User Manual
Operation Instructions

LINCOLN®

2.1A-30008-A04

Quicklub®

VDC-Pumps 223 (without) and 233 (with Data Logger) Microprocessor, Control Unit and Membrane Keypad

4354a01

810-55400-1

Subject to modifications

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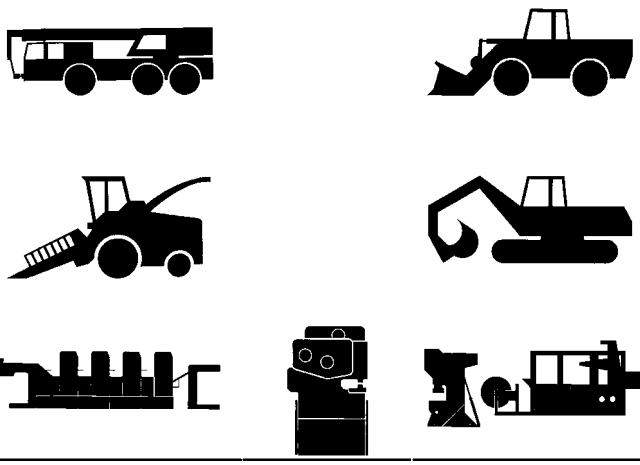
Fields of Application for Quicklub Progressive Central Lubrication Pumps

Industry - Machines	Pump Type	
	**Pump:**	Quicklub 223, 233
	Reservoir:	2 l - 2XL[1)], 2XLBO[1)] 4 l - 4XLBO[1)] 8 l - 8XLBO[1)] [1)] Filling from the bottom 4l, 8l – with lockable reservoir lid (Option) **Low-level control for all reservoir sizes**
	Control:	Integrated control unit with metering device monitoring

See the respective model designation on the pump type plate e.g. P233-2XL-1K6-24-2A6.15-**MDF00**
or P223-2XL-1K6-24-2A6.15-**MF00**

Further information can be found in the following manuals:
Technical Description for „Diagnostic Software QuickData“ for pump 233 and QLS 331
Technical Description for progressive divider valves for grease and oil, model SSV, SSV M and SSV D
Installation Instructions
Parts Catalogue
Spare Parts Catalogue for pump 203

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Introduction

Explanation of Symbols Used

The following description standards are used in this manual:

Safety Instructions

Structure of safety instructions:

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

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

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

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

ATTENTION	refers to faults or damages on machines.
CAUTION	refers to bad damages and possible injuries.
WARNING	refers to possible dangerous injuries.
NOTE	refers to improvements in handling of systems.
IMPORTANT	refers to considerable disadvantages in handling of systems.

Example:


1013A94

ATTENTION!

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

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

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

- Listing of applicable statements
  - Subpoint of applicable statements

1. Determination of the number or sequence of contents

➲ Procedural instruction

User's Responsibility

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

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

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

Environmental Protection

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

Service

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

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Safety Instructions

Appropriate Use

- Use the 223 and 233 pumps only for dispensing lubricants in centralized lubrication systems. The pump is designed for intermittent operation.

Misuse

Any use of the 223 and 233 pumps that is not expressly mentioned in this User Manual will be regarded as misuse.
If the 223 and 233 pumps are used or operated in a different manner other than specified, any claim for warranty or liability will be null and void.


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NOTE

If personal injury or material damage occurs as a result of inappropriate operation, e.g. if the safety instructions are ignored or resulting from an incorrect installation of the 223 and 233 pumps, no claims or legal actions may be taken against Lincoln GmbH & Co. KG.

Exclusion of Liability

The manufacturer of the pumps 223 and 233 will not accept any liability for damages:

- caused by a lack of lubricant due to an irregular refilling of the pump;
- caused by the use of contaminated lubricants;
- caused by the use of greases which are not or only conditionally pumpable in centralized lubrication systems (see page 45 and 46);
- caused by chemical or biological modifications of the lubricant used;
- caused by inadequate disposal of used or contaminated lubricants as well as of components that have been in touch with lubricant;
- caused by unauthorized modification of the system components;
- caused by the use of unapproved parts.

Disposal

Dispose of used or contaminated lubricants as well as of parts that were in touch with lubricant according to the legal regulations pertaining to environmental protection. Make sure to observe the safety data sheets of the lubricants used.

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.

Avoid the operation with

- unapproved parts.
- insufficient or contaminated lubricants.

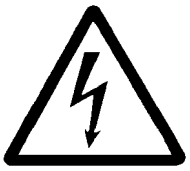
General Safety Instructions

- Lincoln Quicklub centralized lubrication systems
  - are designed state-of-the-art.
  - can be assembled for safe operation.
- Incorrect use may result in bearing damage caused by poor or over-lubrication.
- Unauthorized modifications or changes to an installed system are not admissible. Any modification must be subject to prior consultation with the manufacturer of the lubrication system.

Installation

- Any safety equipment already fitted to the vehicle or the machine:
  - should not be modified or made ineffective;
  - should only be removed for the purpose of fitting the system;
  - must be reinstalled after fitting the system.
- Keep Quicklub centralized lubrication systems away from sources of heat. Adhere to the operating temperature.
- Use only original Lincoln spare parts (see Parts Catalog) or parts approved by Lincoln.
- Adhere to:
  - the installation instructions of the vehicle or machine manufacturer as regards all drilling and welding procedures.
  - the specified minimum distances between the boreholes and the upper/lower rim of the frame or between two boreholes.

Operation, Maintenance and Repair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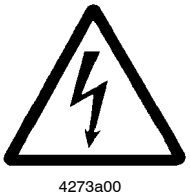
CAUTION!

The centralized lubrication system may be installed by qualified personnel only. ***Before beginning with the installation or service work, disconnect the power supply!***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ATTENTION!

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

- Suitably pack defective printed circuit boards and return to the factory (see page 33, paragraph „Printed Circuit Boards“).

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Safety Instructions, continuation

Operation, Maintenance and Repair, continuation


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ATTENTION!

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

CAUTION!

It is not allowed to use the pump in potentially explosive fields.

- Repair should only be performed by authorized and instructed personnel who are familiar with the instructions.
- Lincoln Quicklub centralized lubrication systems
  - must be operated only with installed pressure relief valve.
  - must be refilled in regular intervals with clean lubricant recommended by the manufacturer without air entrapments.
  - operate automatically. However, a regular check (approx. every 2 days) should be made to ensure that lubricant is emerging from all lubrication points.

Pump Models

Fig. 1 Different models of pumps 223 (without) and 233 (with reading window)

Pumps 223 and 233 basically differ by the read-out function ((P223 without; P233 with). However, both pumps are available with all reservoir variants.

Reservoir sizes

- 2 l transparent plastic reservoir
- 4 l transparent plastic reservoir
- 8 l transparent plastic reservoir

Control unit models 223, 233

- Pumps 223, 233 can be used with integrated control panels with monitoring of the metering device; pumps 233 additionally with data logger for the data transmission to the Lincoln diagnostic software **QuickData.**

[1] **Refer to the designation on the pump type plate, e.g. P233 -2XLBO- 1 K6 - 24 - 2A6.15- MDF00 (see also chapter “Identification Code” page 7 and 8).**

For the following features of distinction please see the identification code on pages 7 and 8:

- motor voltage
- type of control unit (if any)
- remote control for triggering an additional lubrication cycle
- design and number of pump elements
- design and number of pressure relief valves
- filling type
- use of return line connections
- low-level control

Electrical connection

Pumps model 223, 233 may be equipped with a 10 m electric cable.

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Identification Code – DC Pump Models P223

Examples of model designations


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NOTE

Any pump combinations other than the following standard pumps can be composed and ordered in accordance with the valid model identification code.

P223 - 4 - X - L - 1 - K6 - 24 - 2A - 6. - 15 - MF00
P223 - 2 - X - L - BO 1 - K7 - 24 - 2A - 6. - 15 MF00
P223 - 8 - X - L - BO 1 - K6 - 12 - 2A - 6. - 15 - MF00
P223 - 4 - X - L - BO - 1 - K6 - 24 - 2A - 6. - 15 MF00

Basic pump model for grease
with 1-3 outlets and 12 VDC or 24 VDC motor

Reservoir design
2 = 2 l transparent plastic reservoir
4 = 4 l transparent plastic reservoir
8 = 8 l transparent plastic reservoir

X = Reservoir for grease

L = Low-level control

without designation = Standard reservoir (2 liters)
BO = Filling from top

Pump elements
1-3 = Number of the use elements

K 5 = Piston diameter = 5 mm
K 6 = Piston diameter = 6 mm
K 7 = Piston diameter = 7 mm
KR = Pump element, adjustable, Piston diameter = 7 mm

Connecting voltage
12 or **24** VDC motor

Number of electric connecting possibilities (on pump housing only)
2A = 2 connections:
- connection for power supply on the left, external illuminated pushbutton for additional lubrication and malfunction
- piston detector on the right

Type of connection [1)]
6 = Bayonet plug, 7/5-core, DIN 72585-1

[1)] other types of connection on request possible

Connection outside the pump
00 = without socket-outlet, without cable
15 = Bayonet socket with 10 m cable, 7/5-wire

Control p. c. b. s. 12V / 24 V
MF00 = with microprocessor control and membrane key pad

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Identification Code – DC Pump Models P233

Examples of model designations


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NOTE

Any pump combinations other than the following standard pumps can be composed and ordered in accordance with the valid model identification code.

P233 - 4 - X - L - 1 - K6 - 24 - 2A - 6. - 15 - MDF00
P233 - 2 - X - L - BO 1 - K7 - 24 - 2A - 6. - 15 MDF00
P233 - 8 - X - L - BO 1 - K6 - 12 - 2A - 6. - 15 - MDF00
P233 - 4 - X - L - BO - 1 - K6 - 24 - 2A - 6. - 15 MDF00

Basic pump model for grease
with 1-3 outlets and 12 VDC or 24 VDC motor

Reservoir design
2 = 2 l transparent plastic reservoir
4 = 4 l transparent plastic reservoir
8 = 8 l transparent plastic reservoir

X = Reservoir for grease

L = = Low-level control

without designation = Standard reservoir (2 liters)
BO = Filling from top

Pump elements
1-3 = Number of elements used

K 5 = Piston diameter = 5 mm
K 6 = Piston diameter = 6 mm
K 7 = Piston diameter = 7 mm
KR = Pump element, adjustable, Piston diameter = 7 mm

Connecting voltage
12 or **24** VDC motor

Number of electric connecting possibilities (on pump housing only)
2A = 2 connections:
- connection for power supply on the left, external illuminated pushbutton for additional lubrication and malfunction
- piston detector on the right

Type of connection [1)]
6 = Bayonet plug, 7/5-core, DIN 72585-1

[1)] other types of connection possible on request

Connection outside the pump
00 = without socket-outlet, without cable
15 = Bayonet socket with 10 m cable, 7/5-wire

Control p. c. b. s. 12V / 24 V
MDF00 = with microprocessor control, data logger and membrane keypad

Description

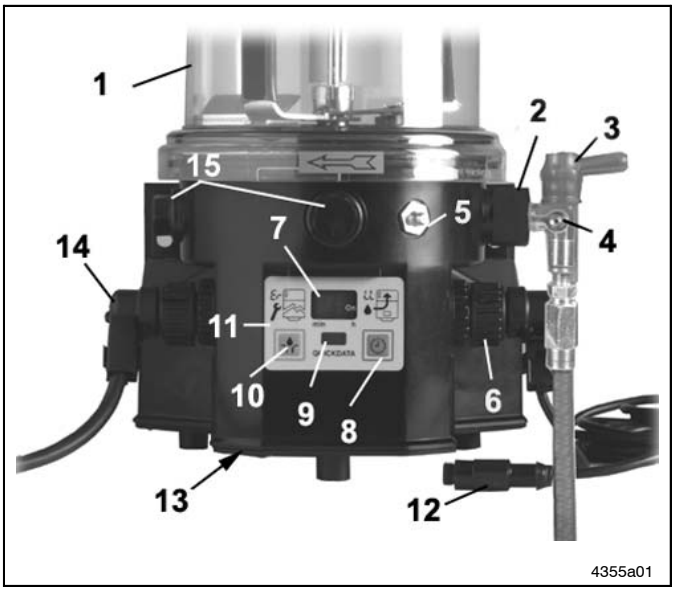

Fig. 2 Components of pump 223, 233

1 -	Reservoir	9 -	Reading window for Datalogger (only P233)
2 -	Pump element	10 -	Momentary-contact switch for additional lubrication
3 -	Pressure relief valve	11 -	Membrane key pad
4 -	Filling nipple, system emergency lubrication possible	12 -	Piston detector
5 -	Fillilng nipple, pump	13 -	Covering to the p.c.b.
6 -	Adaptor for piston detector	14 -	Adaptor for power supply
7 -	Display	15 -	Closure plug for the use of a pump element
8 -	Momentary-contact switch for indication or setting of pause time		

Quicklub centralized lubrication pumps

- Are compact multi-line pumps consisting of the following components:
  - Housing with integrated motor
  - Reservoir with stirring paddle and fixed paddle
  - P223: Control printed circuit board (p.c.b.)
    P233: Data logger (control p.c.b. with readable data memory)
  - Pump element
  - Accessories:
    - Pressure relief valve
    - Refilling unit
    - Electrical connection parts


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NOTE

Pressure relief valve are not part of the pump components and have to be ordered separately. Accessories for refilling of the reservoir (see parts catalogue).

- can drive up to 3 pump elements
- operate according to lubrication cycles (pause and operating times)
- can be equipped with a low-level control
- can supply up to 100 lubrication points depending on the line lengths
- are designed for the automatic lubrication of the connected lubrication points
- are designed for the delivery of greases up to NLGI 2 at temperatures from - 25° C to 70° C
- can be used at low temperatures down to - 40° C

During the operating time the pump dispenses lubricant to the connected lubrication points via one or several metering devices.

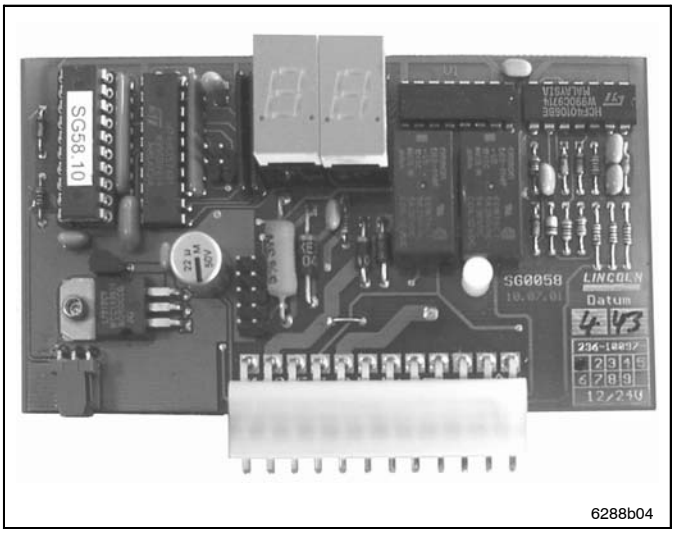

Fig. 3 Control p.c.b. MF00 (P223)

P223 without data logger

Control p.c.b. MF00

- The control unit is installed in the housing of the pump behind the membrane keypad (see pos. 11, fig. 2) as an integrated p.c.b. MF00.

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Description, continuation

P233 with data logger

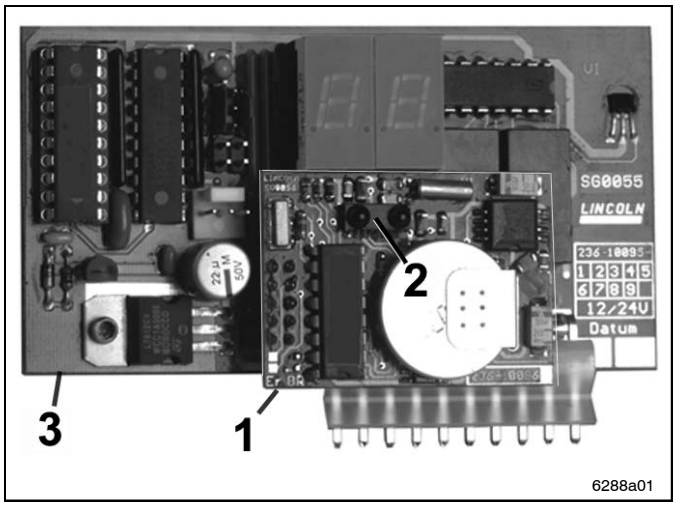

Fig. 4 Control p.c.b. MDF00 with built-on data logger

1 - Data logger
2 - IR interface
3 - Control p.c.b.

