

# JM Oil Lubrication Pump

Multi-line pumps and multi-line units  
for oil total loss lubrication systems in compressor design

**Original operating instructions** acc. to 98/37/EC, Annex II B  
for partly completed machinery

**Assembly instructions** acc. to EC Dir. 2006/42/EC  
for partly completed machinery with associated operating instructions

EN



# JM Oil Lubrication Pump Unit

## Masthead

The original assembly instructions with associated operating instructions in accordance with EC Machinery Directive 2006/42/EC are an integral part of the described product and must be kept for future use.

These original assembly instructions with associated operating instructions were compiled in accordance with the established standards and rules for technical documentation, VDI 4500 and EN 292.

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## Information concerning EC Declaration of Conformity and EC Declaration of Incorporation

The product:  
multi-line pump unit,

of the series: **JM**

is hereby confirmed to comply with the essential protection requirements stipulated by the following Directive(s) of the Council on the approximation of laws of the Member States:

- Machinery Directive 2006/42/EC
- Low Voltage Devices 2006/95/EC
- Electromagnetic Compatibility 2004/108/EC

### Notes:

- (a) This declaration certifies compliance with the aforementioned Directives, but does not constitute a guarantee of characteristics.
- (b) The safety instructions in the documentation included with the product must be observed.
- (c) The commissioning of the products here certified is prohibited until such time as the machine or vehicle in which the product is installed conforms with the provisions and requirements of the applicable Directives.

(d) The operation of the products at non-standard supply voltage, as well as non-adherence to the installation instructions, can negatively impact the EMC characteristics and electrical safety. We further declare:

- The aforementioned product is, according to EC Machinery Directive 2006/42/EC, Annex II Part B, designed for installation in machinery / for incorporation with other machinery to form a machine. Within the scope of application of the EC Directive, commissioning shall be prohibited until the machinery in which this part is installed conforms with the provisions of this Directive.
- The aforementioned product may, with reference to EC Directive 97/23/EC concerning pressure equipment, only be used in accordance with its intended use and in conformity with the instructions provided in the documentation. The following must be observed in this regard:

The product is not designed or certified for use with fluids from Group I (Hazardous Fluids), as defined in Article 2, Par. 2 of Directive RL 67/548/EEC, dated June 27, 1967. The product is neither designed nor approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors and such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature. When used in conformity with their intended use, the products supplied by SKF Lubrication Systems Germany AG do not reach the limit values listed in Article 3, Para. 1, Clauses 1.1 to 1.3 and Para. 2 of Directive 97/23/EC. They are therefore not subject to the requirements of Annex 1 of the Directive. Consequently, they do not bear a CE marking in respect of Directive 97/23/EC. SKF Lubrication Systems Germany AG classifies them according to Article 3, Para. 3 of the Directive. The Declaration of Conformity and Incorporation forms part of the product documentation and is supplied together with the product.

## Explanation of symbols and signs

You will find these symbols, which warn of specific dangers to persons, material assets, or the environment, next to all safety instructions in these operating instructions.

Please heed these instructions and proceed with special care in such cases. Please forward all safety instructions to other users.

Instructions placed directly on the machines/grease lubrication pump units, such as:

- Arrow indicators
- Labels for fluid connections must be followed and kept in a fully legible condition.



**You are responsible!**

Please read the assembly and operating instructions thoroughly and follow the safety instructions.

### Hazard symbols



**General hazard**  
DIN 4844-2-W000



**Electrical voltage/current**  
DIN 4844-2-W008



**Hot surface**  
DIN 4844-2-W026



**Danger of being drawn into machinery**  
BGV 8A



**Slipping hazard**  
DIN 4844-2-W028



**Warning of potentially explosive atmosphere**  
DIN 4844-2-W021

### Indicators used with safety instructions and their meaning

Indicator	Use
<b>Danger!</b>	Danger of bodily injury
<b>Warning!</b>	Danger of damage to property and the environment
<b>Note!</b>	Provides additional information

### Informational symbols



Note

- Prompts an action
- Used for itemizing
- ➔ Refers to other facts, causes or consequences
- ☞ Provides additional information

## Assembly instructions according to Machinery Directive 2006/42/EC, Annex VI

The assembly instructions fulfill the aforementioned Machinery Directive with regard to "partly completed machinery." Partly completed machinery, which includes the product described herein, is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which the above-mentioned Directive applies.

### 1. Safety instructions



The operator of the described product must ensure that the assembly instructions are read and understood by all persons responsible for assembly, operation, maintenance, and repair of the product. The assembly instructions must be kept readily available.



Note that the assembly instructions form part of the product and must accompany the product if sold to a new owner.

The described product is manufactured in accordance with the generally accepted rules and standards of industry practice and with occupational safety and accident prevention regulations. Risks may, however, arise from its usage and may result in physical harm to persons or damage to other material assets. Therefore the product may only be used in proper technical condition and in observance of the assembly instructions. In particular, any malfunctions which may affect safety must be remedied immediately.



In addition to the assembly instructions, statutory regulations and other general regulations for accident prevention and environmental protection must be observed and applied.

#### 1.1 Intended use

The JM oil lubrication pump is a high-pressure pump that produces a maximum continuous operating pressure of 600 bar per outlet. The pump's main field of application is total loss oil lubrication of the cylinders and packing parts used in piston compressors. The JM oil lubrication pump can deliver all mineral oils with an operating viscosity between 25 and 3000 mm<sup>2</sup> /s. The use of synthetic oils requires prior approval from SKF Lubrication System.

Any other usage is deemed non-compliant with the intended use.

## 1.2 Authorized personnel

Only qualified technical personnel may install, operate, maintain, and repair the products described in the assembly instructions. Qualified technical personnel are persons who have been trained, assigned and instructed by the operator of the final product into which the described product is incorporated. Such persons are familiar with the relevant standards, rules, accident prevention regulations, and assembly conditions as a result of their training, experience, and instruction. They are authorized to carry out the required activities and in doing so recognize and avoid potential hazards.

