SKF Oil+Air Lubrication Units and Mixing Valves

Product Series OLA, MV and 161

For use in SKF Oil+Air Centralized Lubrication Systems
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SKF Oil+Air lubrication unit
OLA8-1868B... (maximum equipment level)

SKF Oil+Air lubrication unit
OLA1-180XAA... (minimum equipment level)

Mixing valves with metering MV204-1...
Mixing valves without metering MV21
Mixing valves without metering MV32

Mixing valves with metering 161-300-338
Mixing valves without metering 161-300-313
Mixing valves without metering 169-000-253
SKF Oil+Air lubrication units are employed for a wide range of applications in the field of centralized lubrication technology. The main field of application is mechanical engineering due to the high demands made on a defined lubrication system that provides high availability with low wear and a long service life. SKF Oil+Air lubrication units are employed for bearing lubrication, especially the lubrication of spindle bearings. Additional fields of application include the lubrication of chains, gear trains, and process oiling. SKF Oil+Air lubrication units can be individually configured for each application.

Advantages
- Better machining performance in spindle bearing lubrication due to higher speed factors (on spindle bearings, up to approx. 2.5 × 10^6 mm × rpm)
- Higher dependability due to continuous supply of defined quantities of lubricant; sealing air provided by the system protects the bearings against outside contamination
- Less lubricant – as much as needed, as little as possible – for greater safety and environmental protection; demand-based metering for each lubrication point, with approximately 90% lower lubricant consumption compared to oil lubrication; no oil mist, no repack period compared to grease lubrication

Fields of application
- Bearing lubrication, especially of spindle bearings
- Chain lubrication
- Gear train lubrication
- Sideway lubrication
- Assembly and process oiling

Product selection table

<table>
<thead>
<tr>
<th>Product series</th>
<th>Material Seal</th>
<th>Material Housing</th>
<th>Actuating pressure [bar]</th>
<th>Number of outlets</th>
<th>Metered quantities [cm³/cycle]</th>
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<tr>
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Mixing valves with metering
- MV(3)01-1... NBR/FPM Aluminium 3–10 17–40 1 – – – – – 13–14
- MV(3)02-1... NBR/FPM Aluminium 3–10 17–40 2 – – – – – 13–14
- MV(3)03-1... NBR/FPM Aluminium 3–10 17–40 3 – – – – – 13–14
- MV(3)04-1... NBR/FPM Aluminium 3–10 17–40 4 – – – – – 13–14
- MV(3)05-1... NBR/FPM Aluminium 3–10 17–40 5 – – – – – 13–14
- MV(3)06-1... NBR/FPM Aluminium 3–10 17–40 6 – – – – – 13–14
- MV(3)07-1... NBR/FPM Aluminium 3–10 17–40 7 – – – – – 13–14
- MV(3)08-1... NBR/FPM Aluminium 3–10 17–40 8 – – – – – 13–14
- 161-300-338  NBR Aluminium 3–10 12–45 1 – – – – – 15
- 161-300-339  NBR Aluminium 3–10 12–45 1 – – – – – 15

Mixing valves without metering
- 161-300-313  NBR Aluminium 3–10 3–40 1 – – – – – 16
- 161-300-315  NBR Aluminium 3–10 3–40 1 – – – – – 16
- MV21         NBR Aluminium max. 10 5 1 – – – – – 17
- MV32         NBR Aluminium max. 10 5 2 – – – – – 17
- MV33         NBR Aluminium max. 10 5 3 – – – – – 17
- MV34         NBR Aluminium max. 10 5 4 – – – – – 17
- MV35         NBR Aluminium max. 10 5 5 – – – – – 17
- MV36         NBR Aluminium max. 10 5 6 – – – – – 17
- MV37         NBR Aluminium max. 10 5 7 – – – – – 17
- MV38         NBR Aluminium max. 10 5 8 – – – – – 17
**SKF Oil+Air lubrication systems**

**Fundamentals**

Oil+air lubrication systems SKF Oil+Air lubrication systems are employed for bearing lubrication, especially the lubrication of spindle bearings.

Additional fields of application include the lubrication of chains, gear trains, and process oiling. Oil+air lubrication is distinguished by the fact that a metered quantity of oil is drawn into streaks in a lubrication line by a continuous air flow (compressed air) and is transported in the direction of the compressed air flow along the tube wall and to the lubrication point. A lubrication unit, a progressive distributor, or a single-line distributor pumps a defined quantity of lubricant to a mixing valve. There, an air flow feeds the lubricant through the secondary line and to the lubrication point in the form of oil streaks. The bearing or chain is thus continuously supplied with a flow of lubricant and air. The air flow introduced creates overpressure in the bearing assembly and prevents the ingress of contaminants. This form of lubrication typically does not form an oil mist.

Oil-streak sensors can be employed for monitoring in SKF Oil+Air lubrication systems. Oil-streak sensors continuously monitor the oil flow in the secondary line. Oil+air lubrication units can be configured individually for each application.

**Components of oil+air lubrication systems**

- Gear pump unit with oil pressure switch and fill level switch in design with a control unit (IG54-20-54-I) and without
- Oil+air mixing valves with metering
- Mixing valves and lubricant distributors for external lubricant metering
- Air control valve with and without air filter
- Pressure switch for monitoring compressed air
- Oil filter with and without contamination monitoring
- 3/2 directional control valve for switching compressed air on and off
- Oil-streak sensor GS4011 (→ brochure 1-1704-EN)

SKF Oil+Air lubrication systems can be ordered either as a complete oil+air lubrication unit (gear pump unit, oil+air mixing valve, and optional accessories installed on mounting plate) or as individual components (gear pump unit, oil+air mixing valve, lubricant distributor, and accessories individually).
SKF Oil+Air lubrication systems

Fundamentals

Principles of oil+air lubrication - example: rolling bearings

Many fields of engineering require that the speeds of spindles and shafts on rolling bearings increase beyond the limits cited in rolling bearing catalogs, e.g. in the case of bearings for grinding and milling spindles to increase cutting speeds. Beyond the design and construction of the bearing, another critical aspect of meeting this requirement is the selection of a suitable lubrication system. Conventional lubrication systems (e.g. oil bath lubrication or circulating-oil lubrication), for which the values in rolling bearing catalogs were prepared, fail in such cases because friction-related losses, and thus the temperature, rise beyond permissible limits due to hydrodynamic losses in the lubricant. In a circulating-oil lubrication system with simultaneous cooling of the lubricant, it may be possible to reduce the temperatures, but higher power losses and greater machine-/seal-related complexity would have to be endured. The diagram on this page shows that the best values in respect to bearing friction (NR) and bearing temperature (t) are achieved with a minimal supply of oil.