Control p.c.b. MDF00

- The control unit is installed in the housing of the pump behind the membrane keypad (see pos. 11, fig. 2, page 9) as an integrated p.c.b. MDF00.
- The data logger (fig. 4, pos. 1) is fixed onto the p.c.b.

Control and monitoring system QuickData®

- The control and monitoring system consists of:
  - control p.c.b. MDF00 (pos. 3, fig. 4)
  - built-on data logger module with IR interface (pos. 2, fig. 4)
  - membrane keypad with display (pos. 3, fig. 2)
  - IR interface module RS 232 (COM) for laptops, PDA and Palm
  - Lincoln diagnostic software QuickData®
  - monitored metering device model SSV with integrated piston detector (comp. fig. 22, page 17)

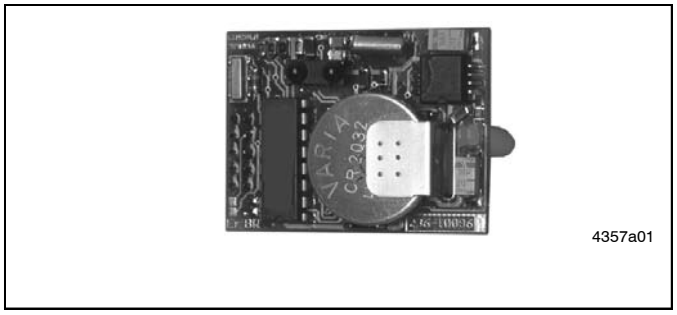

Fig. 5 Data logger module

Data logger module

- Pump 233 is equipped with a readable data memory (data logger) QuickData®.
- The data logger renders information regarding system settings, events such as low-level indications, malfunctions, operating times and lubrication cycles.
- By means of the Lincoln diagnostic software QuickData® the above-mentioned data can be read on a suitable laptop via an infrared interface (see User Manual “Diagnostic Software QuickData®).

Control Unit

Control p.c.b.

- The centralized lubrication system is monitored, i.e. events such as malfunctions of the centralized lubrication system, faults in the elapse of the operating time, low-level indications, pause time, residual pause times of the pump are displayed in the display window of the membrane keypad.
- Version P233 additionally transmits data into the data logger.

Data memory

The following events are memorized in the EEPROM of printed circuit boards MF00 (P223) or MDF00 (P233). However, they can be read and analyzed only out of pumps 233 via the Lincoln diagnostic software QuickData®:

- Malfunctions (start, end and duration) in the centralized lubrication system
- faults in the elapse of the operating time
- low-level indication (start, end and duration)
- number of connections and disconnections of the power supply
- automatically triggered lube cycles
- manually triggered lube cycles
- operating data
- customer related data

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Description, continuation

Control Unit, continuation

Operating states

Functions, processes, settings, faults or malfunctions of the pump are indicated on a membrane keypad as shown on the survey:


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NOTE

*The fault indication **„LL“** appears whenever the solenoid fixed to the stirring paddle has passed the proximity switch six times. Appearing **„LL“** on the display, the lubrication cycle is being completed fully. Afterwards, the control unit does not switch the pump on automatically any longer.*

Pump	Display
· Failure in the power supply	no indication
· Power supply ON	right segment illuminated
· Failure in the membrane key pad	**EP**
· Operating time elapses	Rotating segment
· Pump element does not dispense	**Er**
· Reservoir empty	**LL**
· Pause time	**PP**
· Residual pause time	**rP**
· Lubrication point or divider valve blocked	**Er**
· Leakage in the main line from the pump to the monitored divider valve	**Er**
· Air entrapments in the grease	**Er**
· Failure in one lube cycle (depending on the installation of the monitored divider valve)	**Er**

Mode of Operation

Pump elements with fixed lubrication output

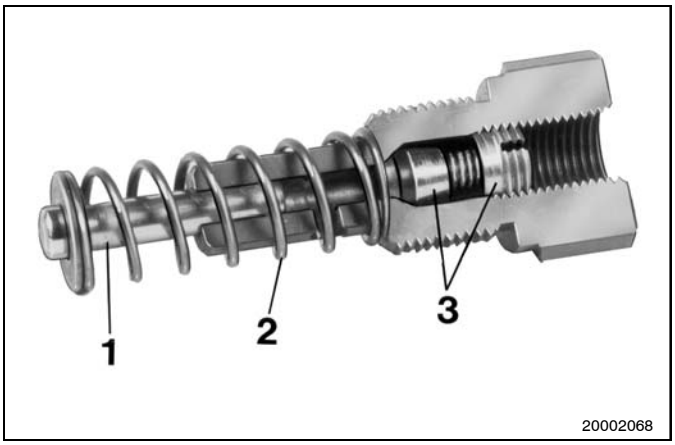

Fig. 6 Pump element, sectional drawing

1 - Piston
2 - Return spring
3 - Check valve

- The electric motor drives the eccentric (pos. 1, fig. 7-8, page 12).
- During the operating time:
  - piston (pos. 2) sucks in lubricant from the reservoir (refer to fig. 7).
  - piston 2 dispenses the lubricant to the connected lubrication points via the metering device (see fig. 8).
- The following designs are available:

  Piston diameter, K5 ..... 5 mm
  Lubricant output ..... approx. 2 cm³/min
  Piston diameter, K6 (Standard) ..... 6 mm
  Lubricant output ..... approx. 2,8 cm³/min
  Piston diameter, K7 ..... 7 mm
  Lubricant output ..... approx. 4 cm³/min
- Tightening torques ..... 25 Nm

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Mode of Operation, continuation

Pump elements with fixed lubrication output, continuation

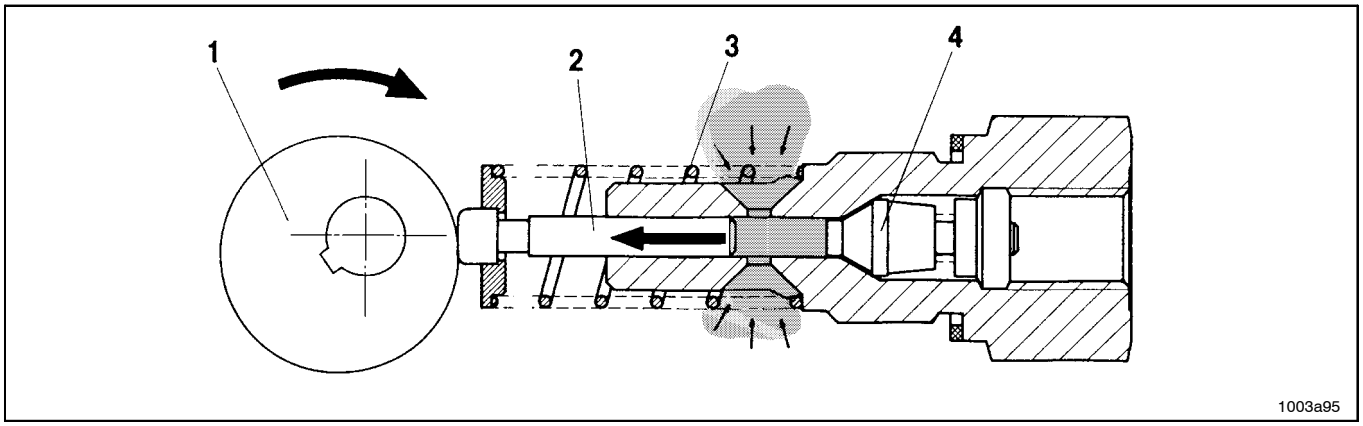

Fig. 7 The pump element sucks in lubricant

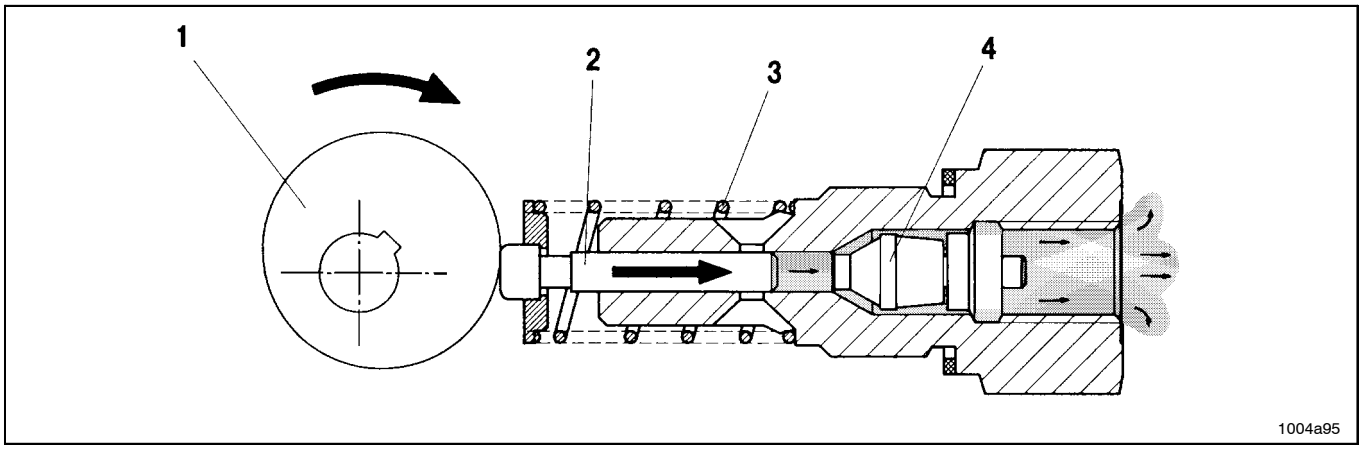

Fig. 8 The pump element dispenses lubricant

1 - Eccentric 2 - Piston 3 - Spring 4 - Check valve

Pump element B7 with bypass check valve

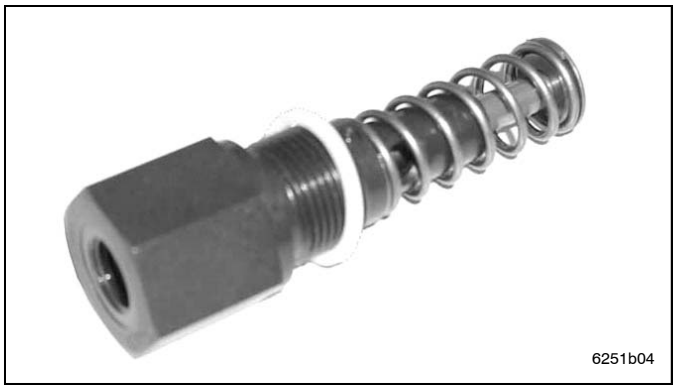

Fig. 9 Pump element B7

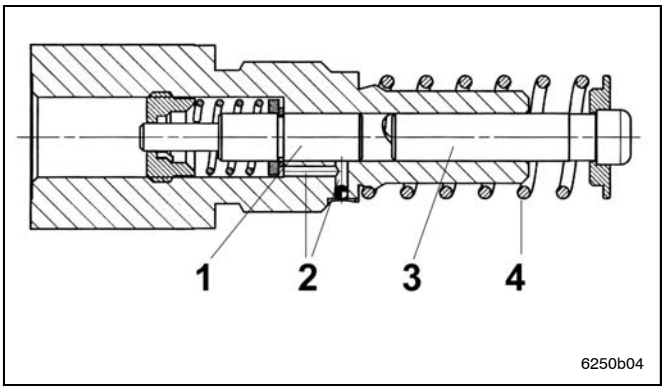

Fig. 10 Sectional diagram - pump element B7

- Pump element B7 suits especially applications in contaminated environments as the supplied lubricant is passing through a bypass bore (pos. 2) on the check valve (Pos. 1).
- The output is 2 cm³/min.

1 - Check valve
2 - Bypass
3 - Pump piston
4 - Return spring

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Mode of Operation, continuation

Pump elements with fixed lubrication output, continuation

Check valve

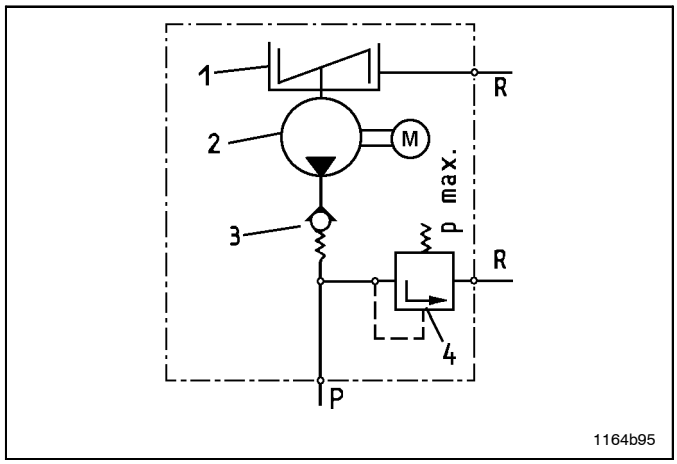

Fig. 11 Hydraulic diagram of the pump

1 - Reservoir with stirring paddle
2 - Pump
3 - Check valve, spring-loaded
4 - Pressure relief valve
R - Return line
p - Pressure line

- The check valve
  - closes the pressure line during suction stroke.
  - prevents the lubricant from flowing back to the housing or reservoir.

Arrangement of the pump elements

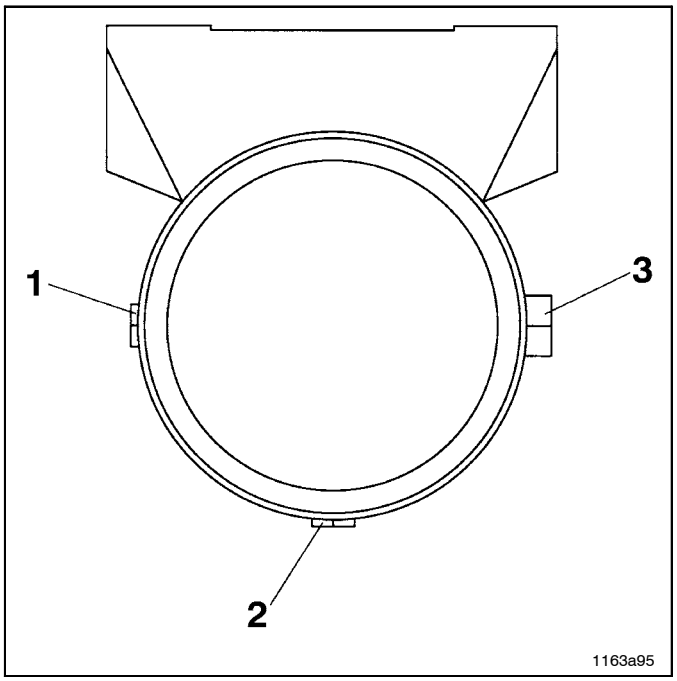

Fig. 12 Arrangement of the pump elements

- If several pump elements are to be installed, the installation arrangement shown in Fig. 12 must be adhered to.
- If there is only one pump element, it can be installed in any position. Standard position is no. 3.
- If there are two elements, install one in position 3 and the other in position 1.

