

Printed Circuit Board for Pump 203

236-13891-1 Models V10 - V13*

236-13891-2 Models V20 - V23*

with Adjustable Pause and Operating Times

Applications for Commercial Vehicles or Industrial Applications



Subject to change without notice

****See page 4 „Applications“***

10051327a

Survey

Pump	Voltage [V]	Control unit	Setting ranges	Part no.	Applications
203	12/24	integrated V10-V13*,** V20-V23*,**	P1: 4 to 60 minutes P2: 1 hour to 15 hours A 1: 8 seconds to 120 seconds A 2: 2 to 30 minutes	236-13891-1 236-13891-2	
		integrated M00-M23***	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 V10-V13*,** ADR		236-13891-1	
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	236-13860-2	

A - Operating time ranges

B - Time of availability

P - Pause time range

Ü - Monitoring time

* 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 corresponding 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 236-13857-1 - Model H
- Printed Circuit Board 236-13870-1 - Models M 00 - M 15
- Printed Circuit Board 236-13870-1 - Models M 16 - M 23
- Timer 236-13860-2 Model PSG 02
- Installation Instructions
- Parts Catalog

Printed Circuit Board V10-V13 and V20-V23

Applications

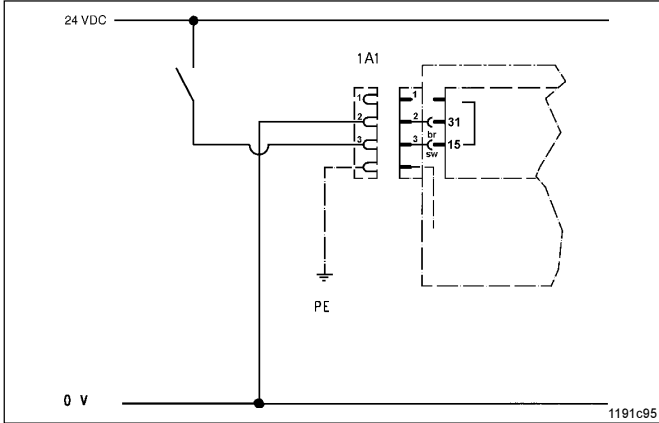


Fig. 1 - Machine contact, printed circuit board 236-13891-1 (V10-V13)

The printed circuit boards can be used for the following applications

1.) Lubrication cycles **only** as a function of the machine working hours.

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

Caution: On the PCB 236-13891-1 (V10-V13)* do not connect the red core of the connecting cable to connection 1, Fig. 1, 14, 16 (terminal 30) since terminal 30 is connected internally with terminal 15.

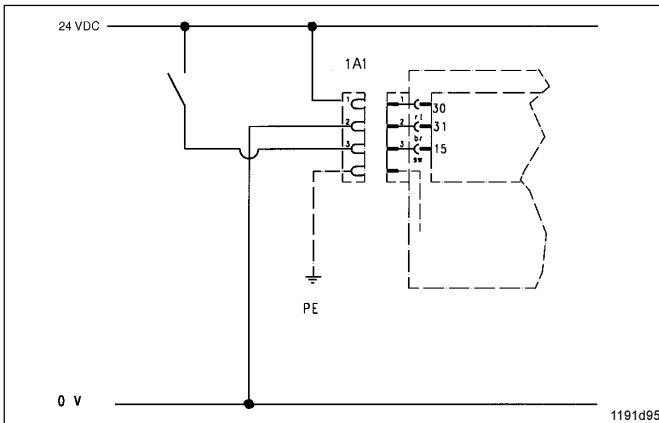


Fig. 2 - Machine contact, printed circuit board 236-13891-2 (V20-V23)

Note: The PCB's 236-13891-1 and 236-13891-2 differ only as regards their connection of the terminals. In the case of PCB 236-13891-2 the terminals 30 and 15 are not connected.

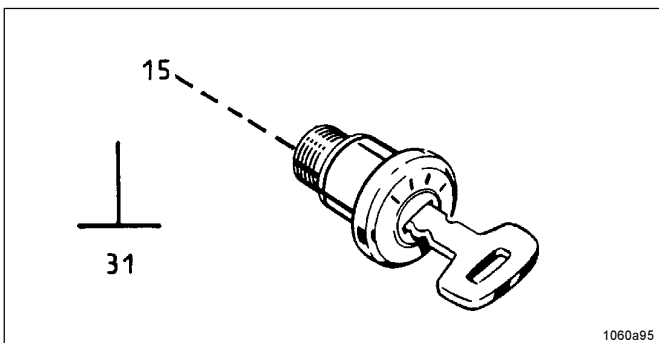


Fig. 3 - Driving switch

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

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

Note: In the case of PCB 236-13891-2 also connect the battery voltage (terminal 30).

