Pump Types

- The 203 pumps differ from each other only in the design and reservoir size as well as in the type of the electric connection (different plugs with or without electric cable).

- Reservoir sizes:
  - 2 l transparent plastic reservoir
  - 4 l transparent plastic reservoir
  - 8 l transparent plastic reservoir

- Electric connection
  For the industrial applications, the pumps are only equipped with plugs.
  The pumps model 203 used in commercial vehicles are equipped with a 10 m electric cable.

- All other data such as:
  - motor voltage
  - version of the control unit
  - remote control for triggering an additional lubrication cycle (2A1)
  - design and number of pump elements
  - design and number of safety valves
  - filling type
  - use of return line connections
  - low - level control (option)
can be learnt from the pump type designation code.

- Control unit models 203
  The following control units can be used for the 203 pumps: (refer to the respective Technical Description)

  a) external control units
     PSG 01
     PSG 02 (Industry)

  b) integrated control units
     - with fixed pause time (6 hours) and adjustable operating time, F*
     - with adjustable pause and operating times, V00-V03*
     - with metering device monitoring (microprocessor control), F M 00 - M 23*

  c) integrated control unit (trailers)
     - with fixed time of availability (6 hours) and adjustable operating time, H *

* Refer to the designation on the pump nameplate.
Example: P203 -2XNBO - 1 K6 - 24 - 2A1.10 - V00
Also refer to the designation code on page 6.

Fig. 1 - The different types of pump 203
### Identification Code - Pump Models 203

#### Examples of model designations

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P203-2 X N - 1 K6- 24- 1A 01- V00</td>
<td>Basic pump model for grease or oil with 1-3 outlets and 12 VDC or 24 VDC motor</td>
</tr>
<tr>
<td>P203-4 X L - 1 K7- 24- 2A 1. 10- V02</td>
<td>Reservoir design</td>
</tr>
<tr>
<td>P203-2 X N - 1 K6- 24- 2A 1. 11- V00-ADR</td>
<td>2 = 2 l transparent plastic reservoir</td>
</tr>
<tr>
<td>P203-2 y N BO- 2 K5- 24- 1A 1. 01- F</td>
<td>4 = 4 l transparent plastic reservoir</td>
</tr>
<tr>
<td>P203-4 X N BO- 1 K6- 24- 2A 4. 12- M00</td>
<td>8 = 8 l transparent plastic reservoir</td>
</tr>
<tr>
<td></td>
<td>X = Reservoir for grease</td>
</tr>
<tr>
<td></td>
<td>Y = Reservoir for oil</td>
</tr>
<tr>
<td></td>
<td>N = Standard design</td>
</tr>
<tr>
<td></td>
<td>L = Low - level control</td>
</tr>
<tr>
<td></td>
<td>BO = Filling from top</td>
</tr>
<tr>
<td></td>
<td>FL = Flat-type reservoir (2 Litre)</td>
</tr>
<tr>
<td></td>
<td>1-3 = Number of the use elements</td>
</tr>
<tr>
<td></td>
<td>K5 = Piston diameter = 5 mm</td>
</tr>
<tr>
<td></td>
<td>K6 = Piston diameter = 6 mm</td>
</tr>
<tr>
<td></td>
<td>K7 = Piston diameter = 7 mm</td>
</tr>
<tr>
<td></td>
<td>12 V DC or 24 V DC motor</td>
</tr>
<tr>
<td></td>
<td>1A = 1 connection, supply voltage</td>
</tr>
<tr>
<td></td>
<td>2A = 2 connections, supply voltage + remote control for additional lubrication, for low - level control, piston detector (microprocessor)</td>
</tr>
<tr>
<td></td>
<td>1 = Hirschmann plug</td>
</tr>
<tr>
<td></td>
<td>4 = AMP - flanged plug (microprocessor)</td>
</tr>
<tr>
<td></td>
<td>8 = PG - cable gland</td>
</tr>
<tr>
<td></td>
<td>00 = without socket-outlet, without cable</td>
</tr>
<tr>
<td></td>
<td>01 = with socket-outlet, without cable</td>
</tr>
<tr>
<td></td>
<td>10 = with 10 m cable</td>
</tr>
<tr>
<td></td>
<td>11 = with 10 m ADR cable</td>
</tr>
<tr>
<td></td>
<td>12 = with 10 m cable, 4 - wire (microprocessor M00 - M07)</td>
</tr>
<tr>
<td></td>
<td>13 = with 10 m cable, 5 - wire (microprocessor M08 - M23)</td>
</tr>
<tr>
<td></td>
<td>Control p. c. b. s. 12V / 24 V</td>
</tr>
<tr>
<td></td>
<td>F - with fixed pause time and variable adjustable operating time</td>
</tr>
<tr>
<td></td>
<td>F ADR - with fixed pause time and variable adjustable operating time **</td>
</tr>
<tr>
<td></td>
<td>V00 - V03 - with adjustable pause and operating time **</td>
</tr>
<tr>
<td></td>
<td>V00 - V03 - ADR with adjustable pause and operating time **</td>
</tr>
<tr>
<td></td>
<td>M 00 ... M 23* - with microprocessor control (various adjustments - see combinations of the jumper - positions)</td>
</tr>
<tr>
<td></td>
<td>H - for trailer or semitrailers</td>
</tr>
<tr>
<td></td>
<td>H - ADR for trailers and semitrailers **</td>
</tr>
<tr>
<td></td>
<td>No designation: Pump without control p. c. b.</td>
</tr>
</tbody>
</table>