Pump elements with adjustable lubricant output

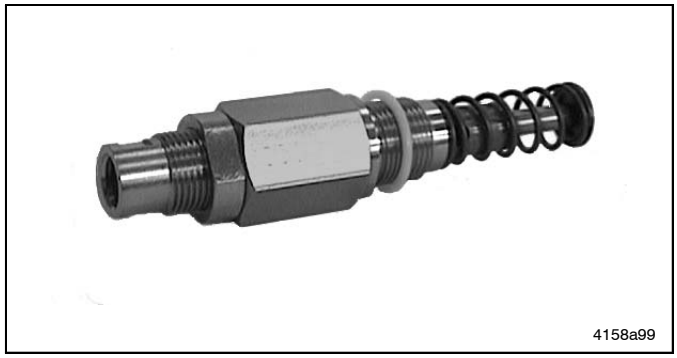

Fig. 13 Adjustable pump element

- The mode of operation (suction and supply phase) is the same as that of the pump elements with an invariable lubricant output.
- Lubricant outputs are adjustable from 0.04 to 0.18m^3/stroke, or 0.7 to 3cm^3/min.
- The pump elements are factory-set to the maximum lubricant output; the adjusting dimensions “S” should be 29 ± 0.1 mm (see fig. 14, page 14).

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Mode of Operation, continuation

Pump elements with adjustable lubricant output, continuation

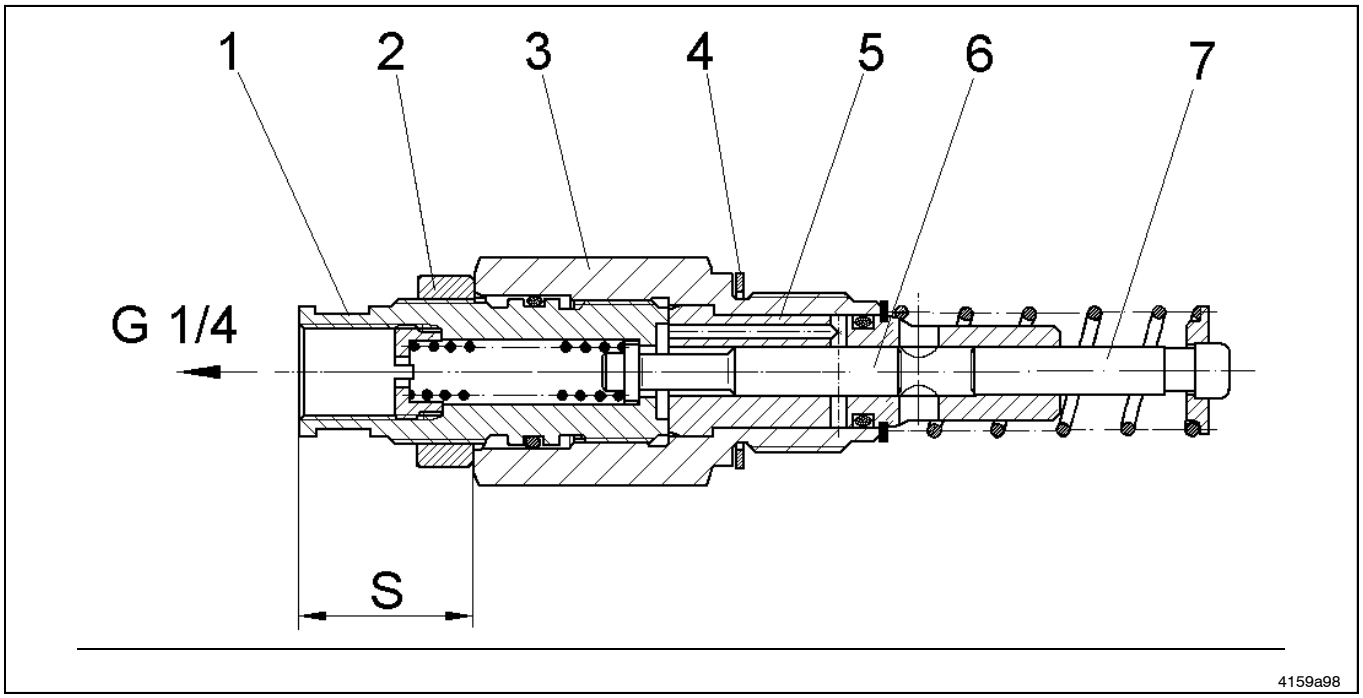

Fig. 14 Sectional view: adjustable element

1 - adjusting spindle SW 16 (SW ~ with over flats)
2 - counternut SW 24
3 - pump element body
4 - gasket
5 - pump cylinder
6 - control piston
7 - delivery piston
S - setting dimension

Setting of adjustable pump elements

- ➲ Unscrew the coupling nut for fixing the pressure relief valve.
- ➲ Loosen counter nut (pos.2[1)]) while holding in position pump element body (pos.3) by means of a second wrench.
- ➲ Change the position of the adjusting spindle (pos.1) by means of a wrench, see supply diagram (fig. 13).
- ➲ The dimension “S” (fig. 14) for the desired lubricant output can be ascertained by using the supply diagram (fig. 15).

[1)] All indications of positions refer to fig. 14.

Retrofit adjustment of min. lubricant output

- ➲ Before the pump element can be adjusted to a small lubricant output, the dimension “S” for max lubricant output must be ascertained, and the difference from the nominal value 29 must be transferred to any desired settings between 25.5 ... 28.5.
- ➲ Dimension “S” must be adjusted to the desired value in accordance with the delivery diagram (fig. 15).


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NOTE

At maximum setting “S“ is 29 ±0.1 mm.

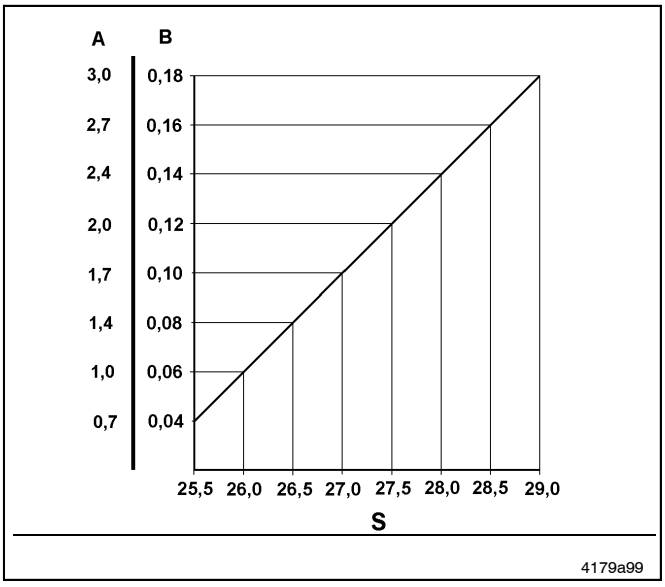

Fig. 15 Supply diagram

A - Lubricant output cm^3/min
B - Lubricant output cm^3/stroke
S - Setting dimension

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Mode of Operation, continuation

Setting of adjustable pump elements, continuation

Retrofit adjustment of max. lubricant output

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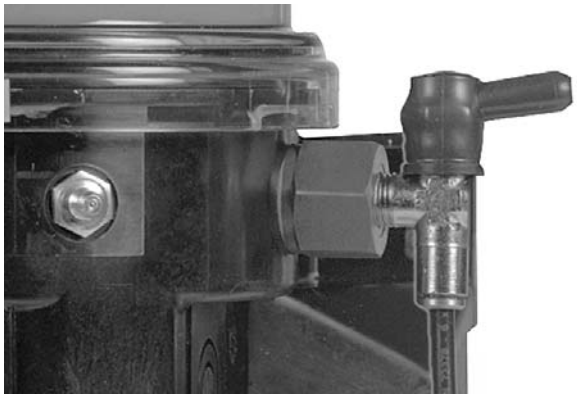
NOTE

In order to ensure that the lubricant output setting will be as exact as possible, first the actual dimensions "S" of the max. lubricant output must be ascertained as follows. The measured difference from the nominal value 29 must be considered for all other settings values (e.g. ± 0.1).

- ➲ Unscrew the adjusting spindle (pos.1[1)]) from the pump element body (pos.3) until "S" is approx. 30 mm.
- ➲ Screw counter nut (Pos.2) onto stop collar of the adjusting spindle (pos.1).
- ➲ Screw adjusting spindle (pos.1) with counter nut (pos.2) into pump element body (pos.3) until stop.

[1)] All indications of positions refer to fig. 14, page 14.

Pressure Relief Valve



10022618a

Fig. 16 Pressure relief valve

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IMPORTANT

Each pump element must be secured with a pressure-limiting valve.

*The pressure relief valve is not contained in the scope of supply of the pumps 223, 233. Therefore it is to be ordered **separately** (see Spare Parts Catalogue).*

without grease return

- The pressure relief valve
  - limits the pressure build-up in the system.
  - opens, if the specific overpressure is reached.
  - is to be selected according to the requirements to the lubrication plant (see different opening pressures; 200, 270, 350 bar).
- If lubricant is leaking at the pressure relief valve, this indicates that the system is malfunctioning.
- Despite existing fault monitoring devices a regular visual and function control must be carried out on the lubrication system.

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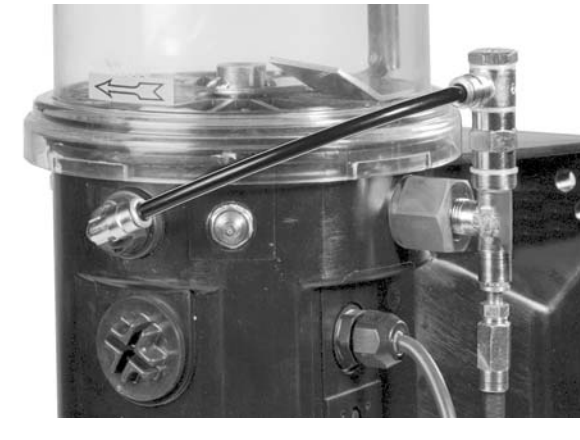
NOTE

Between a malfunction (blockage) and the following fault indication (lubricant leakage; monitoring intermittent LED display) there may be a longer time delay.
The duration of the delay depends on the type and length of the lines, the type of lubricant, the ambient temperature and other influences.



00002626a

Fig. 17 Pressure relief valve with grease return

with grease return (optional)

- If the system is blocked, grease will leak from the pressure relief valve. This grease quantity is returned to the reservoir.

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Mode of Operation, continuation

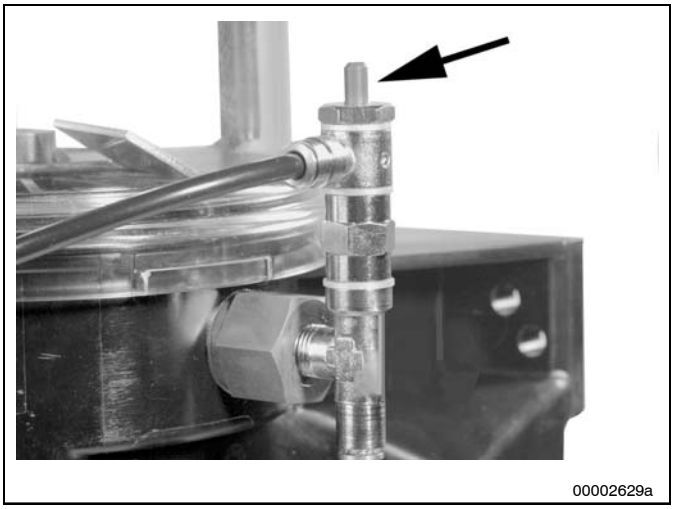

Fig. 18 Fault indication in the case of a blockage

Pressure relief valve with grease return (optional), continuation

Fault indication

- In the case of a blockage in the system, the grease pushes out the red pin at the pressure relief valve, thus indicating that there is a fault.

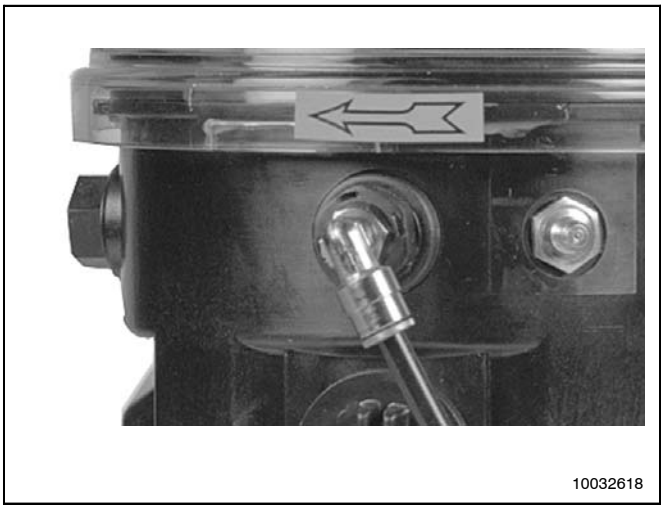

Fig. 19 Return line connection

Return Line Connection

- The lubricant quantities, which cannot be dispensed by the metering device, must be returned to the pump via the return line connection.

Control p.c.b. with or without data memory

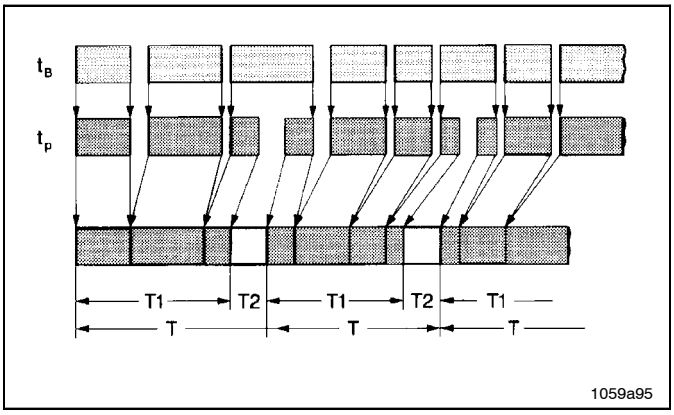

Fig. 20 Time sequence diagram

t_B - working hours
t_P - individual pause time
T - lubrication cycle
T1 - stored pause time
T2 - operating times

- The control p.c.b. controls the sequence of the pause and operating times of the 223 and 233 centralized lubrication pumps as a function of the vehicle or machine working hours t_B (see fig. 20).
- The sequence of the pause and operating times is activated when the machine contact or driving switch is switched on, i.e. the centralized lubrication pump is ready for operation.
- A lubrication cycle consists of one pause time and one operating time. Once the pause time has elapsed, the operating time starts to run. This lubrication cycle is repeated permanently after the machine or vehicle has been put into operation.
- During the operating time the pump element dispenses the lubricant to the lubrication points via progressive metering devices.

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Mode of Operation, continuation

Control p.c.b. with or without data memory, continuation

Pause time

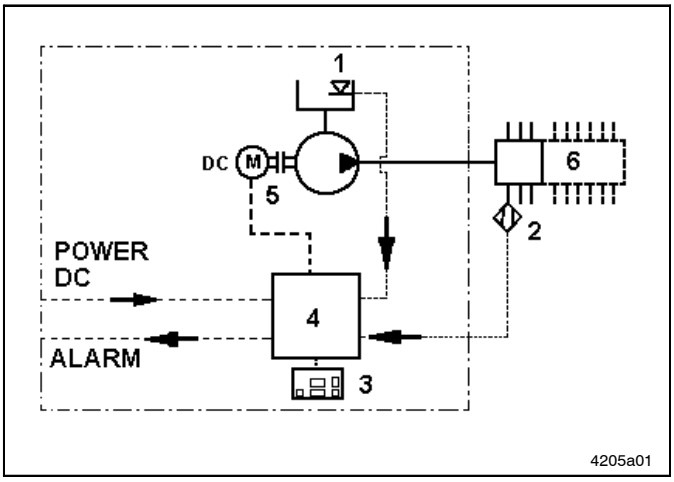

Fig. 21 Schema of the centralized lubrication pump

1 -	low-level control	4 -	control p.c.b.
2 -	piston detector	5 -	pump
3 -	membrane key pad	6 -	divider block model SSV N

Factory setting of the pause time ..... 6 hours

- The pause time
  - determines the frequency of the lubrication cycles within a working cycle.
  - is started and stopped with the power supply via the machine contact or the driving switch.
  - is adjustable
- When the machine contact ort he driving switch is switched off, the pause times which have already elapse are stored and added up by an electronic data memory (EEPROM) until the time which has been set on the membrane key pad is reached.
- After the machine contact or driving switch is switched on again, the control p.c.b. operates from the point where it had been interrupted.
- If the setting is modified within the pause time, the control p.c.b. takes over the new value automatically on completion of the programming procedure (see paragraph “Programming Mode”, page 26).
- The pause time setting may be different for each application. It must be adjusted in accordance with the respective lubrication cycle (see paragraph “Programming Mode”, page 26).

