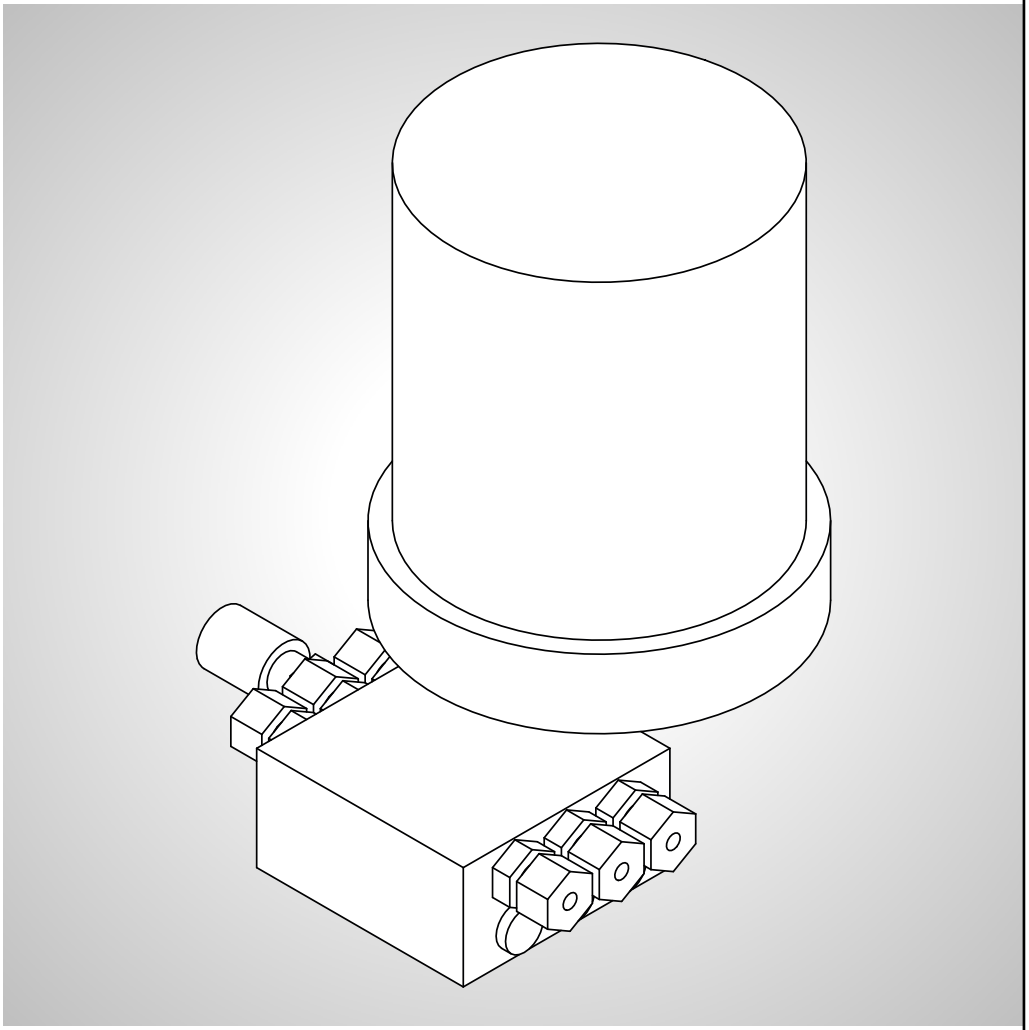
GÜDEL

SERVICE MANUAL

Automatic lubrication system Memolub PLCD (24 V DC)



Project / Order:	B1X.XXXXXXXX
Bill of materials:	101XXXXX
Serial number:	
Year of manufacture:	2019

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Translation of the original instructions

This manual contains standard illustrations that may deviate from the original. In the case of special models, options, or technical changes, the scope of delivery may differ from the descriptions here. Reprinting the instructions, in whole or in part, requires our permission. Subject to change due to technical improvements.

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Revision history

Version	Date	Description
2.0	10.07.2019	Entire manual updated New: • Outputs open and closed ➲ 11
1.0	25.05.2016	Basic version

Table -1 *Revision history*

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1 Safety

1.1 General

Read the entire manual before working with the product. The manual contains important information for your personal safety. The manual must be read and understood by all persons who work on the product in any of the product life phases.

Read the Safety chapter of the superordinate manual before working with the product. It contains important information for your personal safety. The chapter must be read and understood by all persons who work on the product in any of the product's phases. You are obligated to implement the information and warnings it contains, wherever they pertain to the product.