*Not in conjunction with Hirschmann plugs (type of connection 1) |
** for transport of hazard materials

Note: Any pumps combinations other than the above standard pumps can be composed and ordered in accordance with the valid model identification code.
Description of the QUICKLUB 203 Central Lubrication Pump

• The QUICKLUB 203 central lubrication pump
  - is a compact multiline pump consisting of the following components:
    - Housing with integrated motor
    - Reservoir with stirring paddle
    - Printed circuit board
    - Pump element
    - Safety valve
    - Filling nipple
    - Electrical connection parts
  - can drive up to 3 pump elements
  - operates according to lubrication cycles (pause and operating times)
  - can be equipped with a low-level control
  - can supply up to 300 lubrication points depending on the line lengths
  - is designed for the automatic lubrication of the connected lubrication points
  - is designed for the delivery of greases up to NLGI 2 at temperatures from -25° C to 70° C or of mineral oils of at least 40 mm²/s (cST)
  - 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.

Low-level control (optional)

• The pump model 203 can be equipped with a low-level control.
• The following versions are available:
  - Low-level control in conjunction with printed circuit boards F* and V00-V03*
  - Low-level control in conjunction with printed circuit board M00-M23*
  - Low-level control for pumps without printed circuit board.
  - When the reservoir is empty, the signal lamp flashes, thus indicating the low level. Refer to the chapter Low-level control.

* The designation indicates the version of the printed circuit board. It is part of the pump type designation code mentioned on the nameplate of each pump. Example: P203 ...-2XN-1K6-24-1A1.10-V00
Mode of Operation

Pump Elements

- The electric motor drives the eccentric 1 (Fig. 5, 6).
- During the operating time:
  - piston 2 sucks in lubricant from the reservoir. Refer to Fig. 5.
  - piston 2 dispenses the lubricant to the connected lubrication points via the metering device. Refer to Fig. 6.

- 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

Suction Phase

Fig. 5 - The pump element sucks in lubricant

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

Delivery Phase

Fig. 6 - The pump element dispenses lubricant

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

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

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

Arrangement of the pump elements

- If several pump elements are to be installed, the installation arrangement shown in Fig. 8 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.

Pressure limiting valve without grease return

Important: Each pump element must be secured with a pressure limiting valve.
- The pressure limiting valve
- limits the pressure build-up in the system
- opens at an overpressure of 250 or 350 bar depending on the safety valve design.
- If lubricant is leaking at the pressure limiting valve, this indicates that the system is malfunctioning.

Note: The pumps model 203 are equipped without pressure limiting valve. When ordering the pumps, order the safety valve separately. See the Parts Catalog under Safety valves.

Pressure limiting valve with grease return (optional)

If the system is blocked, grease will leak from the pressure limiting valve. This grease quantity is returned to the reservoir.
Technical Data

**Pump**
- Admissible operating temperature: -40° C to 70° C*
- 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 of at least NLGI grade 2
- Mineral oils up to 40mm²/s (cST) at 40° C
- Class of protection: IP6K 9K acc. to DIN 40050 T9

*Note: The pump is designed for the above mentioned temperature range. The lubricants used must still be pumpable at the temperatures mentioned above. In case of doubt, consult the lubricant manufacturer.