Operating time

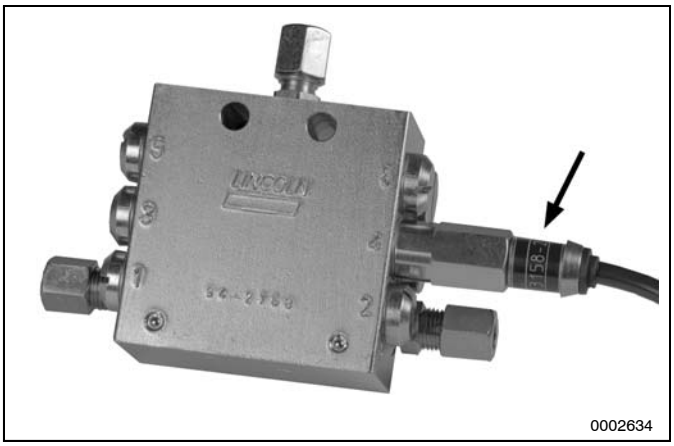

Fig. 22 Divider block SSV 6 with piston detector

- The operating time depends on the system’s lubricant requirement and on the location of the piston detector (either on the main metering device or on the secondary metering device).
- A piston detector (initiator) which has been installed on a metering device instead of a piston closure plug, monitors and brings he pump operating time to a close after all the pistons of this metering device have dispensed their lubricant quantity once.
- During the pump operating time a circulating segment appears in the display of the membrane keypad (see paragraph “Display of the membrane key pad, page 18).
- After an interruption of the operating time, e.g. by switching off the power supply, the operating time continues from the point where it had been interrupted.
- When the machine contact ort he driving switch is switched off, the pause times, which have already elapsed, are stored and added up by an electronic data memory (EEPROM) until the piston detector stops the operating time.

Monitoring time

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NOTE

Only one lubrication cycle can be monitored.

NOTE

Normally, the monitoring time ends at the same time as the operating time.

- A fixed monitoring time of a maximum of 30 minutes runs in parallel to the operating time.
- If there is no switching off signal from the piston detector (fig. 22) to the control p.c.b. within 30 minutes a fault signal will occur (see paragraph “Display of the membrane key pad”, page 18).
- An external signal lamp flashes continuously in case of a fault.

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Mode of Operation, continuation

Membrane keypad

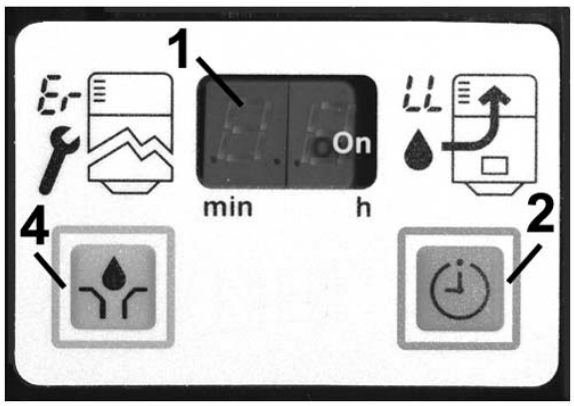

Fig. 23 P223 membrane keypad

1 - Display
2 - Key for acknowledgment of fault indications and setting of time (shift key)

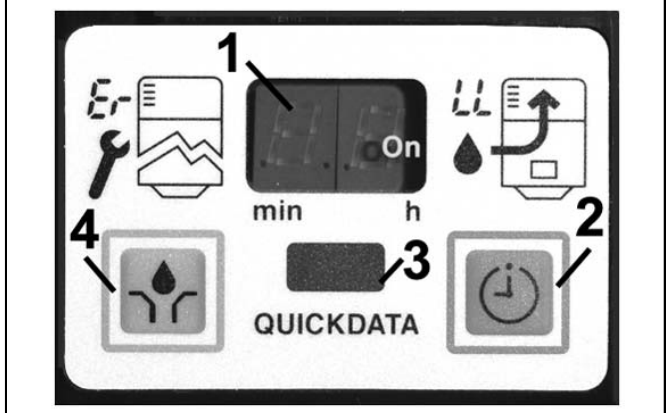

Fig. 24 P233 membrane keypad with display and reading window

3 - Reading window for "QuickData"
4 - Key for triggering an additional lubrication and for setting the time values (setting key)

Display of the membrane keypad

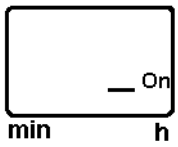

Fig. 25 Green segment, pause time, voltage applied

- As soon as voltage is applied (On), the lower right-hand segment in the display window flashes (pause time runs).
- If the power supply is interrupted during the pause time, after switching it on again, the pause time continues at the point of interruption.

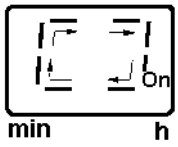

Fig. 26 Green circulating illuminated segment, operating time

- During the operating time of the pump, a circulating illuminated segment appears in the display window of the membrane keypad.
- If the power supply is interrupted during the operating time, after switching it on again, the operating time continues at the point of interruption.

Low-level control

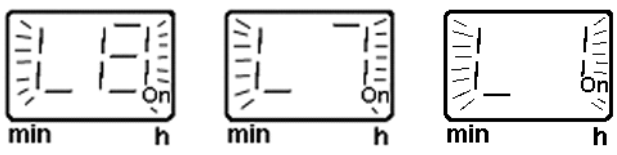

Fig. 27 Announcement of a low-level indication

- **In the display mode**, a low-level is announced by an intermittent display of * L8 *, * L7 *, * L6 *, ... * L1 *.
- Finally the intermittent *** LL *** appears for a low-level indication that had not been confirmed (see fig. 28, page 19).

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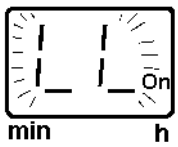
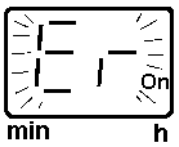
Mode of Operation, continuation

Display of the membrane keypad, continuation

Monitoring time / Malfunction



4211a99



4210a99

Fig. 28 Display of an low-level indication or malfunction

- If there is no feedback from the piston detector (initiator) within **30 minutes** (monitoring time) from completion of the pause time or from triggering an additional lubrication, the jump switches off immediately. One of the fault signals *** Er *** (Error) or *** LL *** (Low-Level) is displayed as a flashing light in the display of the membrane keypad.

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IMPORTANT

*If a malfunction *** Er *** or low-level indication *** LL *** is present, the pump does not switch on automatically any longer.*

Operator keys of the membrane keypad

Operator keys of the membrane keypad in the display mode

4214a99

Fig. 29 Acknowledging receipt of a flashing low-level or fault indication

Acknowledging receipt of a low-level indication / malfunction

- By pressing the key (fig. 26, < 2 sec.) the flashing *** Er *** changes into a permanent light.
- Fault indications that have been confirmed but not been remedied yet will flash again after switching the power supply off and on again.

Operator keys of the membrane keypad in the operating mode

4222a99

Fig. 30 Operator key to trigger an additional lubrication cycle

Additional lubrication cycle

➲ An additional lubrication cycle is triggered via the button (fig. 30). Press the button **for 2 seconds**.

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

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

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NOTE

External triggering of an additional lubrication cycle (see fig. 38, page 23).

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NOTE

*If a malfunction is present (flashing display *** ER ***), it can be acknowledged before triggering an additional lubrication cycle (see fig. 29). However, this is not compelling.*

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

➲ Press key > 2 seconds.

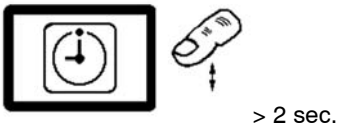

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Fig. 31 Information regarding the set pause time and residual pause time

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Mode of Operation, continuation

Operator keys of the membrane keypad

Operator keys of the keypad in the programming mode

4222a99

Fig. 32 Settings in the programming mode

· **Reset of the pause time**

➲ Setting of the pause time by

- single key activation for one hour/ minute
- permanent activation for quick run

· **Settings of the monitoring relay**
How to set the metering device cycles:

· The monitoring relay signalizes a malfunction over an external lamp Lampe via the optional connection “X2“ (see connection diagrams).
In case of the standard setting “normally open contact (NO)“ a malfunction is signalized by a permanently lit lamp.
In case of the standard setting “normally closed contact (NC)” the malfunction is signalized by a lamp that stopped burning.

➲ For VDC version ..... 1 to 5 cycles

· **Termination of the programming mode**

➲ Terminate the programming mode.

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Fig. 33 Changing to the different programming levels

1. **Changing to the different programming levels**

➲ Press key to change into the programming mode.

➲ Settings:

hours	.....	P1
minutes	.....	P2
metering device cycles	.....	P3
output potential-free contact	....	P4

➲ Termination of programming

Monitoring relay

· The monitoring relay signalizes a malfunction (only in combination with optional connector “**X2”;** see electrical connection diagrams pages 39 ff).

· In the first case the relay picks up (normally open contact).

· In the second case the relay releases (normally closed contact, broken-wire interlock).

· The signal is available via a potential free contact.

· When the fault indication is confirmed, the relay releases. The flashing display changes into a permanent display.

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Mode of Operation, continuation

Reading of the data memory “QuickData“ (only P 233)

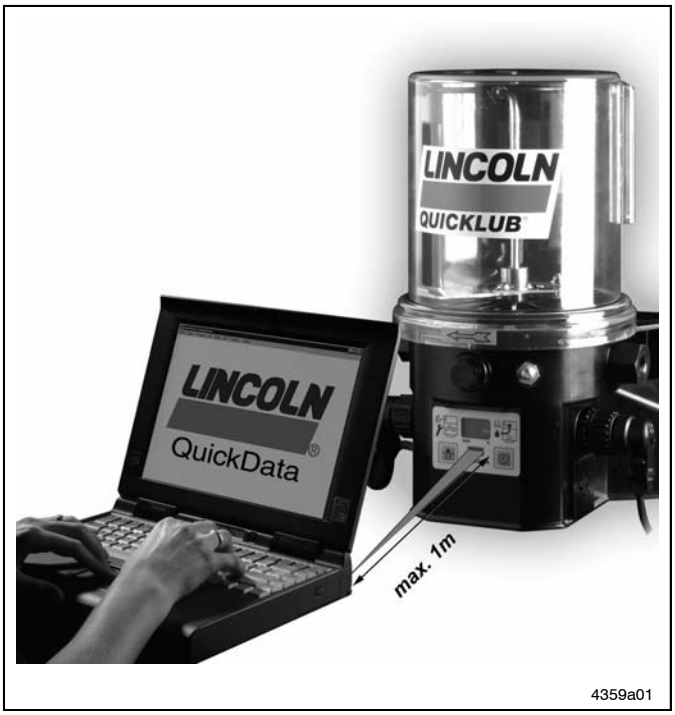

Fig. 34 Reading of the data memory

➲ Read data memory via a suitable laptop with integrated or, if not available, external infrared interface (see User Manual “Diagnostic Software QuickData“.

➲ To be able to read from the reading window, place the infrared interface of the laptop at a maximum distance of 1 m horizontally in front of it, and then read the data.

Hardware requirements

Operating system: ...MS Windows 95, 98, ME, NT, 2000

- *Computer: .....*IBM AT or compatible device,
- 486 DX or faster,
- 16 MB RAM hard disk with min. 1 MB free memory
- a free serial connection (COM-Port, ... 9-pole)
- mouse
- CD-ROM drive

External infrared interface

- Part n°. 236-10127-1
- Protocol : IrDA 1.2 19200/8/N Baud
- Plug-in for COM-Port (RS 232, 9-pole SubD-plug; socket)
- Reach approx. 1 m

Low-level control for grease

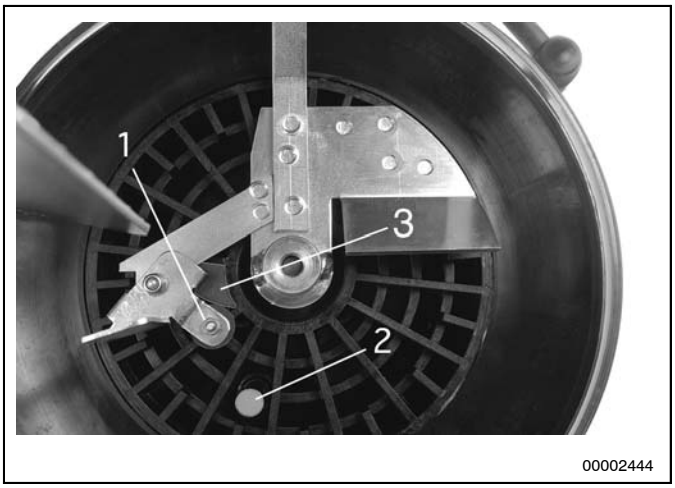

Fig. 35 Switching parts of the low-level control

1 - Guiding plate with round solenoid (at the stirring paddle)
2 - Electromagnetic switch
3 - Control cam


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NOTE

The above-mentioned switching parts must not be used with fluid grease. In this case, use a float magnetic switch; see below low-level control for oil.


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NOTE

The flashing signal starts only after the solenoid has activated the electromagnetic switch 6 times contact-free.

When the reservoir is filled

- The stirring paddle rotates clockwise during the operating time.
- Due to the rotating motion of the stirring paddle in the lubricant the pivoting guiding plate with the round solenoid, item 1[1)], is pressed backwards. The solenoid moves toward the center of rotation of the stirring paddle. The electromagnetic switch item 2[1)] cannot be activated.
- Control cam item 3[1)] guides the round solenoid with the pivoting guiding plate automatically outwards, in the direction of the reservoir wall. After the lubricant has left the control cam, it flows against the guiding plate, thus displacing the solenoid again onto the center of rotation of the stirring paddle.

[1)] All indications of positions refer to fig. 35.

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Mode of Operation, continuation

Low-level control for grease, continuation

When the reservoir is empty

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NOTE

The flashing signal starts only after the solenoid has activated the electromagnetic switch 6 times contact-free.

- During the rotating motion of the stirring paddle there is no backpressure from the lubricant. The guiding plate with the round solenoid no longer moves towards the center of rotation of the stirring paddle. After control cam (pos. 3) has been overtravelled, the solenoid remains in the outer position and overruns electromagnetic switch (pos. 2). The solenoid activates the electromagnetic switch contact-free, thus triggering a low-level signal. The operating time is terminated via the piston detector.
- The flashing frequency in the case of the control p.c.b. 236-13870-2 is:
  0.5 seconds ON and 0.5 seconds OFF
- The external relay drops out and the LED is extinguished once the operating time has expired. The pump stops operating and doesn't restart automatically any longer.

[1] All indications of positions refer to fig. 35 (page 21).

Magnetic switch

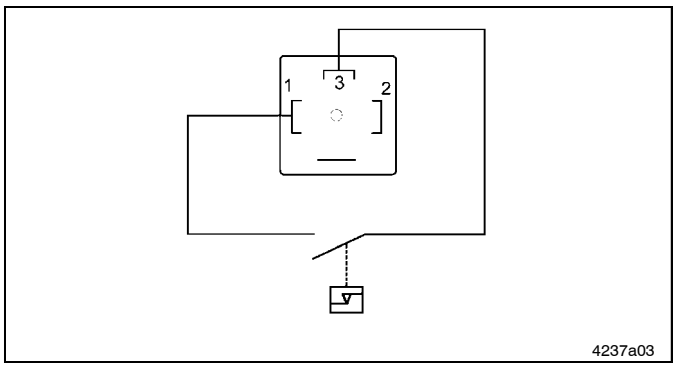

Fig. 36 Connection diagram, low-level control for grease

- The electromagnetic switch is activated contact-free and without wear by the magnetic field of the solenoid fitted to the stirring paddle.

