

***Printed Circuit Board 236-13870-1  
for Metering Device Control  
(microprocessor control)  
Models : "M 00 - M 15"***

***Applications for Commercial Vehicles or Industrial Applications  
with Flashing Fault Indication***



Subject to change without notice

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### Survey

Pump	Voltage [V]	Control unit	Setting ranges	Part no.	Applications
203	12/24	integrated F *,**	P : 6 hours, fixed A : 2 to 30 minutes	236-13856-1	
		integrated V 00-V 03*,**	P 1 : 3.75 to 56.25 minutes P 2 : 1 hour to 15 hours A 1 : 7.5 seconds to 112.5 seconds A 2 : 2 to 30 minutes	236-13862-1	
		integrated M 00- M 23***	P : 4 to 60 minutes P : 1 to 15 hours Ü : 5 or 30 minutes	236-13870-1	
		without control unit or with external control unit*			
203	12/24	integrated F *,** ADR V 00- V 03*,** ADR		236-13859-1 236-13862-1	
203	12/24	integrated H *	B : 6 hours, fixed A : 2 to 30 minutes	236-13857-1	
203	12/24	integrated H * ADR	B : 6 hours, fixed A : 2 to 30 minutes	236-13857-1	
203	24 VDC	external PSG 01	P : 0.5, 1, 2...to 12 hrs. A : 2, 4, 8, 16, 32 min	236-13834-1 664-36875-1	
203	24 VDC, 115 VAC, 230 VAC	external PSG 02	P : 1 min to 160 hrs. A : 1 min to 160 min Ü : 1 min to 160 min	236-13860-2	

A - Operating time ranges B - Time of availability  
ring time

P - Pause time range

Ü - Monito-

- \* 1A1 - Version - Pump without connection for the illuminated pushbutton
- \*\*2A1 - Version - Pump with connection for the illuminated pushbutton
- \*\*\*2A4 - Version - Pump with microprocessor control

Note: The applications of the progressive systems are various. There is therefore a control unit available for each individual application.

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**Further information can be found in the following manuals:**

- Technical Description Pump Model 203
- Technical Description Progressive Metering Devices for Grease and Oil, model SSV
- Technical Description for "Electronic Control Units" of the 203 pump
- Printed Circuit Board 236-13856-1 - Model F
- Printed Circuit Board 236-13862-1 - Model V 00-V 03
- Printed Circuit Board 236-13857-1 - Model H
- Printed Circuit Board 236-13870-1 - Models M 16 - M 23
- Timer 236-13860-2 Model PSG 02
- Installation Instructions
- Parts Catalog

## Printed Circuit Boards M 00...M 15\*

### Applications

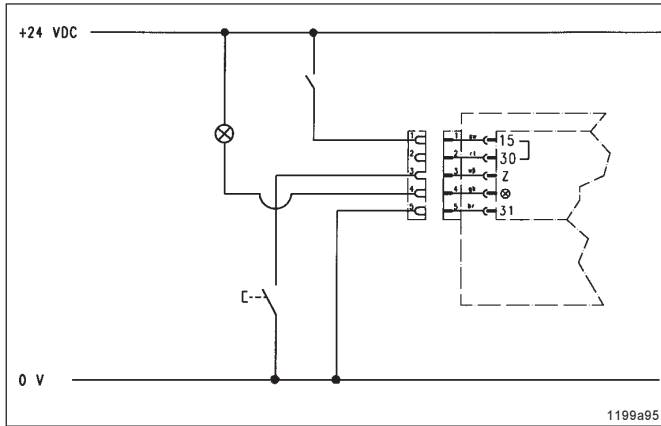


Fig. 1 - Machine contact

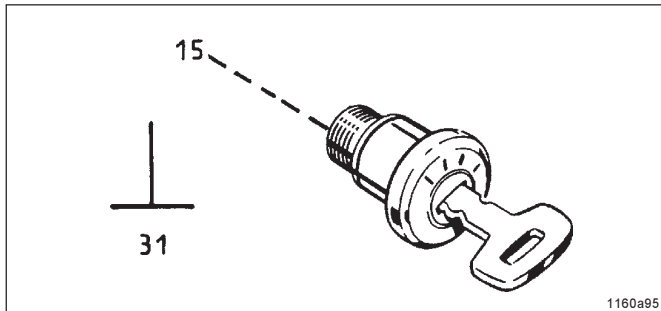


Fig. 2 - Driving switch

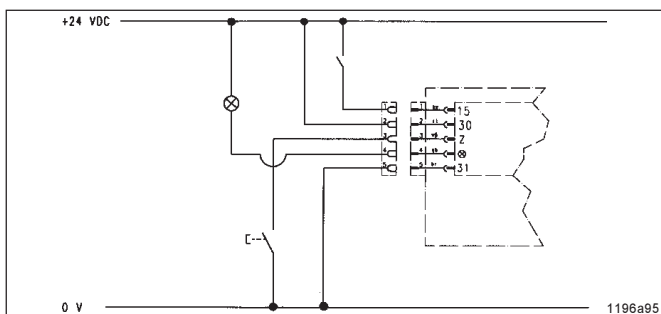


Fig. 3 - Supply voltage and machine contact

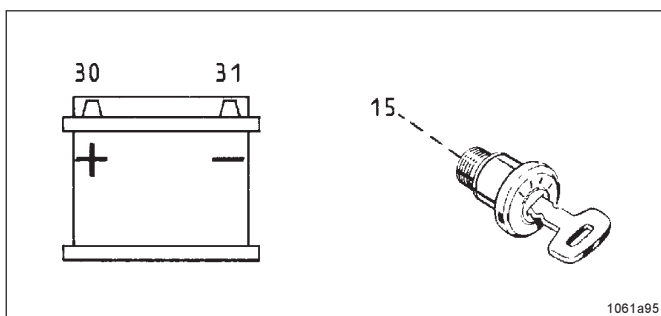


Fig. 4 - Battery voltage and driving switch

The printed circuit boards can be used for the following applications

#### Printed circuit boards M00...M 07

1. Lubrication cycles only as a function of the machine operating hours.

When the machine contact (external contact) is switched on the centralized lubrication system is ready for operation.

