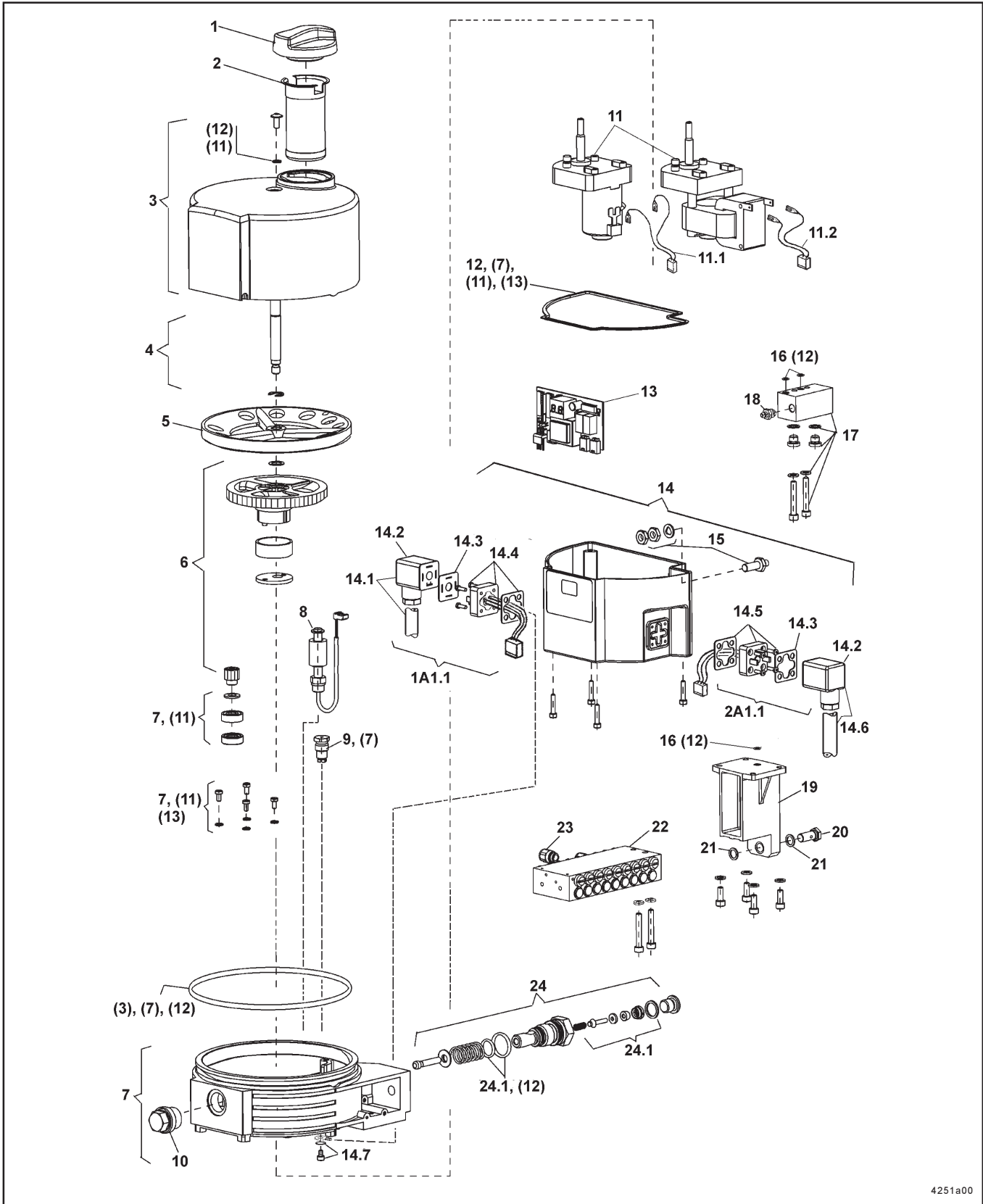
Subject to modifications

Parts list

Pos.	Designation	Kit	Part	Qty	Part no.	Pos.	Designation	Kit	Part	Qty	Part no.
1	Cover		x	1	221-12488-4	14.3	Flat packing		x	2	236-13294-3
2	Filter		x	1	235-13128-2	14.4	Appliance plug 1, for power supply VDC		x	1	664-36968-4
3	Reservoir	x		1	550-34004-1		Appliance plug 1, for power supply VAC		x	1	664-36968-3
4	Shaft	x		1	550-36979-1	14.5	Appliance plug 2, for remote control, VDC		x	1	664-36968-6
5	Intermediate plate	x		1	450-24857-1		Appliance plug 2, for remote control, VAC		x	1	664-36968-5
6	Eccentric gear	x		1	550-36979-4	14.6	Socket 2 with 10 m cable, for remote control	x		1	664-36078-9
7	Housing	x		1	550-34003-1	14.7	Combination screw		x	1	201-14434-1
8	Floating switch		x	1	450-24856-1	15	Proximity switch	x		1	550-36980-1
9	Pressure relief valve, 80 bar		x	1	235-14343-4	16	O-ring dia. 5x1,5		x	2	219-12222-2
10	Closure plug M 22x1,5x12		x	1	303-19285-1	17	SSV divider block SSV V6 - K	x		1	619-37589-1
11	Motor, 12 VDC	x		1	550-36982-1		SSV V12 - K	x		1	619-37590-1
	Motor, 24 VDC	x		1	550-36982-2		SSV V18 - K	x		1	619-37591-1
	Motor, 120 VAC	x		1	550-36982-3	18	Hydraulic lube fitting, St. R 1/8 A3 F		x	1	251-14109-6
	Motor, 230 VAC	x		1	550-36982-4	19	Piston plug with sealing for control pin		x	1	519-32123-1
11.1	Motor connection VDC		x	1	664-36968-2	20	Pump element, assy. ø 6 mm		x	1	650-28856-1
11.2	Motor connection VAC		x	1	664-36968-1	20.1	Sealing parts for pump element	x		1	550-36979-5
12	Sealing kit for QLS 311			1	550-36979-8						
13	Printed circuit board for 1 cycle 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 3 cycles 12/24 VDC	x		1	550-36983-2						
	120 VAC	x		1	550-36983-4						
	230 VAC	x		1	550-36983-6						
14	Housing cover for low-level control and VDC, plug 1A1.0	x		1	550-36984-1						
	VDC, plugs 1+2A1.0	x		1	550-36984-2						
	Housing cover for low-level control and VAC, plug 1A1.0	x		1	550-36984-3						
	VAC, plugs 1+2A1.0	x		1	550-36984-4						
14.1	Appliance plug 1 with 10 m cable, for power supply		x	1	664-36078-7						
14.2	Socket, black GMD-3011		x	2	236-13277-9						

Subject to modifications

QLS 311 with bottom mounted SSV Divider Block



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Fig. 41 - QLS 311 with bottom mounted SSV Divider Block

Subject to modifications

Pos.	Designation	Kit	Part	Qty	Part no.
1	Cover		x	1	221-12488-4
2	Filter		x	1	235-13128-2
3	Reservoir	x		1	550-34004-1
