Injection oilers, micro pumps
for minimal quantity metering

Delivery rates
Metering pumps deliver lubricants in a measured amount. These piston pumps are for small delivery rates from 3 to 30 mm³. The lubricant’s delivery rate is partially adjustable.

Main features
- Optimal metering of every lube point regardless of line lengths and cross sections
- Lubricant supplied from one central reservoir, a standalone reservoir, and also by a central pressurized oil line in the case of injection oilers
- Metering elements can be actuated individually or in groups
- Splash lubrication through high oil acceleration (injection oiler)
- Fast sequence of pulses: up to 120 pulses per minute (injection oiler)
- Space saving design
- Ecofriendly: no oil in the exhaust air

Possible applications
- Air oiling (assembly tools)
- Greasing of small parts (assembly support)
- Chain lubrication
Oiling during production of camshafts

Adjustment of delivery rate
All injection oilers are set for maximum delivery volume at the plant. The delivery rate can be reduced in increments by turning the setting sleeve counterclockwise.

Max. delivery rate/stroke  30 mm³
1 full turn to the left:  25 mm³
2 full turns to the left:  20 mm³
3 full turns to the left:  15 mm³
4 full turns to the left:  10 mm³
5 full turns to the left:  5 mm³
over 6 full turns to the left:  3 mm³

The setting sleeve can be set by hand. It engages 4 times per revolution (which can be heard and felt) so that intermediate settings are also possible. The maximum delivery rate is set again by turning the setting sleeve clockwise to the stop.

The first start-up should take place at the maximum delivery rate.
### Technical data

- **Ambient temperature:** –20 to +80 °C
- **Lubricant:** . . . . . . oil \(^2\)
- **Operating viscosity:** . . 10 to 1100 mm²/s
- **Pumping medium:** Compressed air (Z) . . 3 to 10 bar
- **Max. perm. flow rate:** at 6 bar . . . 200 l/min
- **Mounting position:** . . oil duct S vertical

\(^1\) other media on request.
If fluid grease or grease is used, the suction action must be supported with priming (max. 3 bar). Please inquire about the correct use of other media.

### Setting sleeves

- **a** Setting sleeve for adjustment of quantity and manual actuation for additional triggering of a lube pulse
- **b** Indicator pin for function display
- **c** Guard cap

- **S** = oil feed
- **P** = oil outlet port
- **Z** = compressed air

### Attention: direction of rotation

- turn to the left
- + turn to the right

---

### Injection oiler, 1- and 3-port type

#### Delivery rate

<table>
<thead>
<tr>
<th>Version</th>
<th>Delivery rate [cm²/Stroke]</th>
<th>Order No.</th>
<th>for tube diam.</th>
<th>Lateral connections for sensor</th>
<th>Seal material</th>
<th>Features, application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-port type</td>
<td>0.003 – 0.03</td>
<td>501-301-000</td>
<td>2.5</td>
<td>no</td>
<td>NBR</td>
<td>Individual use, can be coupled to further 1- and 3-port-injection oilers. Basis unit for injection oiler with reservoir.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-008</td>
<td>2.5</td>
<td>no</td>
<td>FPM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-024</td>
<td>4</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-024-V5</td>
<td>4, quick connector</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-025</td>
<td>4</td>
<td>no</td>
<td>FPM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-053</td>
<td>4, quick connector</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-001</td>
<td>2.5</td>
<td>yes</td>
<td>NBR</td>
<td>Basis unit for injection oiler with reservoir and sensor (combined oiler)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-301-002</td>
<td>2.5</td>
<td>yes (^1)</td>
<td>NBR</td>
<td>external oil discharge</td>
</tr>
<tr>
<td>3-port type</td>
<td>0.003 – 0.03</td>
<td>501-303-000</td>
<td>2.5</td>
<td>no</td>
<td>NBR</td>
<td>group actuation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-008</td>
<td>2.5</td>
<td>no</td>
<td>FPM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-003</td>
<td>2.5</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-024</td>
<td>4</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-028</td>
<td>4</td>
<td>no</td>
<td>FPM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-029</td>
<td>4</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-026-V5</td>
<td>4, quick connector</td>
<td>no</td>
<td>NBR</td>
<td>group actuation</td>
</tr>
<tr>
<td>3-port type</td>
<td>0.003 – 0.03</td>
<td>501-303-037</td>
<td>4</td>
<td>no</td>
<td>NBR</td>
<td>group actuation, piston monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-303-038</td>
<td>4</td>
<td>no</td>
<td>NBR</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) yes, but internal oil path covered by gasket 818-100-007