Fault indication..... intermittent flashing

#### Printed circuit boards M00...M 07

2. Lubrication cycles **only** as a function of the working hours of the commercial vehicle.

When the driving switch (terminal 15) is switched on, the centralized lubrication system is ready for operation

Fault indication..... intermittent flashing

#### Printed circuit boards M07...M15

3. Lubrication cycles

- as a function of the machine working hours and
- in addition, as a function of add-on units, auxiliary units, etc. which **temporarily** run during the machine working hours and **must be lubricated only within their running time.**

• The power supply (+ and -) is applied. When the machine contact (external contact) is switched on, the centralized lubrication system is ready for operation.

Fault indication..... intermittent flashing

#### Printed circuit boards M07...M15

4. Lubrication cycles

- as a function of the vehicle working hours and
- in addition, as a function of add-on units, auxiliary units, etc. which **temporarily** run during the machine operating hours and **must be lubricated only within their running time.**

• The battery voltage (terminals 30 and 31) is applied. When the driving switch (terminal 15) is switched on, the centralized lubrication system is ready for operation.

Fault indication..... intermittent flashing

\* M 00 - M 15 is the designation of the respective version of the printed circuit board (see page 18 "Combinations of the jumper positions"). It is part of the pump type designation code mentioned on the nameplate of each pump.

**Advantages**

- The central lubrication system is monitored.
- The signal lamp and the operating time as well as the faults are indicated (**flashing signal in the case of commercial vehicles and industrial applications**).

*Note: Industrial applications with external relay: refer to "Technical Description" of printed circuit board 236-13870-1, models M 16 - M 23*

- The following functions and operations are monitored and indicated as a fault in the case of a malfunction.

<p><b>Pump:</b></p> <p>Function of the drive motor Function of the signal lamp Supply voltage failure - no lubrication Pump element does not supply - no lubrication Reservoir empty (if low-level control not available) - no lubrication</p> <p><i>Note: The fault is only indicated when the reservoir is completely empty and as soon as the pump element stops dispensing the lubricant.</i></p> <p>Reservoir empty (in the case of low-level control) - The lubrication cycle occurs until the end of the operating time.</p> <p><i>Note: The fault is indicated when the reservoir is empty, but if the pump element is still surrounded with lubricant.</i></p>	<p><b>System :</b></p> <p>Lubrication point or metering device blocked Main line leaking (from pump to the monitored metering device) Air bubbles in the grease Lubrication circuit 1 and/or - if any - lubrication circuit 2 malfunctioning</p>
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- The indication is made via a signal lamp.
- The signal output via the signal lamp is as follows:

**Intermittent flashing signal (B)**  
Jumper plugged on B/D

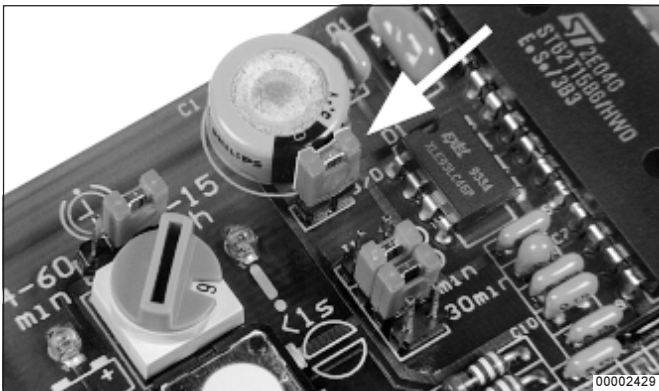


Fig. 5 - Jumper plugged on B/D

System	Signal lamp
Motor check Check of the signal lamp	Is lit for approx. 2 seconds
Operating time	Is lit
Fault	Flashes with different frequencies according to the fault - See "Fault indication"

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**Power Supply**

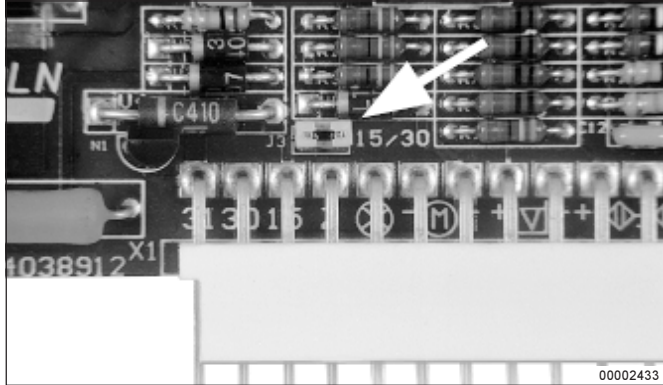


Fig. 6 - Jumper plugged on 15/30

Printed circuit boards M 00...M 07

- When the **jumper is plugged on 30/15** the connections **15 and 30 are connected (bridged)** within the printed circuit board. Refer to Fig. 1.  
 The connection cable has 4 wire.

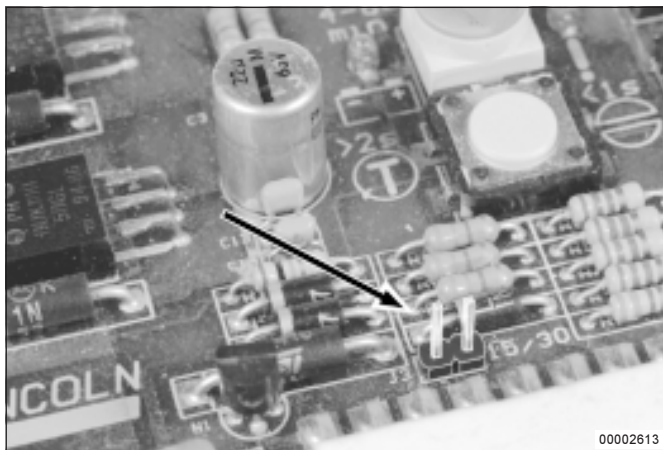


Fig. 7 - Jumper 15/30 has been removed

Printed circuit boards **M 08... M 15**

- Jumper 30/15 has been removed. The printed circuit board must be connected to the power supply (+ and -) or to the battery voltage (terminals 30 and 31). Refer to Fig. 3.
- The connection 15 is used for the additional activation as a function of auxiliary units or drives, etc. Refer to Fig. 3.  
 The connection cable has 5 wire.