4	Shaft	x		1	550-36979-1
5	Intermediate plate	x		1	450-24857-1
6	Eccentric gear	x		1	550-36979-4
7	Housing	x		1	550-34003-1
8	Floating switch		x	1	450-24856-1
9	Pressure relief valve, 80 bar		x	1	235-14343-4
10	Closure plug M 22x1,5x12		x	1	303-19285-1
11	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
11.1	Motor connection VDC		x	1	664-36968-2
11.2	Motor connection VAC		x	1	664-36968-1
12	Sealing kit for QLS 311			1	550-36979-8
13	Printed circuit board for 1 cycle 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 3 cycles 12/24 VDC	x		1	550-36983-2
	120 VAC	x		1	550-36983-4
	230 VAC	x		1	550-36983-6
14	Housing cover for low-level control and VDC, plug 1A1.0	x		1	550-36984-1
	VDC, plugs 1+2A1.0	x		1	550-36984-2
	Housing cover for low-level control and VAC, plug 1A1.0	x		1	550-36984-3
	VAC, plugs 1+2A1.0	x		1	550-36984-4
14.1	Appliance plug 1 with 10 m cable, for power supply		x	1	664-36078-7
14.2	Socket, black GMD-3011		x	2	236-13277-9

Pos.	Designation	Kit	Part	Qty	Part no.
14.3	Flat packing		x	2	236-13294-3
14.4	Appliance plug 1, for power supply VDC		x	1	664-36968-4
	Appliance plug 1, for power supply VAC		x	1	664-36968-3
14.5	Appliance plug 2, for remote control, VDC		x	1	664-36968-6
	Appliance plug 2, for remote control, VAC		x	1	664-36968-5
14.6	Socket 2 with 10 m cable, for remote control	x		1	664-36078-9
14.7	Combination screw		x	1	201-14434-1
15	Proximity switch	x		1	550-36980-1
16	O-ring dia. 5x1,5		x	2	219-12222-2
17	Connecting block	x		1	550-36979-7
18	Hydraulic lube fitting, St 1/8 A3F		x	1	251-14109-6
19	Manifold	x		1	550-36979-6
20	Banjo bold		x	1	226-13777-2
21	Sealing ring, aluminium		x	2	226-13780-1
22	SSV divider block SSV 8 - K	x		1	619-37586-1
	SSV 12 - K	x		1	619-37587-1
	SSV 18 - K	x		1	619-37588-1
23	Piston plug with sealing for control pin		x	1	519-32123-1
24	Pump element, assy. ø 6 mm		x	1	650-28856-1
24.1	Sealing parts for pump element	x		1	550-36979-5

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 311 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
also complies with
Standard for Safety/Industrial Control Equipment for US and Canada



Declaration of conformity according to EMV directive 89/336 EWG

We declare that the model of the

Centralized Lubrication System QLS 311

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 medial (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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