The definition of trained personnel and the prohibition of employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

## 1.3 Electric shock hazard

Electrical connections for the described product may only be established by qualified and trained personnel authorized to do so by the operator, and in observance of the local conditions for connections and local regulations (e.g., DIN, VDE). Significant bodily injury and property damage may result from improperly connected products.



### **Danger!**

Work on products that have not been de-energized may result in bodily injury.

Assembly, maintenance and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.

## 1.4 System pressure hazard



Lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

- Max. particle size 40  $\mu\text{m}$
- Max. particle density 10  $\text{mg}/\text{m}^3$
- Pressure dew point 7°C
- Water content max. 7800  $\text{mg}/\text{m}^3$
- Residual oil content max. 25  $\text{mg}/\text{m}^3$

## 2. Lubricants

### 2.1 General information



All products from SKF Lubrication Systems may be used only for their intended purpose and in accordance with the information in the product's assembly instructions.

Intended use is the use of the products for the purpose of providing centralized lubrication/ lubrication of bearings and friction points using lubricants within the physical usage limits which can be found in the documentation for the devices, e.g., assembly instructions/operating instructions and the product descriptions, e.g., technical drawings and catalogs. Particular attention is called to the fact that hazardous materials of any kind, especially those materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed after consultation with and written approval from **SKF Lubrication Systems** .

No products manufactured by SKF Lubrication Systems are approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature. Other media which are neither lubricants nor hazardous substances may only be fed after consultation with and written approval from SKF Lubrication Systems. SKF Lubrication Systems considers lubricants to be a component of the system design which must be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critically important in these considerations.



Observe the instructions from the machine manufacturer regarding the lubricants that are to be used.




#### **Warning!**

The amount of lubricant required at a lubrication point is specified by the bearing or machine manufacturer. It must be ensured that the required quantity of lubricant is provided to the lubrication point. The lubrication point may otherwise not receive adequate lubrication, which can lead to damage and failure of the bearing.

The selection of a lubricant suitable for the lubrication task is made by the machine/system manufacturer and/or the operator of the machine/system in cooperation with the lubricant supplier.

The bearings/friction points that require lubrication, their expected load during operation, and the expected ambient conditions are taken into account during selection, with consideration of economic and environmental aspects.



 Where necessary, SKF Lubrication Systems supports customers in the selection of suitable components for feeding the selected lubricant and in the planning and design of a centralized lubrication system.

Please contact SKF Lubrication Systems if you have further questions regarding lubricants. Lubricants can be tested for their feedability (e.g. "bleeding") and use in central lubrication systems in an on-site laboratory.

You can request an overview of the lubricant tests offered by SKF Lubrication Systems from the company's service department.

### 2.3 Approved lubricants



Only lubricants approved for the product may be used. Unsuitable lubricants can lead to failure of the product and damage to property.



Different lubricants must not be mixed, as mixing may result in damage and necessitate costly and complicated cleaning of the product/lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The product described here can be operated using lubricants that meet the specifications in the technical data. Depending on the product design, these lubricants may be oils, fluid greases, or greases.

Oils and base oils may be mineral, synthetic, and/or rapidly biodegradable. Consistency agents and additives may be added depending on the operating conditions.

Note that in rare cases there may be lubricants whose properties are within permissible limit values but whose other characteristics render them unsuitable for use in centralized lubrication systems. For example, synthetic lubricants may be incompatible with elastomers.

### 2.4 Lubricants and the environment



Lubricants can contaminate soil and bodies of water. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.

It is important to note that lubricants are environmentally hazardous, flammable substances that require special precautionary measures during transport, storage, and processing. Consult the safety data sheet from the lubricant manufacturer. For information regarding transport, storage, processing, and environmental hazards of the lubricant that will be used.

The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

## 2.5 Lubricant hazards



Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, and repair of centralized lubrication systems. Leaks must be sealed without delay.

Lubricant leaking from centralized lubrication systems is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.



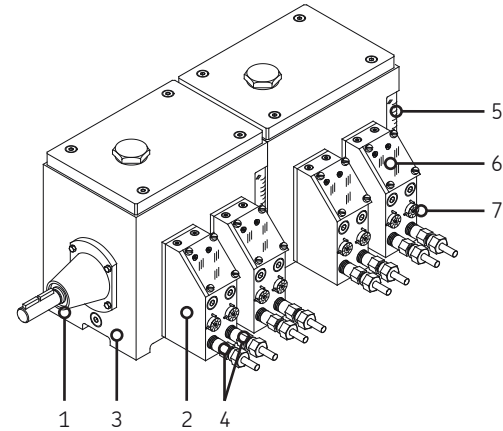
Follow the safety instructions on the lubricant's safety data sheet.

Lubricants are a hazardous substance. The safety instructions on the lubricant's safety data sheet must be strictly followed. The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

### 3. Overview

#### Item description

- 1 Pump drive
- 2 Pump body
- 3 Pump housing/oil container
- 4 Pump outlets  
(max. 2x pump body)
- 5 Oil level check
- 6 Sight glass
- 7 Delivery volume setting screw

**Fig. 1**

## 4. Assembly

### 4.1 Information on assembly

The product should be protected from humidity and vibration, and should be mounted so that it is easily accessible, allowing all further installation work to be done without difficulty. Make sure there is adequate air circulation to prevent the product from overheating. For the maximum permissible ambient temperature, see "Technical data."

The mounting position of the product is vertical as shown in the assembly drawing. Pressure gauges, oil level glasses, temperature gauges and other visual monitoring equipment must be easy to see.

Before assembling/setting up the reservoir unit, the packaging material and any shipping braces (e.g., plugs) must be removed. The packaging material must be kept until any discrepancies are resolved.

During assembly and especially when drilling, always pay attention to the following:

- Existing supply lines must not be damaged by assembly work
- Other units must not be damaged by assembly work.
- The product must not be installed within range of moving parts.
- The product must be installed at an adequate distance from sources of heat.
- Maintain safety clearances and comply with local regulations for assembly and accident prevention.