The required low lubricant quantities can be best fed to the bearings using the principle of oil+air lubrication, as this lubrication system allows for precise metering of lubricant quantities. In the case of oil-mist lubrication, however, it is hardly possible to supply individual bearings on a reliable and constant basis with the small quantities required because oil-mist lubrication is too imprecise in lubricant metering and feeding. Permanent grease lubrication is well suited and often employed. However, the limit on speed factors achievable using permanent grease lubrication is significantly lower than with oil+air lubrication.

The limit for permanent grease lubrication can generally be assumed as a speed factor n x dm of < 1 to 1.5 x 10⁶ mm x rpm, depending on the bearing type and the grease used. Further, the grease change intervals must be adhered to when using permanent grease lubrication; these are eliminated in oil+air lubrication. For higher speed characteristics, oil+air lubrication is therefore an appropriate system that can, of course, also be used when low speed characteristics are involved.

Lubricant quantities

The amount of lubricant required to lubricate a bearing depends on the type of bearing, number of rows, width, etc. In principle, the bearing manufacturer should be contacted when determining the quantity of lubricant for a bearing. The literature contains the following formula to calculate approximate oil requirements:

\[ Q = w \times d \times B \]

- \( Q \) = quantity in mm³/h
- \( w \) = coefficient = 0.01 mm/h
- \( d \) = internal bearing diameter in mm
- \( B \) = bearing width in mm

In practice, however, the values obtained with this formula had to be increased 4- to 20-fold. That shows quite clearly that the actual amount of lubricant per bearing has to be empirically determined for each specific case. In tests, lubricant quantities of 120 to 180 mm³/h have proven to be favorable, for example, for spindle bearings.
SKF Oil+Air lubrication systems

Fundamentals

Requirements for compressed air
Compressed air must be dry and filtered; filter rating of \( \leq 5 \, \mu m \). A conventional water separator, preferably with semi-automatic emptying, is sufficient for water separation. The quantity of air required for faultless transport of the oil in tubing with an internal diameter of 2.3 mm ranges from roughly 1,000 to 1,500 l/h. This value applies to oil viscosity classes ISO VG 32 to ISO VG 100. Higher values must be assumed in the case of oils with a higher viscosity or different adhesiveness. The air pressure has to be adjusted so that this amount can be put through every line, with due consideration given to pressure losses in the line and storage of the quantity involved. The air pressure available at the unit’s inlet port (supply system) should be at least 3 bar or preferably 6 bar.

Requirements for lubricant
Oils belonging to ISO grades VG 32 to VG 100 have proven to be very suitable. Oils with EP additives are particularly recommended when high loads and low speeds are involved. Oils with a viscosity lower than ISO VG 22 should be avoided, since the load-carrying capacity might no longer suffice in the event of large loads, resulting in shorter bearing life. Oils with a higher viscosity can be used. Oils containing molybdenum disulfide additives should not be used, however, since with these oils there is a risk that molybdenum disulfides will deposit on the nozzle holes and block them. Moreover, the bearing clearance can be critically diminished due to plating with molybdenum disulfide particles.
Lubricant feeding (criteria, bearing type, etc.)

The way the lubricant is fed to the bearing depends on the bearing type and the bearing assembly's design features. The following illustrations provide examples of the lubricant feeding. (Fig. 1).

In case of single-row rolling bearings, it is possible for the lubricant to be introduced into the rolling bearing from the side. The nozzle should be at the level of the rolling bearing’s inner ring. Under no circumstances should the oil+air flow be aligned directly with the cage of the rolling bearing. If using rolling bearings that exert pumping force in one direction (e.g. angular contact bearings), the lubricant must be fed in the direction of pumping force. In case of double-row cylindrical roller bearings, the lubricant should be introduced into the rolling bearing from the side at the level of the outer ring raceway. The lubricant is then distributed almost uniformly to both rows of rolling bearings. On rolling bearings with a with external dimensions from 150 to 280 mm, it is recommended that a second nozzle be installed, with a corresponding increase in case of larger rolling bearing diameters. A single nozzle is sufficient for most applications in which the lubricant is fed through the outer ring of a rolling bearing. The lubricant should be introduced into the bearing assembly via a nozzle whose length depends on the bearing size. Suitable nozzles can be ordered from SKF Lubrication Systems Germany GmbH.

It is also possible to introduce the lubricant directly into the outer ring of the rolling bearing via a bore (Fig. 2).

In this case, it must be assured that the lubricant is not introduced into the pressure zone of the rolling bearing between the rolling element and the bearing ring.

A drain must be provided for the delivered lubricant to keep an oil sump from forming in the lower portion of the bearing. This drain bore must have a diameter of at least 5 mm.

The indicated air pressure is generally enough to reliably overcome the air vortex produced by rolling bearings. If in individual cases a higher air pressure is required to reliably feed the lubricant, this does not impair the function of the entire oil+air lubrication unit.