Signal output	Industrial applications	Applications for commercial vehicles
Intermittent flashing signal	<ul style="list-style-type: none"> <li>• Supply voltage (+ and -) plus machine contact</li> <li>• Only machine contact</li> </ul>	<ul style="list-style-type: none"> <li>• Battery voltage (<b>terminals 30 and 31</b>) plus driving switch (<b>terminal 15</b>)</li> <li>• Only driving switch (terminal 15)</li> </ul>

**Mode of Operation**

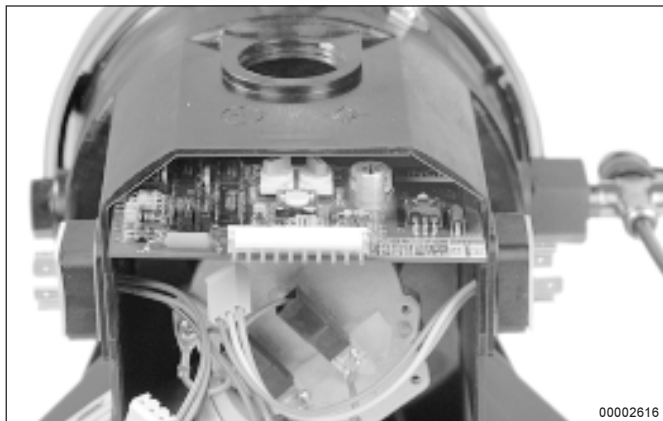


Fig. 8 - Printed circuit board installed in housing

The printed circuit board is integrated in the pump housing

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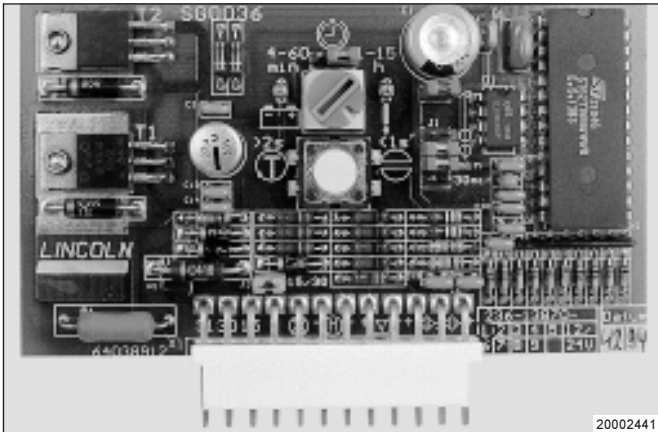


Fig. 9 - Printed circuit board 236-13870-1

- The printed circuit board automatically controls the sequence of the pause and operating times of the 203 central lubrication pump as a function of the vehicle or machine working hours  $t_B$  (Fig. 10).
- The sequence of the pause and operating times is activated when the machine contact or driving switch is switched on.

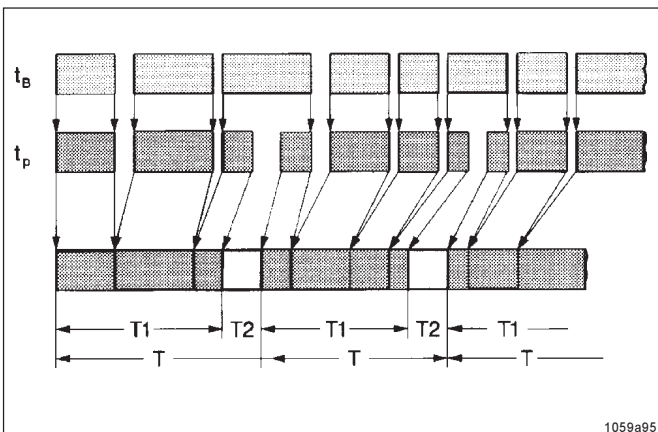


Fig. 10 - Time sequence diagram

$t_B$  - Working hours  
 $t_P$  - Various pause times  
 T - Lubrication cycle  
 T1 - Stored pause times  
 T2 - Operating times

- 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. Refer to Fig. 10.
- During the operating time the pump element dispenses the lubricant to the lubrication points via progressive metering devices.

**Pause time**

- The pause time
  - determines the frequency of the lubrication cycles within a working cycle;
  - is started and stopped via the machine contact or driving switch;
  - is adjustable.
- When the machine contact or the driving switch is switched off, the pause times which have already elapsed as well as the momentary operating conditions (faults) are stored and added up by an electronic memory (EEPROM) until the time which has been set on the blue rotary switch is reached.
- After the machine contact or driving switch is switched on again, the printed circuit board operates from the point where it had been interrupted.
- If the setting is modified within the pause time, the printed circuit board takes over the new value only at the end of the operating time.
- The pause time setting may be different for each application. It must be adjusted in accordance with the respective lubrication cycles. Also refer to "To set the pause time".

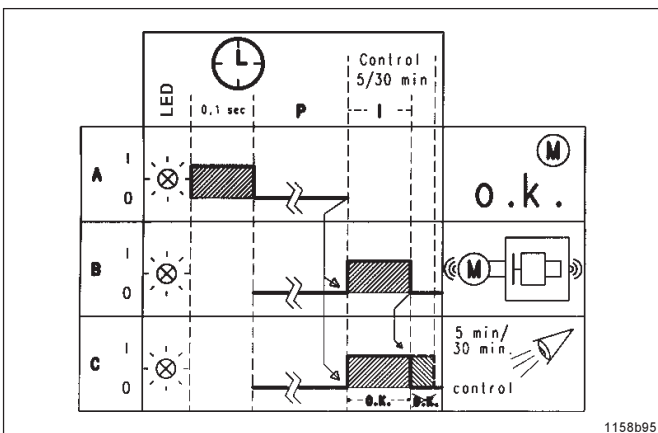
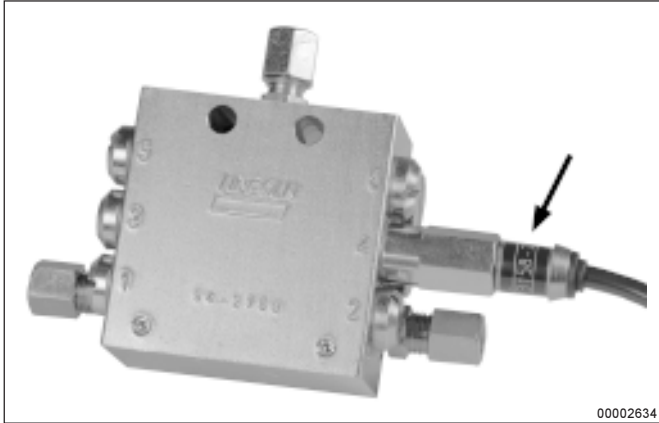


Fig. 11 - Sequence of a lubrication cycle

A - Monitoring of the motor and signal lamp  
 B - Sequence of the operating time  
 C - Sequence of the monitoring time  
 I - Operating time  
 P - Pause time

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Fig. 12 - Piston detector

**Operating time**

- A **piston detector** (initiator) which has been installed on a metering device instead of a piston closure plug monitors and brings the pump operating time to a close after all the pistons of this metering device have dispensed their lubricant quantity.
- 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).