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2 Design, function

2.1 Design

The automatic lubrication system of the drive module consists of a small lubricant dispenser with progressive distributor with several outputs. The automatic lubrication system lubricates the guideway and rack of the equipped axes automatically. The lubricating pinion unit lubricates the rack. The wiper and lubrication unit lubricates the guideway.

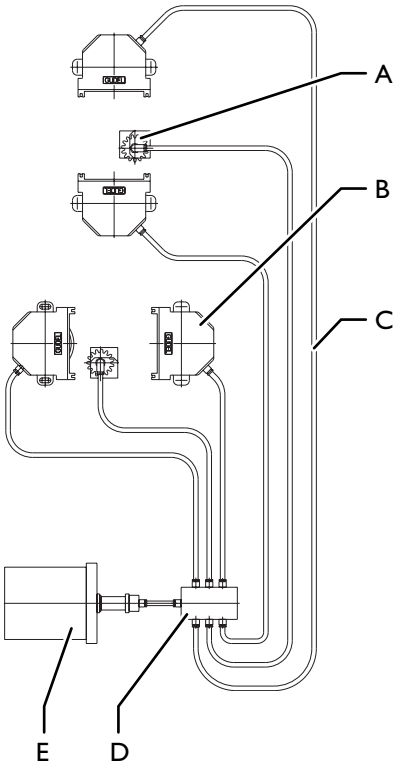

Fig. 2-1 *Design of the MEMOLUB automatic lubrication system*

A	*Lubricating pinion unit*	*D*	*Progressive distributor*
B	*Wiper and lubrication unit*	*E*	*Lubricant dispenser*
C	*Lubrication line*		

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2.2 Position of the encoder

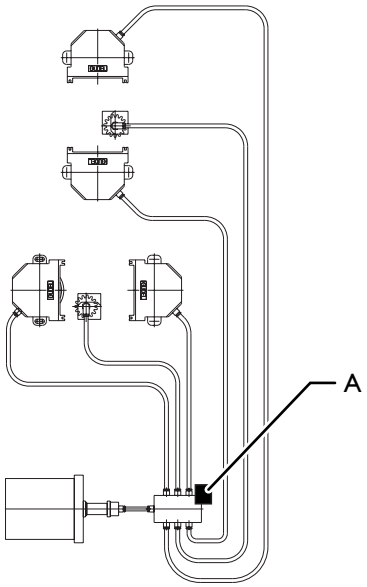

Fig. 2-2 *Position of the encoder*

A *Encoder*

2.3 Function

Lubrication is an important part of the maintenance.

The following are the most important elements for achieving effective lubrication to optimize productivity:

- Lubricant dispenser
- Lubrication point
- Lubrication quantity
- Lubrication cycle

MEMOLUB is a powerful (25 bar) and precise electro-mechanical lubricant dispenser. The lubrication is centralized and automated. The lubricant is contained in a cartridge. With the progressive distributor, several points can be lubricated simultaneously.

2.3.1 Control

For regular lubricant dispensing, the lubricant dispenser needs to be controlled by a PLC. To this end, a pulse rhythm needs to be sent for every lubrication cycle, by means of a control signal. Güdel recommends the following program sequence ➲ 🗎 19

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2.3.2 Functional description of progressive distributor

The progressive distributor evenly distributes the incoming lubricant to all outputs that are in use. If an output is closed, the output on the opposite side from it will discharge double the quantity of lubricant.

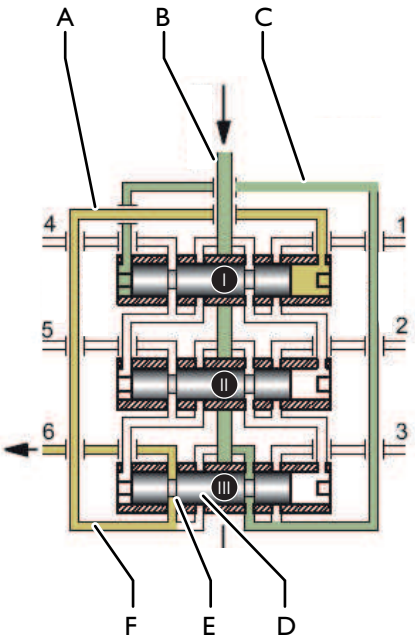

Fig. 2-3 *Function of the progressive distributor I*

A	*Left changeover line*	*D*	*Piston*
B	*Main line*	*E*	*Ring groove*
C	*Right changeover line*	*F*	*Lubricant*

From the main line, the lubricant flows through the right-hand ring groove of piston III. The changeover line moves piston I to its right-hand end position. The lubricant displaced by piston I goes through the left changeover line and exits at output 6.