Secondary lines made of transparent plastic are recommended so that the lubricant transport in the secondary lines (oil-shear formation) can be assessed visually. Secondary lines made of transparent plastic are available in rigid (unplasticized) and flexible (plasticized) designs. The minimum length of the secondary line is 1 m. The maximum length is 10 m. A hose coil is installed approximately 0.3 m in front of the bearing assembly and serves as a lubricant reservoir. If the distance between the oil+air lubrication unit and the bearing is less than 1 m, the secondary line must be laid as a coil. After the compressed air is turned off, the lubricant distributed in the hose coil collects in the lower coils; this ensures that the bearing is supplied with lubricant again shortly after the compressed air is turned back on. The center axis of the hose coil should always be laid horizontally or up to a maximum inclination of 30°. The secondary lines may be laid at an upward or downward angle. Avoid changes in the cross-section of the secondary line from small to large cross-sections in the direction of flow of the lubricant. When the cross-section does change, the transition should be gentle.

SKF oil-streak sensors are recommended for monitoring the continuous lubricant flow in the secondary lines. Oil-streak sensors allow monitoring of the oil-streak transport along the course of the lubrication line between the oil+air metering unit or the mixing valve and the lubrication point.
SKF Oil+Air lubrication unit – OLA

**Designs**

Note
This page shows possible designs of the oil+air lubrication units. The configurator on the following page allows the functional specification of a unit with associated order number.

- Oil filters with monitoring
- Oil filters without monitoring
- Pressure switch for minimum air pressure
- Gear pump unit with control unit
- Gear pump unit without control unit
- Compressed air control valve with air filter and water separator
- Mixing valve with metering
- Air control valve without air filter
- SKF plug connectors
- Counterbore for solderless tube union for tube diam Ø4 mm
SKF Oil+Air lubrication unit – OLA

Configurator

Order coder

Product series

Number of metering points
1 = 1 metering point
2 = 2 metering points
3 = 3 metering points
4 = 4 metering points
5 = 5 metering points
6 = 6 metering points
7 = 7 metering points
8 = 8 metering points

Design of gear pump unit
A = with IG5 control unit, 24 V DC
B = with IG5 control unit, 230 V AC
C = with IG5 control unit, 115 V AC
D = without control unit, 24 V DC
E = without control unit, 230 V AC
F = without control unit, 115 V AC

Design of air filter / valve
0 = without air filter, without valve
1 = without air filter, with 3/2 directional control valve, 24 V AC, 50 Hz
2 = without air filter, with 3/2 directional control valve, 120 V AC, 60 Hz
3 = with 5 µm air filter, without valve
4 = with 5 µm air filter and 3/2 directional control valve, 24 V DC
5 = with 5 µm air filter and 3/2 directional control valve, 230 V AC, 50 Hz
6 = with 5 µm air filter and 3/2 directional control valve, 120 V AC, 60 Hz
7 = with 5 µm air filter and 3/2 directional control valve, 115 V AC

Design of oil filter
X = without oil filter
A = with 3 µm oil filter, without monitoring
B = with 3 µm oil filter, with monitoring
C = with 10 µm oil filter, without monitoring
D = with 10 µm oil filter, with monitoring

Design of pressure switch for minimum air pressure
A = without pressure switch (compressed air must be monitored by compressed air system)
B = pressure switch preset to 3 bar

Metered quantity (only possible complete or completely without SKF plug connector)
X = Metering point plugged
0 = No metering point available
1 = 0.01 cm³/cycle with counterbore for solderless tube union
2 = 0.02 cm³/cycle with counterbore for solderless tube union
3 = 0.03 cm³/cycle with counterbore for solderless tube union
4 = 0.06 cm³/cycle with counterbore for solderless tube union
5 = 0.10 cm³/cycle with counterbore for solderless tube union
6 = 0.16 cm³/cycle with counterbore for solderless tube union

Order example
OLA1-1E0XA30000000
• Product series OLA
• One metering point
• Without control unit, 230 V AC
• Without air filter, without valve
• Without oil filter
• Without pressure switch for minimum air pressure
• Metered quantity 0.03 cm³/cycle

1) The compressed-air valve must be wired by the customer. It can be wired to the internal control unit (if present) or to the machine’s PLC. If wiring to the internal control unit, ensure that the operating voltage of the control unit matches the switching voltage of the compressed-air valve. The compressed-air valve may otherwise be damaged.

2) The pressure switch is wired at the factory to the internal control unit (if present). Wiring must be performed by the customer if no control unit is present or the pressure switch is to be connected to the machine’s PLC.

3) without metering point (with a screwed blanking plug)
SKF Oil+Air lubrication unit – OLA

Dimensions

Maximum and minimum equipment levels

Detail view
→ Fig. 4

Dimensions of oil+air mixing valve with metering

<table>
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<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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Clearance for cover mounting

Fig. 3

Fig. 4

Detail view of oil+air mixing valve with metering
## SKF Oil+Air lubrication unit – OLA

### Technical data

#### Gear pump unit

1. **Delivery rate of unit**
   - 0.2 l/min
2. **Number of metering points**
   - 1 to 8 (>8 on request)
3. **Max. operating pressure**
   - 30 bar
4. **Ambient temperature**
   - +10 to +40 °C
5. **Pumped medium**
   - Mineral or synthetic oil, compatible with NBR elastomers
6. **Operating viscosity**
   - 20 to 1500 mm²/s
7. **Rated capacity of lubricant reservoir**
   - 3 l (others on request)
8. **Ambient temperature**
   - +10 to +40 °C
9. **Lubricant reservoir material**
   - Polyamide (PA6)
10. **Protection class**
    - IP54
11. **Pressure relief valve**
    - Included
12. **Thermal circuit breaker**
    - Included
13. **Duty type (per VDE 0530)**
    - Standard design: S3, ON-time 20% (1.25 to 25 min)
14. **Mounting position**
    - Vertical

<sup>1) techn. Daten des Öl+Luft-Mischventils MV20x <br>2) bezogen auf eine Ölviskosität von 140 mm²/s bei einem Gegendruck von 5 bar</sup>