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NOTE

The life of the magnetic circuit breaker strongly depends on the conditions under which it is loaded. Since the data relative to the maximum switching capacity refer to strictly resistive loads, which cannot always be guaranteed in practice, it is necessary to take the corresponding contact protection measures in the case of deviating loads.

Technical Data

Switching capacity ..... max. 60VA
Switching voltage ..... max. 230 V
Current switched ..... 3 A

Contact protection measures

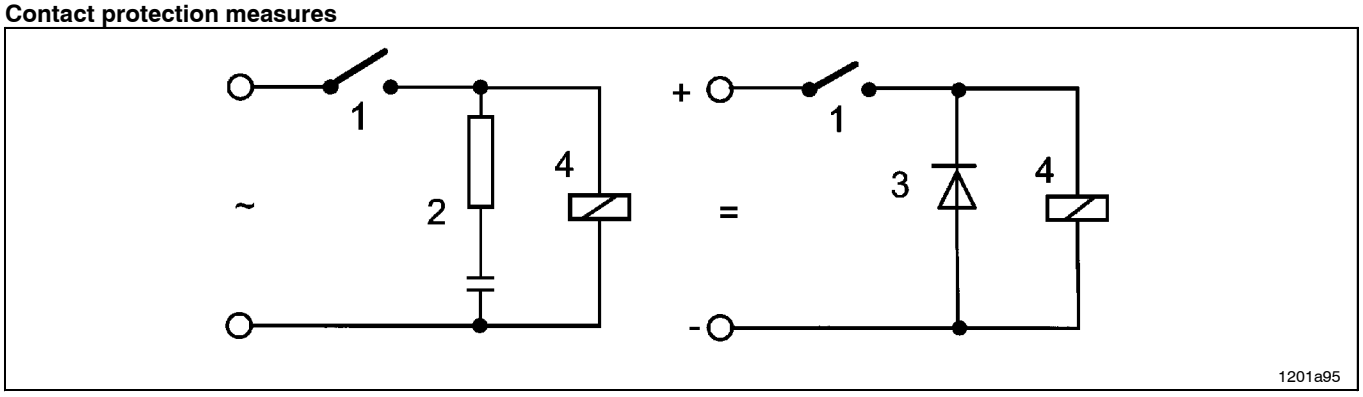

Fig. 37 Contact protection measures

1 - Electromagnetic switch
2 - RC element
3 - Diode
4 - Load

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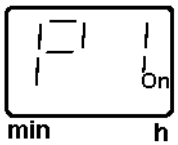
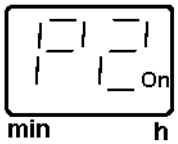
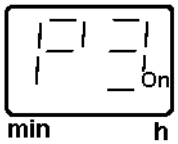
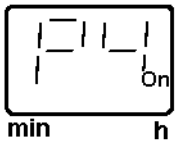
Setting and Operation

Factory Settings

Programming steps	Factory Setting	Description	Page
 4215a99	**6 h**	6 hours Pause time	26
 4217a99	**0 min**	0 minutes Pause time	26
 4218a99	**1 cycle**	Lubrication cycles: 1 cycle (metering device cycle)	27
 6252b04	**NO**	Signal output of the fault relay: NO (normally open) Signalizing during the failure or low-level indication	27

Operator Keys

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

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

External triggering of an additional lubrication cycle

Fig. 38 Key for triggering an additional lubrication cycle

➲ Press key > 2 seconds.

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Setting and Operation, continuation

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

- **Display mode**
- **Programming mode (page 26 ff)**
- **Operating mode (page 29 ff)**

Display Mode

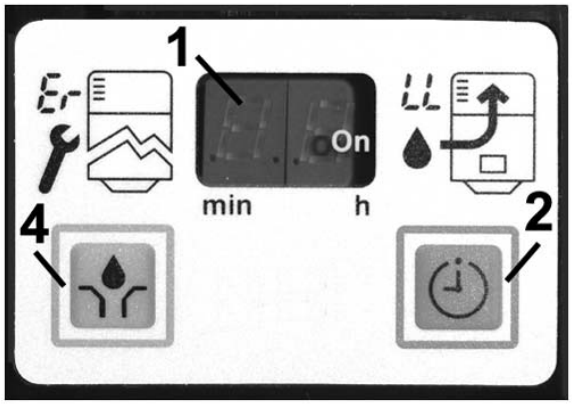

Fig. 39 P223 Membrane keypad

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

1 - Display
2 - Operator key to acknowledge malfunctions and for time setting
4 - Operator key to trigger an additional lubrication cycle

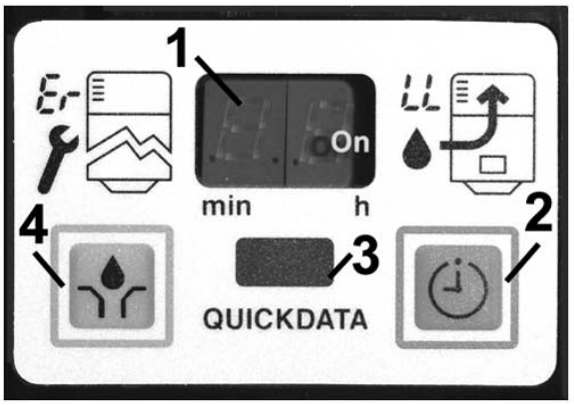

Fig. 40 P233 membrane key pad with reading window

Only P233:

- By means of the Lincoln diagnostic software QuickData the data memory of pump 233 can be transmitted to a notebook, PDA or Palm via the reading window (pos. 3).

1 - Display
2 - Operator key to acknowledge malfunctions and for time setting
3 - Reading window for data transmission out of the integrated data memory to diagnostic software QuickData
4 - Operator key to trigger an additional lubrication cycle

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Setting and Operation, continuation

Display Mode, continuation

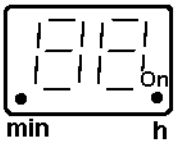
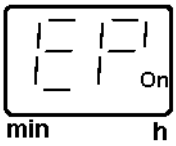
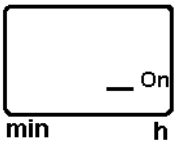
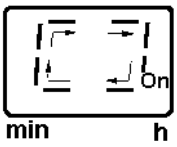
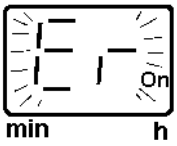
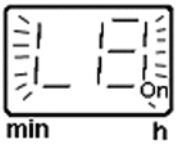
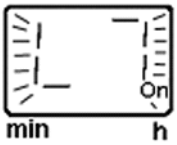
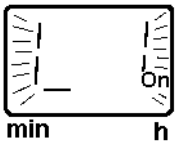
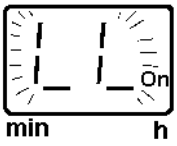
Display	Press
 4207a99	· A test display is made when the voltage is applied; all segments and decimal points are illuminated for 2 seconds.
 4227a99	 6001a02 **NOTE** *If ***EP*** is displayed after the display test, this indicates that the button or the keypad is defective.*
 4208a04	· The right-hand segment (On/h) indicates the available voltage supply during the pause time. As soon as another message is displayed, the segment turns off.
 4209a99	· The operating time is displayed as a rotating segment.
 4210a99	· *** Er *** is shown to indicate a malfunction
 6262b04  6263b04  6264b04	· **In the display mode**, a low level is announced by an intermittent display of *** L8 *, * L7 *, * L6 * … * L1 ***.
 4210a99	· Finally appears the intermittent display *** LL *** for a low-level indication that had not been confirmed.
 4214a99	< 2 sec. <u>To acknowledge a malfunction</u> · The flashing display is changed into a continuous light by pressing the button **(acknowledging).** To **acknowledge**, press the button only briefly (< 2 sec.). · Messages that have been acknowledged but have not yet been remedied flash again after the pump is switched off and on again.

Fig. 41 Display mode

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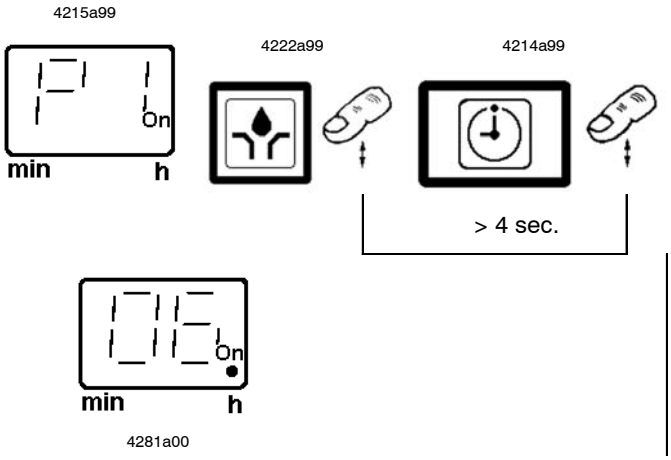
Setting and Operation, continuation

Programming Mode

Display **press**

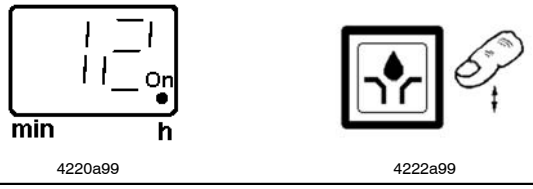


Setting Pause Time P1 and P2

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

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

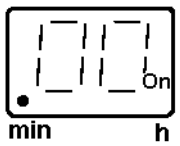
P1: Setting hours
When releasing the two buttons, the currently set value appears (here the factory-set value: 6 hours).
The field "hour" is indicated by a **decimal point** on the **right-hand side**.



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

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

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



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

NOTE

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

Fig. 42 Programming mode (continuation next page)

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Setting and Operation, continuation

Programming Mode, continuation

P3: Setting number of cycles

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

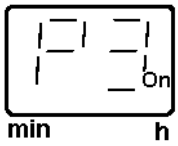
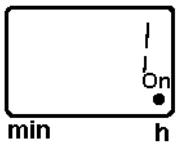
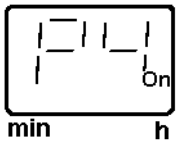
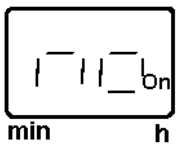
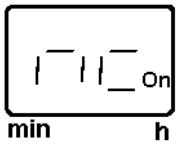
Display	Press
 4218a99	 4214a99
 4219a04	
 4219a99	 4222a99
 6252b04	 4214a99
 6254b04	
 6253b04	 4222a99

Fig. 42 Programming mode (continuation next page)


6001a02

IMPORTANT

Settings are only possible in connection with progressive divider block SSV 6 or SSV 8 KNQLS (connected as a main divider block) and a jumper attached to the p.c.b.

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

Max. cycle time VDC ..... 1 to 5

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

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

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

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

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

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

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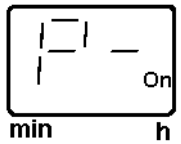
Setting and Operation, continuation

Programming Mode, continuation



4221a99

4214a99

4222a99

4208a99

Fig. 42 Programming mode

Completing the programming

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

6001a02

IMPORTANT

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

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

6001a02

NOTE

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

IMPORTANT

After completion of the programming, check the parameter settings in the operating mode once again (see pages 29 ff).

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Setting and Operation, continuation

Operating Mode

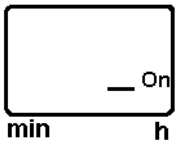
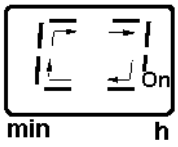
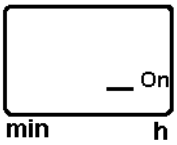
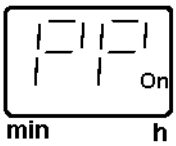
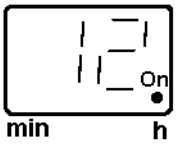
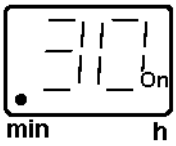
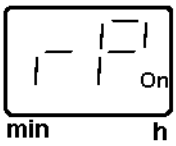
Display	Press
 4208a04	
 4209a99	 > 2 sec. 4222a99
 4208a04	
 4123a99	 4214a99
 4216a99	after two sec.
 4220a99	after two sec.
 4224a99	after two sec.

Fig. 43 Operating mode (continuation next page)


6001a02

IMPORTANT

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

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

Operating option: Initiating an additional lube cycle

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

Operating option: Calling up of set parameters and data determined

➲ Press the button.

PP (set pause time)


6001a02

NOTE

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

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

12 . (hours)

. 30 (minutes)

rP (remaining pause time)

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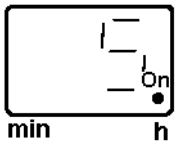
Setting and Operation, continuation

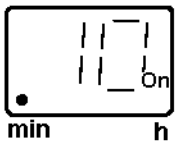
Operating Mode, continuation



4225a99

after two sec.

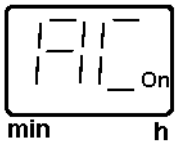
5 . (hours)



4226a99

after two sec.

. 10 (minutes)

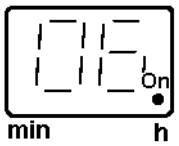


4277a00

after two sec.

AC number of the automatically triggered lube cycles, countable up to 9999 cycles.
Then counting starts from the beginning again.

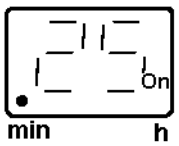
Example **0625** cycles:



4281a00

after two sec.

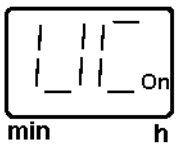
06. Display for thousands and hundreds
06 as 600



4280a00

after two sec.

.25 Display for tens and ones

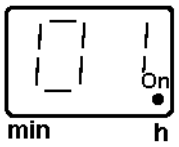


4278a00

after two sec.

UC Number of the manually triggered (by the user) additional lube cycles, countable up to 9999 cycles.
Then counting starts from the beginning again.

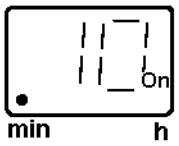
Example **0110** cycles:



4297a00

after two sec.

01. Display for thousands and hundreds
01 as 100



4226a99

after two sec.

.10 Display for tens and ones

Fig. 43 Operating mode (continuation next page)

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Setting and Operation, continuation

Operating Mode, continuation

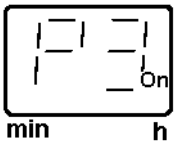
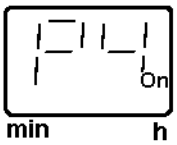
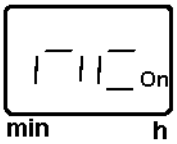
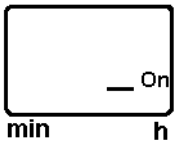
 4218a99	after two sec.	P3: Number of metering device cycles
 4219a99	after two sec.	Display of the metering device cycles
 6252b04	after two sec.	P4: Programming of the output signal
 6253b04	after two sec.	Display of the output signal “normally closed“ (NC) or “normally open“ (NO)
 4208a04	after approx. 40 sec.	Termination of the operating mode

Fig. 43 Operating mode

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Maintenance, Repair and Tests

Maintenance

- The maintenance is essentially limited to refilling the reservoir with clean lubricant in good time. However, check regularly whether the lubricant is really dispensed to all the lubrication points.
- Also check the main lines and lubricant feed lines for damage and replace them, if necessary.

6001a02

NOTE

Whenever work is done on the centralized lubrication system, particular attention should be paid to absolute cleanliness. Dirt in the system will cause malfunctions.

- For cleaning the system use benzine or petroleum. Do not use tri-, perchloroethylene or similar solvents.
  Also do not use polar organic solvents such as alcohol, methylacohol, acetone or similar.

Pump Filling

1011b93

Fig. 44 Fill pump reservoir

2 l, 4 l, 8 l - Reservoir

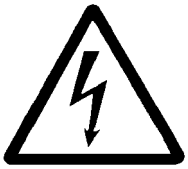
➲ Fill the reservoir up to the ”Max.” mark via the filling nipple, if any, or via the upper filling opening.