---

### Oiler for group actuation

1) Ports tapped for solderless tube connection (for 2.5 mm diam. tubing)
2) Through-hole for wall mounting (M6×30 screws)

---

See important product usage information on the back cover.
Injection oiler, 1-port or 3-port type, with proximity switch

**Injection oiler with proximity switch, order No. 501-301-095**

1) Ports tapped for solderless tube connection (for 4 mm diam. tubing)
2) Through-hole for wall mounting (screws DIN 912 – M6)
3) Setting sleeve for adjustment of delivery rate and manual action for additional triggering of a lubrication pulse
4) Optical indicator pin
5) Guard cap

**Injection oiler with proximity switch, order No. 501-303-037 and 501-303-038**

1) Through-hole (ø6.7) for wall mounting (Schrauben DIN 912 – M6)
2) Setting sleeve for adjustment of delivery rate and manual action for additional triggering of a lubrication pulse
3) Optical indicator pin
4) Guard cap

**Circuit diagram**

<table>
<thead>
<tr>
<th>PNP</th>
<th>BN</th>
<th>BK</th>
<th>BU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36 V DC</td>
<td></td>
<td>(0 V)</td>
</tr>
</tbody>
</table>

**Technical data**

- Ambient temperature: –20 to +80 °C
- Lubricant: oil
- Operating viscosity: 10 to 1100 mm²/s
- Actuation medium: Compressed air
- Max. perm. flow rate at 6 bars: 200 l/min
- Seal material: NBR
- Mounting position: oil duct S vertical

**Proximity switch**

- Rated voltage: .24 V DC
- Operating voltage: .36 V DC
- Rated current: .100 mA
- Switching indicator: .LED

3) other media on request. If fluid grease or grease is used, the suction action must be supported with priming (max. 3 bar). Please inquire.
Injection Oilers, Micro Pumps

**Example 1: Gravity oil layout** (group actuation)

- **S** = oil feed
- **P** = oil outlet port
- **Z** = compressed air port

- To the lube points
- Air pulse for group actuation
- Screw plug sealing ring

**Example 2: Gravity oil layout with venting line** (group and individual actuation combined)

- To the lube points
- Air pulse for individual actuation
- Air pulse for group actuation
- Both control types can be combined in any way desired.

**Example 3: Configuration of a large system with ring line** (group actuation)

- To the lube points

---

**Injection oiler, 1-port type**

**Injection oiler, 3-port type, individual actuation**

**Injection oiler, 3-port type, group actuation**

**Air flow with individual actuation**

**Air flow with group actuation**

**S** = oil feed
**P** = oil outlet port
**Z** = compressed air port

Max. 3 bar

Priming pump
Injection oilers, 1- and 3-port type, with reservoir

The injection oiler is combined with a reservoir of transparent material when used with only a few lube points.

Applications
- tool lubrication

Further injection oilers can be hooked up. The individual metering pumps can in turn be actuated individually or in groups. If the lubrication frequency has to be scaled down, the injection oiler can be coupled with a counting stage.

We recommend that a venting line be laid for automatic venting of the oil-conducting chambers and bores (cf. illus.).

### Injection oilers with reservoir

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Version</th>
<th>Reservoir capacity [l]</th>
<th>Reservoir material</th>
<th>Seal material</th>
</tr>
</thead>
<tbody>
<tr>
<td>501-301-011</td>
<td>1-port type</td>
<td>0.25</td>
<td>PA6.3-T</td>
<td>NBR</td>
</tr>
<tr>
<td>501-301-028</td>
<td>1-port type</td>
<td>0.25</td>
<td>PA6.3-T</td>
<td>FPM</td>
</tr>
<tr>
<td>501-301-029</td>
<td>1-port type</td>
<td>0.25</td>
<td>PA6.3-T</td>
<td>NBR</td>
</tr>
</tbody>
</table>

Mounting position as shown
See page 3 for technical data
See page 2 for adjustment of delivery rate

1) Ports tapped for solderless tube connection (for 2.5 mm diam. tubing)
Injection Oilers, Micro Pumps

Injection oiler, 1-port type, with reservoir

The reservoir is equipped with a float switch (WS) for minimum level.

The float switch opens with sinking level.
Circular plug connection M12×1
Max. load: 10 VA
0.25 A
240 V AC

P = oil outlet
Z = compressed air connection

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Reservoir capacity [l]</th>
<th>Seal material</th>
</tr>
</thead>
<tbody>
<tr>
<td>501-301-056</td>
<td>0.8</td>
<td>NBR</td>
</tr>
</tbody>
</table>

Mounting position as shown
See page 3 for technical data
See page 2 for adjustment of delivery rate

1) Ports tapped for solderless tube connection (for 4 mm diam. tubing)
Injection Oilers, Micro Pumps

Injection oiler with proximity switch and grease cartridge

Applications

- Greasing small parts (assembly support)
- Selective splash lubrication of chain friction points

Spring pressure is used to deposit the lubricant from the grease cartridge. When the injection oiler is actuated, the adjusted output is ejected. The proximity switch monitors the motion of the metering piston.