#### Motor (gear pump unit)

- **Rated frequency [Hz]**
  - 50 / 230 VAC
  - 60 / 230 VAC
  - 24 VDC
- **Rated voltage**
  - 115 / 230 VAC
  - 115 / 230 VAC
  - 24 VDC
- **Rated current [A]**
  - 0.6 / 0.53
  - 1.36 / 0.68
  - 1.6
- **Starting current [A]**
  - –
  - 4
- **Power [W]**
  - 60
  - 75
  - 39

#### Oil filter

- **Filter mesh**
  - 3 μm or 10 μm
- **Contaminant capture**
  - 6.3 g at Δp = 5 bar (3μm)
  - 5.2 g at Δp = 5 bar (10μm)

#### Fill level switch (included in gear pump unit)

- **Function**
  - NC-contact (opens when fill level too low)
- **Switching voltage range**
  - 10 to 25 VAC; 10 to 36 V DC
- **Switched current (resistive load)**
  - ≤ 0.25 A
- **Switching capacity (resistive load)**
  - ≤ 3 W

#### Oil pressure switch (included in gear pump unit)

- **Function**
  - NO-contact
- **Switching voltage range**
  - 10 to 25 VAC; 10 to 36 V DC
- **Switched current (resistive load)**
  - ≤ 1 A
- **Switching capacity (resistive load)**
  - ≤ 10 W
- **Nominal pressure**
  - 20 bar

#### Pressure switch for minimum air pressure

- **Function**
  - NC-contact
  - NO-contact
- **Switching pressure**
  - 0.5 to 5 bar (preset to 3 bar)
- **Max. switching voltage**
  - 290 V
- **Max. switched current**
  - 5 A
- **Reset differential**
  - Approx. 15 %

#### 3/2-directional air control valve

- **Switching voltage**
  - 120 VAC, 60 Hz; 230 VAC, 50 Hz;
  - 24 V DC
- **Switching capacity**
  - 4 W
- **Plug connector**
  - DIN EN 175301-803-C
- **Pressure range**
  - 0 to 10 bar

#### Oil contamination indicator (optionally installed on oil filter)

- **Function**
  - NC contact = alarm 100%;
  - NO-contact = pre-warning 75%
- **Max. switching voltage**
  - 24 V AC/DC
- **Max. switched capacity**
  - 15 W
- **Breaking capacity (resistive load)**
  - 3 A (at 15 V AC/DC)
- **Opening pressure Δp**
  - 0.1 bar -10 %

#### IG54-20-S4-L control unit (optionally in gear pump unit)

- **Rated voltage**
  - 115 / 230 VAC (50 / 60 Hz) selectable; 24 V DC
- **Pump runtime limit**
  - 60 s (non-adjustable)
- **Interval time**
  - 10 min (adjustable from 1 to 99 min)
- **Pump dwell time**
  - 5 s (adjustable from 0 to 99 cycles)
- **Pre-lubrication cycles**
  - 10 (adjustable from 0 to 99 seconds)

#### Air pressure control valve

- **Type**
  - Diaphragm regulator
- **Max. primary pressure**
  - 16 bar
- **Secondary pressure**
  - 0.5–10 bar
- **Sealing material**
  - NBR

#### Air pressure control valve incl. filter and water separator

- **Filter mesh**
  - 5 μm
- **Water separation**
  - Semi-automatic
SKF Oil+Air lubrication unit – OLA

Hydraulic layouts

Oil+air lubrication unit with control unit

Oil+air lubrication unit without control unit

Wiring diagrams

Design of gear pump unit

Design E / F  
MKL2-12FC11000+428 /+429  
Connector  
XS1: DIN EN 195301-803A

Design D  
MKL2-12FB11000+924  
Connector  
XS1: DIN EN 195301-803A

Design B / C  
MKL2-12FC11000+428 /+429

Design A  
MKL2-12FC11000+924

1) optional  
2) optional: Kontakt schließt bei minimalem Füllstand

1) Connected by customer to internal control unit (if present) or external PLC.  
Compressed-air valve minimum air pressure (DL), compressed-air valve Y1  
2) The control unit can be switched between 230 V and 115 V AC.  
The pump motor is not switchable!
SKF Oil+Air mixing valves with metering – MV...-1...

**Designs**

The MV20x-1... and MV30x-1... are oil+air mixing valves with metering. They are built in block design and contain up to eight secondary line connections.

The lubricant metering is selectable in a range of 0.01–0.16 cm³ for each lubrication point.

Secondary line connections which are not needed can be plugged. This involves screwing an appropriate metering screw for zero metering into the mixing valves.

The MV20x-1... design contains an air adjustment screw for setting the quantity of compressed air. The quantity of compressed air cannot be adjusted on the MV30x-1... design. The secondary line connections on both designs are available with SKF plug connectors or fittings for solderless tube unions for tube Ø4 mm. Another oil+air mixing valve must be provided if more than eight lubrication points will be supplied. In this case, the compressed air must be fed separately to each mixing valve.

**Configurator**

<table>
<thead>
<tr>
<th>Order code</th>
<th>M</th>
<th>V</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>
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<tr>
<td>Product series</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjustability of air metering</td>
<td>20 = Adjustable</td>
<td>30 = Not adjustable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of metering points</td>
<td>1 = 1 metering point</td>
<td>5 = 5 metering points</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2 = 2 metering points</td>
<td>6 = 6 metering points</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
<td>3 = 3 metering points</td>
<td>7 = 7 metering points</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>4 = 4 metering points</td>
<td>8 = 8 metering points</td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Seal type</td>
<td>00 = NBR</td>
<td>58 = FKM (FPM)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Metered quantity (only possible complete or completely without SKF plug connector)</td>
<td>X = Metering point plugged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = No metering point available</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1 = 0.01 cm³/cycle with counterbore for solderless tube union</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = 0.02 cm³/cycle with counterbore for solderless tube union</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 0.03 cm³/cycle with counterbore for solderless tube union</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = 0.06 cm³/cycle with counterbore for solderless tube union</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = 0.10 cm³/cycle with counterbore for solderless tube union</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>6 = 0.16 cm³/cycle with counterbore for solderless tube union</td>
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<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>A = 0.01 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>B = 0.02 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C = 0.03 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D = 0.06 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E = 0.10 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>F = 0.16 cm³/cycle with SKF plug connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) without metering point (with a screwed blanking plug)

**Order example for MV206-100-AACCFF00**

- Product series MV
- Adjustable air metering
- 6 metering points
- Sealing material NBR
- Metering of metering points 1, 2 = 0.01 cm³/cycle with SKF plug connector
- Metering of metering points 3, 4 = 0.03 cm³/cycle with SKF plug connector
- Metering of metering points 5, 6 = 0.16 cm³/cycle with SKF plug connector
SKF Oil+Air mixing valves with metering – MV...-1...