* This designation shows the version of the PCB installed in the pump. It forms part of the pump designation on the nameplate on each pump.

In the case of P 203-...-K.-.A. ...-V10 the PCB 236-13891-1 is installed, see connection diagrams 1, 14 and 16.

In the case of P 203 - ... - .K. - .A... -V20 the PCB 236-13891-2 see connection diagram 2, 17.

Mode of Operation

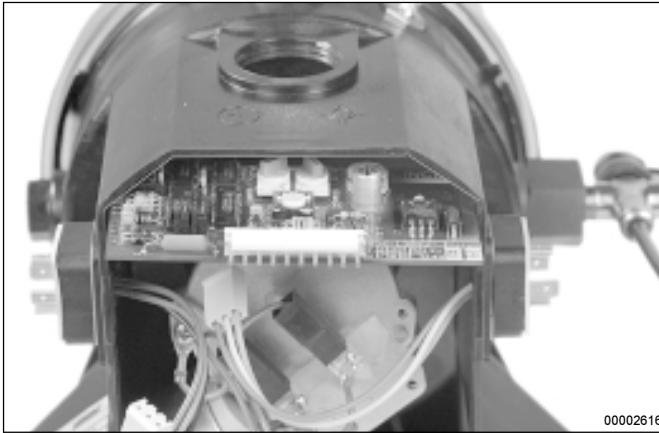


Fig. 4 - Printed circuit board installed in the housing

- The printed circuit board is integrated in the pump housing.

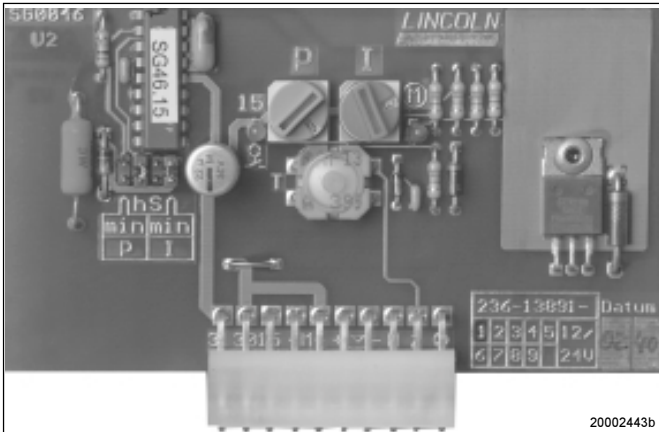


Fig. 5 - Printed circuit board 236-13891-1

- The printed circuit board automatically controls the sequence of the pause and operating times of the model 203 central lubrication pump as a function of the vehicle or machine working hours t_B (Fig. 5).
- The sequence of the pause and operating times is activated when the machine contact or driving switch is switched on.

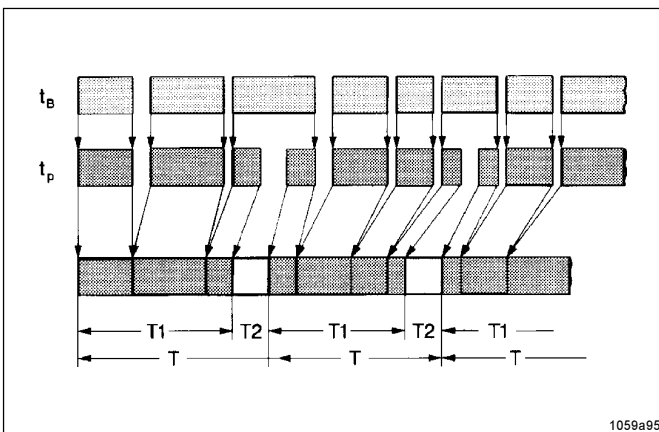


Fig. 6 - Time sequence diagram

- 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. 5.
- During the operating time the pump element dispenses the lubricant to the lubrication points via progressive metering devices.

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

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 are stored and added up (refer to T1, Fig. 6) until the time which has been set on the blue rotary switch (Fig.8) is reached.
- The pause time setting may be different for each application. It must be adjusted in accordance with the respective lubrication cycles. Also see "To set the pause time".

The operating time

- depends on the system's lubricant requirement ;
- is adjustable;
- is finished when the machine contact or the driving switch is switched off.
- The longer the operating time, the greater the lubricant requirement and vice-versa.
- When the machine contact or the driving switch is switched off, the operating times which have already elapsed are stored and added up until the time which has been set on the red rotary switch (Fig. 10) is reached. After this, the lubrication cycle starts again.
- The operating time setting may be different for each application. It must be adjusted in accordance with the respective lubricant requirement. Also see "To set the operating time".