On the pump units' electrical connections, it must be ensured that appropriate measures prevent interference between signals due to inductive, capacitive or electro-magnetic couplings. Shielded cables must be used in places where electrical interference fields can distort signal transmissions despite separate laying of cables. The rules and empirical values for "EMC-compliant" cabling must be taken into consideration.

## 4.2 Assembly of the JM oil lubrication pump unit

### 4.2 Setup and attachment

The JM grease lubrication pump must be installed on a level surface. The pump's base plate must not be under stress.

Furthermore, sufficient space must be provided for maintenance work during installation, also in the case of pump designs with pre-lubrication (hand-crank).



#### **Warning!**

Pump outlet ports not in use must not be closed!

Where necessary, a return line to the reservoir should be provided for, or a pump body with 2 outputs should be switched with a pump body with one output.



#### **Warning!**

Pump bodies that are not in use should be dismantled.

The remaining housing opening must be sealed with a cover panel (Order no. 24-0413-2367).

Even when the setting screw is set to "1" a minimal delivery occurs.

### 4.2.1 Assembly

The assembly of the pump housing of the JM oil lubrication pump is done using 4 screws (M 10x1 with a thread length of 15mm).

#### **Tightening torque of the pump housing**

When assembling the pump housing, the following tightening torque must be adhered to:

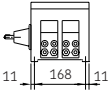
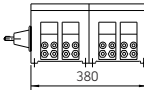
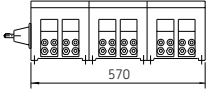
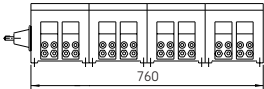
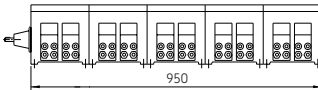
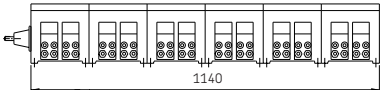
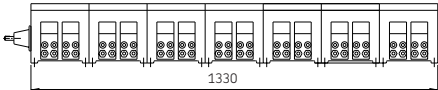
**Torque 50 Nm**



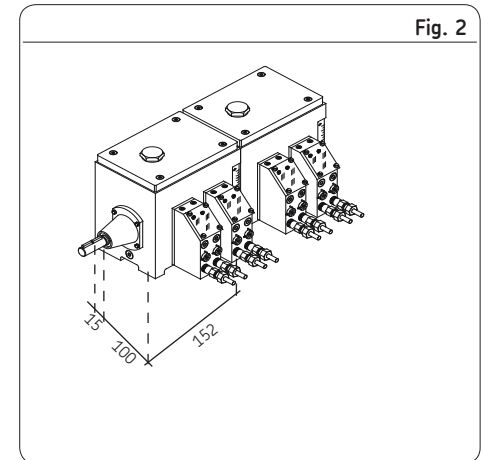
#### **Warning**

When drilling the assembly holes, you must be careful of any supply lines or other units, as well as of other hazards such as moving components. Maintain safety clearances and comply with local regulations for assembly and accident prevention.

## 4.2.2 Mounting dimensions

	Number of housings [n]	Capacity [liters]	Outlets max. [n]
	1	2	4
	2	4	8
	3	6	12
	4	8	16
	5	10	20
	6	12	24
	7	14	28

## 4.2.3 Assembly holes



### 4.2.4 Use

The JM oil lubrication pump is a high-pressure pump that produces a maximum continuous operating pressure of 600 bar per outlet.

The pump's main field of application is total loss oil lubrication of the cylinders and packing parts used in piston compressors.

The JM oil lubrication pump can deliver all mineral oils with an operating viscosity between 25 and 3000 mm<sup>2</sup>/s. Please inquire before using synthetic oils.

### 4.2.5 Housing versions

The JM pump consists of 1 to 7 pump housings (individual reservoirs) with 1 to 4 outlets each.

Each pump housing has a capacity of 2 liters. A maximum of 7 housings can be screwed together to form one pump.

Pump housings can be mounted optionally on a common oil reservoir and are available in ventilated or pressure-tight versions. (Max. admission pressure 1 bar)

### 4.3 Drive versions

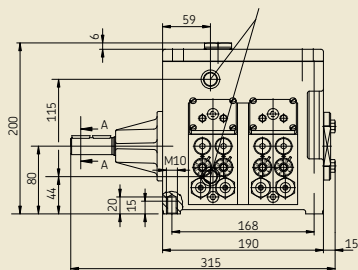
#### 4.3.1 Standard design

The pump shaft can either be driven directly via a coupled shaft or via a gear train, with or without an electric motor, and with or without freewheel.

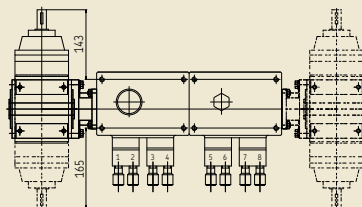
An optional prelubricator can be installed on the reverse side of the drive for designs with integrated freewheel.

For pumps with over 16 outputs, the required motor power increases from 0.55 kW to 0.75 kW.

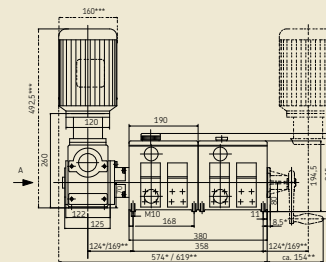
Rotary drive



Rotary drive with gear train



Electric motor drive with gear train







## 4.3.2 Rotary drive

## Technical data

## General

mounting position	horizontal, level surface
Ambient temperature	0 °C to + 60 °C
Reservoir capacity	2, 4, 6, 8, 10, 12, 14 liters