Dimensions

**MV203-1... / MV303-1...**

![Dimensions Diagram](image)

**Dimensions of designs**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV201-1...</td>
<td>40</td>
<td>20</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>MV202-1...</td>
<td>55</td>
<td>43</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>MV203-1...</td>
<td>80</td>
<td>60</td>
<td>70</td>
<td>23</td>
</tr>
<tr>
<td>MV204-1...</td>
<td>105</td>
<td>77</td>
<td>95</td>
<td>27</td>
</tr>
<tr>
<td>MV205-1...</td>
<td>130</td>
<td>94</td>
<td>120</td>
<td>31</td>
</tr>
<tr>
<td>MV206-1...</td>
<td>130</td>
<td>111</td>
<td>120</td>
<td>22.5</td>
</tr>
<tr>
<td>MV207-1...</td>
<td>155</td>
<td>128</td>
<td>145</td>
<td>26.5</td>
</tr>
<tr>
<td>MV208-1...</td>
<td>155</td>
<td>145</td>
<td>145</td>
<td>18</td>
</tr>
<tr>
<td>MV301-1...</td>
<td>40</td>
<td>20</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>MV302-1...</td>
<td>55</td>
<td>43</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>MV303-1...</td>
<td>80</td>
<td>60</td>
<td>70</td>
<td>23</td>
</tr>
<tr>
<td>MV304-1...</td>
<td>105</td>
<td>77</td>
<td>95</td>
<td>27</td>
</tr>
<tr>
<td>MV305-1...</td>
<td>130</td>
<td>94</td>
<td>120</td>
<td>31</td>
</tr>
<tr>
<td>MV306-1...</td>
<td>130</td>
<td>111</td>
<td>120</td>
<td>22.5</td>
</tr>
<tr>
<td>MV307-1...</td>
<td>155</td>
<td>128</td>
<td>145</td>
<td>26.5</td>
</tr>
<tr>
<td>MV308-1...</td>
<td>155</td>
<td>145</td>
<td>145</td>
<td>18</td>
</tr>
</tbody>
</table>

---

**Note**
The configurator on page 13 allows the functional specification of oil+air mixing valves with metering with associated order number.

---

**Technical Data**

**Metered quantities**

<table>
<thead>
<tr>
<th>Metered quantity [cm³/cycle]</th>
<th>Metering rate marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>1</td>
</tr>
<tr>
<td>0.02</td>
<td>2</td>
</tr>
<tr>
<td>0.03</td>
<td>3</td>
</tr>
<tr>
<td>0.06</td>
<td>6</td>
</tr>
<tr>
<td>0.10</td>
<td>10</td>
</tr>
<tr>
<td>0.16</td>
<td>16</td>
</tr>
</tbody>
</table>

**MV20x-1... / MV30x-1... mixing valves with metering**

- Mounting position: preferably as illustrated
- Number of metering points: 1 to 8
- Metered quantity per metering point: 0.01 - 0.16 cm³/cycle
- Actuating pressure, air: 3 – 10 bar
- Actuating pressure, oil: 17 – 40 bar
- Operating temperature: 5 – 80 °C
- Sealing material: NBR / FPM
- Air consumption: 1,000 to 1,500 Nl/h

---

**Note**
To ensure the proper function of SKF Oil+Air mixing valves with metering even after changing the metered quantity, the meterings 0.01 and 0.02 cm³ may only be replaced by authorized SKF Lubrication Systems employees or partners.
SKF Oil+Air mixing valves with metering – 161-300-338/-339

**Designs**

161-300-338 / -339 are oil+air mixing valves with metering with a secondary line connection. These mixing valves with metering can be consolidated into groups for multiple lubrication points. In this case, the compressed air must be fed separately to each mixing valve. Metering is performed by an integrated (SKF MonoFlex) single-line distributor and is selectable between 0,03; 0,06 and 0,1 cm³/cycle.

The lubricant supply connection has a counterbore for a solderless tube union for lines with Ø4 mm. The connection for compressed air is either G1/2 or G3/4 depending on the design.

![Diagram of 161-300-338 valve](image)

**Technical Data**

<table>
<thead>
<tr>
<th>161-300-338, 161-300-339</th>
<th>Actuating pressure, air</th>
<th>3–10 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuating pressure, oil</td>
<td>12–45 bar</td>
<td></td>
</tr>
<tr>
<td>Operating viscosity</td>
<td>20–1 500 mm²/s</td>
<td></td>
</tr>
<tr>
<td>Pumped medium</td>
<td>Mineral or synthetic oil, compatible with NBR elastomers</td>
<td></td>
</tr>
<tr>
<td>Mounting position</td>
<td>as illustrated</td>
<td></td>
</tr>
</tbody>
</table>

**Metering is replaceable**

<table>
<thead>
<tr>
<th>Order number</th>
<th>Metered quantity [cm³/cycle]</th>
<th>Metering rate marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>321-40364</td>
<td>0.03</td>
<td>3</td>
</tr>
<tr>
<td>321-40664</td>
<td>0.06</td>
<td>6</td>
</tr>
<tr>
<td>321-41064</td>
<td>0.10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Dimensions**

161-300-338

- Connection thread with counterbore for solderless tube union, tube Ø4.

161-300-339

- Connection thread with counterbore for solderless tube union, tube Ø4.