Time storage

- When switching off the ignition voltage and/or the operating voltage the times already expired are saved for an unlimited duration.
- When the power supply is switched on again the printed circuit board continues to operate from the point where it had been interrupted.

Time Setting



Fig. 7 - The cover to access the printed circuit board has been removed

* To set the pause or operating time, remove the cover on the pump housing.

Note: To reset a jumper (Fig. 9), remove the printed circuit board.

Important: After having set the pause time or operating time, screw the cover on the pump housing again

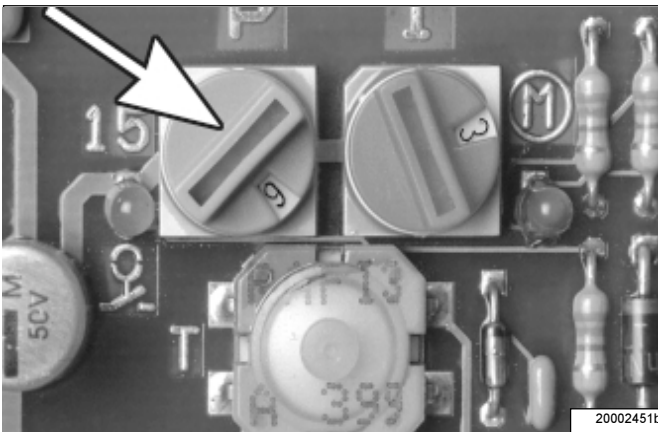


Fig. 8 - Rotary switch - Pause time

To set the pause time

The pause time can be set to 15 different 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

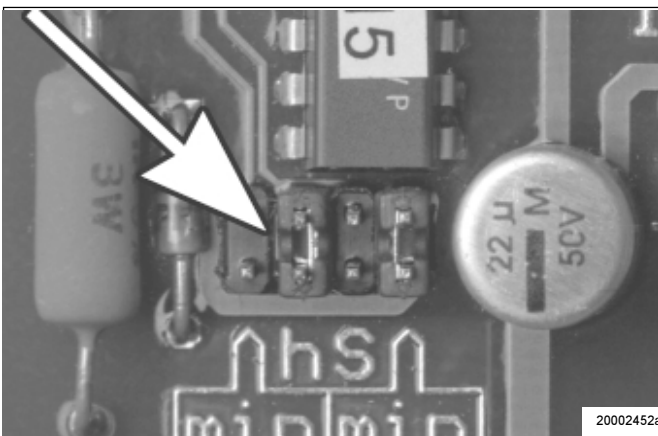


Fig. 9 - Preselection of the time range

Note: When the switch is on "0" a fault is shown at the right-hand LED 3, see page 9.

At the same time the factory-set pause time is accepted.

Factory setting

Rotary switch on : 6 hours
 or 24 minutes

- The time ranges can be modified by replugging the jumper (Fig. 9) on the printed circuit board.
- Factory setting of the jumper: see chart page 15. The combination number can be learnt from the pump type designation code mentioned on the nameplate of each pump.

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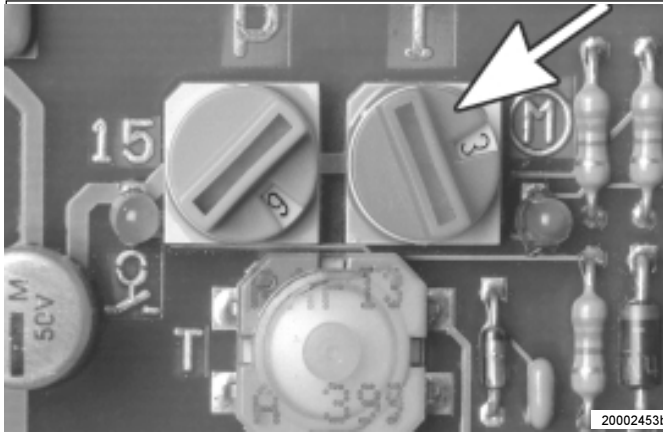


Fig. 10 - Rotary switch - Operating time

To set the operating time

- The operating time can be set to 15 different settings by means of the red rotary switch.

Time ranges: Seconds or minutes

Switch position	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Seconds	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
Minutes	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30

Note: When the switch is on "0" a fault is shown at the right-hand LED 3 Fig. 12. At the same time the factory-set operating time is accepted.