➲ It is possible to use greases up to penetration class NLGI grade 2.

6001a02

IMPORTANT

The grease or oil must be free from impurities and must not be liable to change its consistency in the course of time.



4273a00

CAUTION!

If the pump is filled via the upper filling opening, switch off the power supply before starting filling.

1013A94

CAUTION!

Risk of bursting if the reservoir is overfilled.

When filling the reservoir by means of pumps with a large delivery volume do not exceed the max. filling mark.

6001a02

NOTE

If the reservoir has been completely emptied, the pump may require until 10 minutes before it operates with its full output.

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Maintenance, Repair and Tests, continuation

Repair

Pump

- Use only original Lincoln spare parts for repair on the pumps.
- The pump should be returned to the factory for warranty work or major repairs.

Replace pump element

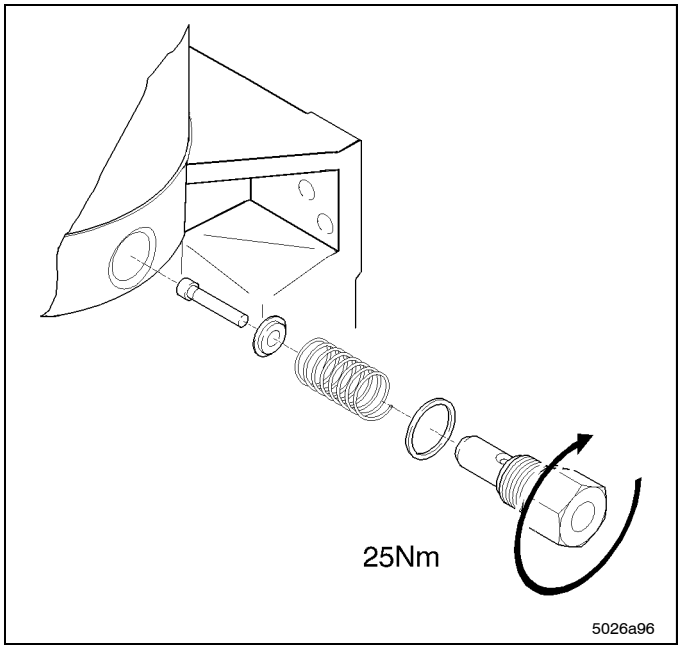

Fig. 45 Replace pump element

➲ Remove the pressure relief valve from the pump element.

➲ Unscrew the pump element.


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IMPORTANT

Take care that the piston, the pull-back spring and the washer are not left lying in the grease; otherwise the reservoir must be disassembled in order to remove these pieces.

IMPORTANT

Do not leave the piston, spring and washer in the housing because they may block the motor.

NOTE

Pump elements with adjustable lubricant output are to be set to the required output before installation.

➲ Install a new pump element with a new sealing ring.

Control p.c.b.

➲ Note down the jumper positions of the defective control p.c.b.

➲ Pack the defective control p.c.b. properly so that it will reach the factory without any further damages.

- A defective control p.c.b. will always be replaced by a control p.c.b. version MF00 (P223) or MDF00 (P233).

➲ Set the jumper configuration on the new control p.c.b. according to the one noted down from the old control p.c.b.

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Maintenance, Repair and Tests, continuation

Tests

Operational Test / Triggering an Additional Lubrication Cycle

- To check the pump operation it is possible to perform an additional test (see paragraph ”Additional lubrication cycle“, page 19).

Check the Pressure Relief Valve

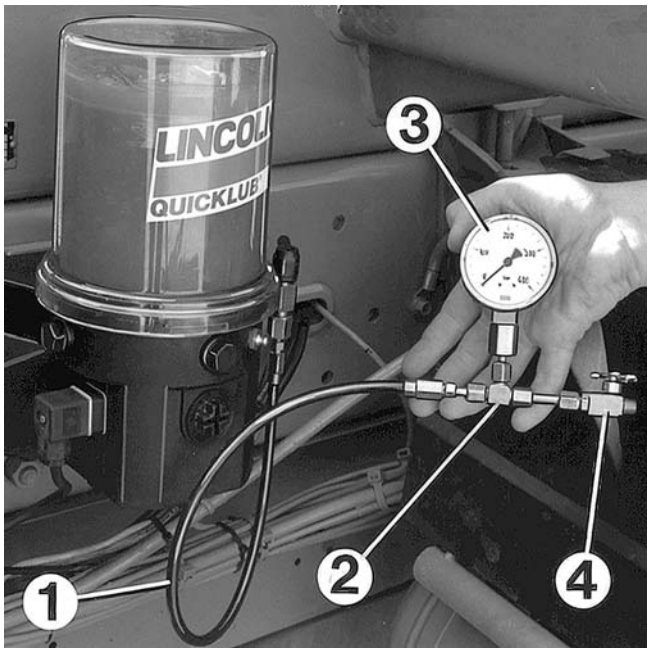

Fig. 46 Check the pressure relief valve

1st option

➲ Connect the pressure gauge (0-600 bar; 0-8708 psi) to the pressure relief valve (see fig. 16, page 15).

➲ Trigger an additional lubrication cycle.

2nd option

➲ Connect the manual pump of the pressure and checking set 604-36879-1 to the pressure relief valve and check the opening pressure by means of the manual pump.

➲ The pressure relief valve should open at a pressure of 200, 270 or 350 bar depending on its design.

6001a02

IMPORTANT

Do not connect the pressure gauge directly to the pump element. High pressure may exceed the above-mentioned range, causing the motor to stall. The motor is designed in such way that it can stall for about 30 minutes without being damaged.

1 - Hose line, min. length 1m
2 - T-piece
3 - Pressure gauge
4 - Relief cock

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Troubleshooting

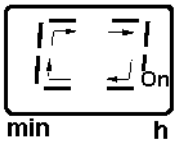

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Fig. 47 Green circulating illuminated segment, operating time

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NOTE

The pump operation can be checked from the outside by observing whether the stirring paddle is rotating (e.g. by triggering an additional lubrication).
Additionally, during the operating time of the pump a circulating illuminated segment appears in the display window of the membrane keypad (see fig. 47).

Fault: The pump motor does not run, stirring paddle does not turn

Cause:	**Remedy:**
· Power supply interrupted, segment display for On/h is not lit	➲ Check the power supply (connection, lines) and fuses. ➲ If necessary rectify the fault and/or replace the fuses.
· Power supply from control p.c.b. to motor interrupted, electric motor defective	➲ Check the line leading from the fuses to the pump plug. ➲ Check the power supply to the motor. If necessary, replace the motor.
· Defective control printed circuit board	➲ Replace the control p.c.b.
· Defective operator key of the membrane key pad	➲ *** EP *** display is lit. Replace housing and membrane keypad.

Fault: Pump motor does not stop dispensing (30 minutes monitoring time)

Cause:	**Remedy:**
· Defective piston detector (initiator)	➲ Remove main line towards the monitored divider valve.
· Blockage in the system	➲ Unscrew the piston detector. ➲ Check the piston detector by introducing an iron pin into the borehole of the detector, maintain it there for more than 2 seconds and pull out again. If then the pump switches off, a blockage may exist. If the pump does not switch off, check cable connections towards the pump.
· Coble connections from the piston detector towards the pump interrupted.	➲ Check cable connections towards pump. ➲ If necessary, replace piston detector with connecting plug.
· Defective control p.c.b.	➲ Replace the control p.c.b.

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Troubleshooting, continuation

Fault: The pump does not deliver lubricant

Cause:	Remedy:
· Reservoir empty. *** LL *** display on the membrane keypad is flashing.	➲ Fill up the reservoir with clean grease. Let the pump run (trigger additional lubrication cycle, see fig. 30, page19) until lubricant shows at all lube points.
· Pump does not deliver lubricant and *** Er *** display on the membrane keypad is flashing.	
	 6001a02 **NOTE** *Depending on the ambient temperature and/or sort of lubricant it may take 10 minutes of operation before the pump elements reach their full lubricant output. Therefore, trigger several additional lube cycles.*
· Air bubbles in the lubricant	➲ Trigger an additional lubrication cycle (see fig. 30, page 19). Loosen the outlet fitting or the main line on the pressure relief valve. The lubricant must penetrate without air bubbles.
	 6001a02 **NOTE** *When push-in type fittings are used, the high-pressure hose, which is under pressure, cannot be easily disconnected from the pressure relief valve. For this purpose, loosen the pressure relief valve or, if exists, the filling nipple on the pressure relief valve in order to relieve the high-pressure hose.*
· Unsuitable lubricant has been used	➲ Renew the lubricant (see the lubricant list page 45 and 46).
· Suction hole of the pump element clogged	➲ Remove pump element. Check suction hole for foreign particles. If there are any, remove them.
· Pump piston worn	➲ Replace pump element.
· Check valve in the pump element defective or clogged	➲ Replace pump element.

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Technical Data

PUMP

Admissible operating temperature ..... -40° C to 70° C [1)]
Number of outlets ..... 1,2 or 3
Reservoir capacity ..... 2 l, 4 l, 8 l
Refilling .....via hydraulic lubrication fitting or from top
Lubricant ..... greases up to NLGI grade 2
Class of protection ..... IP6K 9K acc. to DIN 40050 T9
.....U_L type 4X only for indoor use, 12 and 13

6001a02

[1)] NOTE

The pump is designed for the above mentioned temperature range. However, most times the lubricants are pumpable up to –25°C only. For lower temperatures use low-temperature lubricants.

Pump element with fixed lubricant output

Piston diameter, K5, B7 .....5 mm
- Lubricant output ..... approx. 2 cm³/min
Piston diameter, (Standard) K6.....6 mm
- Lubricant output ..... approx. 2.8 cm³/min
Piston diameter, K7, S7 .....7 mm
- Lubricant output ..... approx. 4 cm³/min
Max. operating pressure . ..... 350 bar
Connection thread ..... G ¼“
- suitable for tube dia ..... 6 mm

Pump element with adjustable lubricant output

KR ..... 0.04 to 0.18 cm³/stroke
..... 0.7 to 3 cm³/min
Connection thread ..... G ¼“
- suitable for tube dia ..... 6 mm
- suitable for tube dia ..... 8 mm

6001a02

IMPORTANT

The lubricant outputs listed refer to grease of NLGI grade 2 measured at 20°C, backpressure 100 bar, and nominal voltage 12/24 V. Any differing pressures or temperatures result in different lubricant outputs. Any system design must be based on the above values.

PRESSURE RELIEF VALVE

SVTE-350-G 1/4A-D6 624-28894-1
SVTE-350-G 1/4A-D8 624-28774-1

TORSION TORQUES

Install pump ..... 18 Nm
Electric motor on housing ..... 12 Nm
Pump element in housing ..... 25 Nm
Closure plug in housing ..... 12 Nm
Return line connector in housing ..... 10 - 12 Nm

WEIGHTS

The weights below include the following ‘‘**individual weights**”:
- Pump kit with **one** pump element, safety valve, grease filling (0.75 kg, 1.5 kg)
- Packing (cardboard box)
- Attaching parts
- Operating Instructions

2 l reservoir, standard design (0.75 kg)

- Pump 233, version 2A6.15 ..... approx. 7.6 kg

4 l reservoir, standard design (1.5 kg)

- Pump 223, 233, version 2A6.15 ..... approx. 10.4 kg

8 l reservoir, standard design (1.5 kg)

-Pump 223, 233, version 2A6.15 ..... approx. 10.6 kg

In the case of pump versions deviating from those mentioned, add the weights of the following components to the mentioned weights:
- per pump element ..... +0.2 kg
- per pressure relief valve ..... +0.1 kg
- Connection cable with piston detector ..... +0.1 kg
- Reservoir version ”Filling from top” (only 2 l) [3)] ..... +0.15 kg
- 2 l flat-type reservoir..... +0.5 kg

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[3)] NOTE

The 4l and 8l reservoirs have the standard design ”filling from top”.

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Technical Data, continuation

Electrical Data

PUMP

Input

Rated voltage ..... 12 VDC, -20% / +30%
Max. operating current ..... 2.0 A
Rated voltage ..... 24 VDC, -20% / +30%
Max. operating current ..... 1.0 A
Class of protection ..... IP6K 9K acc. to DIN 40050 T9

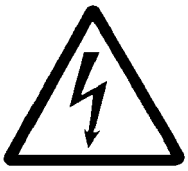

6001a02

NOTE

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

Reverse polarity protection ..... The operating voltage .....inlets are protected against reverse polarity

Residual ripple in relation to the operating voltage
..... ± 5% acc. to DIN 41755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CAUTION!

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


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NOTE

If the internal fuse must be replaced, only use the original fuse type.


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IMPORTANT

Pump 223, 233 is suitable for interval operation only, not for permanent operation!

Output

Output voltage, internal ..... 24 VDC ±1%

EMC

In addition to the EMV directive, the **DC systems** also comply with the following guidelines and standards:
- the vehicle guideline 95/245/EC
- EN 40839 T1, 3 and 4

The printed circuit board is protected against condensate by a protective paint coating.

Emitted interference acc. to ..... EN 55011 / 03.91
..... and EN 50081-1 / 01
Interference immunity acc. to ..... prEN 50085-2 / 1994

Motor

DC gear motor (interference-suppressed)
- Operating voltage 24VDC
- Max. current input 24V ..... 3 A
- Speed ..... approx. 17 U/min

Relay for Malfunction DC

Malfunction / low-level control:
- Switching voltage ..... max. 48 VAC/ VDC
- Switching current ..... max. (resistive) 2 A
- Switching capacity ..... max. 100 VA/80 W


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NOTE

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

CONTROL PRINTED CIRCUIT BOARD

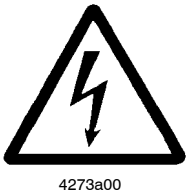
Rated voltage ..... 24 VDC
Operating voltage ..... 9 to 30 V
Residual ripple in relation
- with the operating voltage..... ±5% acc. to DIN 41755
Output motor ..... transistor 7A / short-circuit proof
Reverse voltage protection ... The operating voltage inputs
..... are protected against polarity reversal
Temperature range ..... -25 °C to 70 °C
- Output fault / readiness for service
.....transistor 3A / short-circuit proof

Class of protection:
Printed circuit board installed in housing ..... IP 6 K 9 K

TIME SETTING

Range of pause time ..... increment 1 minute
- VDC ..... 4 minutes to 60 hours
Factory setting:
Pause time..... 6 hours/cycle
Number of lubrication cycles:
- VDC ..... 1 to 5 cycles
Timer memory ..... indefinite over EEPROM

Operation with bayonet plug


4273a00

CAUTION!

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

Protective measures to be applied for the appropriate operation with quarter-turn type plugs:
"Functional extra-low voltage with safe isolation" /
"Protective Extra-Low Voltage" (PELV)
Standards: EN60204 Part1:1992 / IEC 204-1:1992, modified
DIN VDE 0100 Part 410 / IEC 364-4-41:1992

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Technical Data, continuation

Electrical connection VDC

Observe the safety instructions (page 6) and the technical data (pages 37 and 38)!

- ➲ Make sure of the connection and the type of construction of your P223, 233.
- ➲ Connect the electrical wires according to the following electrical connecting diagrams.

6001a02

NOTE

For connection of the low-level control observe the respective connection diagrams and contact protective measures (see fig. 37, page 22).