## Weights

Drive	13.5 kg
Each reservoir	6.0 kg
Each pump element	3.1 kg

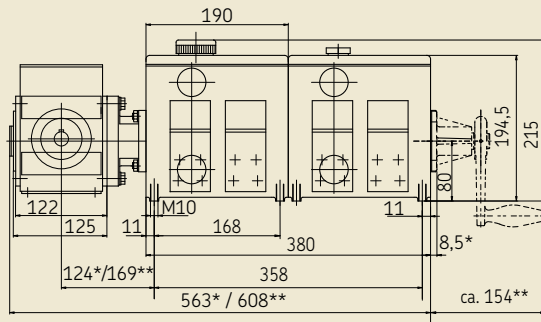
## Pump

Type	High-pressure pump with eccentric shaft drive of the pump pistons
Operating pressure	max. 600 bar <sup>1)</sup>
Number of attachable individual housings	1 to 7
Pump bodies	
per individual housing	1 to 2
Outlets per pump body	1 to 2
Number of outlets	1 to 28
Delivery volume adjustment	
per pump outlet	Continuous, min. 25%
Delivery volume	
per outlet and full stroke	(Max.) 0.07-/0.1- /0.2 cm <sup>3</sup>
Direction of rotation	CW or CCW (without free-wheeling)
Drive speed $n_1$	6 - 25 rpm
Lubricant	Mineral oils <sup>2)</sup>
Lubricant temperature range	0 °C to + 80 °C
Operating viscosity	25 to 3000 mm <sup>2</sup> /s

1) At operating pressure > 400 bar and an operating viscosity < 100 mm<sup>2</sup>/s please contact the SKF service center.

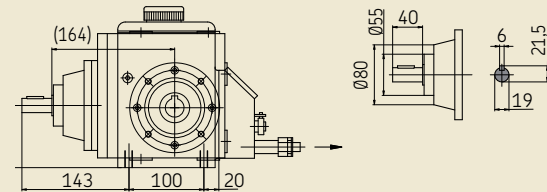
2) Please inquire before using synthetic lubricants.

## 4.3.3 Rotary drive with gear train

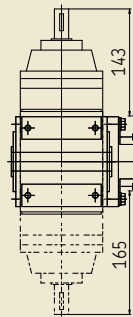


\* = without prelubrication

\*\* = with prelubrication

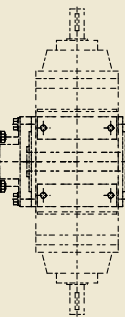


Drive position "C"



Drive position "D"

Drive position "E"



Drive position "F"

4.3.3 Rotary drive with gear train

Technical data

General

Mounting position ..... Horizontal, level surface  
 Ambient temperature ..... 0 °C to + 60 °C  
 Reservoir capacity ..... 2, 4, 6, 8, 10, 12, 14 liters

Pump

Type ..... High-pressure pump with eccentric shaft drive of the pump pistons

Weight

Drive ..... 11.0 kg  
 Each reservoir ..... 6.0 kg  
 Each pump element ..... 3.1 kg  
 Operating pressure ..... Max. 600 bar <sup>1)</sup>  
 Number of attachable individual housings ..... 1 to 7  
 Pump bodies per individual housing ..... 1 to 2  
 Outlets per pump body ..... 1 to 2  
 Number of outlets ..... 1 to 28  
 Delivery volume adjustment per pump outlet ..... Continuous, min. 25%  
 Delivery volume per outlet and full stroke ..... (Max.) 0.07-/0.1-/0.2 cm<sup>3</sup>

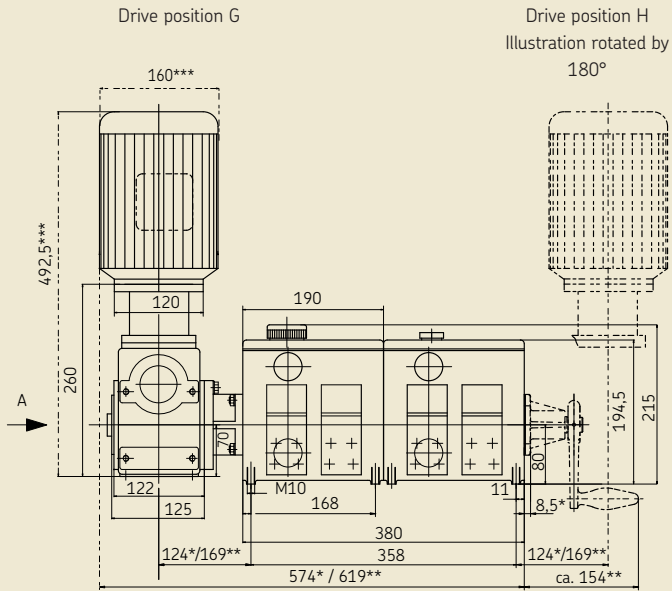
Gear train

Ratio 35.1:1; 62.8:1; 83.2:1; 100.9:1; 25.7:1; 162:1

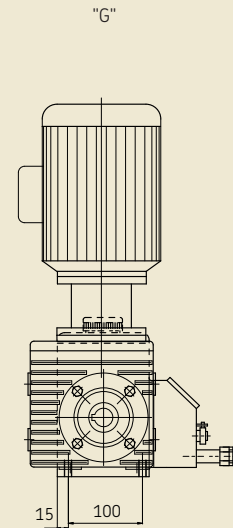
Drive speed,  
 Delivery volume/min ..... See page 7  
 Drive speed  $n_1$  ..... 210 - 4000 min<sup>-1</sup>  
 Drive speed  $n_2$  ..... 6 - 25 min<sup>-1</sup>  
 Direction of rotation ..... Clockwise or counterclockwise (without/with freewheel)  
 Lubricant ..... Mineral oils <sup>2)</sup>  
 Lubricant temperature range ..... 0 °C to + 80 °C  
 Operating viscosity ..... 25 to 3000 mm<sup>2</sup>/s

1) At operating pressure > 400 bar and an operating viscosity < 100 mm<sup>2</sup>/s please contact the SKF service center.  
 2) Please inquire before using synthetic lubricants.