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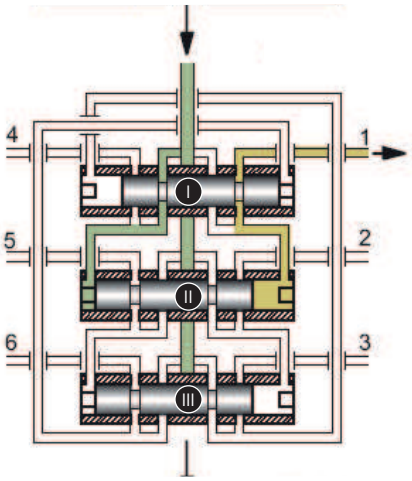

Fig. 2-4 *Function of the progressive distributor 2*

After piston I has moved, lubricant flows to the left side of piston II and pushes the piston to its right-hand end position. The displaced lubricant exits through output 1.

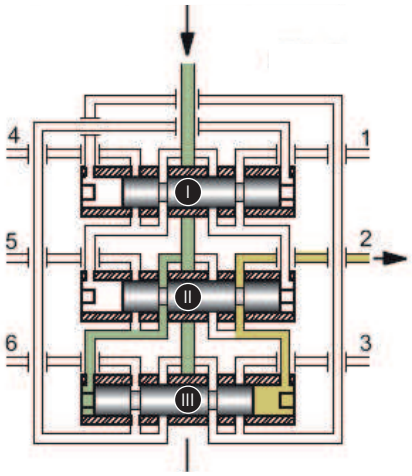

Fig. 2-5 *Function of the progressive distributor 3*

After piston II has moved, lubricant flows to the left side of piston III and pushes the piston to its right-hand end position. The displaced lubricant exits through output 2.

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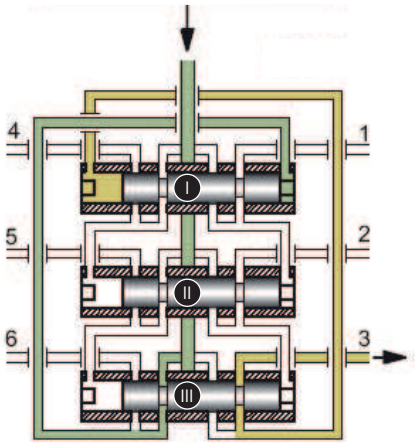

Fig. 2-6 *Function of the progressive distributor 4*

After piston III has moved, lubricant flows to the right side of piston I and pushes the piston to its left-hand end position. The displaced lubricant exits through output 3. The progressive distributor continues to follow the functional sequence as described, until all outputs have been supplied with lubricant.

As long as pressure is generated by the lubricant, the entire procedure keeps repeating in the progressive distributor.

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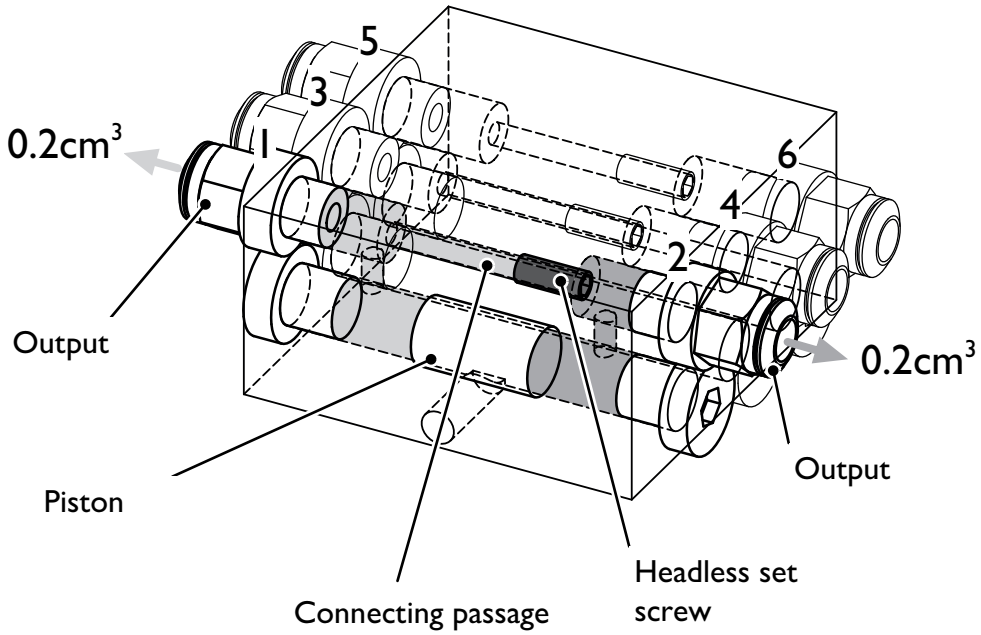
2.3.2.1 All outputs open