**Motor:**
- DC gear motor (interference-suppressed)
- Operating voltage: 12VDC or 24VDC
- Max. current input:
  - 12V: 6.5 A
  - 24V: 3 A
- Speed: approx. 17 rpm

*Note: The pump motor is designed for intermittent operation. For continuous operation, contact the pump manufacturer.

**Torsion torques**
- Electric motor on housing: 12 Nm
- Pump element in housing: 25 Nm
- Closure plug in housing: 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 203 without connection cable: 5.4 kg
- Pump 203, version E 1: 6.5 kg
- Pump 203, version E 2: 7.1 kg

**4 l reservoir, standard design (1.5 kg)**
- Pump 203 without connection cable: 8.3 kg
- Pump 203, version E 1: 9.3 kg
- Pump 203, version E 2: 9.9 kg

**8 l reservoir, standard design (1.5 kg)**
- Pump 203 without connection cable: 8.6 kg
- Pump 203, version E 1: 9.6 kg
- Pump 203, version E 2: 10.2 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 safety valve: +0.1 kg
- 10 m monitoring cable, 5-wire (microprocessor) E 4: +1.1 kg
- 10 m monitoring cable, 4-wire (microprocessor) E 4: +0.4 kg
- Connection cable with piston detector: +0.1 kg
- Reservoir version “Filling from top” (only 2 l): +0.15 kg
- 2 l flat-type reservoir: +0.5 kg

*Note: The 4l and 8l reservoirs have the standard design “filling from top”.

**Pump element**
- Piston diameter, K5: 5 mm
- Lubricant output: approx. 2 cm³/min
- Piston diameter, (standard) K6: 6 mm
- Lubricant output: approx. 2.8 cm³/min
- Piston diameter, K7: 7 mm
- Lubricant output: approx. 4 cm³/min
- Max. operating pressure: 350 bar
- Connection thread: G 1/4 suitable for tube DIA
- Note: The lubricant output listed refers to grease of NLGI grade 2 measured at 20°C, backpressure 100 bar, 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.
• 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.

• 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 machi-
ne or vehicle has been put into operation. Refer to Fig. 5.
• During the operating time the pump element dispenses the lubri-
cant to the lubrication points via progressive metering devices.
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. 5) 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. Also see “To set the operating time”.

• When the machine contact or the driving switch is switched off, a capacitor takes over the power supply to the printed circuit board, thus the times which have already elapsed are not lost.

• **Switching off until 5 days**
  When the power supply is switched on again the printed circuit board continues to operate from the point where it had been interrupted.

• **Switching on after 5 days**
  When the power supply is switched on again, the capacitor is charged. The printed circuit board immediately starts with an operating time.
**Time Setting**

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

---

**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**

<table>
<thead>
<tr>
<th>Switch position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minutes</td>
<td>3.75</td>
<td>7.5</td>
<td>11.25</td>
<td>15</td>
<td>18.75</td>
<td>22.5</td>
<td>26.25</td>
<td>30</td>
<td>33.75</td>
<td>37.5</td>
<td>41.25</td>
<td>45</td>
<td>48.75</td>
<td>52.5</td>
<td>56.25</td>
</tr>
<tr>
<td>Hours</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

**Note:** The 0 setting has no function.

---

**Factory setting**

Rotary switch on: ............................................................. 6 hours
or ............................................................. 22.5 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 14. The combination number can be learnt from the pump type designation code mentioned on the nameplate of each pump.
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

<table>
<thead>
<tr>
<th>Switch position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seconds</td>
<td>7.5</td>
<td>15</td>
<td>22.5</td>
<td>30</td>
<td>37.5</td>
<td>45</td>
<td>52.5</td>
<td>60</td>
<td>67.5</td>
<td>75</td>
<td>82.5</td>
<td>90</td>
<td>97.5</td>
<td>105</td>
<td>112.5</td>
</tr>
<tr>
<td>Minutes</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
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<td>18</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>26</td>
<td>28</td>
<td>30</td>
</tr>
</tbody>
</table>

*Note: The 0 setting has no function.*

### Factory setting

- Rotary switch on: ........................................................ 6 minutes
  or .............................................................. 22.5 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 14. The combination numbers can be learnt from the pump type designation code mentioned on the nameplate of each pump.
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 V00 will always be delivered. See chart page 14.
- 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

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. 10 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.