## 4.3.4 Electric motor drive with gear train



- \* = without prelubrication
- \*\* = with prelubrication
- \*\*\* = depending on motor manufacturer



View A

4.3.4 Electric motor drive with gear train

Technical data

General

Mounting position ..... Horizontal, level surface  
 Reservoir capacity ..... 2, 4, 6, 8, 10, 12, 14 liters

Pump

Type ..... High-pressure pump with eccentric shaft drive of the pump elements

Weight

Gear train with motor ..... 20.0 kg  
 Each reservoir ..... 6.0 kg  
 Each pump element ..... 3.1 kg  
 Operating pressure ..... Max. 600 bar<sup>1)</sup>  
 Number of attachable individual housings ..... 1 to 7  
 Pump bodies per individual housing ..... 1 to 2  
 Outlets per pump body ..... 1 to 2  
 Number of outlets ..... 1 to 28  
 Delivery rate adjustment per pump outlet ..... Continuous, min. 25%  
 Delivery volume per outlet and full stroke ..... (Max.) 0.07-/0.1-/0.2 cm<sup>3</sup>

Motor

Type ..... B14/V18  
 Type of voltage ..... 3-phase AC voltage  
 Power ..... Depending on gear ratio and speed 0.18 - 0.75 kW  
 Direction of rotation ..... Clockwise or counterclockwise (without/with freewheel)  
 Lubricant ..... Mineral oils<sup>2)</sup>  
 Lubricant temperature range ..... 0 °C to + 80 °C  
 Operating viscosity ..... 25 to 3000 mm<sup>2</sup>/s

Gear train

Ratio ..... 35.1:1; 62.8:1; 83.2:1; 100.9:1; 125.7:1; 162:1  
 Drive speed, delivery volume/min see page 22-23

Rated speed [rpm <sup>-1</sup> ]	Frequency [Hz]	Rated output [kW]	Rated current at 230/400 V [A]
1000	50	0.18	1.17/0.67
		0.25	1.43/0.82
		0.37	2.05/1.18
		0.55	2.90/1.67
		0.25	1.37/0.78
1500	50	0.37	1.97/1.13
		0.55	2.79/1.61

## 4.3.5 Delivery volumes with electric motor drive

The delivery volume depends on the rated speed, motor make, gear train, gear ratio, pump elements and settings.

Characteristics at delivery volumes of **0.07, 0.1 and 0.2 cm<sup>3</sup>/piston strokes**

Motor		Gear train		Pump element					
Rated speed n <sup>-1</sup> /min	Rated output kW	i=n <sub>1</sub> / n <sub>2</sub>	Drive speed	Q=0.07 cm <sup>3</sup> /stroke		Q=0.1 cm <sup>3</sup> /stroke		Q=0.2 cm <sup>3</sup> /stroke	
				Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min	Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min	Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min
1000	0.18	162	17	0.09	0.38	0.13	0.53	0.26	1.05
	0.18	125.7	13	0.12	0.47	0.17	0.68	0.34	1.35
	0.25	100.9	98	0.15	0.60	0.22	0.86	0.43	1.72
	0.25	83.2	78	0.18	0.73	0.26	1.05	0.52	2.09
	0.37	62.8	57	0.25	1.01	0.36	1.45	0.72	2.90
	0.55	35.1	39	0.45	1.80	0.64	2.56	1.28	5.13

**Note**

The delivery rate figures are based on motor designs with a mains frequency of 50 Hz. The delivery rate figures are increased by 20% at a mains frequency of 60 Hz. The figures for dimensions, delivery rates, and power consumption refer to standard VEM motors.  
If other makes are used, deviations have to be expected.

Characteristics at delivery volumes of **0.07, 0.1 and 0.2 cm<sup>3</sup>/piston stroke**

Motor		Gear train		Pump element					
Rated speed n <sup>-1</sup> /min	Rated output kW	i=n <sub>1</sub> /n <sub>2</sub>	Drive speed	Q=0.07 cm <sup>3</sup> /stroke		Q=0.1 cm <sup>3</sup> /stroke		Q=0.2 cm <sup>3</sup> /stroke	
				Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min	Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min	Q <sub>min</sub> cm <sup>3</sup> /min	Q <sub>max</sub> cm <sup>3</sup> /min
1500	0.25	162	17	0.14	0.57	0.20	0.82	0.41	1.64
	0.25	125.7	13	0.18	0.74	0.26	1.05	0.53	2.11
	0.37	100.9	98	0.24	0.95	0.34	1.36	0.68	2.73
	0.37	83.2	78	0.29	1.16	0.41	1.65	0.83	3.31
	0.55	62.8	57	0.39	1.56	0.55	2.22	1.11	4.44
	0.75	35.1	39	0.70	2.78	0.99	3.97	1.99	7.95

#### 4.4 Lubrication line arrangement

When arranging the main and secondary lubricant lines, observe the following instructions in order to ensure that the entire lubrication system functions smoothly.

The main lubricant line must be dimensioned in accordance with the maximum operating pressure occurring in the lubrication unit used and the displacement volume of that lubrication unit. If possible, the main lubricant line should rise upward from the lubrication unit and be ventable at the highest point on the lubrication line system.

Possible lubricant distributors at the end of the main lubricant line must be installed such that the outlets of the lubricant distributors point upwards. If the system configuration requires that the lubricant distributors be arranged below the main lubricant line, they should not be placed at the end of the main lubricant line.

The pipes, tubes, shutoff valves and directional control valves, fittings, etc. that will be used must be designed for the maximum operating pressure of the lubrication unit, the permissible temperatures and the lubricants that will be delivered. In addition, the lubrication line system needs to be protected from exces-

sive pressure by means of a pressure-limiting valve.

All components of the lubrication line system such as pipes, tubes, shutoff valves and directional control valves, fittings, etc. must be carefully cleaned before assembly. No seals should point inward in the lubrication line system, as this could hinder lubricant flow and introduce contaminants into the lubrication line system.



#### **Warning!**

Lubrication lines must always be free of leaks. Lubrication lines should always be arranged so that air pockets cannot form anywhere. Avoid changes in the cross-section of the lubrication 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.