*Note: If two lubrication cycles are monitored, the operating time ends after the two piston detectors have transmitted their signal to the printed circuit board.*

- During the operating time, the **signal lamp is permanently lit**.

**M 00 - M 07**

- If the **operating time is interrupted** (within the monitoring time) because the machine contact or the driving switch has been switched off, it will **start again from the beginning** after it is switched again.

**M 08 - M 16**

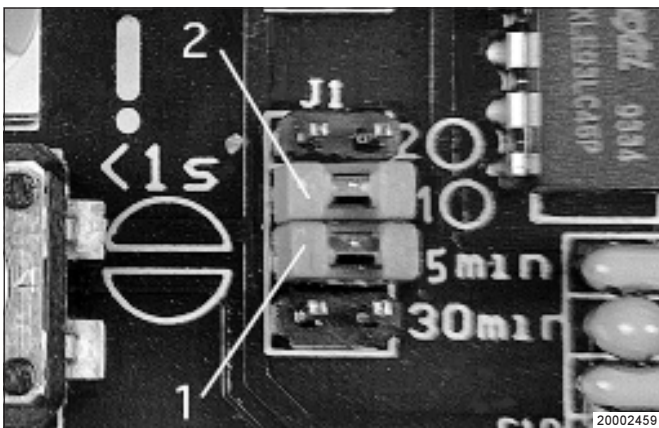
- The operating time always completely elapses even if the machine contact or the driving switch is switched off.

**Monitoring time**

- A fixed **monitoring time** of maximum 5 or 30 minutes (depending on the jumper position) runs in parallel to the operating time.

*Note: Normally, the monitoring time ends at the same time as the operating time.*

- If there is **no switching off signal** from the piston detector to the printed circuit board within 5 or 30 minutes, a **fault signal** will occur. The signal lamp flashes with the corresponding flashing frequency. See "Fault indication".
- If the **operating time exceeds 5 minutes**, the **monitoring time can be changed from 5 to 30 minutes by replugging the jumper**.
- If there are **two monitored lubrication cycles**, the **jumper must be plugged to (2 "O")**.



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Fig. 13- Monitoring ranges

- |                                |            |     |
|--------------------------------|------------|-----|
| 1 - Jumper for monitoring time |            |     |
| 5 min                          | 5 minutes  |     |
| 30 min                         | 30 minutes |     |
| 2 - Jumper for                 | 1 circuit  | 1 O |
| or                             | 2 circuits | 2 O |

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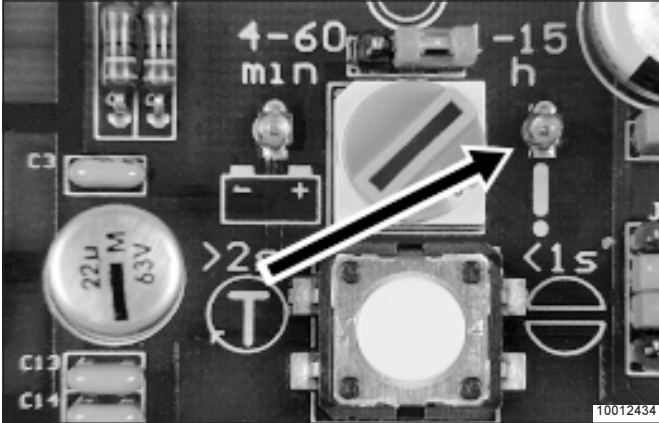


Fig. 14 - LED for the monitoring time or fault indication

**Functional check**

- Each time the machine contact (external contact) or the driving switch is switched on, a functional check of the drive motor and signal lamp takes place automatically.
- During the functional check the motor is switched on for **0.1 second** (the stirring paddle slightly rotates) and the signal lamp lights up for **2 seconds**.
- If there is a fault, the signal lamp **flashes**. See "Fault Indication".

*Note: LED display fig.14 indicates the same operating state as the signal lamp.*

**Functions of the Pushbutton and Signal Lamp**

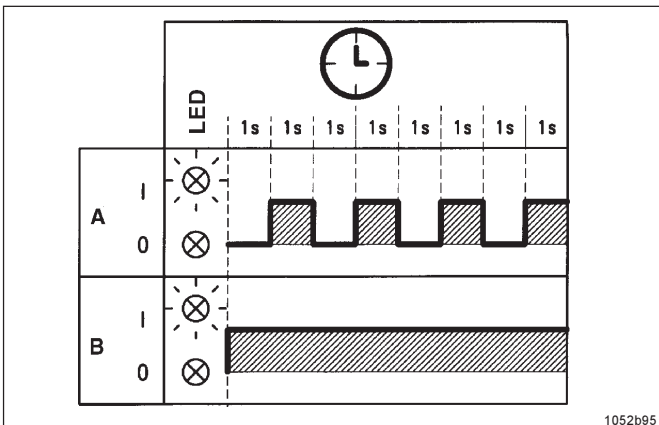


Fig. 15 - Indicated operating states

- A - Fault indication
- B - Indication of operation or acknowledged fault

**Pushbutton (Fig. 16)**

- The following functions can be performed with the pushbutton:
  - triggering an additional lubrication cycle - Press pushbutton for over 2 seconds (> 2 s)
  - fault acknowledgement < 1 s
  - in the case of a fault, switching on pump again by pressing pushbutton (> 2 seconds)

*Note: It is also possible to acknowledge any fault or to trigger an additional lubrication cycle via pushbutton 4 of the printed circuit board (Fig. 20).*

**Signal lamp**

- The signal lamp or the LED fig. 14 indicates the operating state of the centralized lubrication system.
- The faults are indicated by different flashing frequencies of the signal lamp or the LED fig. 14. See "Fault Indication".