The progressive distributor evenly distributes the incoming lubricant to all outputs. The opposite outputs are operated by the same piston. For the identical conveying volume to be output at the opposite outputs, the headless set screw must close the connecting passage of the two outputs. The progressive distributor is normally supplied ex works with the headless set screw fitted.



The same conveying volumes are output by the piston at output 1 and output 2. The connecting passage between the two outlets is closed with the headless set screw.

Fig. 2-7 *All outputs open (the internals of the progressive distributor are shown in simplified form)*

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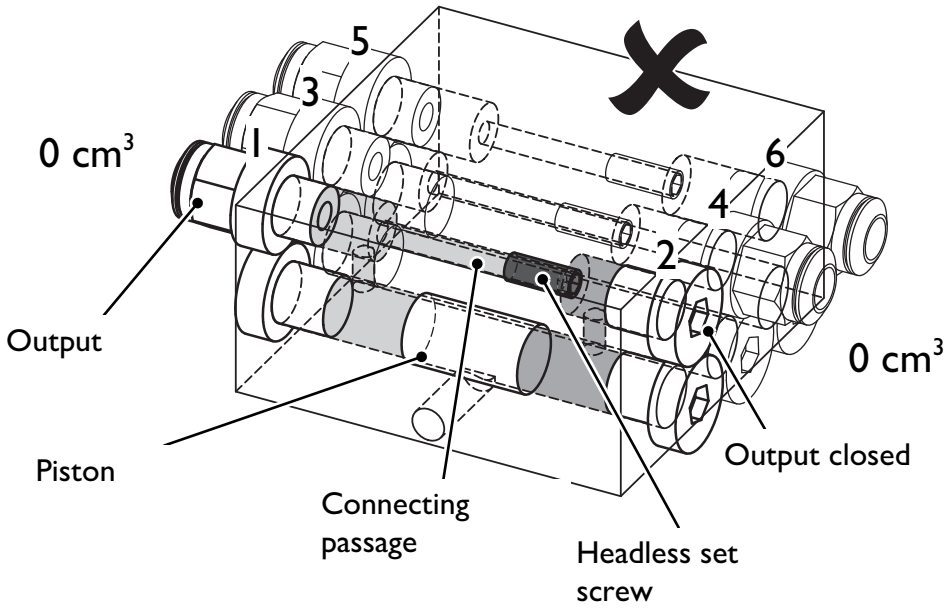
2.3.2.2 Output closed

The connecting passage between opposite outputs is closed with a headless set screw ex works. In some cases, outputs on the progressive distributor may be closed. The headless set screw must then be removed. As a result, the piston conveys twice the volume to the open output.

NOTE

Lubricating film missing

If an output is closed without removing the headless set screw from the connecting passage between the opposite outputs, the progressive distributor will not work. The piston cannot move. A missing lubricating film on guideways and racks leads to damage to the product. This results in operational failure.



Output 2 is closed. The connecting passage between the two outlets is closed with the headless set screw. The piston is blocked by the enclosed conveying volume. The progressive distributor does not work.

- Always remove the headless set screw from the connecting passage if you want to close the outputs