The flow of lubricant in the lubrication lines should not be hindered by the installation of sharp bends, angle valves, or flap valves. Any unavoidable changes in the cross-section of the lubrication line should be realized as

gentle transitions. Sudden changes of direction should be avoided if possible.



#### **Warning!**

Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Be mindful of any lubricant leaking out during assembly, operation, maintenance, and repair of centralized lubrication systems. Leaks must be sealed without delay.

Lubricant leaking from centralized lubrication systems is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.



#### **Warning!**

Follow the safety instructions on the lubricant's safety data sheet.

Lubricants are a hazardous substance. The safety instructions on the lubricant's safety data sheet must be strictly followed. The safety data sheet for a lubricant can be requested from the lubricant manufacturer.



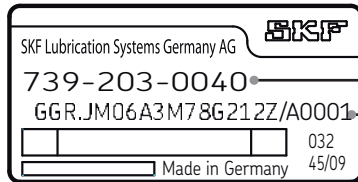
#### 4.7 Note on the rating plate

The rating plate on the oil lubrication pump unit provides important data such as the type designation, order number, barcode, and serial number.

To avoid loss of this data in case the rating plate becomes illegible, these characteristics should be entered in the following table.

- Enter key data from rating plate in the following table

**Fig. 3** Key data from rating plate



Part no.



Description

**Warning!**

Information beyond the actual assembly procedure is contained in the included operating instructions. The assembly and operating instructions are therefore considered an inseparable part of the documentation.

The operating instructions are divided into the chapters:

1. Safety instructions
2. Lubricants
3. Transport and temporary storage
4. Assembly
5. Design and function
6. Commissioning
7. Shutdown
8. Maintenance
9. Malfunction
10. Spare parts

(see Table of Contents Page 3).



These assembly instructions and the included operating instructions must be read and properly understood by the assembler and the responsible technical personnel/operator before assembly.

## JM Oil Lubrication Pump

Multi-line pumps and multi-line units  
for oil total loss lubrication systems in compressor design

## Original operating instructions

acc. to 98/37/EC, Annex II B for partly completed machinery

## Operating instructions associated with assembly instructions

according to EC Dir. 2006/42/EC for partly completed machinery

# 1. Safety instructions

General



## Warning!

These operating instructions must be read and properly understood by the assembler and the responsible technical personnel/operator before assembly and commissioning.

The safety instructions listed in Chapter 1, "Safety instructions," of the assembly instructions also apply without restrictions to these operating instructions.



In addition to the operating instructions, general statutory regulations and other binding regulations for accident prevention and for environmental protection (recycling/disposal) must be observed and applied.

Disclaimer of liability

**SKF Lubrication Systems** shall not be held liable for damages:

- Caused by contaminated or unsuitable lubricants
- Caused by the installation of non-original SKF components or SKF spare parts
- Caused by inappropriate usage
- Resulting from improper assembly, configuration or filling
- Resulting from improper response to malfunctions
- Caused by independent modification of system components
- Only media approved for these types of pump units may be used. Unsuitable media may result in pump unit failure and potentially severe bodily injury and property damage.

# 2. Lubricants



## Warning!

The information on lubricants listed in Chapter 2, "Lubricants," of the assembly instructions also applies without restrictions to these operating instructions.

## 3. Transport, delivery, and storage

### SKF Lubrication Systems

products are packaged in accordance with standard commercial practice according to the regulations of the recipient's country and DIN ISO 9001. During transport, safe handling must be ensured and the product must be protected from mechanical effects such as impacts. The transport packaging must be marked "Do not drop!".



#### Warning!

The product must not be tilted or dropped.

There are no restrictions for land, air or sea transport.

After receipt of the shipment, the product(s) must be inspected for damage and for completeness according to the shipping documents. The packaging material must be kept until any discrepancies are resolved.

SKF Lubrication Systems products are subject to the following storage conditions:

### 3.1 Lubrication units

- Ambient conditions: Dry and dust-free surroundings, storage in well ventilated dry area
- Storage time: max. 24 months
- Permissible humidity: < 65%
- Storage temperature: 10 - 40°C
- Light: avoid direct sun or UV exposure and shield nearby sources of heat

### 3.2 Electronic and electrical devices

- Ambient conditions: dry and dust-free surroundings, storage in well ventilated dry area
- Storage time: max. 24 months
- Permissible humidity: < 65%
- Storage temperature: 10 - 40°C
- Light: avoid direct sun or UV exposure and shield nearby sources of heat

### 3.3 General notes

- The product(s) can be enveloped in plastic film to provide low-dust storage
- Protect against ground moisture by storing on a shelf or wooden pallet
- Bright-finished metallic surfaces, especially wearing parts and assembly surfaces, must be protected using long-term anti-corrosive agents before storage
- At approx. 6-month intervals: Check for corrosion. If there are signs of corrosion, reapply anti-corrosive agents
- Drives must be protected from mechanical damage

## 4. Assembly

### 4.1 Information on assembly

The assembly procedure for multiline pump units is described in detail in the assembly instructions associated with these operating instructions. Information/instructions about assembling the JM oil lubrication pump unit beyond the scope of the assembly instructions are contained later in this chapter.

### 4.2 Assembly of the JM multiline pump unit

- Assembly must be performed in accordance with the included assembly instructions and the additional information/instructions contained in this chapter.

### 4.3 Housing versions

The JM pump consists of 1 to 7 pump housings (individual reservoirs) with 1 to 4 outlets each.

Each pump housing has a capacity of 2 liters. A maximum of 7 housings can be screwed together to form one pump.

The pump housings can optionally be mounted on a common oil reservoir. They are available in ventilated or pressure-tight versions. (max. admission pressure of 1 bar)

### 4.4 Dismantling and disposal



#### **Warning!**

The applicable national environmental regulations and statutes are to be adhered to when dismantling and disposing of the multiline pump unit.

The product can also be returned to SKF Lubrication Systems for disposal, in which case the customer is responsible for reimbursing the costs incurred.