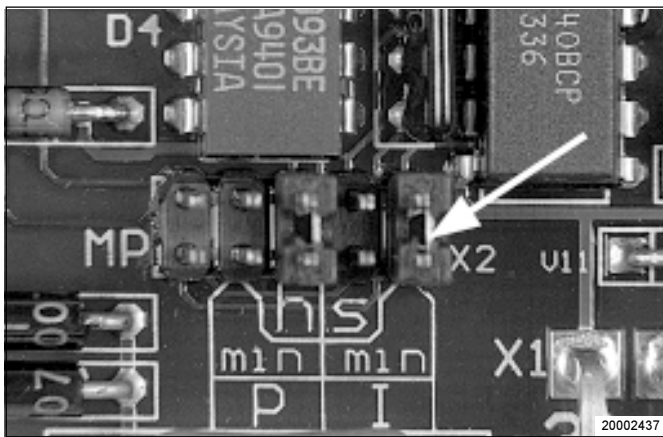


Fig. 11 - Preselection of the time range

Factory setting

Rotary switch on : 6 minutes
 or 24 seconds

- The time ranges can be modified by replugging the jumper (Fig. 11) on the printed circuit board.
- Factory setting of the jumper: see chart page 15. The combination numbers can be learnt from the pump type designation code mentioned on the nameplate of each pump.

Fault indication

Rotary switch set at „0“

- When one of the rotary switches 2, 3 Fig. 12 is on the „0“ setting a fault is shown at the right-hand LED 3.
- The fault is indicated by 4 flashes of the LED.
- The pump motor also runs according to the flash frequency. If the warning is ignored the controller automatically adopts the **factory-set** values for the operating or pause time

Pushbutton 5 Fig. 12 continuously actuated (short circuit)

- If a short circuit occurs at the pushbutton or is present at the external illuminated pushbutton Fig.13 or at the connecting parts a fault is shown at the red LED 3, fig. 12.
- The fault is indicated by 3 flashes of the LED when the voltage supply is switched on.
- The motor of the pump also runs according to the flash frequency.

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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 V 10 (V20) will always be delivered. See chart page 15.
- Before installing another printed circuit board, take care that the setting of the jumper or that of the operating/pause time is the same as on the old printed circuit board.

Operational Test / To Trigger an Additional Lubrication Cycle

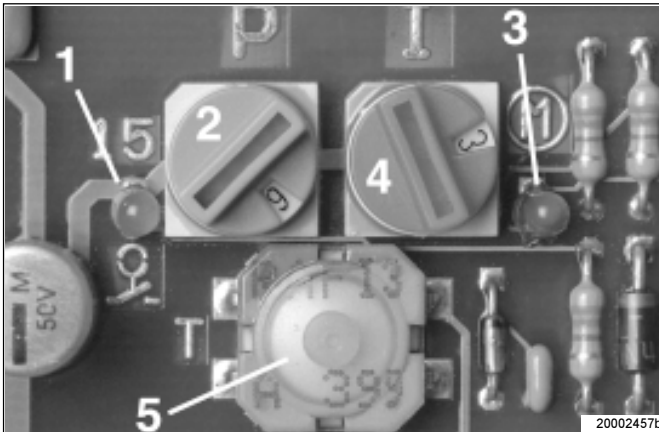


Fig. 12 - LED on the printed circuit board

- | | |
|-------------------------------|---|
| 1 - LED, left-hand | 4 - Rotary switch, operating time |
| 2 - Rotary switch, pause time | 5 - Pushbutton for additional lubrication |
| 3 - LED, right-hand | |

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

Pumps model 203 installed on machines

- * Switch on the machine contact.

Pumps model 203 installed on commercial vehicles

- * Switch on the driving switch

For all pumps

- To check whether power is applied to the printed circuit board, observe whether the LED 1 Fig. 12 is lit.
- * Press pushbutton 5 on the printed circuit board (> 2 seconds) until the right-hand LED 3 lights up.
- A shorter pause time elapses, followed by a normal lubrication cycle.
- Additional lubrication cycles can be triggered at any time.



Fig. 13 - To trigger an additional lubrication cycle, only pumps with illuminated pushbutton

Note: In the case of model 203 pump, version 2A1, with external illuminated pushbutton, it is also possible to trigger an additional lubrication cycle via this pushbutton.

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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 whether the signal lamp of the illuminated pushbutton (if any) is lit.