Large distances can be selectively wetted with spray nozzles (leaflet 1-5012-5-EN). Steel tubing (4 mm diam.) with a max. length of 500 mm should be used for this purpose.

The cartridge (order No. M-LUB.EP2.DP.2) is exchangeable; reservoirs for greater grease demand (BF1.5) see page 10.

To suit the respective application, it is possible to operate the injection oiler with oil or grease up to NLGI grade 2.

Technical data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>501-301-094</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartridge capacity</td>
<td>80 cm³, grease, NLGI grade 2</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 to +70 °C</td>
</tr>
<tr>
<td>Mounting position</td>
<td>as shown</td>
</tr>
</tbody>
</table>

Injection oiler

- Control medium: filtered compressed air 40 µm
- Actuation pressure: 3 to 10 bar
- Delivery rate: 0.003 - 0.03 cm³/stroke, adjustable

Material

- Housing: zinc die cast
- Seals: NBR

Proximity switch

- Supply voltage: 10...30 V DC
- Rated current: 400 mA
- Type of enclosure: IP 67
- Switching indication: LED

1) Through-hole (ø6.7) for wall mounting (screws DIN 912-M6)
2) Ports tapped for solderless tube connection (for 4 mm diam. tubing)
3) Setting sleeve for adjustment of delivery rate and manual action for additional triggering of a lubrication pulse
4) Optical indicator pin
5) Guard cap
Grease reservoir

<table>
<thead>
<tr>
<th>Technical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No. . . . . . . BF1.5</td>
</tr>
<tr>
<td>Compressed air for following piston . . max. 10 bar</td>
</tr>
<tr>
<td>Lubricant . . . . . . grease up to NLGI grade 2</td>
</tr>
<tr>
<td>Reservoir capacity . . 1.5 kg</td>
</tr>
<tr>
<td>Mounting position . . any</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection fittings</th>
</tr>
</thead>
<tbody>
<tr>
<td>for M14×1.5: socket union 408-202 double tapered sleeve 408-001</td>
</tr>
<tr>
<td>for G1/4: washer 508-108 adaptor 406-054 for tube 6 mm diam. or 301-020 for tube 8 mm diam.</td>
</tr>
</tbody>
</table>

1) Ports tapped solderless tube connection (for 8 mm diam. tubing)
Micro pumps

The micro pump is a pneumatically actuated, miniature piston pump. The compressed air controlled by a 3/2-way valve actuates the delivery piston, which discharges the respective output on the basis of its displacement. The travel of the stroke, and thus the metering of the delivery rate, is increased or decreased with setting rings.

Care must be taken to make sure that the compressed-air line leading to the pump is relieved of pressure after each actuation so that the delivery piston can return to its initial position.

The micro pump is specially designed for minimal quantity lubrication, and, namely, only for cases in which oil is to be sprayed on with compressed air. The necessary accessories are documented in leaflet 1-5012-5-EN.

### Technical data

- **Air pressure**: 4 - 8 bar
- **Ambient temperature**: –20 to +70 °C
- **Frequency**: max. 3 Hz
- **Operating temperature**: +10 to +70 °C
- **Max. delivery pressure**: approx. 35 bars
- **Lubricant**: mineral oils without additives, max. viscosity 400 mm²/s
- **Oil feed**: gravity oil reservoir

### Micro pump

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Metering</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV-003</td>
<td>fixed metering rates with setting ring: 3, 5, 10 and 30 mm³</td>
</tr>
<tr>
<td>PVR-003</td>
<td>metering rate adjustable from 0 - 30 mm³</td>
</tr>
</tbody>
</table>

### Baseplate

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Number of pumps</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV.1641</td>
<td>1</td>
</tr>
<tr>
<td>PV.1642</td>
<td>2</td>
</tr>
<tr>
<td>PV.1643</td>
<td>3</td>
</tr>
<tr>
<td>PV.1644</td>
<td>4</td>
</tr>
<tr>
<td>PV.1645</td>
<td>5</td>
</tr>
</tbody>
</table>
Important product usage information

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed. Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

Further brochures
1-4003-EN  Electromagnetic pump PE
1-9201-EN  Transport of Lubricants in Centralized Lubrication Systems