**Fault Indication**

See "The Faults and Their Causes"

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### To acknowledge a Fault



Fig. 16 - To acknowledge a fault

- When the pushbutton is pressed briefly (< 1 second) the fault is acknowledged, i.e. the lamp stops flashing and is permanently lit.

*Note: Any acknowledged fault remains stored even after the driving switch or machine contact has been switched off. Upon switching on again, the signal lamp flashes again in accordance with the fault.*

### To Remedy to a Fault

- \* In the case of a malfunctioning, check the central lubrication pump and the connected system for faults.
- \* Eliminate the cause of the fault.
- \* Switch on the pump again by triggering an additional lubrication cycle. For this, press the pushbutton **>2 seconds**.
- When the fault is eliminated, the signal lamp will extinguish **at the end of the lubrication cycle**.

**Important:** If there has been any fault, the pump will not start automatically after the elimination of that fault. It must be switched on, i.e. an additional lubrication cycle must be triggered. See "To trigger an additional lubrication cycle".

*Note: It is also possible to acknowledge/reset a fault or trigger an additional lubrication cycle by means of the pushbutton on the printed circuit board (Fig. 20). For this, press it < 1 second and > 2 seconds. **Condition: The machine contact or driving switch must be switched on.***

### Time Setting



Fig. 17 - The cover to the printed circuit board has been removed

- \* To set the pause time, remove the cover on the pump housing.

*Note: To reset a jumper, remove the printed circuit board.*

**Important:** After having set the pause time, screw the cover on the pump housing again.

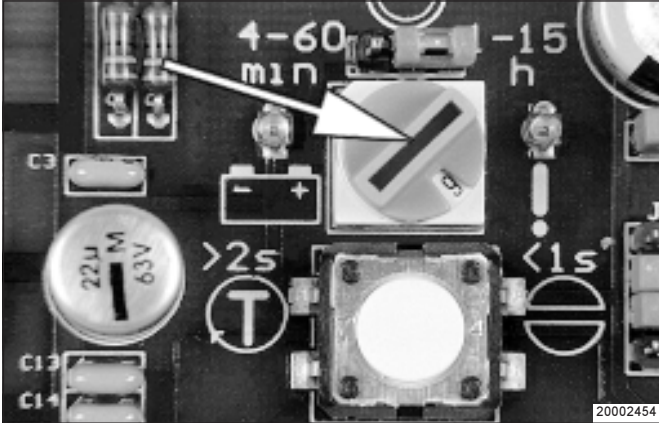


Fig. 18 - Rotary switch - Pause time

**To set the pause time**

The pause time can be adjusted to 15 settings by means of the blue rotary switch.

*Time ranges: Minutes or hours*

Switch position	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Minutes	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
Hours	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

*Note: The 0 position corresponds to the shortest time, see pos. 1.*

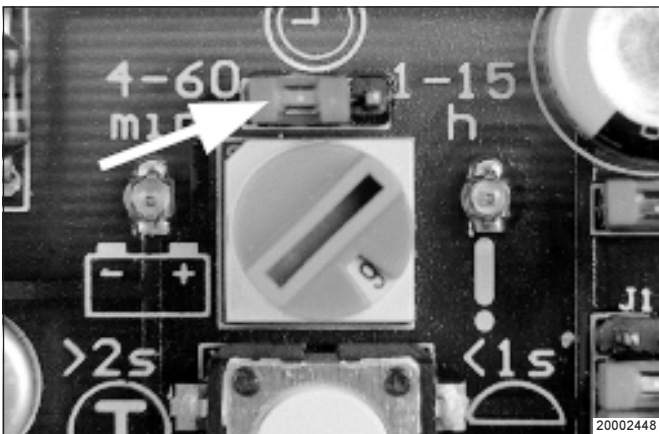


Fig. 19 - Preselection of the time ranges

**Factory setting**

- The time ranges (hours or minutes) can be modified by replugging the jumper on the printed circuit board (Fig. 19).

**Pause time**

Rotary switch either on ..... 6 hours  
 or ..... 24 minutes

**Monitoring time**

- For the factory setting of the jumper see the chart page 18. The combination number can be learnt from the type designation code mentioned on the nameplate of each pump.

### Operational Test /To Trigger an Additional Lubrication Cycle

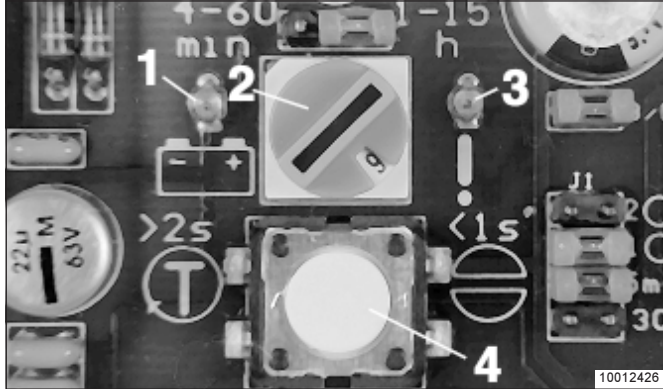


Fig. 20 - LED of the printed circuit board

- |                                    |  |
|------------------------------------|--|
| 1 - LED, left-hand<br>Power supply | 3 - LED, right-hand,<br>Indication of operation    |
| 2 - Rotary switch<br>"pause time"  | 4 - Pushbutton for<br>additional lubrication cycle |

- To check the function of the pump it is possible to perform an operational test.

#### Pumps model 203 installed on machines

- \* If necessary, switch on the power supply
- \* Switch on the machine contact

#### Pumps model 203 installed on commercial vehicles

- \* If necessary, switch on the battery voltage
- \* Switch on the driving switch

- To check whether power is applied to the printed circuit board, observe whether the left-hand LED 1, Fig. 20, is lit.

- \* Press the pushbutton (> 2 seconds) for triggering an additional lubrication (illuminated pushbutton, Fig. 16, or pushbutton on the switch cabinet) until the right-hand LED 3 lights up.

- The right-hand LED indicates the following functions:
  - operating time
  - monitoring time (in normal cases it is as long as the operating time, in the case of a fault: 5 or 30 minutes)
  - faults

- When an additional lubrication cycle has been triggered, a shorter pause time occurs, followed by a normal lubrication cycle.

- Additional lubrication cycles can be triggered at any time

### Repair

The defective printed circuit boards should be suitably packed and returned to the factory.