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.
Technical Data

Rated voltage ............................................................ 12/24V DC
Operating voltage
12V/ 24V ..................................................................... 9V to 30V
Residual ripple in relation with the operating voltage ............ ± 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
Lamp current in the case of pump 2A1 ........................... max. 2 A
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 (Electromagnetic compatibility) guidelines for road vehicles acc. to DIN 40839 T1, 3 and 4.
The printed circuit boards model V additionally comply with the EMC guideline 89 / 336 / EWG

Emitted interference acc. to ........................................... EN 55011 / 03.91 and prEN 50082-2 / 1993
Noise immunity acc. to .................................................. prEN 50082-2 / 1993

Time setting

Pause time, depending on the jumper position:
...................................... 3.75; 7.5; 11.25; to 56.25 minutes
.......................................................... 1, 2, 3...to 15 hours

Operating time, depending on the jumper position
....................................... 7.5; 15; 22.5;....to 112.5 seconds
..................................................... 2, 4, 6 ,....to 30 minutes

Factory setting
Pause time .......................................................... 6 hours
or ............................................................... 22.5 minutes
Operating time .................................................. 6 minutes
or .............................................................  22.5 seconds
Connection Diagram - Industrial Applications

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

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

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

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

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.
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.
Progressive Metering Devices Model SSV

Suitable Lubricants

- The progressive metering devices model SSV can be used for dispensing
- mineral oils with min. 40 mm²/s (cSt) or
- greases up to the penetration class NLGI 2

Note: It must nevertheless be ensured that the oils or greases used do not alter their consistency significantly in the course of time or under the influence of temperature or pressure.

The progressive metering devices
- are piston-operated metering devices;
- automatically (progressively) dispense the lubricant fed by the pump to the connected lubrication points;
- have a lubricant output of 0.2 cm³ per outlet and piston stroke;
- when one or more outlets are closed (see "Combining outlets") they can dispense a double or multiple lubricant quantity;
- are available with 6 to 12 outlets or up to 22 outlets;
- offer the option of combining several lubrication points into one centralized lubrication point.
- meter the supplied lubricant into predetermined single quantities.
- can be monitored visually or electronically.
- The installation of max. 3 pump elements allows the supply of lubricant to max. 3 separate lubrication circuits.
- Each lubrication circuit is equipped with a pressure relief valve (safety valve) which limits the pressure to the maximum admissible value.
- Any blockage in a lubrication circuit is indicated by grease leaking from the respective pressure relief valve.

Features of a Progressive Metering Device

- The term “progressive” refers to the special features of the lubricant distribution within the metering devices, e.g.
- the successive movements of the individual pistons within the metering device due to the supplied lubricant being under pressure;
- the pistons move in a predetermined order and the cycles are repeated constantly;
- each piston must have completed its movement fully before the next piston can be moved, no matter whether the lubricant is dispensed continuously or intermittently;
- the pistons operate interdependently of one another;
- no lubrication point which is connected to the system is omitted.
Applications

- QUICKLUB progressive metering devices offer the option of combining several lubrication points on a machine to one or more central lubrication points, as shown in Fig. 4 which illustrates this basic feature.

- When they are used in connection with hand-operated pumps, pneumatic or electric pumps the progressive metering devices are a simple and low-cost centralized lubrication system. See Fig. 5.

1 - Hand-operated pump
2 - Pneumatically operated pump
3 - Electrically operated pump
4 - Lubrication fitting block
5 - Hand-operated filling pump

- Progressive metering devices can be used in two-line or single-line centralized lubrication systems in order to increase the number of outlets of multiline pumps or to subdivide the single metering devices and measuring valves (Fig. 4 - 8) also as secondary metering devices in large and small oil circulating systems.
Lubricant Distribution Within the Metering Device

- The 5 following illustrations show how the lubricant distribution is made to the individual outlets.

Note: To simplify the description we only show the lubricant distribution for outlets 2, 7, 5, 3 and 1. The remaining distribution operations are derived from the logical pumping sequence.

**Phase 1**
- The lubricant enters the metering device from above (white arrow) and flows to the right-hand end of piston A.
- Piston A (black arrow) is moved to the left under the pressure of the lubricant, causing the lubricant ahead of the left-hand end of piston A to be dispensed to outlet 2 (dashed arrow).