![Diagram of 161-300-339 valve](image)
SKF Oil+Air mixing valves without metering – 161-300-313/-315

Designs

161-300-313 / 315 are oil+air mixing valves without metering. Each mixing valve has a secondary line connection. The mixing valves can be consolidated into groups for multiple lubrication points.

Oil supply and metering are performed by an (SKF MonoFlex) single-line distributor († brochure 1-5001-EN) connected to the mixing valve and operated on an intermittently operated centralized lubrication system (SKF MonoFlex).

The single-line distributor meters the lubricant, which is fed to the mixing valve through a lubrication line. Within the mixing valve, the supplied compressed air transports the lubricant into the secondary line and to the lubrication point. The metered quantity depends on the number of lubrication cycles on the intermittently operated centralized lubrication systems and the selected metering on the single-line distributor.

The lubricant supply connection has a counterbore for a solderless tube union for tube Ø4 mm. The connection for compressed air is either G1/2 or G1 depending on the design. An additional mixing valve is required for each additional lubrication point. In this case, the compressed air must be fed separately to each mixing valve.

Technical Data

### 161-300-313, 161-300-315

- **Actuating pressure, air**: 3–10 bar
- **Actuating pressure, oil**: 3–40 bar
- **Operating viscosity**: 6–760 mm²/s
- **Pumped media**: Mineral or synthetic oil, compatible with NBR elastomers
- **Mounting position**: as illustrated

### Dimensions

#### 161-300-313

![Diagram of 161-300-313](image)

1) Connection thread with counterbore for solderless tube union, tube Ø4.

#### 161-300-315

![Diagram of 161-300-315](image)

1) Connection thread with counterbore for solderless tube union, tube Ø4.
SKF Oil+Air mixing valves without metering – MV21 ... MV38

Designs

MV21 und MV32 ... MV38 are oil+air mixing valves without metering and have a modular design with up to eight lubrication line connections (for example, MV35 contains 5x MV21). Oil supply and metering are performed by an (SKF MonoFlex) single-line distributor (brochure 1-5001-EN) connected to the mixing valve and operated on an intermittently operated centralized lubrication system (SKF MonoFlex). The single-line distributor meters the lubricant, which is fed to the mixing valve through a lubrication line.

Within the mixing valve, the supplied compressed air transports the lubricant into the secondary line and to the lubrication point. The metered quantity depends on the number of lubrication cycles on the intermittently operated centralized lubrication systems and the selected metering on the single-line distributor.

Attached externally metering:
- SKF Monoflex distributors 0,01–0,2 cm³
- Injection oiler 0,003–0,03 cm³
- Micro pumps from 0–0,30 cm³

Dimensions

![Diagram of MV32 mixing valve]

3) Connection thread with counterbore for solderless tube union, tube Ø4.
2) Ø5,5 Tie-rod bore hole consisting of sections

Technical Data

<table>
<thead>
<tr>
<th>Metered quantities</th>
<th>Air delivery rate [l/min]</th>
<th>Air pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order number</td>
<td>Number of outlets</td>
<td></td>
</tr>
<tr>
<td>MV21</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MV32</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MV33</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MV34</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MV35</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>MV36</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>MV37</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>MV38</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

![Graph of air delivery rate vs. air pressure]

MV21 ... MV38

- Actuating pressure, air: max. 10 bar
- Actuating pressure, oil: 5 bar
- Operating viscosity:
  - Oil with mineral or synthetic base: max. 3 000 mm²/s
  - Compatible with NBR elastomers
- Pumped media: preferably as illustrated
- Mounting position: 0,003–0,3 cm³/cycle
- Metered quantities (external lubricant distributors):
SKF Oil+Air flow divider – 169-000-18x und 169-000-25x

Designs

SKF Oil+Air flow dividers distribute oil+air flows to 2–6 lubrication points. To achieve the most uniform distribution of an oil+air flow, there may not be any back pressure on the outlets of the oil+air flow divider. Further, it must be ensured that the lengths of the secondary lines on the outlets of a flow divider do not vary by more than 0.5 m. A second flow divider must be used if the lengths of secondary lines on the outlets of a flow divider differ by more than 0.5 m.

Technical Data

<table>
<thead>
<tr>
<th>169-000-18x, 169-000-25x</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuating pressure, air</td>
<td>max. 10 bar</td>
</tr>
<tr>
<td>Actuating pressure, oil</td>
<td>5 bar</td>
</tr>
<tr>
<td>Operating viscosity</td>
<td>max. 3 000 mm²/s</td>
</tr>
<tr>
<td>Pumped media</td>
<td>Oil with mineral or synthetic base, compatible with NBR elastomers</td>
</tr>
<tr>
<td>Mounting position</td>
<td>preferably as illustrated</td>
</tr>
<tr>
<td>Metered quantities (external lubricant distributors)</td>
<td>0.01–0.2 cm³/cycle</td>
</tr>
</tbody>
</table>

Flow divider 169-000-18x

<table>
<thead>
<tr>
<th>Order number</th>
<th>Number of outlets</th>
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</thead>
<tbody>
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<tr>
<td>169-000-183</td>
<td>3</td>
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<tr>
<td>169-000-184</td>
<td>4</td>
</tr>
<tr>
<td>169-000-185</td>
<td>5</td>
</tr>
<tr>
<td>169-000-186</td>
<td>6</td>
</tr>
</tbody>
</table>

Flow divider 169-000-25x

<table>
<thead>
<tr>
<th>Order number</th>
<th>Number of outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>169-000-252</td>
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</tr>
<tr>
<td>169-000-253</td>
<td>3</td>
</tr>
<tr>
<td>169-000-254</td>
<td>4</td>
</tr>
<tr>
<td>169-000-255</td>
<td>5</td>
</tr>
<tr>
<td>169-000-256</td>
<td>6</td>
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</table>