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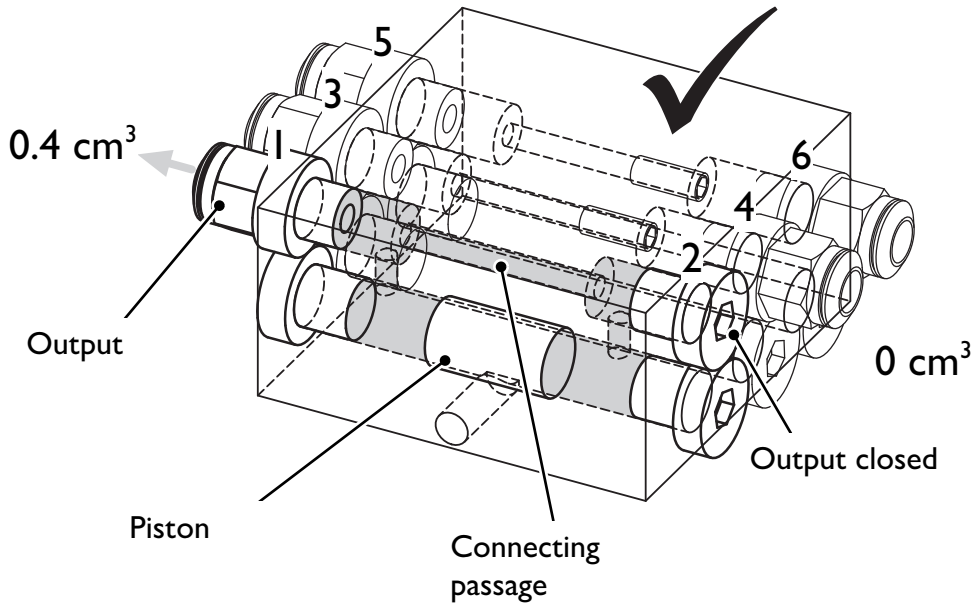

Double the conveying volume is output by the piston at output 1. Output 2 is closed. The connecting passage between the two outlets is open.

Fig. 2-8 *Output closed (the internals of the progressive distributor are shown in simplified form)*

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3 Commissioning

3.1 Connecting PLCD

Connect the automatic lubrication system as follows.

The interface electronics of Memolub reacts very sensitively to low voltage levels. The low voltage levels can be caused by the semiconductor electronics of output boards.