**Phase 2**
- Once piston A has reached its left-hand final position, the junction channel to the right-hand end of piston B is opened.
- The lubricant which arrives from above (white arrow) also moves piston B (black arrow) to the left, causing the lubricant quantity ahead of the left-hand end of piston B to be dispensed to outlet 7 (dashed arrow).
Phase 3
- Once piston B has reached its left-hand final position, the junction channel to the right-hand end of piston A is opened.
- The lubricant which flows from above (white arrow) moves piston C (black arrow) to the left, causing the lubricant quantity ahead of the left-hand end of piston C to be dispensed to outlet 5 (dashed arrow).

![Fig. 11: Phase 3](image)

Phase 4
- The channel to the right-hand end of piston D is now open (black arrow).
- The lubricant which is fed from above (white arrow) moves piston D to the left, causing the lubricant quantity ahead of the left-hand end of piston D to be dispensed out of the metering device via outlet 3 (dashed arrow).

![Fig. 12: Phase 4](image)

Phase 5
- In phase 4, piston D had opened the junction channel to the left-hand end of piston A.
- The lubricant flowing in (white arrow) moves piston A to the right (black arrow), causing the lubricant quantity to be dispensed to outlet 1 (dashed arrow).
- In the subsequent distribution sequence, pistons B - D are moved from the left to the right one after the other.
- A complete distribution sequence is finished and a new cycle can begin.

![Fig. 13: Phase 5](image)

**When the lubricant supply is interrupted**
- the pistons come to a halt;
- the lubricant is no longer dispensed to the lubrication point.
- When the lubricant is fed again to the metering device, the cycle begins from the point where it had been interrupted.
Monitoring of the Operation

Fig. 14: Example of a lubrication system

A - Safety valve
B - Main metering device SSV 6
C - Secondary metering device SSV 8
D - Secondary metering device SSV 6
E - Lubricant plastic tube
F - Secondary metering device SSV 12
G - High pressure plastic hose

System-dependent monitoring

- The main metering device (B, Fig. 14) and the secondary metering devices are connected by a high pressure plastic hose G. This feature automatically causes the linkage of the progressive system connected downstream of the pump.
- If only one piston does not move in any metering device or if the metering device can no longer dispense any lubricant via its outlets, this metering device will block itself.
- If one of the secondary metering devices is blocked, the main metering device is also blocked. The whole progressive system installed downstream of the pump stops operating.
- The fundamental internal structure of the progressive metering device guarantees the self-monitoring of the sequence within the metering device.
- The linkage makes it possible to monitor the operation of the whole system.

Visual monitoring

- The metering devices can be equipped with an indicator pin which is connected to the piston and moves back and forth during lubricant distribution.
- If there is a blockage in the system, the indicator pin stops moving.

Note: It is also possible to indicate the movements of the indicator pin or any blockage in the system by means of a control switch (KS) or a proximity switch (KNN).

Electrical monitoring (microprocessor control)

- A piston detector (initiator) which has been installed on a metering device instead of a piston closure plug monitors the pump operating time and brings it to a close after all the pistons of this metering device have dispensed their lubricant quantity.
- If there is a blockage in the system or if the pump reservoir is empty, the piston detector can no longer record the piston movements. The switching off signal is not transmitted to the control unit. A fault signal occurs.

Important! For the system monitoring it is recommended that one SSV metering device with pre-assembled piston detector be used per lubrication circuit. These special metering devices must be ordered separately for each lubrication system. Refer to the Parts Catalog.
- The pre-assembled metering devices have the designation SSV ... - N (they are available for SSV 6, 8, 10 and 12). They must be installed in the system instead of a normal metering device.
Determining the Lubricant Output by Combining Outlets

**Tube Fittings, Screw-Type**

- The whole system can be monitored visually via the pressure relief valve. If lubricant is leaking at the pressure relief valve during the distribution sequence, this indicates that there is a blockage in the system.

**Important:** In the case of the progressive metering devices models SSV 6 - 12 the outlets 1 and/or 2 must never be closed. In the case of the progressive metering devices model SSV 14 - 22, the two outlets with the highest numbers must never be closed, otherwise the system would block owing to the structure of the metering device.