• Fault: the pump motor does not run	
• Cause:	• Remedy:
<ul style="list-style-type: none"> • Voltage supply interrupted • Voltage supply to the printed-circuit interrupted • Voltage supply interrupted between the printed circuit board and the motor • Printed-circuit board defective 	<ul style="list-style-type: none"> • Check the voltage supply to the pump. If necessary, eliminate the fault. • Check the line leading from the pump plug to the printed circuit board. • If the voltage is applied, the left-hand LED is lit. • Triggering an additional lubrication cycle • If the voltage is applied, the right-hand LED is lit. • Replace the printed circuit board.
• Fault: Right-hand LED 3 Fig. 12 flashes	
• Cause:	• Remedy:
<ul style="list-style-type: none"> • One of the two rotary switches 2, 4 Fig. 12 is on „0“. Signal: 4 flashes • Short circuit at pushbutton 5 Fig. 12 or, if present, at the illuminated push button or at their connecting parts Signal: 3 flashes 	<ul style="list-style-type: none"> • Set rotary switch to a number or a letter. • Check whether the short circuit is at the PCB or, if present, at the illuminated pushbutton. If necessary, exchange the PCB or the illuminated pushbutton.

Technical Data

Rated voltage	12/24V DC	Time setting
Operating voltage		
12V/ 24V	9V to 30V	Pause time, depending on the jumper position:
Residual ripple in relation	 4; 8; 12; 24 to 60 minutes
with the operating voltage	± 5% acc. to DIN 41755 1, 2, 3...to 15 hours
Motor output	Transistor 7A/short-circuit proof	Operating time, depending on the jumper position
Reverse voltage protection:	 8; 16; 24;...to 120 seconds
The operating voltage inputs are protected against	 2, 4, 6,...to 30 minutes
polarity reversal		Factory setting
Temperature range	-25°C to 70°C	Pause time
Lamp current in the case of pump 2A1	max. 2 A	or
Class of protection		Operating time
Printed circuit board installed in housing	IP 6K 9K	or

In order to protect the printed circuit board against condensati-
on 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

and the EMC guideline 89 / 336 / EWG

Emitted interference acc. to EN 55011 / 03.91 and
..... EN 50081-1 / 01.92

Noise immunity acc. to EN 50082-2 / 03.95

The type 203 pumps with PCB V10 - V13 (V20 - V23) comply
with the Automotive EMC Directive 95/54/EEC and with the
EC approval mark e1

021016

shown on the nameplate

Connection Diagram - Industrial Applications, Printed Circuit Board 236-13891-1 (V10-V13)

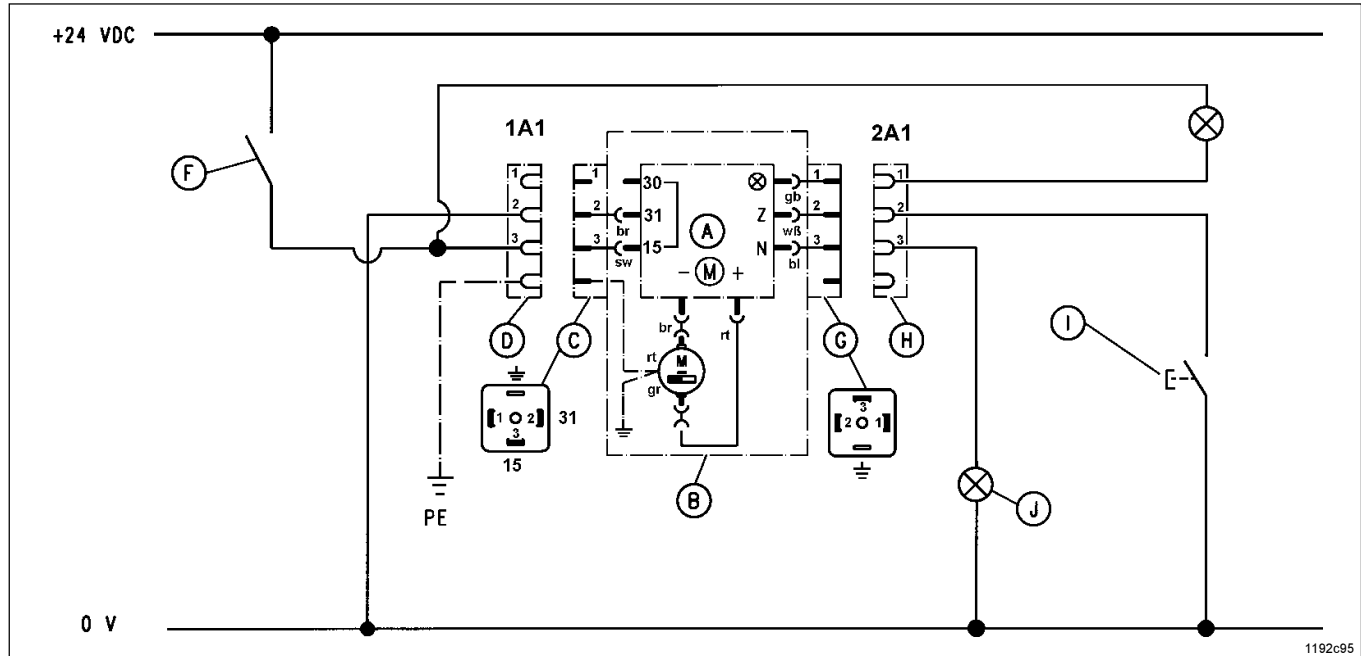


Fig. 14 - Connection diagram Quicklub 203 with adjustable pause time
 Connection via Hirschmann type-in connectors DIN 43650-A