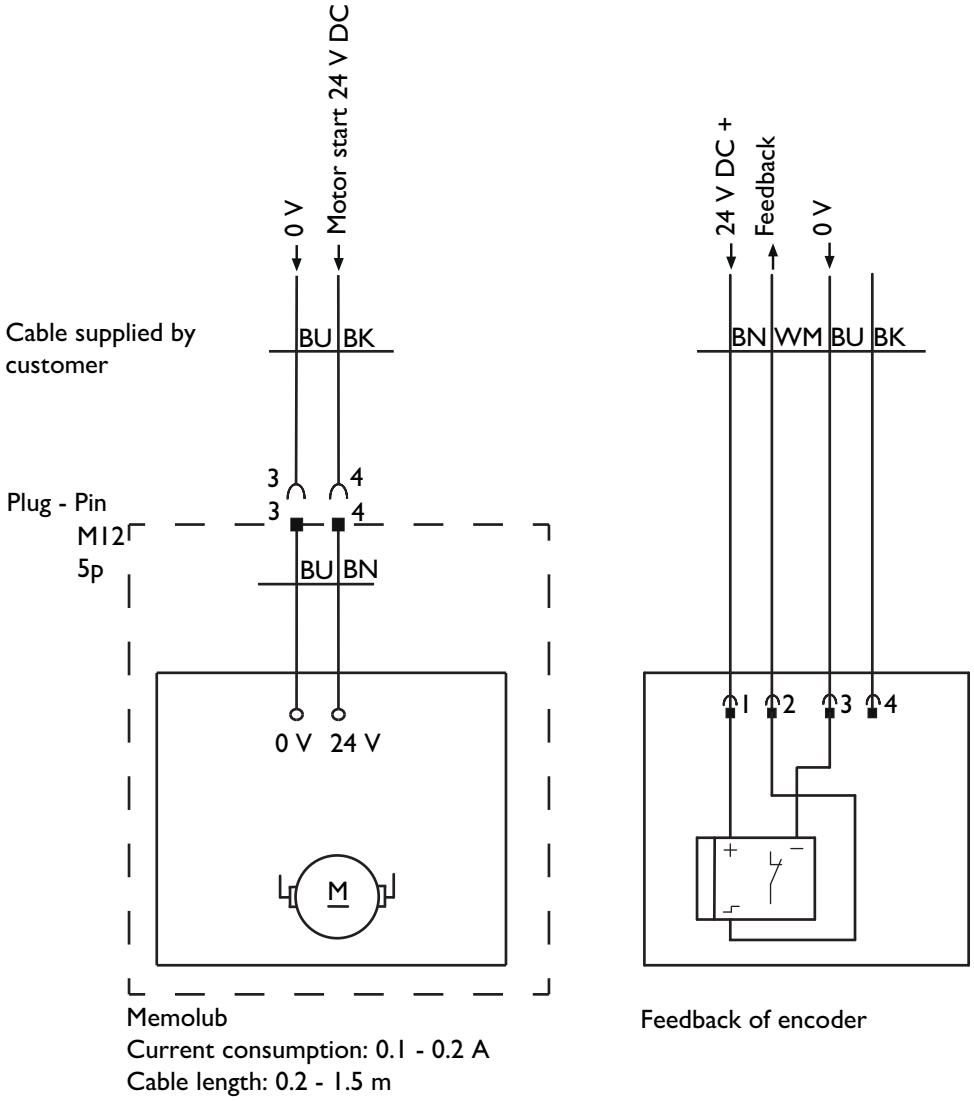

Fig. 3-1 *Connecting PLCD*

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3.2 Programming

3.2.1 Signal waveform over time

The signal waveform over time for the motor (output) and encoder (feedback) is as follows.

The encoder reports a complete pass through the progressive distributor, with two edge changes. The software therefore has to react to the second changing edge at the feedback input.