- If the printed circuit board must be replaced, a **model M 00** will always be delivered. See chart page 18.
- Before installing another printed circuit board, take care that the jumper is set to the same position as on the old printed circuit board.

## The Faults and Their Causes

### Fault Indication

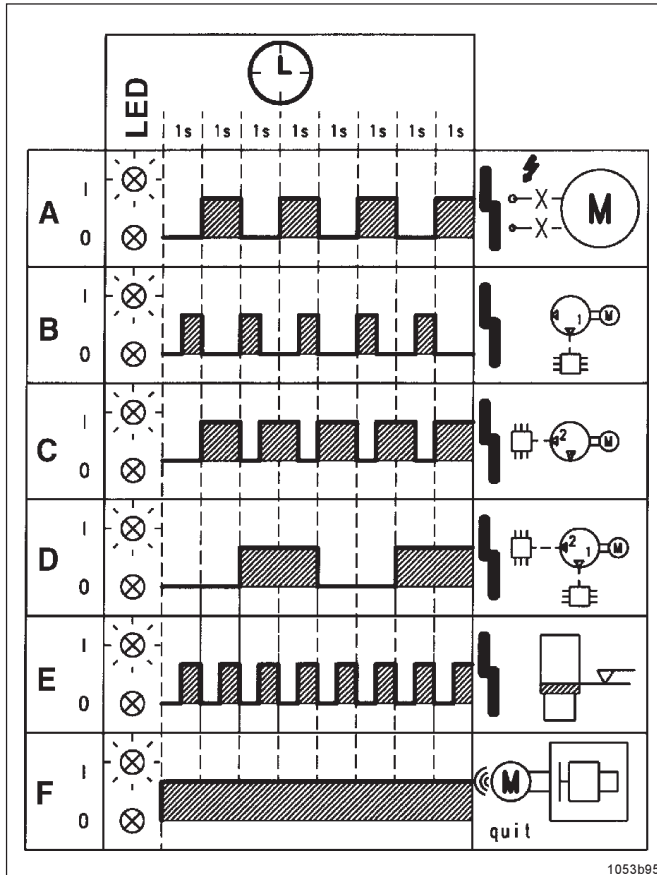


Fig. 21 - Flashing frequencies in the case of malfunctions

- A - Drive motor defective
- B - Lubrication circuit 1 malfunctioning
- C - Lubrication circuit 2 malfunctioning
- D - Lubrication circuits 1 and 2 malfunctioning
- E - In the case of low-level control: reservoir empty
- F - Fault acknowledged (maintained lightening)

#### Drive motor defective

If the motor does not run when the driving switch or machine contact is switched on or if the feed line to the motor is damaged, the signal lamp flashes after 2 seconds as follows:

A 1 second - "ON" - 1 second - "OFF"

#### Malfunctions

such as

- blocked lubrication point (s)
- blocked metering devices (s)
- interruption in the main line leading to the metering device equipped with a piston detector
- air in system
- reservoir empty (only if the pump is not equipped with an optional low-level control)

are indicated as described under B, C or D.

The above mentioned faults cause the pistons in the monitored metering device to stop. The signal lamp indicates the respective fault signal with the following flashing frequencies:

#### Lubrication circuit 1 malfunctioning

B 0.5 second - "ON" - 1 second - "OFF"

#### Lubrication circuit 2 malfunctioning

C 1 second - "ON" - 0.5 second - "OFF"

#### Lubrication circuits 1 and 2 malfunctioning

D 2 seconds - "ON" - 2 seconds - "OFF"

#### Low-level control (optional)

The signal lamp is flashing with the following frequency:

#### Reservoir empty

E 0.5 second - "ON" - 0.5 second - "OFF"

*Note: The low-level signal is converted into a flashing signal with the a.m. frequency only after 6 motor revolutions.*

- In the case of a malfunction the piston detector (initiator) can no longer record the piston movements and therefore, it cannot switch off the pump.
- Due to the monitoring time which runs in parallel to the operating time, the printed circuit board switches off the pump at the end of the monitoring time.
- A fault signal occurs.
- The signal lamp is flashing.
- The pump no longer starts automatically. See "To Remedy to a Fault"

**Troubleshooting**

*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), whether the LED on the printed circuit board are lit or the signal lamp of the illuminated pushbutton/switch cabinet is lit.*

• <b>Fault: The pump motor does not run</b>	
• <b>Cause:</b>	• <b>Remedy:</b>
<ul style="list-style-type: none"> <li>• Voltage supply interrupted</li> <li>• Voltage supply to the printed-circuit board is interrupted</li> <li>• Printed circuit board defective</li> </ul>	<ul style="list-style-type: none"> <li>• Check the voltage supply to the pump. If necessary, eliminate the cause of the fault.</li> <li>• Check the line leading from the pump plug to the printed circuit board.</li> <li>• If the voltage is applied, the left-hand LED is lit.</li> <li>• Replace the printed circuit board.</li> </ul>
• <b>Fault: The pump motor runs permanently (5 minutes or 30 minutes )- Duration of the monitoring time</b>	
• <b>Cause:</b>	• <b>Remedy:</b>
<ul style="list-style-type: none"> <li>• Piston detector (initiator) defective.</li> <li>• Cable connection of the piston detector to the pump interrupted</li> <li>• Printed circuit board defective</li> </ul>	<ul style="list-style-type: none"> <li>• Disconnect the main line leading to the monitored metering device.</li> <li>• Unscrew the piston detector and check it. For this, insert a metallic pin into the borehole of the detector. Let it there over 2 seconds and then remove it. If the pump is not switched off afterwards, check the cable connections to the pump. If necessary, replace the piston detector along with the connector.</li> <li>• Check the cable connections to the pump. If necessary, replace the piston detector with the connector.</li> <li>• Replace the printed circuit board</li> </ul>

## Technical Data

Rated voltage ..... 12/24V DC  
 Operating voltage.  
     12V/ 24V ..... 9V to 30V  
 Residual ripple in relation  
 with the operating voltage .....  $\pm 5\%$  acc. to DIN 41755  
 Motor output ..... 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 6K 9K

In order to protect the printed circuit board against condensation,  
 it has been covered with a protective varnish.

All the printed circuit boards comply with the EMC (Electroma-  
 gnetic compatibility) guidelines for road vehicles acc. to DIN  
 40839 T1, 3 and 4.