- | | | |
|--|--|--|
| A - Printed circuit board | 1A1 - Pump without illuminated pushbutton | G - Cable connector 2* |
| B - Pump housing | 2A1 - Pump with cable connection for illuminated pushbutton* | H - Line socket 2 (grey) for connection cable, 3-wire* |
| C - Cable connector 1 | F - Machine contact | I - Pushbutton for additional lubrication |
| D - Line socket 1 (black) for connection cable, 3-wire | | J - Signal lamp in the case of low-level control |
- * on request

Attention! If a pump model 103 CS...E2 is replaced by a pump model P203-...-2A1.10, the lamp connection of the illuminated pushbutton must be changed from minus to plus.

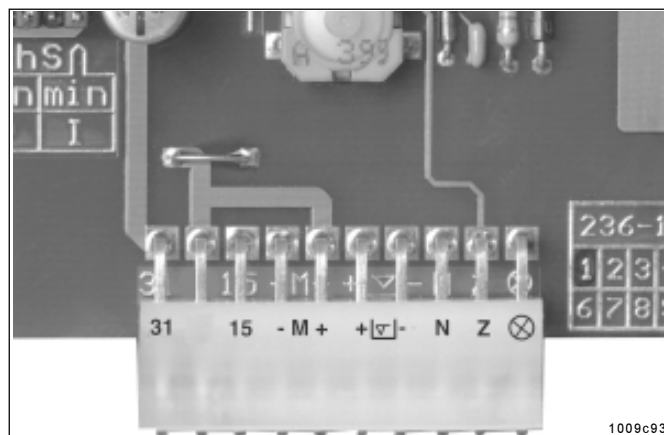


Fig. 15 - Terminals of the printed circuit board

- | | |
|---------------------|-----------------------------|
| 31 - Earth | ☒ - Low-level control* |
| 15 - Driving switch | N - Level control* |
| Ⓜ - Motor | Z - Additional lubrication* |
| | ⊗ - Signal lamp* |