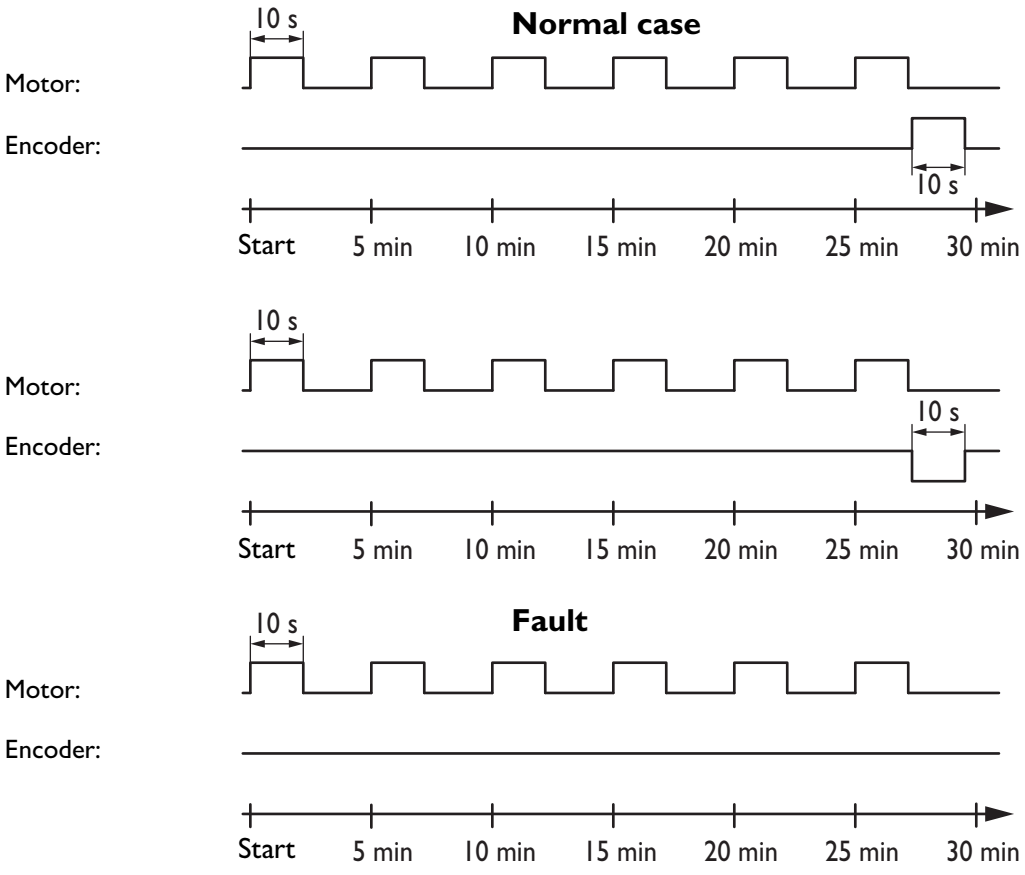

Fig. 3-2 *Signal waveform over time*

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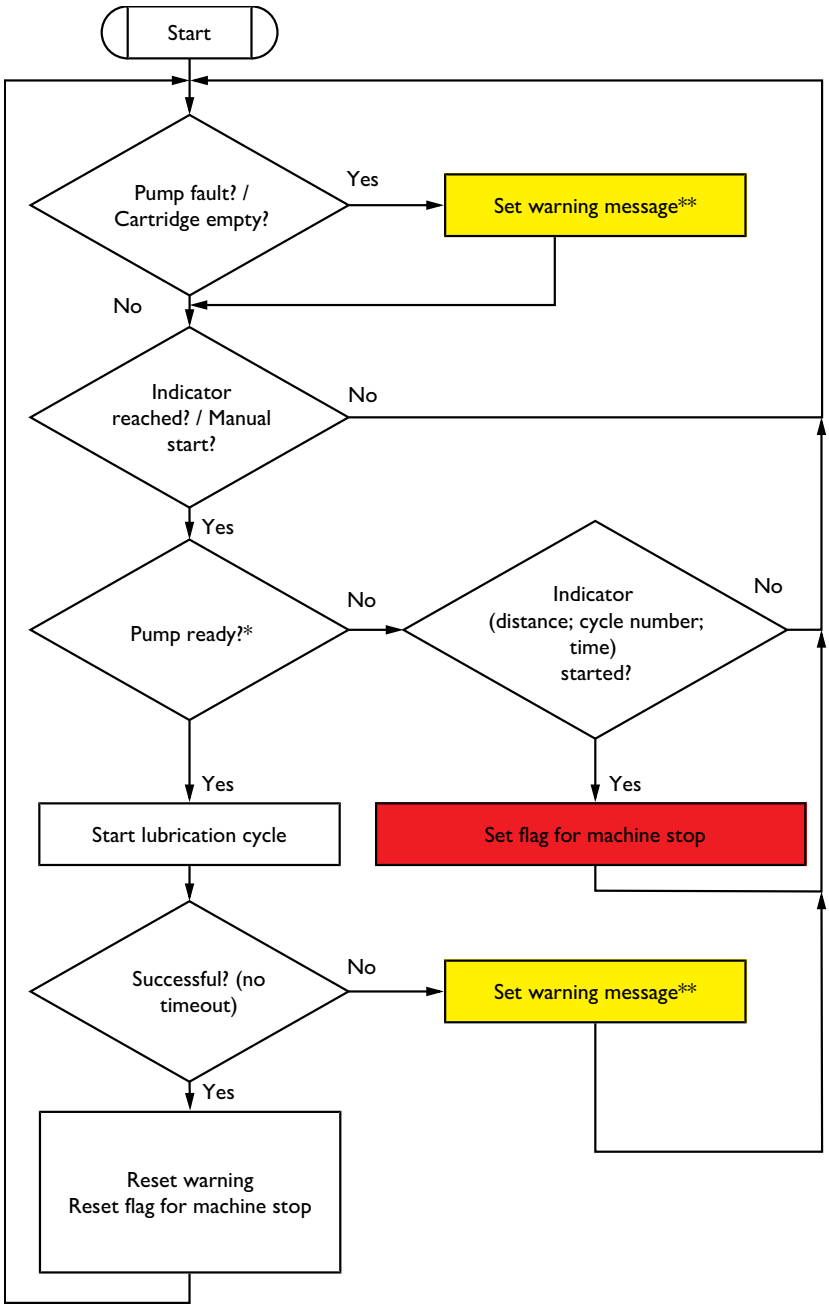
3.2.2 Suggested solution: Programming software



* = No fault (5 s input) AND not empty AND lubrication cycle not started

** = Reset corresponding warning message as soon as OK again

Fig. 3-3 *Automatic lubrication system flowchart*

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4 Operation

4.1 Setting the lubrication cycle / lubrication quantity

The following table shows the lubricant consumption when standard settings are used.

You can find additional settings in the third-party documentation from MEMOLUB.

4.1.1 Lubrication quantity

Lubrication quantity

Per pulse, the lubricant dispenser discharges the following lubrication quantity to the progressive distributor:

Lubrication quantity [ml]	Lubrication quantity per output on the progressive distributor [ml]
0.635	0.1015 (on a progressive distributor with six outputs)

Table 4-1 *Lubrication quantity per pulse: at the lubricant dispenser / at an output of the progressive distributor*

The lubrication quantity per output on the progressive distributor is usually equal. However, closing an output affects the lubrication quantity per output.

Lubrication quantity: Calculation example

The lubrication quantity is increased by increasing the number of pulses sent to the MEMOLUB lubrication system. The more pulses are sent within the same period, the higher are the lubrication quantity and the lubrication consumption.