Pump 223 with control p.c.b. MF00

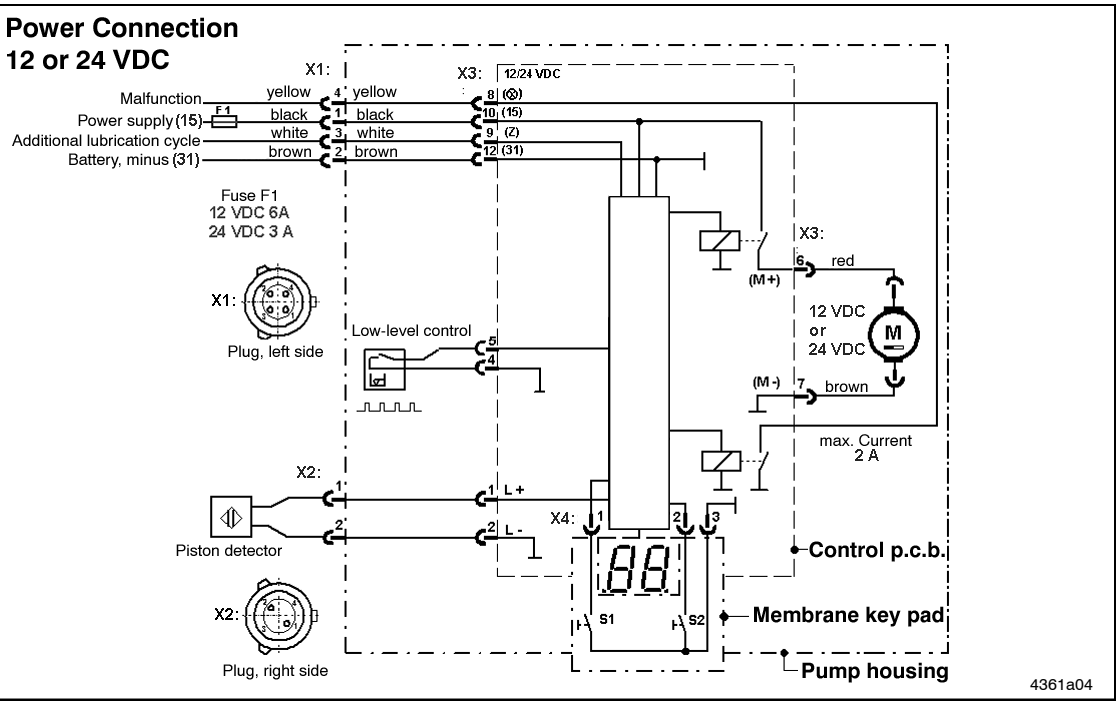

Fig. 48 Connection diagram DC, pump 223

Pump 233 with control p.c.b MDF00

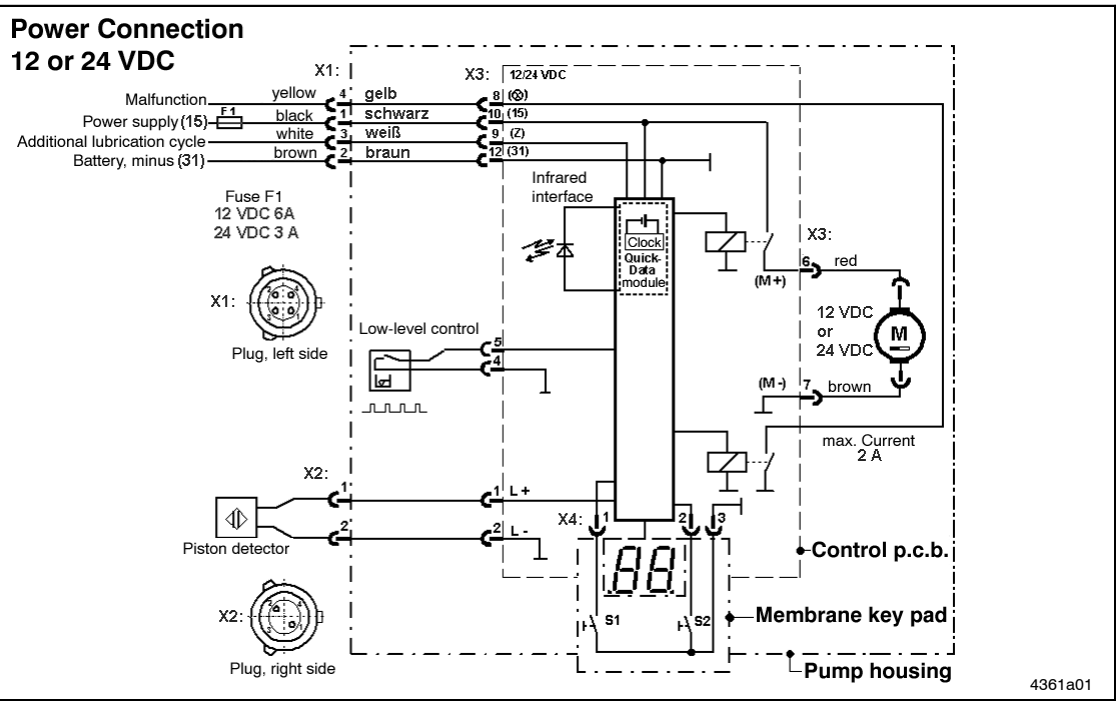

Fig. 49 Connection diagram DC, pump 233

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Technical Data, continuation

Dimensions - 2 l reservoir

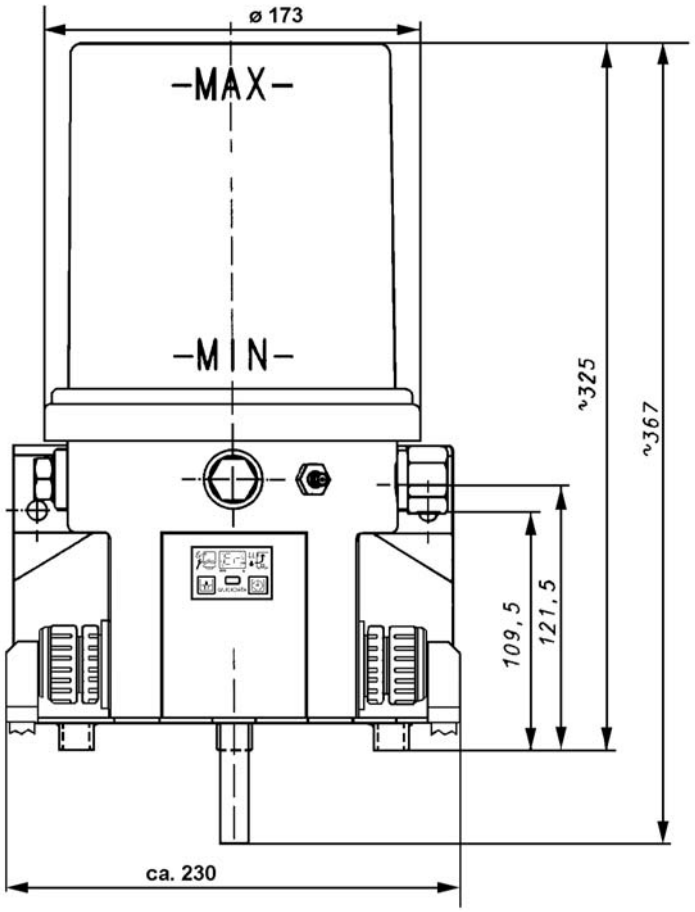

Fig. 50 Dimensions - 2 l reservoir

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Technical Data, continuation

Dimensions - 2 l reservoir with filling from the top

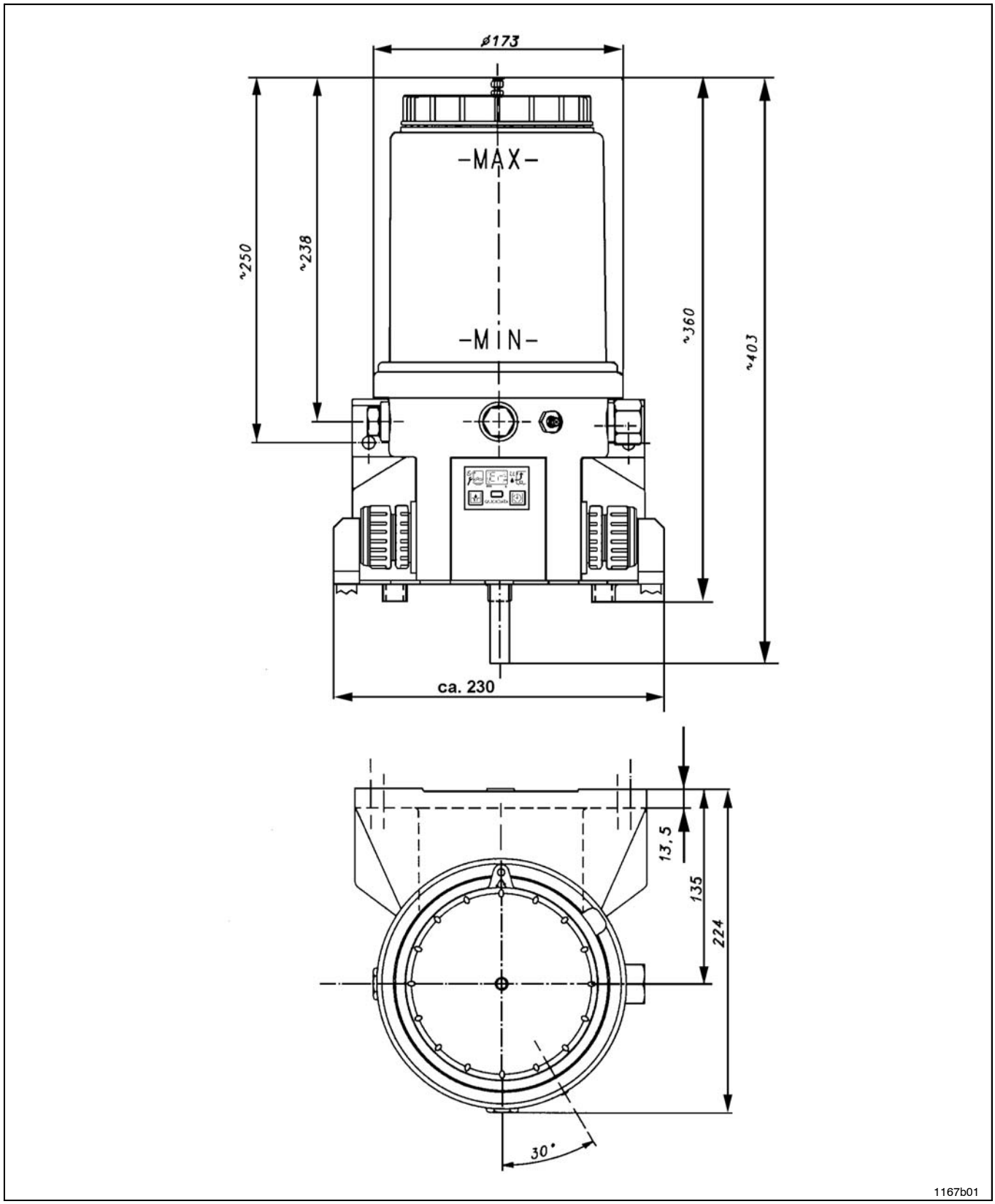

Fig. 51 Dimensions - 2 l reservoir with filling from the top

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Technical Data, continuation

Dimensions - 2 l flat-type reservoir

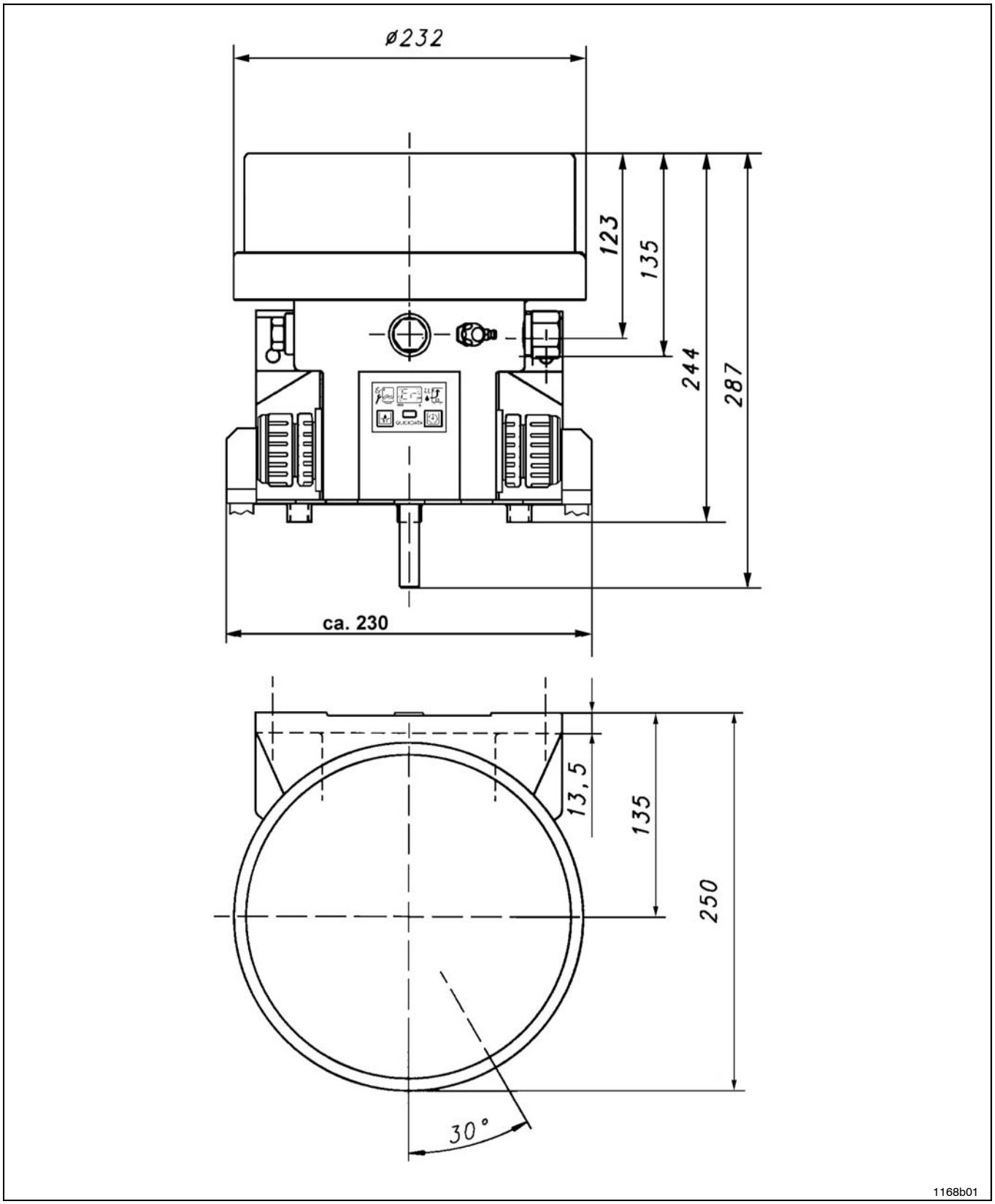

Fig. 52 Dimensions - 2 l flat-type reservoir

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Technical Data, continuation