## 5. Design and function

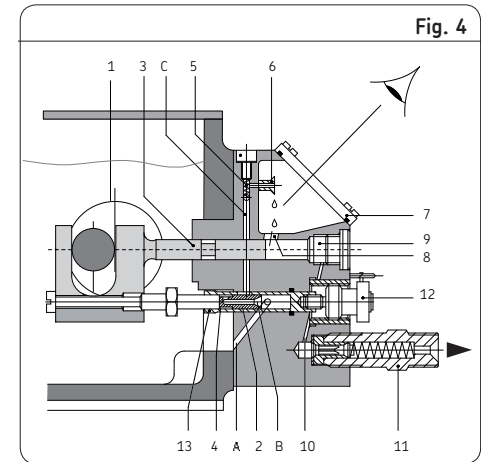
### 5 Function

See figure 4

The pump shaft (1) imparts the required stroke motion to both the feed piston (2) and the working piston (3). The feed piston (2) first presses the lubricant drawn in via duct A into duct B. The lubricant then flows to duct C via the ring groove (4). From there, the oil moves through a check valve (5) into the drop nozzle (6). The oil drops into the intake duct (8) behind the sight glass (7). As it continues its movement, the working piston (3) closes the intake duct (8) and presses the apportioned quantity of oil from the cylinder chamber (9) through the delivery duct (10) and the check valve (11) through to the lubrication point. The delivery volume is regulated via the setting screw (12) that increases or decreases the effective stroke of the feed piston (2) via the cylinder bush (13). Turning the screw clockwise decreases the delivery volume.

The delivery volume can be reduced to almost zero. In addition to the position of the setting screw, the delivery volume depends on the pump element (0.07-, 0.1- or 0.2 cm<sup>3</sup>/full stroke) and the drive speed as well as the selected step-down ratio.

A comparison of the delivery volume ranges for the pump elements (electric motor design) is shown on page 22/23.



#### Warning!

When using a pressure-tight housing version A, the maximum permissible manometric pressure of 1 bar is to be observed.

## 6. Commissioning


### 6.1 Condition on delivery

The JM oil lubrication pump unit is delivered with all its setting screws set for full stroke to facilitate venting of the pump.

The oil reservoir has to be filled before commissioning. Then check whether bubble-free oil emerges at the pump body outlet ports when the pump is switched on. If this is not the case, the pump will have to be vented.

### 6.2 Commissioning

- Fill the pump's oil reservoir with oil.



 Requirement prior to the next step:

#### For rotary drive -


connection of the pump shaft on the drive side

#### For electric motor drive -

Connect lines in accordance with the technical specifications and the local conditions for connections and local regulations.

- Switch on the oil lubrication pump
-  After a few minutes (depending on the piston diameter and drive speed) bubble-free oil must emerge at the pump outlet ports. If this is not the case, the pump body affected has to be vented as described in the following.
- Turn setting screw (12) to position "8" full stroke
-  See Figure 4
- Prelubrication or switch drive on
- Let the pump run until bubble-free oil emerges at the pump outlet ports

### 6.3 Venting of pump elements

-  Switch off the oil lubrication pump
- Requirement  
The work specified in 6.2 Commissioning, has been performed and the preconditions described there have been met.
- Tighten the vent plug (14) using hexagon socket screw key (SW 4)
- Turn setting screw (12) to required delivery value
- Connect delivery lines to pump body outlet ports
- Insert hexagon socket screw key (SW 4) in vent plug (14) (via drop nozzle (6) )
- Loosen the vent plug (14) 3 to 4 turns (counter-clockwise)



## 6.4 Delivery rate of the pump elements

The delivery rate of the pump elements can be set using the key figures engraved between the two stop screws.

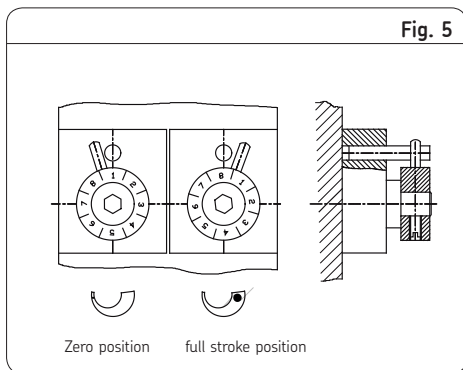
## 6.5 Adjusting the delivery rate

☞ See Fig. 5

Set the setting screw (12) to the appropriate value

"1" = minimum delivery rate

"8" = maximum delivery rate



## 6.6 Determination of delivery rate

The delivery volume can be easily determined and/or set as follows:

☞ See Fig. 4

- Loosen and remove the sight glass (7) (in front of the drop nozzle (6))
- Measure the delivery volume per time at the drop nozzle (6) using a glass gauge
- Increase or decrease the delivery volume by turning the setting screw (12)
- Repeat the procedure until the desired delivery volume is reached  
Position 1 = minimal quantity
- Position and fasten the sight glass (7)

Since each outlet is supplied separately, the set delivery rate remains constant and independent of the rate set for neighboring setting screws.

## 6.7 Startup of pump after long downtime

☞ The following is to be performed on all pump bodies!

☞ See Fig. 4/Fig. 5

- Mark the actual position of the setting screw (12) using a marker
- Rotate setting screw (12) to maximum delivery rate (position "8")
- Insert hexagon socket screw key (SW 4) in vent plug (14) (via drop nozzle (6))
- Loosen vent plug (14) 3 to 4 turns (counter-clockwise)
- Allow pump to run until oil without bubbles is discharged at the pump outlet ports
- Tighten the vent plug (14) with hexagon socket screw key (SW 4)
- Turn setting screw (12) back to previous delivery value (see marking)

## 7. Shutdown

### 7.1 Temporary shutdown

The described product can be temporarily shut down by disconnecting the electrical, pneumatic, and/or hydraulic supply connections. The safety instructions in these assembly instructions must be observed when doing so.

If the product is to be shut down for an extended period of time, follow the instructions in Chapter 3, "Transport, delivery, and storage," of these operating instructions. To recommission the product, follow the instructions in the Chapters "Assembly" and "Commissioning" in the assembly instructions and operating instructions.