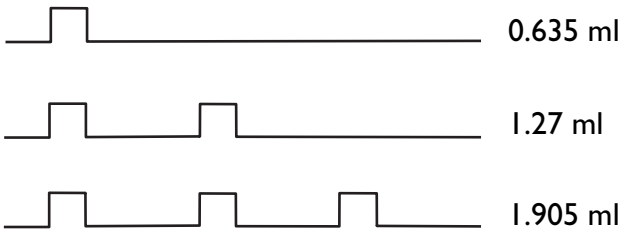

Fig. 4-1 *Calculation example: Lubrication quantity at the lubricant dispenser*

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5 Replacing the cartridge

Fig. 5-1 *Replacing cartridge*

Lubrication ex works	Specification	Lubrication quantity
➲ Chapter 6.1, 25	➲ Chapter 6.1, 25	

Table 5-1 *Lubricants: Guideways, racks, and pinions*

Replace the cartridge as described in the MEMOLUB third-party documentation.

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6 Lubricants

NOTE

Unsuitable lubricants

Using unsuitable lubricants can cause damage to the machine!

- Only use the lubricants listed
- If uncertain, please contact our service departments

For more information on the lubricants, refer to the tables below. For further information, refer to the chapter "Maintenance tasks" and the respective third party documentation.

Special Güdel lubricants

If special lubricants have been delivered ex-works at the request of the customer, you can find the relevant specifications in the spare parts list.

Alternative manufacturers

The following tables show the specifications of the lubricants. Please inform your manufacturer accordingly. They will then suggest an alternative from their product range.

Low temperatures / food grade

Observe the application range limits of lubricants according to the safety data sheet.

6.1 Lubrication

Fig. 6-1 *Automatic lubrication system Memolub*

Lubrication ex works	Specification	Lubrication quantity	Location of application	Category
Mobil Glygoyle 460 NSF no.136467	CLP PG 460 in accordance with DIN 51502		Automatic lubrication system Memolub	oil

Table 6-1 *Lubricants: Automatic lubrication system Memolub*

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Fig. 6-2 *Automatic lubrication system Memolub*

Lubrication ex works	Specification	Lubrication quantity	Location of application	Category
Castrol Longtime PD	2KP2K-30 in accordance with DIN 51502		Automatic lubrication system Memolub	grease

Table 6-2 *Lubricants: Automatic lubrication system Memolub*

6.2 Lubricant table

Lubrication ex works	Specification	Lubrication quantity	Location of application	Category
Castrol Longtime PD	2KP2K-30 in accordance with DIN 51502		Automatic lubrication system Memolub	grease
Mobil Glygoyle 460 NSF no.136467	CLP PG 460 in accordance with DIN 51502		Automatic lubrication system Memolub	oil

This table does not purport to be exhaustive.

Table 6-3 *Lubricant table*

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7 Malfunctions / Troubleshooting

⚠ DANGER

Hazardous voltage

The product contains components that are energized with hazardous voltages. Touching these components will cause an electric shock. Electric shocks can be fatal!

Before working in the danger area:

- Switch off the superordinate main power supply
- Secure the superordinate power supply against being switched on again (main switch of complete system)
- Ground the equipment.

⚠ WARNING

Automatic startup

During work on the product, there is danger of the machine starting up automatically. This can lead to severe or fatal injuries!

Before working in the danger area:

- Secure vertical axes (if equipped) against falling.
- Switch off the superordinate main power supply. Secure it against being switched on again (main switch for the complete system)
- Before switching on the system again, make sure that no one is in the danger area

⚠ WARNING

Overpressure

The automatic lubrication system is pressurized during operation. If maintenance and repairs are performed without depressurizing the system, people can be severely injured!

- Wear protective goggles
- Depressurize the system before performing the work

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Malfunction	Cause	Measure
Lubrication system does not lubricate	Cannot be determined	• Check all possible malfunctions • Fix malfunctions as in Measures
Lubrication system does not lubricate	Lubrication lines damaged	Check lubrication lines
Lubrication system does not lubricate	Cartridge empty	Refill cartridge according to third-party documentation
Lubrication system does not lubricate	No or faulty control signal	Check control signal
Lubrication system does not lubricate	No voltage	Check voltage supply
Lubrication points are supplied too little or not at all	Air in the automatic lubrication system	Venting the automatic lubrication system
Lubrication points are supplied too little or not at all	Dosage too small	• Adjust lubrication cycle • If necessary, adjust intermission
Lubrication lines do not carry lubricant	Pre-lubrication distributor / progressive distributor defective	Replace pre-lubrication distributor / progressive distributor
Lubrication lines do not carry lubricant	Output closed and the headless set screw is mounted in the connecting passage	Remove headless set screw ➲ Chapter 2.3.2.2, 🗎 15
Encoder does not send a signal	• Encoder defective • Cable damaged	• Replace the encoder • Check the cables of the encoder • Check the connection of the encoder

Table 7-1 Malfunctions / Troubleshooting

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