Fig. 17: Pressure relief valve

Fig. 18: Install the outlet fittings and closure plugs in accordance with the dosage

- Inlet fitting
- Delivery hole of the piston
- Closure plug, installed
- Closure plug, piston (with chamfered), piston
- Outlet fitting assembly
- Clamping ring (brass)
- Valve body
- Cutting ring
- Coupling nut
- Junction channel
- Copper washer
- Closure plug, outlet borehole
• The output quantities can be raised by closing outlet boreholes.
• Install an outlet fitting assembly in each outlet borehole which will be used. Refer to Fig. 18, 19, 20.
• **Never remove closure plug 4** (chamfered) on the piston side.
• **Never use closure plug 12** (Fig. 18) or 7 (Fig. 19, 20) as a piston closure plug 4.

**Important:** Always use valve body 7 (Fig. 18) in conjunction with clamping ring 6.

**Note:** In the case of push-in type fittings the clamping ring is always a firm component part of the valve body.

**Important:** In the case of the progressive metering devices model SSV 6 - 12 the outlets 1 and/or 2 must never be closed. In the case of the progressive metering devices model SSV 14 - 22, the two outlets with the highest numbers must never be closed, otherwise the system would block due to the structure of the metering device.

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**Tube Fittings, Push-in-Type (main metering device)**

![Diagram](image)

**Fig. 19 - Install the push-in type outlet fittings and the closure plugs in accordance with the dosage**

1 - Inlet fitting with protective cap *
2 - Delivery borehole of the piston
3 - Closure plug installed in outlet borehole
4 - Closure plug (chamfered), piston
5 - Valve body assembly (with reinforced collar)
6 - Junction channels
7 - Closure plug, outlet borehole
8 - Copper washer

* on request
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Tube Fittings, Push-in Type (secondary metering devices)

Fig. 20: Install the push-in type outlets fittings and closure plugs in accordance with the dosage

1 - Inlet fitting
2 - Delivery borehole of the piston
3 - Closure plug installed in outlet borehole
4 - Closure plug (chamfered), piston
5 - Valve body assembly (with knurled collar)
6 - Junction channels
7 - Closure plug, outlet borehole
8 - Copper washer

Single lubricant output

- The simple lubricant output is the lubricant quantity dispensed by a piston per stroke and per outlet borehole to one lubrication point. It amounts to 0.2 cm³.

Double or multiple lubricant output

- If one or more lubrication points require a double or a multiple lubricant amount, this can be performed by closing one or more outlets.
- As shown in Fig. 21, outlet borehole 10 has been closed. The lubricant quantity supplied by this outlet flows out of the metering device via outlet 8.
- Total quantity at outlet 8:
  - is the quantity of outlet 8
  - plus the lubricant quantity of outlet 10.
- If a triple quantity is needed (at outlet 1), close the outlet borehole located above the discharge borehole. Refer to outlets 3 and 5 on Fig. 21.

Fig. 21: Single, double and triple lubricant output

x - Outlet quantity (1x: single, 2x: double, etc.)
1 - 10 Outlet numbers
A - Clamping ring (brass)
Technical Data

**Metering Device Model SSV**
- Lubricant output per outlet and per stroke: 0.2 cm³
- Max. operating pressure: 350 bar
- Min. operating pressure: 20 bar
- Max. differential pressure between two outlets: 100 bar
- Outlet connection for tube: Ø 6 mm
- Inlet connection: G 1/8
- Operating temperature: -25°C to 70°C

**Push-in-Type Tube Fittings**
- High pressure range, p max.: 350 bar
- Inlet tube fittings of the metering devices
- Low-pressure range, p max.: 250 bar
- Outlet fittings, secondary metering devices

**Inlet fittings to the lubrication point**

**Lines**
- **High-pressure plastic hose**
  - Min. bursting pressure (in connection with hose clamp, screwed): 600 bar
  - Min. bending radius: 50 mm
  - Min. temperature: -40°C
- **Plastic tube**
  - Min. bending radius: 30 mm
  - Bursting pressure at 20°C: approx. 250 bar
  - Min. temperature: -40°C

**Tightening torques**

- Closure plug (piston) in metering device: 10 Nm
- Closure plug (outlets) in metering device: 10 Nm
- Inlet fitting in metering device
  - Screw-type: 17 Nm
  - Plug-type: 10 Nm
- Outlet fitting in metering device
  - Screw-type: 10 Nm
  - Plug-type: 8 Nm
- Compression nut onto inlet fitting: 10 Nm
- Compression nut onto outlet fitting, screw-type
  - Plastic tube: 5 Nm
  - Steel tube: 10 Nm
- Installation of metering device: 10 Nm