### 7.2 Permanent shutdown

If the product will be permanently shut down, the local regulations and laws regarding the disposal of contaminated equipment must be observed.

Lubricants can contaminate soil and bodies of water.



#### **Warning!**

Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.

The product can also be returned to SKF Lubrication Systems for disposal, in which case the customer is responsible for reimbursing the costs incurred.

## 8. Maintenance



### Warning!

Work on products that have not been de-energized may result in bodily injury. Assembly, maintenance and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.

Products from SKF Lubrication Systems are low-maintenance. However, all connections and fittings must be regularly inspected for proper seating to ensure proper function and to prevent hazards from arising.

If necessary, the product can be cleaned using mild cleaning agents that are compatible with the product's materials (non-alkaline, non-soap). For safety reasons, the product should be disconnected from the power supply and the hydraulic and/or compressed air supply.

It must be ensured that no cleaning agent enters the interior of the product during cleaning.

It is not necessary to clean the interior of the product if the product is operated normally and intercompatible lubricants are used. Rinsing with the applied oil once a year is recommended.

The interior of the product must be cleaned if incorrect or contaminated lubricant is accidentally filled into the product. If this occurs, please contact the Service department of SKF Lubrication Systems for assistance.



Dismantling of the product or individual parts thereof within the statutory warranty period is not permitted and voids any claims.



Only original spare parts from SKF Lubrication Systems may be used. Arbitrary alterations to products and the use of non-original spare parts and accessories are not permitted and nullify the statutory warranty.

SKF Lubrication Systems shall not be held liable for damages resulting from improperly performed assembly, maintenance and repair work on the product.

## 8. Maintenance

### 8.1 General

The oil level is to be checked after each 1000 operating hours for JM oil lubrication pumps with gear trains. The gear train has to be filled with gear oil up to the threading of the screw plug.

We recommend changing the gear oil after approx. 3000 hours of operation.

Venting of pump elements as described in section 6.3 is recommended in the event of malfunctions in the pump elements.



#### Note

The following maintenance intervals only apply to the JM oil lubrication pump with and without gear train. They do not apply to the lubricant to be delivered in the respective JM oil reservoirs. The oil levels of these is to be checked and replenished depending on consumption (setting of the metered quantity).

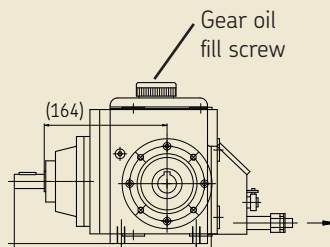
Maintenance item	Operating hours	Check	Change
Oil lubrication pump	<b>1000</b>	Visual inspection	
Gear train	<b>1000</b>	Oil level check	Top up if necessary
Gear train	<b>3000</b>		Oil change

**We recommend using:**

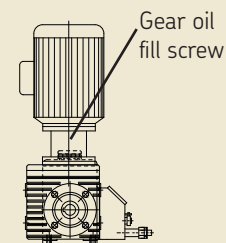
Manufacturer	Available	Gear oil designation
ARAL	Internationally	Degol GS 220
BP	Europe	Energol SG-XP 220
Mobil Oil	Internationally	Glygole 220
Shell	Internationally	Tivela WB

*Only synthetic oils of viscosity class ISO VG 220. Cannot be mixed with mineral oil-based oils*

Rotary drive



Electric motor drive with gear train



## 9. Faults/problems

The following tables provide an overview of possible malfunctions and their causes. Contact the Service department of SKF Lubrication Systems if you cannot remedy the malfunction.



Dismantling of the product or individual parts thereof within the statutory warranty period is not permitted and voids any claims.



All assembly, maintenance and repair work beyond this scope must be performed by **SKF Lubrication Systems Service**.



Only original spare parts from **SKF Lubrication Systems** can be used. Arbitrary alterations to products and the use of non-original spare parts and accessories are not permitted.



### Warning!

Work on products that have not been de-energized may result in bodily injury. Assembly, maintenance and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.



### Warning!

The hot surface of a motor may cause burns. Motor surfaces may only be touched with appropriate gloves or after the motor has been shut off for an extended time.



### Warning!

Lubrication systems are pressurized during operation. Lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

## 9.1 Commissioning malfunctions



### Warning!

In cases of functional failure, always make sure that all technical specifications have been complied with in the existing operating conditions.

Malfunction	Cause	Remedy
No delivery	<ul style="list-style-type: none"> <li>○ Pump not vented</li> <li>○ Motor stopped</li> <li>○ Piston gummed</li> </ul>	<ul style="list-style-type: none"> <li>- Vent the pump element - See 6.3</li> <li>- Check the power supply (see rating plate for electric motor)</li> <li>- Clean or replace the pump element</li> </ul>
Delivery rate too low	<ul style="list-style-type: none"> <li>○ Pump not vented</li> <li>○ Setting screw (Fig. 4, item 12) incorrectly adjusted</li> </ul>	<ul style="list-style-type: none"> <li>- Vent the pump element - See 6.3</li> <li>- Vary the delivery rate - See 6.5 / 6.6</li> </ul>
Prelubrication not functioning properly	<ul style="list-style-type: none"> <li>○ Incorrect direction of rotation of the electric motor</li> <li>○ Free-wheeling defective</li> </ul>	<ul style="list-style-type: none"> <li>- Check electrical connections</li> <li>- Exchange free-wheeling mechanism</li> </ul>
Pump noises	<ul style="list-style-type: none"> <li>○ Pump shaft not aligned</li> </ul>	<ul style="list-style-type: none"> <li>- Check reservoir adjustment</li> <li>- Check flatness of the seating</li> </ul>

## 10. Spare parts



### **Arbitrary alterations and manufacture of spare parts**

Device rebuilding or modification is only permitted with manufacturer's agreement. Original spare parts and accessories, which are authorized by the manufacturer, serve to ensure safety.

The use of other parts shall serve to eliminate any liability for consequences thereof.

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Particular attention is called to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from SKF.

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