Dimensions - 4 l reservoir

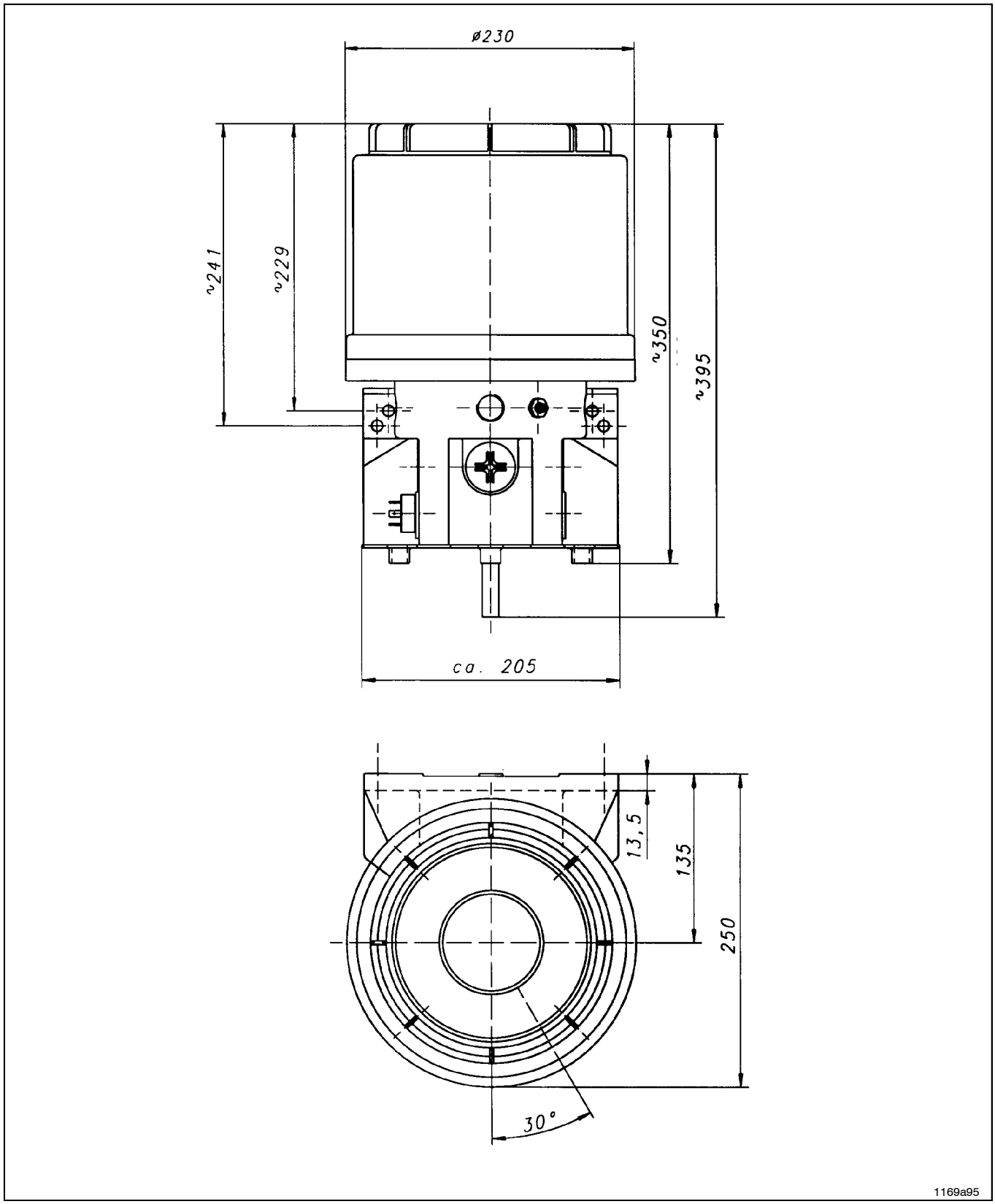

Fig. 53 Dimensions - 4 l reservoir

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Technical Data, continuation

Dimensions - 8 l reservoir

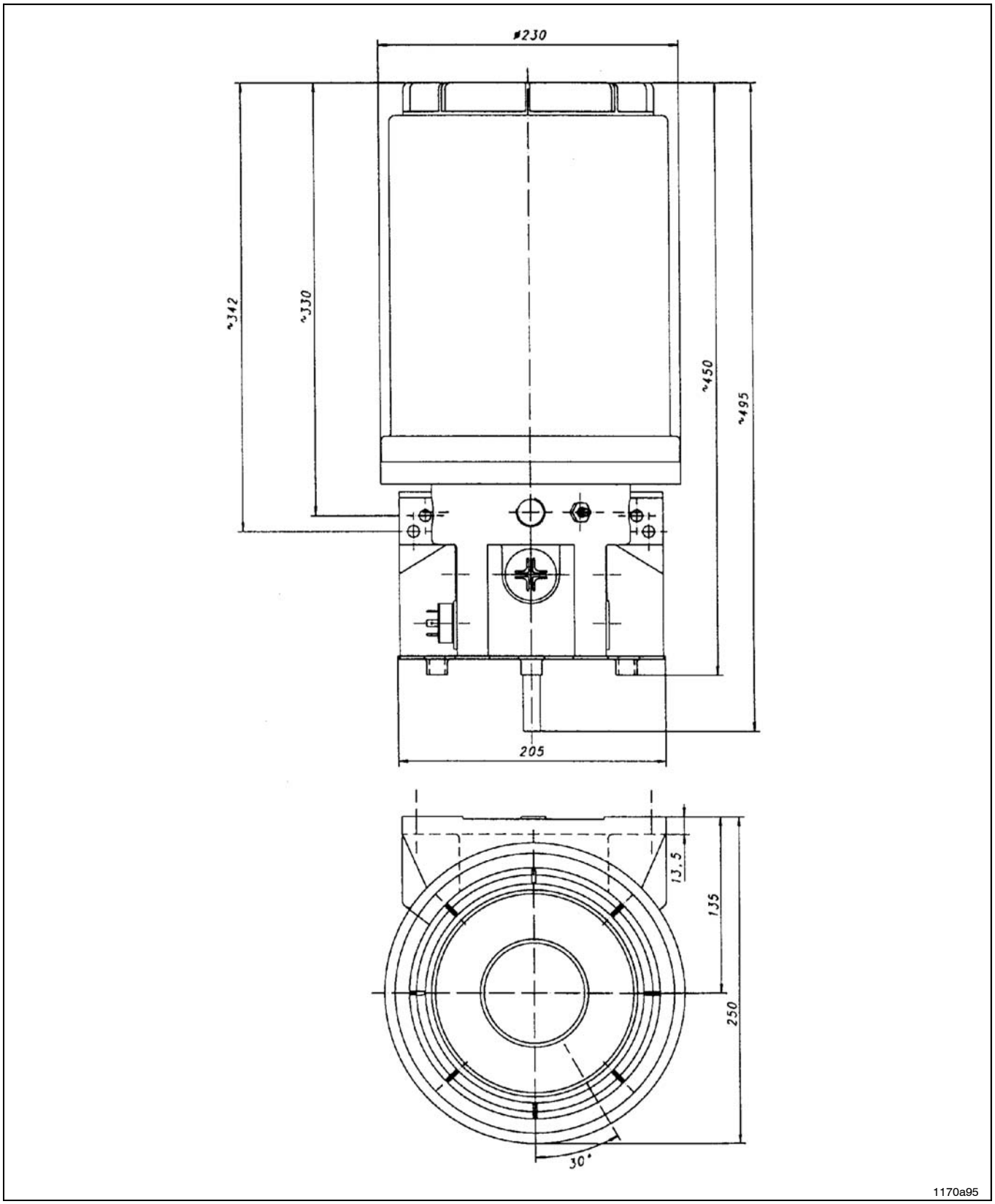

Fig. 54 Dimensions - 8 l reservoir

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Technical Data, continuation

Attaching boreholes of the 2 l, 4 l and 8 l pump

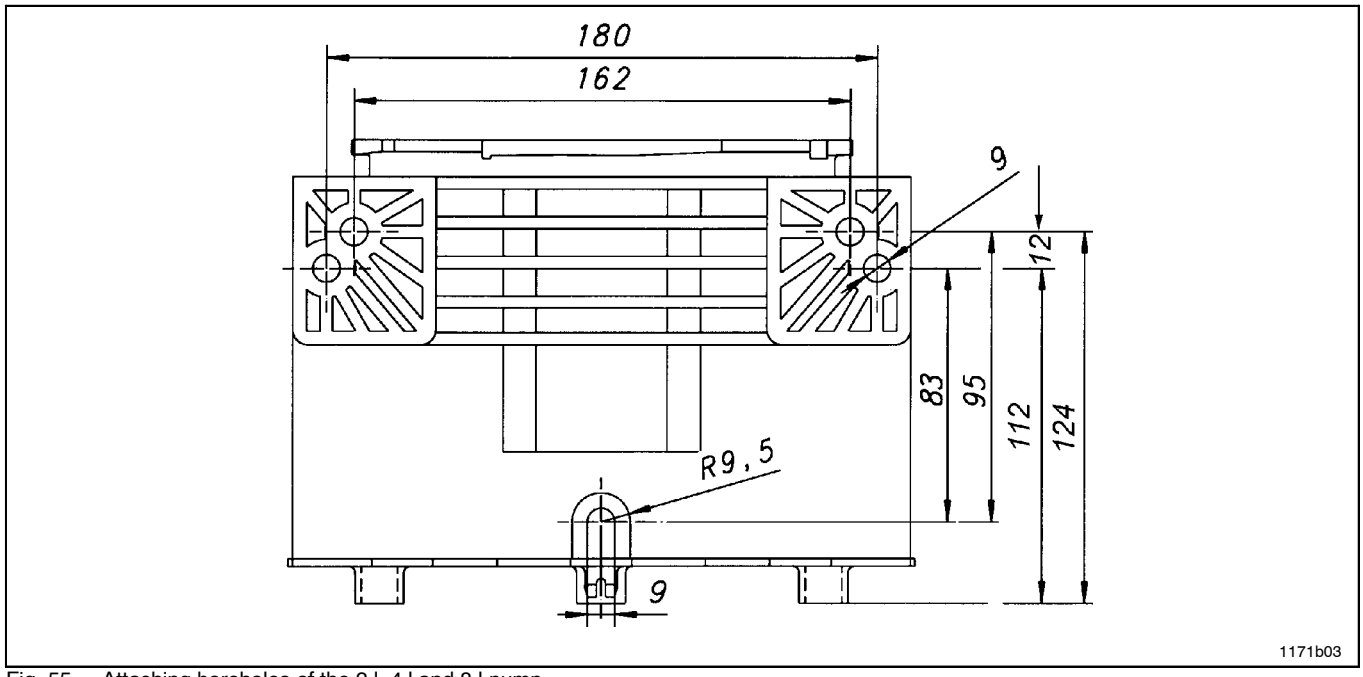

Fig. 55 Attaching boreholes of the 2 l, 4 l and 8 l pump

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NOTE

Tighten pump models with 2 l-flat-type, 4 l and 8 l reservoir with three fastening screws (see point R 9,5).

Lubricants

6001a02

IMPORTANT

Absolute cleanness is essential when handling lubricants. Impurities will remain suspended in the lubricant and cannot settle. This will result in damage to the lubrication system and thus to the bearing.

The pump QuickLub 203 can dispense commercial greases up to NLGI grade 2 at 40 °C.

Lubricant recipes may change. In case of doubts, send your request for more information to the manufacturer of the centralized lubrication system. This refers in particular to lubricants with more than 3% graphite portion. These are only conditionally in lubrication plants promo table.
The lubricants released by us have not been tested with regard to their long-term behavior.

The lubricants tested did not cause any damage due to incompatibility on the material used by us. The composition of the lubricants, their behavior during the transport and their compatibility with other material are not known to us.

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IMPORTANT

The manufacturer of the centralized lubrication system can accept no liability for:
- damages due to the use of greases that are not or only conditionally transportable in centralized lubrication systems.
- damages due to the incompatibility with other materials.
- chemical changes due to the long-term behavior.

The liability is only limited to transportable lubricants in central lubrication systems.

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List of lubricants at present not available.

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Declaration by the Manufacturer

D	GB	F	I
Herstellererklärung im Sinne der EG-Richtlinie Maschinen 98/37/EG, Anhang II B	**Declaration by the manufacturer as defined by machinery directive 98/37/EEC Annex II B**	**Déclaration du fabricant conformément à la directive 98/37/CEE, annexe II B**	**Dichiarazione del costruttore ai sensi della direttiva 98/37/CEE in materia di macchinari, Appendice II B**
Hiermit erklären wir, dass die Bauart von	*Herewith we declare that the supplied model of*	*Par la présente, nous déclarons que le produit ci-dessous*	*Si dichiara che il prodotto da noi fornito*

Product: *Pump 223 and 233*

in der von uns gelieferten Ausführung zum Einbau in eine Maschine bestimmt ist und dass ihre Inbetriebnahme solange untersagt ist, bis festgestellt wurde, dass die Maschine, die in das o.g. Produkt eingebaut werden soll, den Bestimmungen der oben genannten Richtlinie – einschließlich deren zum Zeitpunkt der Erklärung geltenden Änderungen – entspricht.	*is intended to be incorporated into machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the above mentioned directive – including all modifications of this directive valid at the time of the declaration.*	*dans l'exécution dans laquelle nous le livrons, est destiné à être installé sur une machine, et que sa mise en service est interdite tant qu'il n'aura pas été constaté que la machine sur laquelle il sera installé est conforme aux dispositions de la directive ci-dessus, y compris les modifications qui y auront été apportées et qui seront valides à la date de la déclaration.*	*è destinato all' installazione su di un macchinario e che la sua messa in funzione non sarà autorizzata fino a quando non sarà stata accertata la conformità del macchinario, sul quale esso dovrà essere installato, in relazione alle disposizioni della direttiva 98/37/CEE – comprese tutte la rettifiche di questa direttiva al momento della dichiarazione.*
Angewendete harmonisierte Normen, insbesondere	*Applied harmonized standards in particular*	*Normes harmonisées, notamment*	*Norme armonizzate applicate in particolare*

Standards: EN 292-1; EN 292-2; EN 563; EN 8099

01.03.2004 Z. Paluncic

(Datum / Unterschrift)	*(date / signature)*	*(date / signature)*	*(data/firma)*

GR	E	P	NL	DK
Δηλωση του κατασκευασ του συμφ. με τις προδιαγρ αφες: 98/37/ΕΟΚ, παρ. II Β	**Declaración del fabricante conforme con la Directiva CE sobre máquinas 98/37/CEE, Anexo II B**	**Declaração do Fabricante segundo directiva CE 98/37/CEE, Anexo II B**	**Verklaring van de fabrikant inzake de richtlijn betreffende machines, (98/37/EEG, bijlage II B)**	**Fabrikantens erklaring i henold til EF-lovgivning om maskiner 98/37/EØF bilag II b**
Δια του παροντος σας γνω–στοποιουμε, οτι το προιον	*Por la presente, declaramos que el modelo suministrado*	*Em anexo declaramos que o modelo fornecido*	*hiermede verklaren wij, dat de*	*Hermed erklares, at*

Product: *Pump 223 and 233*

προοριζεται για τοποθετηση εντος μηχανηματος, και οτι δεν επιτρεπεται να τεθει σε λειτουργια μεχρις οτου διαπιστωθει, οτι το μηχανημα εντος του οποιου προκειται να τοποθετηθει ανταποκρινεται στις προαναφερομενες ισχυουσες προ – διαγραφες (συμπεριλαμβανο–μενων των αλλαγων που ισχυ –ουν και που εγιναν στο χρον ι–κο αυτο διαστημα).	*es destinado a ser incorporado en una máquina y que su puesta en servicio está prohibida antes de que la máquina en la que vaya a ser incorporado haya sido declarada conforme a las disposiciones de la Directiva en su redacción 98/37/CEE – incluso las modificaciones de la misma vigentes a la hora de la declarción.*	*deverá ser incorporado na maquinaria coberta por esta directiva e não poderá ser colocado em serviço até a maquinaria na qual é para ser incorporado for declarada em conformidade com as provisões da directiva acima mencionada / incluindo todas as modificações desta directiva válida desde a emissão desta declaração.*	*ertoe bestemd is, ingebouwd te worden in een machine en dat een inwerkstelling verboden is, voordat vastgesteld is, dat de machine, waarin deze machine wordt ingebouwd, in overeenstemming met de bepalingen van de richtlijn 98/37/EEG – ingesloten de tot dit tijdstip geldende veranderingen van deze richtlijn - verklaard is.*	*er bestemt til inkorpoering i en maskine og at igangsætningen forbydes indtil der er konstateret, at maskinen, som skal inkorporeres i denne maskine, er bragt i overensstemmelse med alle relevante bestemmelser, samt ændringer gældende på deklarationstidspunktet.*
Προσθετα προς εφαρμογην χρησιμοποιηθησες εναρμον ισμενες προδιαγραφες	Normas armonizadas utilizadas, particularmente	Normas harmonizadas utilizadas, em particular	Gebruikte geharmoniseerde normen,namelijk	Harmoniserede standarder, der blev anvendt,i særdeleshed

Standards: EN 292-1; EN 292-2; EN 563; EN 8099

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(ημερομηνια / υπογραφη)	*(fecha / firma)*	*(Data / assinatura)*	*(Datum/ handtekening)*	*(dato/underskrift)*

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