The printed circuit boards model **M** additionally comply with the  
 EMC guideline 89 / 336 / EWG  
 Emitted interference acc. to ..... EN 55011 / 03.91 and  
     ..... EN 50081-1 / 01.92  
 Noise immunity acc. to ..... prEN 50082-2 / 1993

### Time setting

Pause time, acc. to jumper position:  
     ..... 4, 8, 12,...to 60 minutes  
     ..... 1, 2, 3...to 15 hours

The operating time is switched off via the piston detector.

### Factory setting

Pause time ..... 6 hours  
 or ..... 24 minutes  
 Monitoring time ..... 5 minutes  
 or ..... 30 minutes

Connection Diagram - Industrial Applications M 08 - M 15

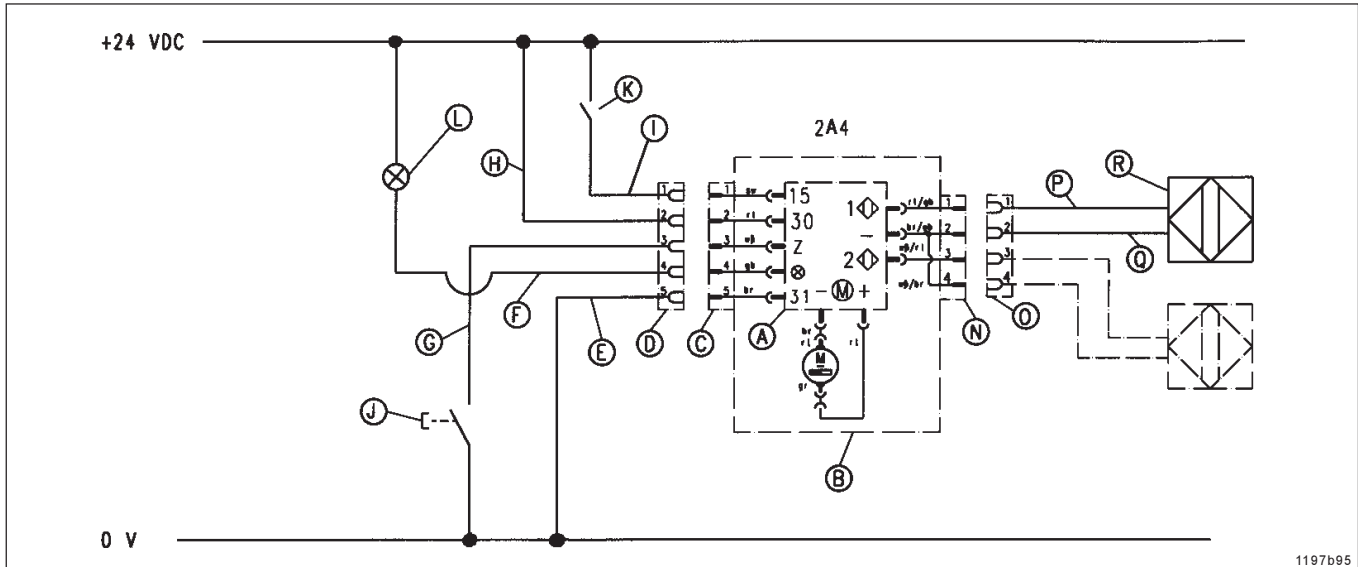


Fig. 22 - Connection diagram QUICKLUB 203 with monitoring of the metering devices (Industry)  
 Connectors AMP, type Superseal

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- |   |   |   |
|---|---|---|
| A - Printed circuit board                       | G - Cable, white                          | N - Cable connector 2                                   |
| B - Pump housing                                | H - Cable, red                            | O - Line socket 2 with 1 or 2 connection cables, 2-wire |
| C - Cable connector 1                           | I - Cable, black                          | P - Cable, blue   |
| D - Line socket 1 with connection cable, 5-wire | J - Pushbutton for additional lubrication | Q - Cable, brown  |
| E - Cable, brown                                | K - Machine contact                       | R - Piston detector (initiator) Monitoring circuit 1    |
| F - Cable, yellow                               | L - Signal lamp                           |   |

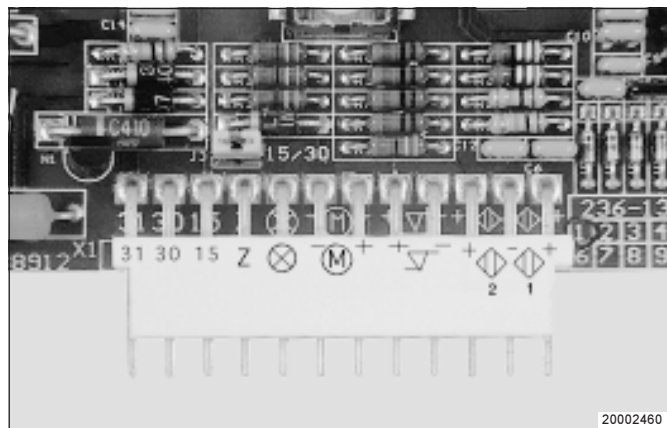


Fig. 23 - Terminals of the printed circuit board

- |                                    |                            |
|------------------------------------|----------------------------|
| 30 -Battery voltage                | ☒ - Low-level control      |
| 31 -Earth                          | Z - Additional lubrication |
| 15 -Driving switch/machine contact | ⊗ - Signal lamp            |
| Ⓜ -Motor                           | ⚡ - Lubrication circuit 1  |
| ⚡ - Lubrication circuit 1          | ⚡ - Lubrication circuit 2  |