* equipment available on request

Subject to change without notice

**Connection Diagram - Applications for Commercial Vehicles
 Printed Circuit Board 236-13891-1 (V10-V13)**

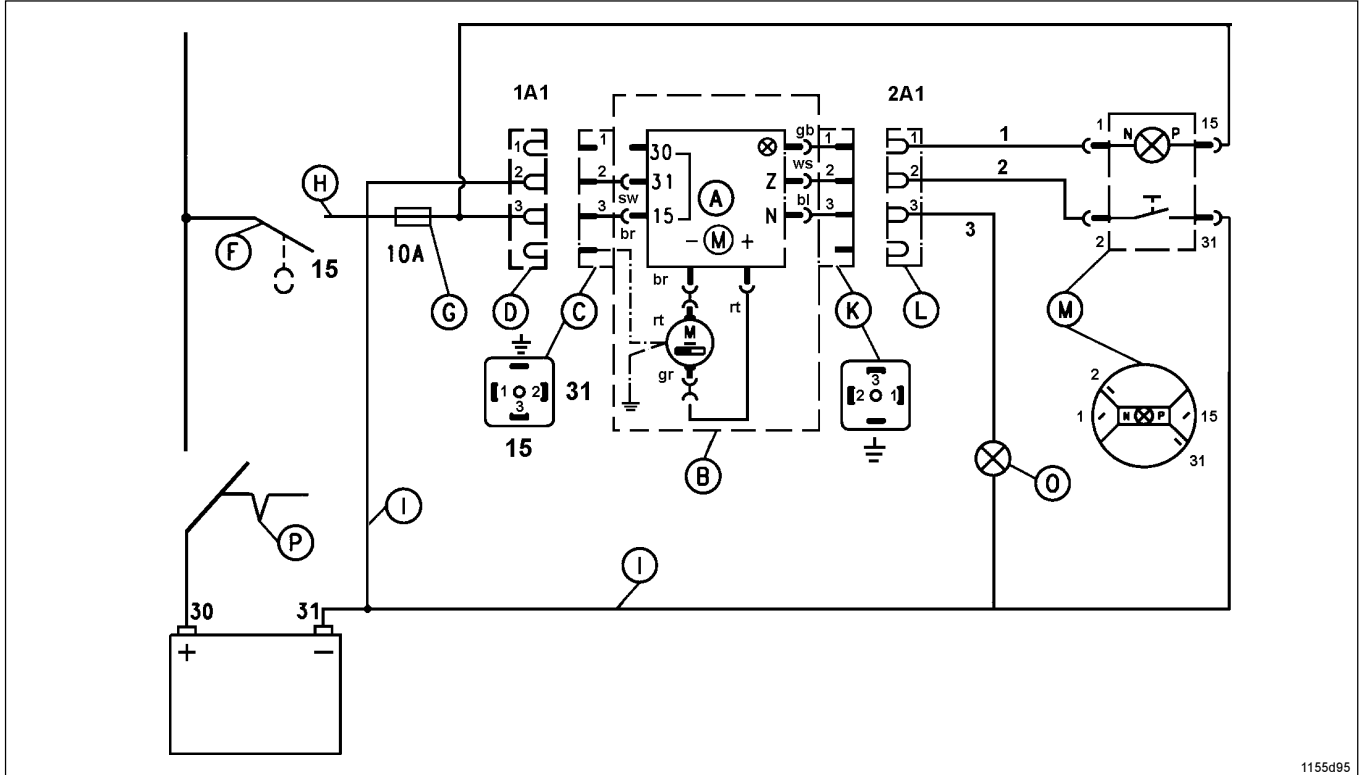


Fig. 16 - Connection diagram Quickclub 203 with adjustable pause time
 Connection via square type plug DIN 43650-A

- | | | |
|--|--|---|
| A - Printed circuit board | 2A1 - Pump with cable connection
for illuminated pushbutton** | K - Cable connector 2** |
| B - Pump housing | F - Driving switch | L - Line socket 2 (grey)
with connection cable, 3-wire** |
| C - Cable connector 1 | G - Fuse 10 A | M - Illuminated pushbutton** |
| D - Line socket 1 (black)
with connection cable, 3-wire | H - Cable, black | O - Signal lamp in the case of low-level
control |
| 1A1 - Pump without illuminated pushbutton | I - Cable, brown | P - Battery cutoff* |

*does not belong to the scope of delivery
 **equipment available on request

Caution: Do not connect the red core (not shown: cf. J Fig. 17) of the 3-core connecting cable to the wire box 1 (D, Fig. 16) since the PCB is connected internally between 30 and 15.

Subject to change without notice

Attention! If a pump model 103 CS...E2 is replaced by a pump model P203-...-2A1.10, the lamp connection of the illuminated pushbutton must be changed from minus to plus.