Dimensions

<table>
<thead>
<tr>
<th>169-000-183</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Double tapered ring pre-installed</td>
<td></td>
</tr>
<tr>
<td>Lubrication point connections MBx1 for tube Ø4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>169-000-253</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricant MB-1 for tube Ø4</td>
<td></td>
</tr>
<tr>
<td>Lubrication point connections MBx1 for tube Ø4</td>
<td></td>
</tr>
</tbody>
</table>
**SKF Oil+Air lubrication**

### Accessories

#### Hose coils

<table>
<thead>
<tr>
<th>Order number</th>
<th>tube Ø [mm]</th>
<th>DA [mm]</th>
<th>L [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>828-090-004</td>
<td>4×0.85</td>
<td>30</td>
<td>2545</td>
<td>14</td>
</tr>
<tr>
<td>828-090-020</td>
<td>4×0.85</td>
<td>30</td>
<td>10545</td>
<td>14</td>
</tr>
<tr>
<td>828-090-021</td>
<td>4×0.85</td>
<td>30</td>
<td>4045</td>
<td>14</td>
</tr>
</tbody>
</table>

#### 3/2 directional control valve

- Order number: 221-296-027+363
- 230 V AC, 50 Hz
- 120 V AC, 60 Hz
- 24 V DC
- Valve body: 993-000-196
- Pressure range: 0–10 bar
- Mounting position: Any
- Sealing material: FKM (FPM)
- Ambient temperature: +55 °C
- Electrical connection: DIN EN 175301-803 Form C, connector socket type 2506

#### Air pressure control valve

- Order number: 231-900-028
  - Type: Diaphragm regulator
  - max. primary pressure: 0–16 bar
  - Secondary pressure: 0.5–10 bar
  - Operating temperature: 0–80 °C
  - Sealing material: NBR
- Air pressure control valve incl. filter and water separator
  - Order number: 231-900-028.U1
  - Filter: 5 μm

#### Air pressure control valve incl. filter and water separator

- Order number: 231-900-028.U1
  - Filter: 5 μm
SKF Oil+Air lubrication

Accessories

Nozzles

<table>
<thead>
<tr>
<th>Order number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>169-000-101+xxx</td>
<td>Nozzle for tube Ø4 mm L=15–120 mm</td>
</tr>
<tr>
<td>169-000-102+xxx</td>
<td>Double nozzle for Rohr Ø4 mm L=15–120 mm</td>
</tr>
<tr>
<td>P-89.29</td>
<td>Nozzle for tube Ø4 mm</td>
</tr>
<tr>
<td>P-89.29-S3</td>
<td>Nozzle for tube Ø4 mm, stainless steel</td>
</tr>
<tr>
<td>P-89.29-VS</td>
<td>Nozzle for tube Ø4 mm, with claw groove for SKF plug connectors</td>
</tr>
</tbody>
</table>

1) Specify the desired length L for xxx

Pressure switch for minimum air pressure

<table>
<thead>
<tr>
<th>Order number</th>
<th>176-271-001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact type</td>
<td>Changeover 1×NC contact, 1×NO-contact</td>
</tr>
<tr>
<td>Adjustment range</td>
<td>(preset to 3 bar)</td>
</tr>
<tr>
<td>Max. switching voltage</td>
<td>250 V AC</td>
</tr>
<tr>
<td>Max. switched current</td>
<td>5 A</td>
</tr>
<tr>
<td>Reset differential</td>
<td>15 %</td>
</tr>
</tbody>
</table>

Differential pressure switch

<table>
<thead>
<tr>
<th>Order number</th>
<th>176-200-009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact type</td>
<td>1×NC contact, 1×NO-contact</td>
</tr>
<tr>
<td>Max. voltage</td>
<td>24 V AC/DC</td>
</tr>
<tr>
<td>Max. switching capacity</td>
<td>15 VA/W</td>
</tr>
<tr>
<td>Opening pressure</td>
<td>Δ5 bar –10 %</td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>420 bar</td>
</tr>
</tbody>
</table>

176-200-009 wiring diagram

BN = +24 V DC
WH = 100% Alarm
BK = 75% pre-warnung
BU = PIN 3 not assigned

Contact position shown: Switch depressurized

176-271-001 circuit diagram

DIN EN 175301-803 A

BN WH NC PE
SKF Oil+Air lubrication

Accessories

### Square connector

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>179-990-033</td>
<td>Cable socket per DIN EN 175301-803-A cable diameter 6 bis 10 mm</td>
</tr>
</tbody>
</table>

### Circular connector M12x1

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>179-990-371</td>
<td>Cable socket, straight (A)</td>
</tr>
<tr>
<td>179-990-600</td>
<td>Cable socket, straight with molded cable (B)</td>
</tr>
<tr>
<td>179-990-372</td>
<td>Cable socket, angled (C)</td>
</tr>
<tr>
<td>179-990-601</td>
<td>Cable socket, angled with molded cable (5 m, 4×0.34 mm²) (D)</td>
</tr>
</tbody>
</table>

### Tube unions for plastic tubing ∅4 mm

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>404-003-V5</td>
<td>SKF plug connectors</td>
</tr>
<tr>
<td>404-612</td>
<td>Socket union for solderless tube union</td>
</tr>
<tr>
<td>404-611</td>
<td>Tapered sleeve for solderless tube union</td>
</tr>
<tr>
<td>404-603</td>
<td>Reinforcing socket for solderless tube union</td>
</tr>
</tbody>
</table>

![Circular connector](image)

### SKF plug connectors

![SKF plug connectors](image)

### Solderless tube union

![Solderless tube union](image)

### Locking pin

![Locking pin](image)

### Screw plug

![Screw plug](image)
# SKF Oil+Air lubrication

## Accessories

### Tubing

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
<th>Detailed information in brochure</th>
</tr>
</thead>
<tbody>
<tr>
<td>WVN715-R04x0.85</td>
<td>Plastic tubes Ø 4 mm, semirigid (unplasticized)</td>
<td>1-0103-EN</td>
</tr>
<tr>
<td>WVN716-R04x0.85</td>
<td>Plastic tubes Ø 4 mm, flexible (plasticized)</td>
<td>1-0103-EN</td>
</tr>
</tbody>
</table>