Subject to change without notice



Connection Diagram - Commercial Vehicles M 00 - M 07

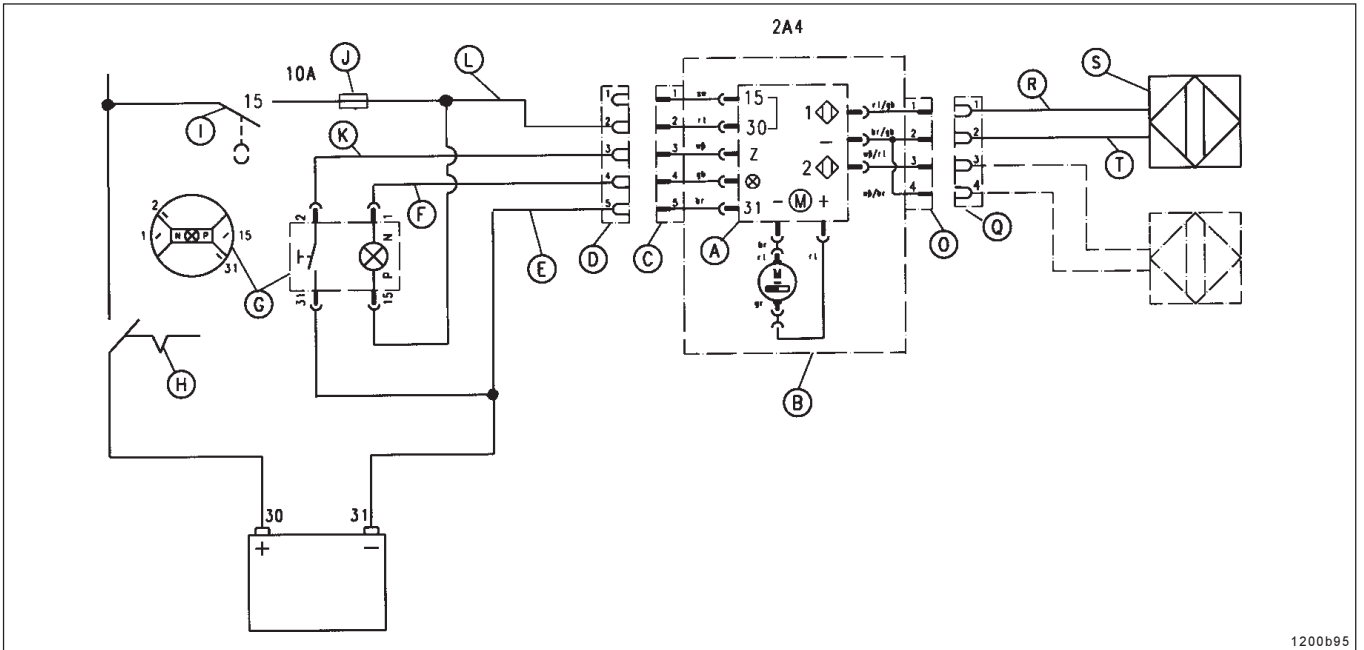


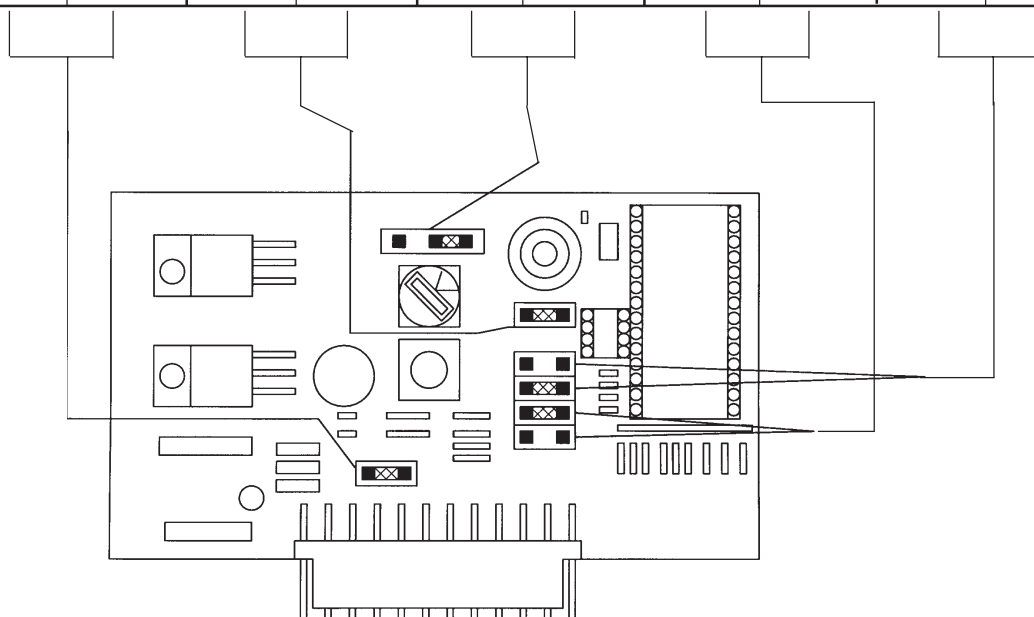
Fig. 24- Connection diagram QUICKLUB 203 with monitoring of the metering devices  
 Connectors AMP, type Superseal

1200b95

- |  |                            |  |
|--|----------------------------|--|
| A - Printed circuit board                          | G - Illuminated pushbutton | O - Cable connector 2  |
| B - Pump housing                                   | H - Battery cutoff         | Q - Line socket 2 with<br>1 or 2 connection cables<br>2-wire |
| C - Cable connector 1                              | I - Driving switch         | R - Cable, blue  |
| D - Line socket 1<br>with connection cable, 4-wire | J - Fuse, 10 A             | S - Piston detector (initiator)<br>Monitoring circuit 1      |
| E - Cable, brown                                   | K - Cable, white           | T - Cable, brown   |
| F - Cable, yellow                                  | L - Cable, red             |  |

### Combinations of the jumper positions - Survey

Possibilities of preselection	Connection of the supply voltage		Signal indication in the case of faults Signal output		Pause time ranges h min		Monitoring time ranges (min)		Number of the monitored lubrication circuits	
	only terminal 15	terminal 15;30	intermittent	permanent	1 - 15	4 - 60	5	30	1	2
Jumper position										
Kombination Nr.										
M 00	X		X		X		X		X	
M 01	X		X		X			X	X	
M 02	X		X		X		X			X
M 03	X		X		X			X		X
M 04	X		X			X	X		X	
M 05	X		X			X		X	X	
M 06	X		X			X	X			X
M 07	X		X			X		X		X
M 08		X	X		X		X		X	
M 09		X	X		X			X	X	
M 10		X	X		X		X			X
M 11		X	X		X			X		X
M 12		X	X			X	X		X	
M 13		X	X			X		X	X	
M 14		X	X			X	X			X
M 15		X	X			X		X		X
M 16		X		X	X		X		X	
M 17		X		X	X			X	X	
M 18		X		X	X		X			X
M 19		X		X	X			X		X
M 20		X		X		X	X		X	
M 21		X		X		X		X	X	
M 22		X		X		X	X			X
M 23		X		X		X		X		X



Subject to change without notice