**Connection Diagram - Applications for Commercial Vehicles
 Printed Circuit Board 236-13891-2 (USA)**

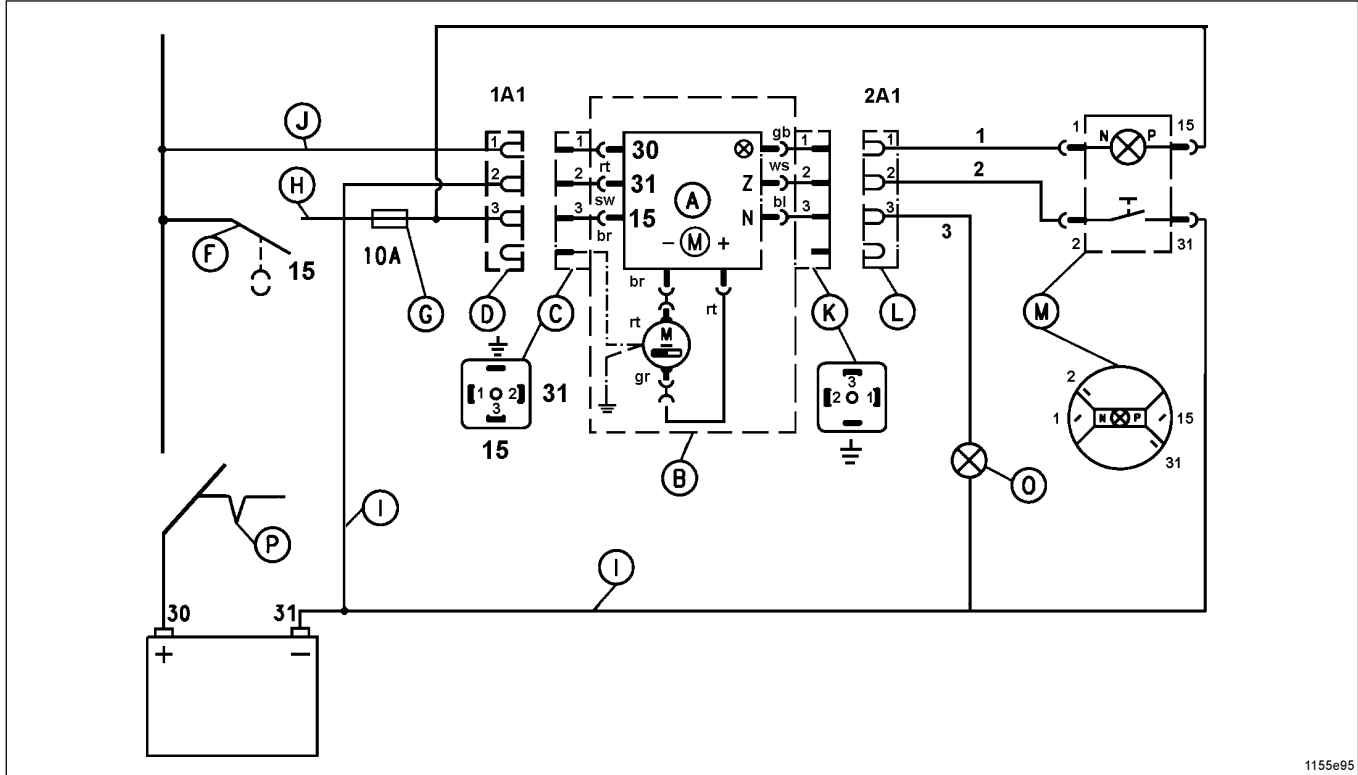
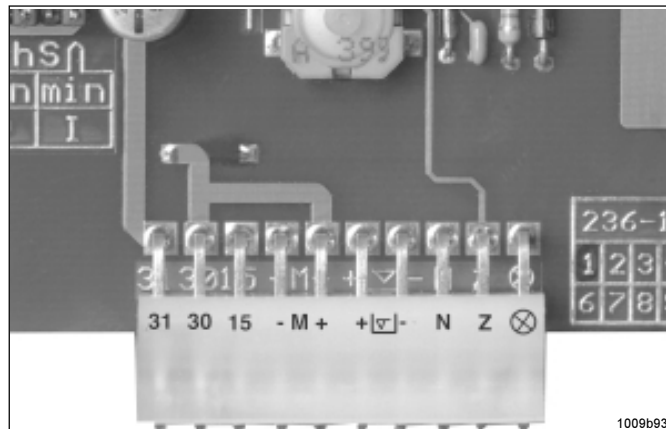


Fig. 17 - Connection diagram Quickclub 203 with adjustable pause time
 Connection via square type plug DIN 43650-A

- | | | |
|---|---|--|
| A - Printed circuit board | 2A1 - Pump with cable connection for illuminated pushbutton** | K - Cable connector 2** |
| B - Pump housing | F - Driving switch | L - Line socket 2 (grey) with connection cable, 3-wire** |
| C - Cable connector 1 | G - Fuse 10A | M - Illuminated pushbutton** |
| D - Line socket 1 (black) with connection cable, 3-wire | H - Cable, black | O - Signal lamp in the case of low-level control |
| 1A1 - Pump without illuminated pushbutton | I - Cable, brown | P - Battery cutoff* |
| | J - Cable, red | |

*does not belong to the scope of delivery
 **equipment available on request

Attention! If a pump model 103 CS...E2 is replaced by a pump model P203-...-2A1.10, the lamp connection of the illuminated pushbutton must be changed from minus to plus.



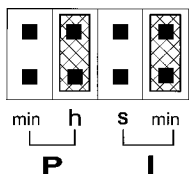
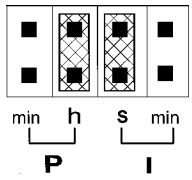
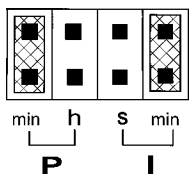
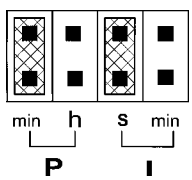
- | | |
|----------------------|-----------------------------|
| 30 - Battery voltage | ☒ - Low-level control* |
| 31 - Earth | N - Level control* |
| 15 - Driving switch | Z - Additional lubrication* |
| ⊙ - Motor | ⊗ - Signal lamp* |

*equipment available on request

Fig. 18 - Terminals of the printed circuit board 236-13891-2

Subject to change without notice

Combinations of the jumper positions - Survey

Possibilities of preselection	Pause time ranges P		Operating time ranges I		Jumper positions See Fig. 8, 10
	4 - 60 min	1 - 15 h	8 - 120 s	2 - 30 min	
Combination no.					
V 10, V 20 Standard		X		X	
V 11, V 21		X	X		
V 12, V 22	X			X	
V 13, V 23	X		X		

Subject to change without notice