### Pressure filter for oil

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>169-460-307</td>
<td>Pressure filter 10 µm, with electric and visual contamination indicator</td>
</tr>
<tr>
<td>169-460-308</td>
<td>Pressure filter 3 µm, with electric and visual contamination indicator</td>
</tr>
<tr>
<td>169-460-250</td>
<td>Pressure filter 10 µm, without electric and visual contamination indicator</td>
</tr>
<tr>
<td>169-460-309</td>
<td>Pressure filter 3 µm, without electric and visual contamination indicator</td>
</tr>
</tbody>
</table>

### Oil-streak sensors

<table>
<thead>
<tr>
<th>Order number</th>
<th>Designation</th>
<th>Detailed information in brochure</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS4011-S50</td>
<td>Oil-streak sensor for 60–120 mm³/h and line diameter of 4 mm</td>
<td>1-1704-EN</td>
</tr>
<tr>
<td>GS4011-S20</td>
<td>Oil-streak sensor for 120–600 mm³/h and line diameter of 4 mm</td>
<td>1-1704-EN</td>
</tr>
</tbody>
</table>
SKF Oil+Air lubrication

Spare parts

OLA 3D exploded view
## SKF Oil+Air lubrication

### Spare parts

#### Spare parts list

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MKL2-12FC11000+428</td>
<td>Gear pump unit with IG54-20-S4-I control unit, for 230 V 50/60 Hz</td>
</tr>
<tr>
<td>2</td>
<td>MKL2-12FC11000+429</td>
<td>Gear pump unit with IG54-20-S4-I control unit, for 115 V 50/60 Hz</td>
</tr>
<tr>
<td>3</td>
<td>MKL2-12FC11000+924</td>
<td>Gear pump unit with IG54-20-S4-I control unit, for 24 V DC</td>
</tr>
<tr>
<td>4</td>
<td>MKU2-12BC11000+428</td>
<td>Gear pump unit without control unit, for 230 V 50/60 Hz</td>
</tr>
<tr>
<td>5</td>
<td>MKU2-12BC11000+429</td>
<td>Gear pump unit without control unit, for 115 V 50/60 Hz</td>
</tr>
<tr>
<td>6</td>
<td>MKU2-12BC11000+924</td>
<td>Gear pump unit without control unit, for 24 V DC</td>
</tr>
<tr>
<td>7</td>
<td>MV201-1...</td>
<td>Oil+air metering unit, 1-port</td>
</tr>
<tr>
<td>8</td>
<td>MV202-1...</td>
<td>Oil+air metering unit, 2-port</td>
</tr>
<tr>
<td>9</td>
<td>MV203-1...</td>
<td>Oil+air metering unit, 3-port</td>
</tr>
<tr>
<td>10</td>
<td>MV204-1...</td>
<td>Oil+air metering unit, 4-port</td>
</tr>
<tr>
<td>11</td>
<td>MV205-1...</td>
<td>Oil+air metering unit, 5-port</td>
</tr>
<tr>
<td>12</td>
<td>MV206-1...</td>
<td>Oil+air metering unit, 6-port</td>
</tr>
<tr>
<td>13</td>
<td>MV207-1...</td>
<td>Oil+air metering unit, 7-port</td>
</tr>
<tr>
<td>14</td>
<td>MV208-1...</td>
<td>Oil+air metering unit, 8-port</td>
</tr>
<tr>
<td>15</td>
<td>853-880-011</td>
<td>NG40 housing for oil filters</td>
</tr>
<tr>
<td>16</td>
<td>169-400-250</td>
<td>Filter element 10 μm for oil filters</td>
</tr>
<tr>
<td>17</td>
<td>169-400-260-V57</td>
<td>Filter element 3 μm for oil filters</td>
</tr>
<tr>
<td>18</td>
<td>176-200-009</td>
<td>Differential pressure switch for oil filters</td>
</tr>
<tr>
<td>19</td>
<td>179-990-465</td>
<td>Connector socket for 3/2 directional control valve</td>
</tr>
<tr>
<td>20</td>
<td>221-296-027+263</td>
<td>3/2 directional control valve for 230 V, 50 Hz</td>
</tr>
<tr>
<td>21</td>
<td>221-296-027+758</td>
<td>3/2 directional control valve for 120 V, 60 Hz</td>
</tr>
<tr>
<td>22</td>
<td>221-296-027+924</td>
<td>3/2 directional control valve for 24 V DC</td>
</tr>
<tr>
<td>23</td>
<td>993-000-196</td>
<td>Valve body, complete for 3/2 directional control valve</td>
</tr>
<tr>
<td>24</td>
<td>176-271-001</td>
<td>Pressure switch 3 bar for monitoring of minimum air pressure</td>
</tr>
<tr>
<td>25</td>
<td>169-101-606</td>
<td>Pressure gauge for air pressure reducing valve (sealing ring ordered separately = item 26)</td>
</tr>
<tr>
<td>26</td>
<td>268-610.03</td>
<td>Sealing ring G1/8 CU for pressure gauge</td>
</tr>
<tr>
<td>27</td>
<td>231-900-028.U1</td>
<td>Air pressure control valve + 5 μM filter complete with air filter and water separator</td>
</tr>
<tr>
<td>28</td>
<td>231-900-028</td>
<td>Air pressure control valve without air filter and water separator</td>
</tr>
<tr>
<td>29</td>
<td>231-900-035</td>
<td>Water separator container</td>
</tr>
<tr>
<td>30</td>
<td>231-900-034</td>
<td>Filter insert 5 μM</td>
</tr>
<tr>
<td>31</td>
<td>995-810-047</td>
<td>Complete documentation for oil+air lubrication unit, incl. Declaration of Incorporation and Conformity</td>
</tr>
</tbody>
</table>
Important information on product usage

SKF and Lincoln 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 (1 013 mbar) by more than 0.5 bar at their maximum permissible temperature.